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ACOUSTICAL REPORT

PROPOSED ADDITIONS TO EXISTING CARWASH CAFÉ

345 HUME HIGHWAY, BANKSTOWN NSW

Date: Thursday, 9 March 2023

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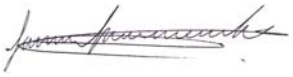
Approved by	James Tsevrementzis  Acoustical Engineer (M.A.A.S)
Client	Alwyn Carwash & Cafe Attention: Lin chen Email: lin@medimark.com.au

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ACOUSTICAL REPORT

PROPOSED ADDITIONS TO EXISTING CARWASH CAFÉ

345 HUME HIGHWAY, BANKSTOWN NSW

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1.0 INTRODUCTION

Koikas Acoustics Pty Ltd was commissioned to conduct a noise impact assessment of the proposed additions to the existing carwash café at 345 Hume Highway, Bankstown NSW seeking approval for the installed automated carwash and extended trading hours for food trucks onsite. A noise complaint was received from a surrounding resident regarding the operation of the automated carwash.

For this DA, the acoustical adequacy of the proposed design must be assessed in terms of standard planning guidelines issued by the City of Canterbury Bankstown Council in their Local Environment Plan (LEP), Development Control Plan (DCP), and other standard planning guidelines related to common sources of noise.

As per the Council guidelines and other standard planning instruments, Koikas Acoustics has determined that the operational noise emission from the existing carwash/ café with the newly install automated carwash to adjoining dwellings requires an assessment at this stage.

This report presents the results and findings of an acoustical assessment of the subject proposal. In-principle acoustic treatments and noise control measures detailed within this report are deemed necessary for the development to comply with the nominated acoustical planning levels/project noise objectives.

2.0 THE PROPOSED DEVELOPMENT

The development is proposed to occupy the site at 345 Hume Highway, Bankstown NSW.

This location is situated in a primarily urban residential area classified as B2 'Neighbourhood Centre' as per relevant land zoning maps included in the Bankstown Local Environment Plan 2015. Surrounding properties are R3 'Medium-Density Residential' Zoning to the east and distant south, RE1 'Public Recreation' zoning to the south, SP2 'Educational Establishment' zoning to the south-west and B6 'Enterprise Corridor' zoning to the north.

The subject site and surrounding properties are identified in the aerial photograph in Figure 1.

Figure 1. Aerial photo of the subject site, monitoring location and surrounding area – Image from Six Maps

This acoustic report and any associated recommendations are based solely on the architectural design and drawings prepared by R.J. Sinclair Pty Ltd (Project No.: 22-004, Dated: 15th October 2022). Any changes to the design may impact the findings of this report and associated noise control recommendations.

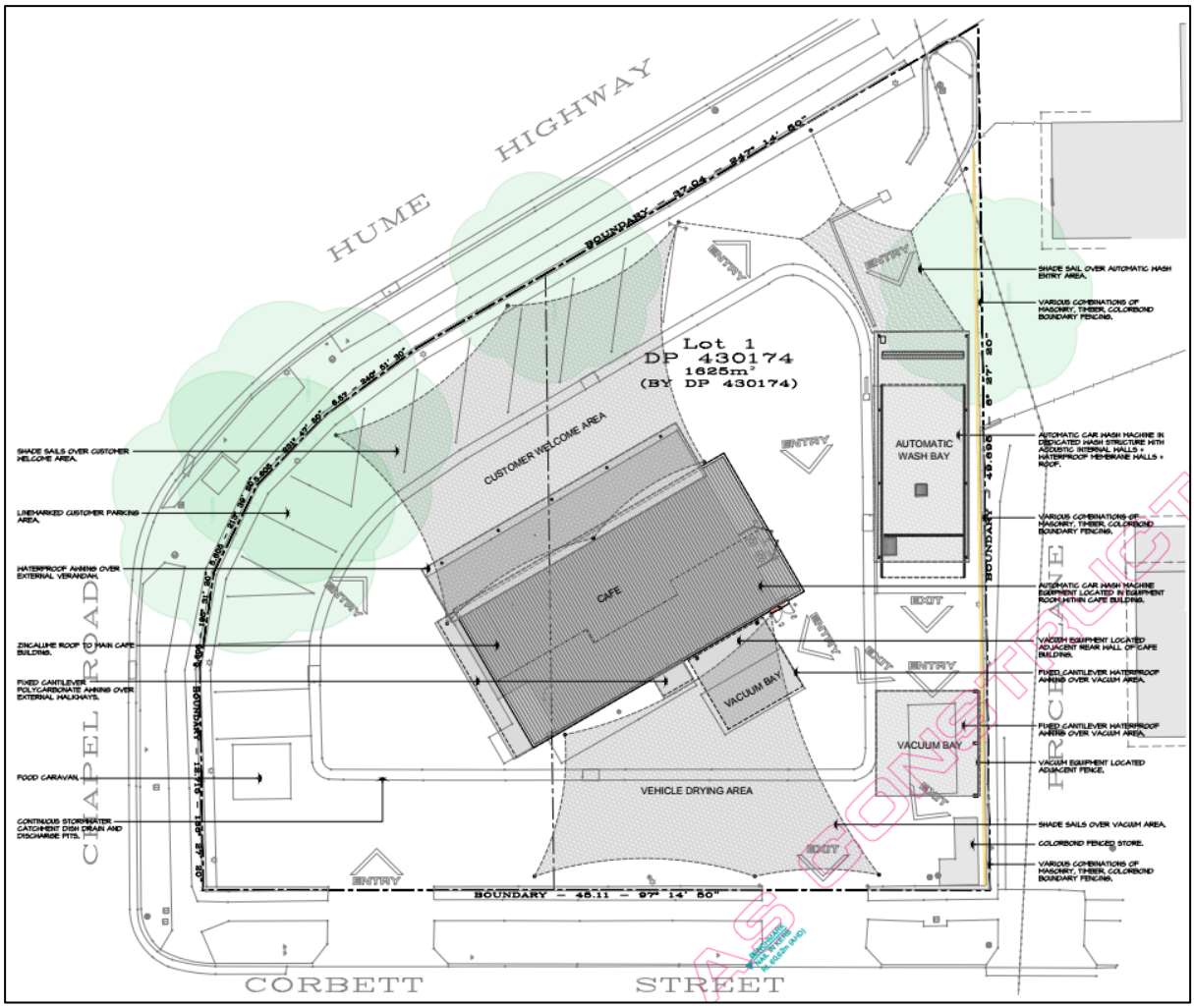


Figure 2. Site: As Constructed General Arrangement Plan – Image from R.J. Sinclair Pty Ltd

See architectural drawing in Figure 2 for location of proposed food truck and automated carwash (also known as automatic wash bay).

The carwash café was previously approved to operate from 6 am to midnight, seven days a week for a period of 12 months, after which, it reverted back to 7am to 7pm on Monday to Saturday and 8am to 7pm on Sundays.

The carwash café is proposed to operate from 8 am to 6 pm, Monday to Sunday. The food truck is proposed to operate from 6 am to midnight.

The patron capacity is for 13 patrons inside the café and 28 patrons outside. 5 working staff with 1 manager operate Monday to Wednesday, and 6 working staff and 1 manager operate Thursday to Sunday.

The carwash café averages up to 250 vehicles per week. The peak period vehicle volume is unknown, therefore, Koikas Acoustics has considered maximum capacity to be 4 vehicles (one in each vacuum bay, one in automatic wash bay and one in vehicle drying area.

The carwash café has four modes of operation:

1. Hand carwash (approximate average of 15 minutes per wash/dry cycle)
2. Automated carwash (approximately 2-3 minutes per wash/dry cycle)
3. Café (indoor and outdoor seated dining, exhaust fan, AC condenser unit)
4. Food truck (food trucks typically include a small portable kitchen with a small exhaust fan – take away only)

3.0 UNATTENDED AMBIENT NOISE SURVEY

An unattended noise logging survey was conducted between 5th August and 11th November 2022. The microphone was placed near the front boundary of 2 Corbett Street at approximately 2.0 metres above the natural ground level.

A Type 1 Convergence Instruments Noise Sentry noise logger was used for this noise survey. The instrument was set up to measure sound pressure levels as 'A' frequency weighting and 'Fast' time response. Noise levels were stored within the logger memory at 15 minutes intervals during the quarter-hour.

A NATA-calibrated and certified Larson Davis CAL200 precision acoustic calibrator was used to field calibrate the sound level meter before and after the noise survey. No system drift was observed for this sound level meter.

A review of the weather records from the Bureau of Meteorology shows that adverse weather conditions did not influence the noise environment during the measurement period. Observable short-duration extraneous noise events were removed from the survey data.

A summary of the noise survey data is presented below.

Table 1. Summary of noise logger results [dB]

Location	Period, T [1]	Ambient noise level L_{Aeq}	Rating background level L_{A90}	Traffic noise level[2] $L_{Aeq, Period}$
2 Corbett Street	Day	61	49	60
	Evening	58	47	
	Night	54	40	54

Notes

1. The **NSW EPA Noise Policy for Industry (NPfI)** refers to:
   Daytime: 7 am – 6 pm Monday to Saturday and 8 am to 6 pm Sunday and public holidays.
   Evening: 6 pm – 10 pm Monday to Sunday
   Night: 10 pm - 7 am Monday to Saturday and 10 pm to 8 am Sunday and public holidays.
2. The **EPA/RMS/NSW DoP** refers to:
   Daytime: 7 am – 10 pm seven days per week.
   Night: 10 pm - 7 am seven days per week

Daily logger graphs are attached in **Appendix A**.

Prevailing ambient noise conditions on-site and in the local area are generally the result of typical environmental noise such as road traffic and localised mechanical plant noise sources.

4.0 ATTENDED NOISE SURVEY

Attended noise surveys were conducted on Monday 14th November 2022 between 1 pm and 3 pm to quantify the typical activities that occur from the carwash café. The following noise sources were measured:

- Generator servicing automated carwash in equipment room at 1 meter from open door.
- Generator servicing automated carwash in equipment room at 1 meter from closed door.
- Two (2) Pullman CB80-3-SS moveable vacuum cleaner at 3 meters.
- One (1) Vacuum + Fragrance fixed vacuum cleaner at 3 meters.
- One (1) Power Vac fixed vacuum cleaner at 3 meters.
- One (1) full automated carwash cycle measured simultaneously at:
    - 5 meters from the exit of the automated carwash, and
    - 5 meters from the entry of the automated carwash.
- Part of automated carwash cycle measured simultaneously at:
    - 5 meters from the exit of the automated carwash, and
    - 3 meters from the west facade of the automated carwash.
- Part of automated carwash cycle measured simultaneously at:
    - 5 meters from the exit of the automated carwash, and
    - 10 meters from the exit of the automated carwash.

Each survey was conducted with an NTi XL2 sound level meter set to A-frequency weighting and fast time response. Calibration readings were taken before and after each survey with a NATA calibrated and certified Larson Davis CAL200 precision acoustic calibrator. No system drift was observed for this meter.

Surveys were conducted for durations deemed sufficient to represent the equivalent noise level without the influence of extraneous noise.

An FFT and tonal analysis was conducted in XL2 Data Explorer in accordance with ISO 1996-2:2007. The FFT and tonal analysis provides a means of assessing the presence of tones in a noise spectrum and defining a tonal adjustment to apply to the L_{Aeq} noise level to essentially act as a penalty to account for the perceived increase in annoyance/offensive quality. Under Annex C of ISO 1996-2:2007, the tonal adjustment has been included for each measured noise source in Table 3 and Table 4. The tonal adjustment has been applied to the noise source.

A summary of the noise survey results is provided in Table 2.

Table 2. Measured Noise Levels [dB]

Noise Source	Noise Metric	Octave Band Noise Levels									Total	L_{Amax}	Annoying Characteristic Correction
		31.5	63	125	250	500	1k	2k	4k	8k			
Generator	L_{PAeq} at 1m from open door	38	50	64	74	73	69	67	62	57	**78**	**79**	**6**
Generator	L_{PAeq} at 1m from closed door	36	45	58	60	61	60	60	56	52	**67**	**71**	**5**
2 x Pullman CB80-3-SS	L_{PAeq} at 3m	34	44	50	61	70	73	77	73	65	**80**	**82**	**1**
1 x Vacuum + Fragrance	L_{PAeq} at 3m	33	45	52	62	69	77	82	81	75	**86**	**90**	**1**
1 x Power Vac	L_{PAeq} at 3m	41	50	59	62	66	74	80	78	73	**83**	**87**	**1**
Full Auto Carwash	L_{PAeq} at 5m from Exit	39	54	61	69	75	77	81	77	68	**84**	**88**	**0**
	L_{PAeq} at 5m from Entry	44	55	62	66	72	74	79	74	62	**82**	**85**	**1**
Partial Auto Carwash	L_{PAeq} at 5m from Exit	38	54	62	72	77	78	82	78	64	**85**	**87**	**1**
	L_{PAeq} at 3m from West Facade	35	47	55	62	67	66	69	62	47	**73**	**75**	**0**
Partial Auto Carwash	L_{PAeq} at 5m from Exit	43	55	62	72	77	79	83	79	66	**86**	**89**	**1**
	L_{PAeq} at 10m from Exit	41	52	61	66	73	74	78	73	57	**81**	**84**	**0**

Furthermore, simultaneous noise measurements were conducted with the unattended noise logger, 1.5 m above the ground at the front boundary of 2 Corbett Street and 1.5 m above the ground at the front boundary of 343 Hume Highway. The ambient background noise levels were measured to be the following:

- $L_{A90,15mins}$ 54 dB at the unattended noise logger;
- $L_{A90,15mins}$ 54 dB at 1.5 m above the ground at the front boundary of 2 Corbett Street, and
- $L_{A90,15mins}$ 57 dB at 1.5 m above the ground at the front boundary of 343 Hume Highway.

Based on our site visits, noise from the following vehicles and equipment were not measurable:

- AC condenser unit was not audible during lulls in traffic. The Daikin RXV85LVMA outdoor unit is published to have a sound pressure level of 56 dB(A) at 1 meter.

- Exhaust fan that services the café kitchen was located on the roof and was not audible during lulls in traffic.
- Vehicles traversing on site could not be accurately measured over the ambient noise, as such, Koikas Acoustics has utilised noise data from their database.
- Breakout noise from the indoor café area was not audible around the building over the ambient noise.

5.0 ACOUSTIC REQUIREMENTS

The Bankstown development control plan (*DCP*) does not outline any specific noise control requirements for a car wash / café. As such, the following noise control standards have been applied to this project.

5.1 EPA NOISE POLICY FOR INDUSTRY

Noise emission design targets have been referenced from the *NSW Environmental Protection Authority (EPA) Noise Policy for Industry (NPfI).*

The NPfI is designed to assess environmental noise impacts associated with scheduled activities prescribed within the Protection of the *Environment Operations Act 1997*, Schedule 1. It is also used as a reference tool for establishing suitable planning levels for noise generated by mechanical plant and equipment and noise emission from commercial operations.

For residential receivers, the guideline applies limits on the short-term intrusive nature of a noise or noise-generating development (project intrusive noise level), as well as applying an upper limit on cumulative industrial noise emissions from all surrounding development/industry (project amenity noise level).

The most stringent of the project intrusive noise level and project amenity noise level are applied as the **project noise trigger level (PNTL)**. To determine which of the intrusive and amenity noise criteria is more stringent, the underlying noise metrics must be the same.

As the intrusive noise level is defined in terms of an $L_{Aeq,\ 15\ minutes}$ and the amenity noise level is defined in terms of an $L_{Aeq,\ Period}$, a +3 dB correction is applied to the project amenity noise level to equate the $L_{Aeq,\ Period}$ to $L_{Aeq,\ 15\ minutes}$.

Non-residential receivers are assessed to project amenity noise levels relevant to the applicable receiver category (industrial/commercial).

Where noise is measured or predicted below the project noise trigger level, the noise outcome is deemed acceptable. Above the project noise trigger level, management responses such as applying reasonable and feasible noise mitigation measures are to be recommended, along with assessing any residual noise impacts once noise mitigation has been considered.

The policy is designed in such a way that the assessing authority would consider the project noise trigger levels, reasonable and feasible mitigation measures, and any residual noise impacts when deciding on acceptable noise outcomes.

The site-specific project noise trigger levels need only be considered for the hours under which the noise or activity occurs.

Table 3. NPfI planning levels – $L_{Aeq,\ 15\ minutes}$ [dB] – Residents along Corbett Street

Period, T (Note 1)	Intrusive		Amenity					Project noise trigger level
	RBL	RBL + 5	Area classification	Recommended amenity noise level	High traffic area	[2]Project amenity noise level	+3dB correction	
Day	49	54	Urban	60	No	55	58	54
Evening	47	52	Urban	50	No	45	48	48
Night	40	45	Urban	45	No	40	43	43

Notes:
1. **EPA** defines the following periods:
   Day: 7 am to 6 pm Mon to Sat and 8 am to 6 pm Sun and public holidays,
   Evening: 6 pm to 10 pm Mon to Sun,
   Night: 10 pm to 7 am Mon to Sat and 10 pm to 8 am Sun and public holidays.
2. Project noise amenity level = recommended noise amenity level – 5 dB, except where specific circumstances are met, such as high traffic.

Table 4. NPfI planning levels – $L_{Aeq,\ 15\ minutes}$ [dB] – Residents along Hume Highway

Period, T (Note 1)	Intrusive		Amenity					Project noise trigger level
	RBL	RBL + 5	Area classification	Recommended amenity noise level	High traffic area	[2]Project amenity noise level	+3dB correction	
Day	52[3]	57	Urban	60	No	55	58	57
Evening	50[3]	55	Urban	50	No	45	48	48
Night	43[3]	48	Urban	45	No	40	43	43

Notes:
1. **EPA** defines the following periods:
   Day: 7 am to 6 pm Mon to Sat and 8 am to 6 pm Sun and public holidays,
   Evening: 6 pm to 10 pm Mon to Sun,
   Night: 10 pm to 7 am Mon to Sat and 10 pm to 8 am Sun and public holidays.
2. Project noise amenity level = recommended noise amenity level – 5 dB, except where specific circumstances are met, such as high traffic.
3. Calculated background noise levels are based on a difference of 3 dB between the ambient background noise levels along Corbett Street and Hume Highway.

Commercial premises must not be exposed to a noise level that exceeds **$L_{Aeq,\ 15\text{-}minutes}$ 63 dB** during business hours. Active recreation areas (e.g. school playground, golf course) must not be exposed to a noise level that exceeds **$L_{Aeq,\ 15\text{-}minutes}$ 55 dB** when in use.

5.2 SLEEP DISTURBANCE/AROUSAL

The potential for noise-induced sleep disturbance should be considered where a noise source or activity from a particular development occurs before 7 am (Monday to Saturday) or 8 am (Sundays or public holidays) and/or after 10 pm (Monday to Sunday). Koikas Acoustics follows the following protocols for determining the potential for sleep disturbance:

1. Conduct a screening assessment to identify potential sleep disturbance impacts as per:
    a. Section 2.5 of the NSW EPA Noise Policy for Industry (NPfI) 'Maximum noise level event assessment' and/or
    b. Section 2.2.4 of the NSW EPA Noise Guide for Local Government (NGLG) 'Assessment of sleep disturbance'
2. Where the screening assessment identifies a potential for sleep disturbance, a further and more rigorous analysis of the maximum noise levels attributed to the noise source or activity under assessment is prepared. This detailed assessment would:
    a. Compare the maximum noise levels and the number of maximum noise events from the subject source or activity to that of typical ambient maximum noise events in the local area such as from passing traffic etc.
    b. Assess the maximum event noise level inside an affected residence and compare this to further guidance on sleep disturbance impacts presented in the NSW EPA Road Noise Policy (RNP).
3. Present a final opinion on the potential for sleep disturbance and/or the need for any specific noise mitigation and/or management.

For reference, the NPfI and NGLG screening levels and RNP internal maximum noise levels are presented below.

Table 5. Sleep disturbance assessment levels

Description	Assessment period	L_{Aeq} noise level	L_{Amax} noise level
Screening assessment 'a' NSW EPA Noise Policy for Industry (2017)	**Night only** 10 pm to 7 am (Mon-Sat) 10 pm to 8 am (Sun & pub hols)	$L_{Aeq\ 15\ mins}$ ≤ 40 dB or the RBL + 5, whichever is the greater	$L_{Amax\ outdoors}$ ≤ 52 dB or the RBL + 15, whichever is the greater
Screening assessment 'b' NSW EPA Noise Guide for Local Government (2013)	**Night only** 10 pm to 7 am (Mon-Sat) 10 pm to 8 am (Sun & pub hols)	n/a	$L_{Amax\ outdoors}$ ≤ RBL + 15 ($L_{A1,\ 1\ minute}$ may also be used where appropriate)
Internal L_{Amax} assessment NSW EPA Road Noise Policy (2013)	**Night only** 10 pm to 7 am (Mon-Sat) 10 pm to 8 am (Sun & pub hols)	n/a	$L_{Amax\ indoors}$ ≤ 50-55 dB is "unlikely to cause awakenings"

It is also important to recognise that the point at which noise causes sleep disturbance is currently not well known and that the EPA advises that "more research is needed to better understand this relationship". Therefore, the above should be used as a guide only and applied with caution on a case-by-case basis.

5.3 OFFENSIVE NOISE (POEO ACT 1997 DEFINITION)

In the definitions of the *Protection of the Environment Operations Act 1997*, 'offensive noise' means noise:

(a) *that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:*

(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or

(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or

(b) *that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances, prescribed by the regulations.*

5.4 OFFENSIVE NOISE CHECKLIST (EPA NOISE GUIDE FOR LOCAL GOVERNMENT, 2013)

The *EPA Noise Guide for Local Government (NGLG)* provides a checklist that is used to assist with establishing if a particular noise is 'offensive'. The checklist is summarised below:

- Is the noise loud in an absolute sense? Is it loud relative to other noise in the area?
- Does the noise include characteristics that make it particularly irritating?
- Does the noise occur at times when people expect to enjoy peace & quiet?
- Is the noise atypical for the area?
- Does the noise occur often?
- Are several people affected by the noise?

6.0 OPERATIONAL NOISE ASSESSMENT

6.1.1 Cadna/A

Assessing noise emitted by the proposed operation of the facility is based on predictive modelling conducted using Cadna/A. The program predicts noise levels to receiver points as well as presenting a graphical representation of noise level contours for a defined area of interest. The input parameters to this model include the source sound power levels, ground contours, ground absorption/reflections, the presence of any acoustic shielding objects.

Noise propagation calculations are determined under *ISO 9613 Acoustics – Attenuation of sound during propagation outdoors*. The sound propagation algorithms adopted in the ISO standard result in the calculation of a downwind sound pressure level which constitutes an assessment of noise-enhancing weather conditions.

The acoustic assessments consider a range of design parameters that directly influence the output of the noise prediction model. A summary of the relevant design parameters is provided below:

- Ground absorption is generally taken as 0.8 for moderately porous ground, except for the subject site where a ground absorption of 0.02 is considered for the concrete hardstands.
- Cumulative noise levels are calculated for all existing and proposed noise sources, assessed over any 15-minutes. All plant and equipment and work processes are considered operational at the same time. This presents an absolute worst-case assessment scenario that is unlikely to occur during typical operation.
- All buildings have been modelled as a smooth façade i.e. 1 dB reflection loss.
- An extensive survey of existing plant and equipment noise levels at the existing carwash café has been conducted by Koikas Acoustics. This data is used where possible and appropriate to represent noise emission from existing and proposed plant and equipment and site operations. Koikas Acoustics database noise levels are used elsewhere where no site-specific noise data is available.

6.2 SOURCE NOISE LEVELS AND ASSESSMENT SCENARIOS

The noise sources considered in the assessment scenario are tabulated below.

Table 6. Noise Source and noise levels

Noise Source	Descriptor	Noise level, [dB]	Location
Daikin RXV85LVMA	L_{APeq} @ 1m	56	Outdoor near equipment room
Kitchen exhaust fan (Fantech HUD634)	L_{Aweq}	85	Rooftop
One light vehicle entering/leaving the car park	L_{Aweq}	78	Outdoor areas
One person speaking with 'normal vocal effort	L_{Aweq}	75	Outdoor areas
Car door slamming (corrected to once every 15 minutes)	L_{Aweq}	55	Outdoor areas
Car engine igniting (corrected to once every 15 minutes)	L_{Aweq}	53	Outdoor areas
Car door slamming	L_{Amax}	93	Outdoor areas

All noise sources tabulated above have been taken from measurements previously conducted by Koikas Acoustics at similar service stations and car wash facilities.

Noise level measurements were taken with a NATA-calibrated Type 1 NTi XL2 sound level meter. The instrument was set up to measure sound pressure levels as 'A' frequency weighting and 'Fast' time response.

Sound level measurements were taken for durations deemed sufficient to represent the underlying noise levels from the noise source without the influence of extraneous noise.

The following design scenarios were assessed.

Table 7. Design scenarios and assumptions		
Scenario	**Description**	**Design assumptions**
1 – Daytime (7 am to 6 pm)	All wash stations and food truck activities – Equivalent noise level assessment ($L_{Aeq,15mins}$)	• Breakout noise from Auto Carwash (3 cars/cycles in one 15 minutes period). • Breakout noise from the generator with closed door (3 cars/cycles in one 15 minutes period) • 12 x vehicles will enter/exit the premises at 5 km/hr • 12 x car engine ignition • 12 x car door slams • 1 x Power Vac (in vacuum bay) • 1 x Vacuum and Fragrance (in vacuum bay) • 2 x Pullman CB80-3-SS (in vehicle drying area) • 2 x kitchen exhaust fans (one on the roof of the café and one on the roof of the food truck) • 12 x people talking near the food truck with a normal vocal effort – 50% speaking simultaneously • 28 x people talking in the outdoor café with a normal vocal effort – 50% speaking simultaneously
2 – Night-time (6 am to 7 am)	Food truck activities – Equivalent noise level assessment ($L_{Aeq,15mins}$)	• 1 x kitchen exhaust fan • 12 x people talking near the food truck with a normal vocal effort – 50% speaking simultaneously • 6 x vehicles will enter/exit the premises at 5 km/hr • 6 x car engine ignition sequences • 6 x car door slams
2 – Night-time (6 am to 7 am)	Food truck activities – Maximum noise level assessment (L_{Amax})	• 1 x car door slam (noisiest food truck activity as an L_{Amax})

6.3 CALCULATED RECEIVER LEVELS

Noise levels have been predicted for nearby residential and commercial receivers by way of preparing an acoustic model and conducting point-to-point calculations based on standard sound propagation algorithms. All calculations consider the noise sources as identified in Section 5.2 of this report.

Reference should also be made to additional noise control recommendations included within Section 6.4 of this report, which also govern the calculated receiver noise levels.

Due to the size of the development, several potentially affected receiver locations must be assessed in terms of their respective noise exposure from the proposed development at the hand washing bay. The most noise-sensitive receiver locations are summarised below.

Table 8. Assessment locations		
ID	**Receiver type and address**	**Assessment location**
R1	Single-storey residential / 345 Hume Highway	Ground floor level
R2	Single-storey residential / 345 Hume Highway	Ground floor level
R3	Double-storey residential / 2 Corbett Street	Ground floor level
R4	Double-storey residential / 2 Corbett Street	First-floor level
R5	Single-storey residential / 3 Corbett Street	Nearest/Most noise-affected boundary
R6	Three-storey residential / 547-549 Chapel Road	First-floor level
R7	Three-storey residential / 547-549 Chapel Road	Ground floor level
R8	School Playground / St Felix Catholic Primary School	Ground floor level
R9	Commercial / 642 Chapel Road	Ground floor level
R10	Commercial / Three Swallows Hotel	Ground floor level
R11	Commercial / 326 Hume Highway	Ground floor level

Predicted operational noise levels are as follows:

Table 9. Calculated receiver noise levels – Scenario 1 [dB]		
Receiver	**Calculated Receiver Noise Level** $L_{Aeq,\ 15\ minutes}$	**EPA NPfI Project Noise Trigger Level – Daytime** $L_{Aeq,\ 15minutes}$
R1	52	**57**
R2	51	**56**[1]
R3	49	**55**[1]
R4	54	**54**
R5	55[2]	
R6	55[2]	
R7	55[2]	
R8	55	**55**
R9	59	**63**
R10	47	
R11	55	

Table 10. Calculated receiver noise levels – Scenario 2 [dB]		
Receiver	**Calculated Receiver Noise Level** $L_{Aeq,\ 15\ minutes}$	**EPA NPfI Project Noise Trigger Level – Night-time** $L_{Aeq,\ 15\ minutes}$
R1	33	**43**
R2	30	
R3	33	
R4	37	
R5	37	
R6	36	
R7	38	
R8	36	**N/A**
R9	42	**N/A**
R10	39	
R11	39	

Table 11. Calculated receiver noise levels – Scenario 3 [dB]		
Receiver	**Calculated Receiver Noise Level** L_{Amax}	**Sleep Disturbance Criteria – Night-time** L_{Amax}
R1	43	**55**
R2	39	
R3	36	
R4	38	
R5	41	
R6	42	
R7	44	
R8	48	**N/A**
R9	54	**N/A**
R10	54	
R11	52	

Notes:

1. Adopted project noise trigger levels have been interpolated from the adopted project noise trigger level along Hume Highway and Corbett Street.
2. As per Table 4.1 of the EPA's Noise Policy for Industry, residual noise impact of up to 2 dB is considered negligible. This presents an absolute worst-case assessment scenario that is unlikely to occur during a typical operation.

Operational noise levels have been assessed to comply with the limiting NPfI and sleep disturbance criteria during the night-time period, pending the inclusion of noise control measures as detailed in the following section of this report. Compliance during the night-time period. Implies compliance

will also be achieved during other periods of the day when the noise criterion is less stringent.

6.4 RECOMMENDATIONS

6.4.1 Automated Carwash

Rapid roller doors are required to be installed to both the entry and exit onto the white frame of the automated carwash (not the blue enclosure seen in Figure 2). Careful consideration should be made to ensure no gaps are present once the rapid roller doors are closed. If the rapid roller door system is not sealed properly along the periphery of the car wash, the acoustic performance of the roller doors will reduce significantly.

The calculations were based on the 2 mm thick PVC. The noise reduction may vary based on workmanship and sealing type. Therefore, we recommend the rapid roller doors be constructed of a minimum 4 mm thick PVC.

Rapid roller doors can be supplied by:

-	DITEX Aprin Division	Sector doors	Mob: 0438 172 704	located in QLD
-	DMF International	Series 3500	Ph: 02 9636 5466	located in NSW
-	ENVICO	Albany Door System	Ph: 07 3390 6218	located in QLD
-	REMAX	Duraflex	Ph: 03 5866 2060	located in VIC

The doors should be set to close for all of the car cleaning processes by linking into the automated car wash control.

Noise compliance testing should be conducted after the installation of the recommended rapid roller door system to ensure compliance with the nominated criterion is achieved.

Furthermore, the existing gaps (see Figure 2) in the automated carwash enclosure should also be adequately sealed with the same type of material (blue) used in the existing structure.

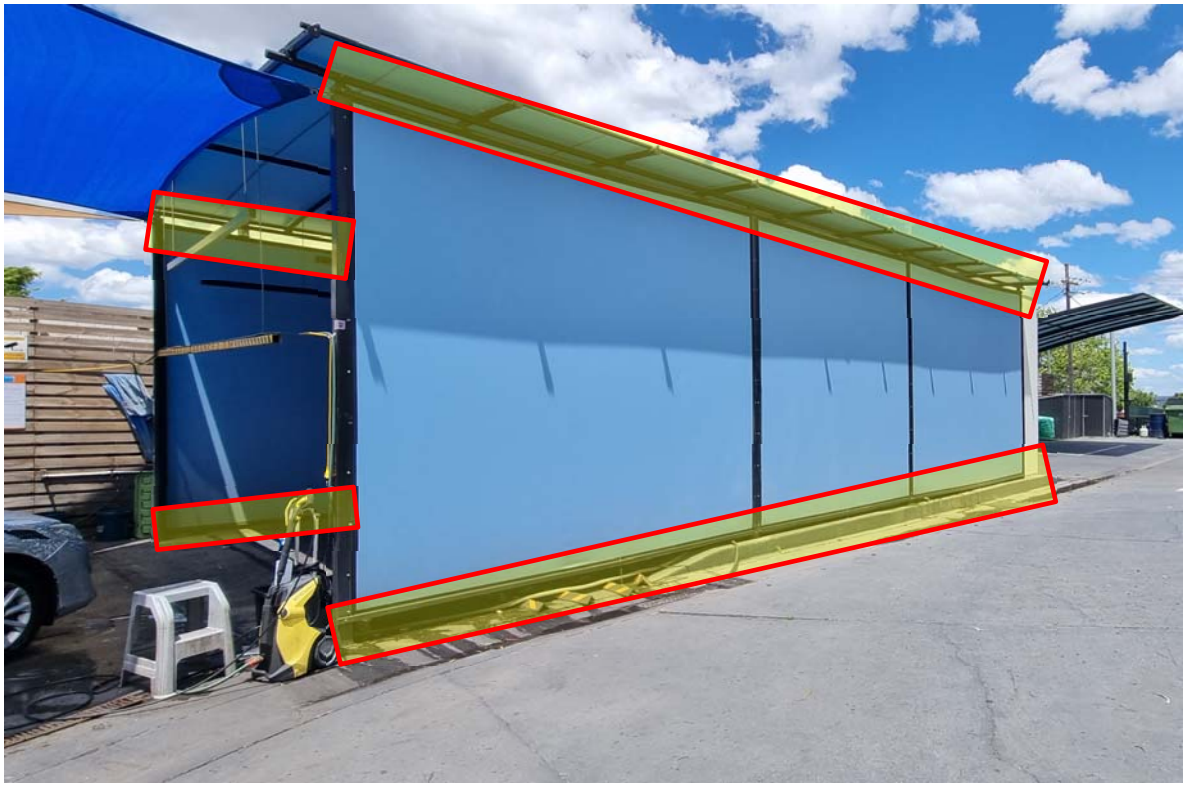


Figure 2. Identified gaps in existing automated carwash enclosure – Image taken by Koikas Acoustics

6.4.2 Noise Barriers/Boundary Fences

- The existing boundary fence located along the eastern boundary is approximately 2.7m high and predominately gapped paling fence. This gapped paling fence should be adequately sealed to the full existing height (approximately 2.7 m) with the building materials outlined below.
- The southern boundary requires new boundary fences of a minimum of 1.5 m in height. The extent of the boundary fences are shown in Figure 3 below.
- An L-shaped noise barrier of a minimum 1.5 m in height is also required for the *vacuum + fragrance* in the vacuum bay and the two *Pullmans CB80-3-SS* in the vehicle drying area. The extent of the noise barriers are shown in Figure 3 below. The barrier should extend approximately 0.5 meters past the machine to ensure no direct line of sight to the residential premises to the east and southern of the carwash café.
- The boundary fence/noise barrier should be constructed out of the following materials:
    - Double-lapped 15 mm thick timber fence palings offset so that there are no air gaps. This equates to a total barrier thickness of 30 mm; OR
    - 15 mm compressed fibre cement panels with no air gaps at the joins; OR
    - 6 mm compressed fibre cement panels on either side of a 50 mm steel frame with fibre-glass insulation batts (14 kg/m3) to the cavity; OR

- 110 mm brick wall; OR
- 100 mm concrete block wall OR
- Permanent plastic formwork filled with sand.

Figure 3. The extent of boundary fence required – Image from R.J. Sinclair Pty Ltd

= proposed minimum 1.5 m high noise barrier

= proposed minimum 1.5 m high boundary fence

= existing 2.7 m high boundary fence

6.5 OFFENSIVE NOISE CHECKLIST (EPA NOISE GUIDE FOR LOCAL GOVERNMENT, 2013)

The *EPA Noise Guide for Local Government (NGLG)* provides a checklist that is used to assist with establishing if a particular noise is 'offensive'. The checklist is summarised below:

- *Is the noise loud in an absolute sense? Is it loud relative to other noise in the area?*

  The site is surrounded by several busy main roads, and noise associated with vehicles would not be considered loud compared to road traffic noise. Noise from the handwashing/vacuum bays and auto carwash may be considered loud, however, noise emissions are calculated to comply with the relevant noise control guidelines.
- *Does the noise include characteristics that make it particularly irritating?*

  Some people may find noise sources associated with car washing activities irritating, however, the noise sources have been corrected for annoying characteristics as per the EPA's NpfI and, noise emissions are calculated to comply with the relevant noise control guidelines.
- *Does the noise occur at times when people expect to enjoy peace & quiet?*

  The carwash café will only operate during the daytime period. Only the take-away food truck is proposed to operate during the night-time, however, noise emissions are calculated to comply with the relevant noise control guidelines during all periods of the day.
- *Is the noise atypical for the area?*

  The site is surrounded by main busy roads, as such, noise associated with vehicles would not be considered atypical. However, noise from the car washing bays may be considered atypical, however, noise emissions are calculated to comply with the relevant noise control guidelines.
- *Does the noise occur often?*

  The carwash café will only operate during the daytime period. Only the take-away food truck is proposed to operate during the night-time, however, noise emissions are calculated to comply with the relevant noise control guidelines during all periods of the day.
- *Are several people affected by the noise?*

  The site is surrounded by residential and commercial receivers, however, noise emissions are calculated to comply with the relevant noise control guidelines.

7.0 CONCLUSION

Koikas Acoustics Pty Ltd was commissioned to conduct a noise impact assessment of the proposed additions to the existing carwash café at 345 Hume Highway, Bankstown NSW seeking approval for the installed automated carwash and extended trading hours for food trucks onsite. A noise complaint was received from a surrounding resident regarding the operation of the automated carwash.

The assessment considers potential noise impacts on surrounding residents such that acceptable acoustic amenity is maintained.

Acoustic planning levels have been referenced from current EPA and POEO acoustic planning guidelines and requirements.

The included recommendations are based on designs prepared by R.J. Sinclair Pty Ltd.

The conclusions reached in this acoustical report should assist Council in making their determination of the proposal. A further detailed acoustical report may be required for the CC submission should the building design be amended, or as required by Council.

Operational noise associated with the use of the carwash café with an automated carwash and food truck has been calculated to comply with the relevant noise control guidelines, provided the recommendations as outlined in Section 6.4 of this report are implemented correctly.

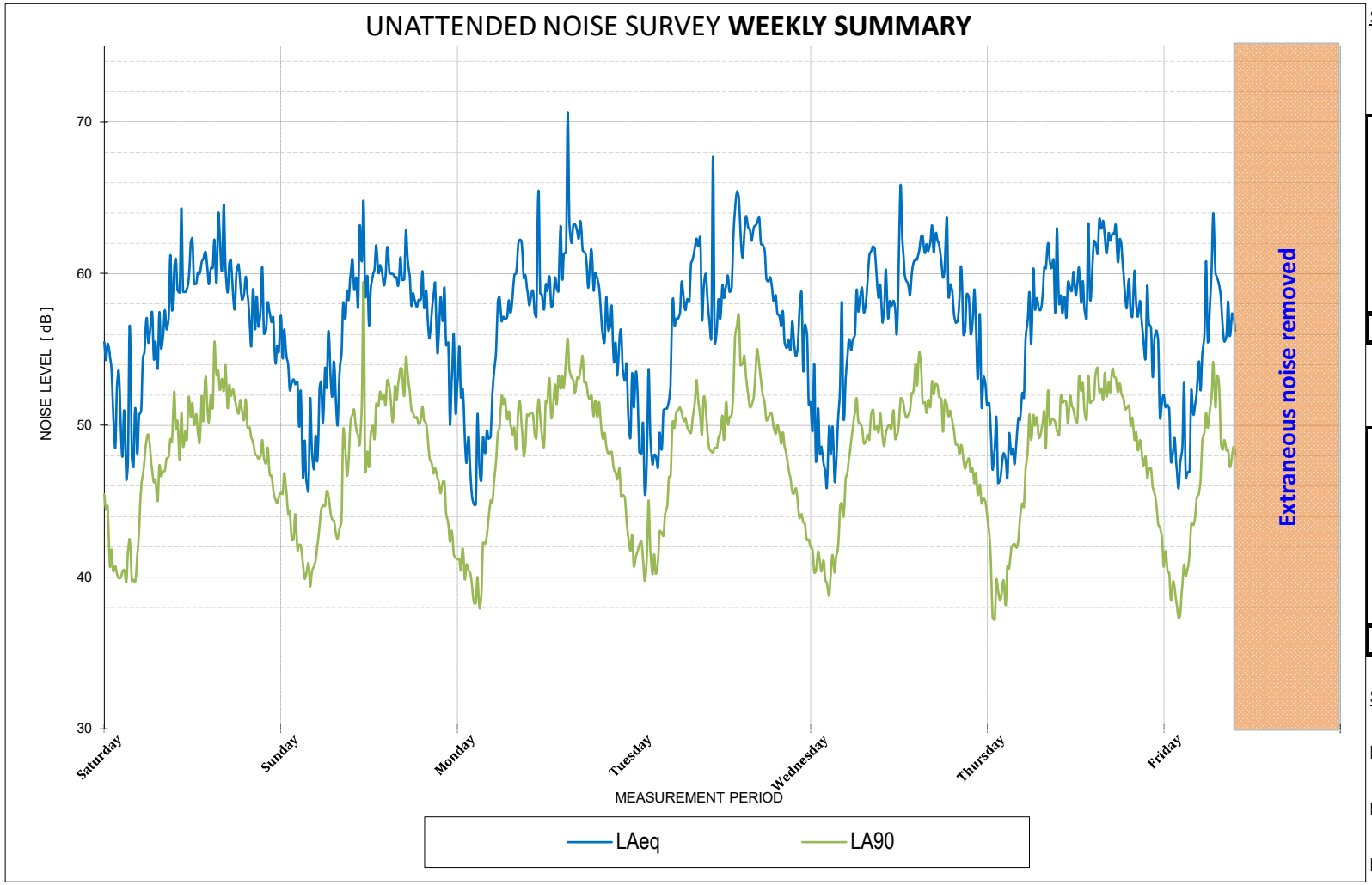
In our professional opinion, there is sufficient scope within the proposed building design to achieve the applied acoustic planning guidelines.

APPENDIX A

APPENDIX A

APPENDIX A

WEEKLY SUMMARY | LOGGER LOCATION: 2 Corbett Street, Bankstown | PERIOD: 5th to the 11th November 2022



Sundays and Public Holidays the hours change to 0800

SUMMARY OF AMBIENT LEVELS

	LA90 Daytime	*LA90* Evening	*LA90* Night-time
Day 1	47	48	40
Day 2	47	46	41
Day 3	49	47	39
Day 4	49	46	41
Day 5	49	47	40
Day 6	50	48	39
Day 7	48	N/A	39
RBL	49	47	40

	LAeq Daytime	*LAeq* Evening	*LAeq* Night-time
Day 1	60	59	54
Day 2	60	58	54
Day 3	62	58	54
Day 4	62	58	54
Day 5	61	59	54
Day 6	61	59	54
Day 7	58	N/A	55
Average	61	58	54

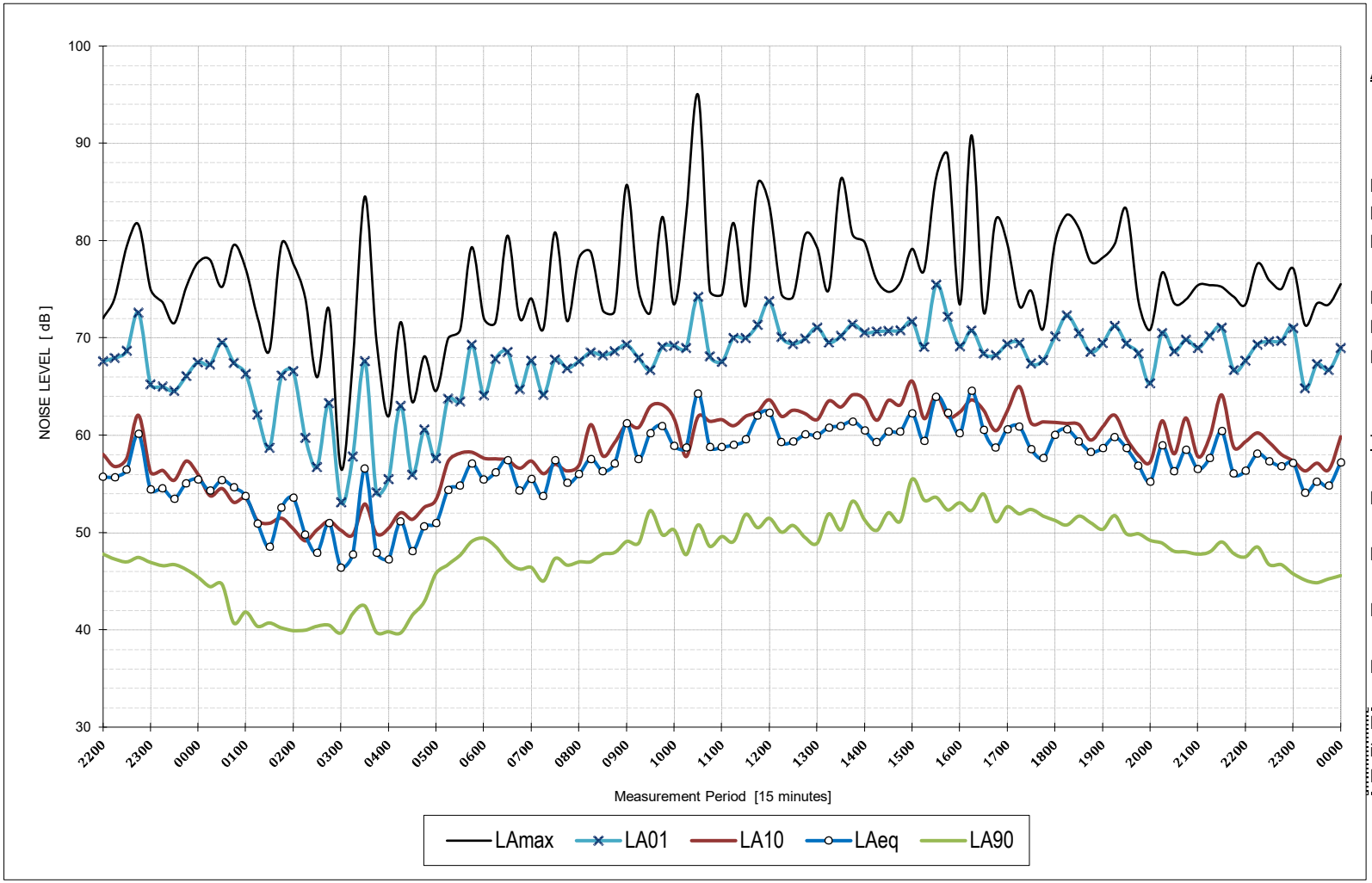
SUMMARY OF TRAFFIC LEVELS

LAeq 15 hrs	0700-2200	60	dB
LAeq 9 hrs	2200-0700	54	dB
Max LAeq 1 hr	0700-2200	62	dB
Max LAeq 1 hr	2200-0700	57	dB

Maximum noise events as defined in the Environmental Noise Management Manual 7 day average - [LAmax - LAeq ≥ 15]	30

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 1 LOGGER LOCATION: 2 Corbett Street, Bankstown DATE: Saturday, 5 November 2022



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	47	dB
LA90 Evening	1800-2200	48	dB
LA90 Night-time	2200-0700	40	dB
LAeq Daytime	0700-1800	60	dB
LAeq Evening	1800-2200	59	dB
LAeq Night-time	2200-0700	54	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	60	dB
LAeq 9 hours	2200-0700	54	dB
Max LAeq 1 hour	0700-2200	62	dB
Max LAeq 1 hour	2200-0700	57	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	33

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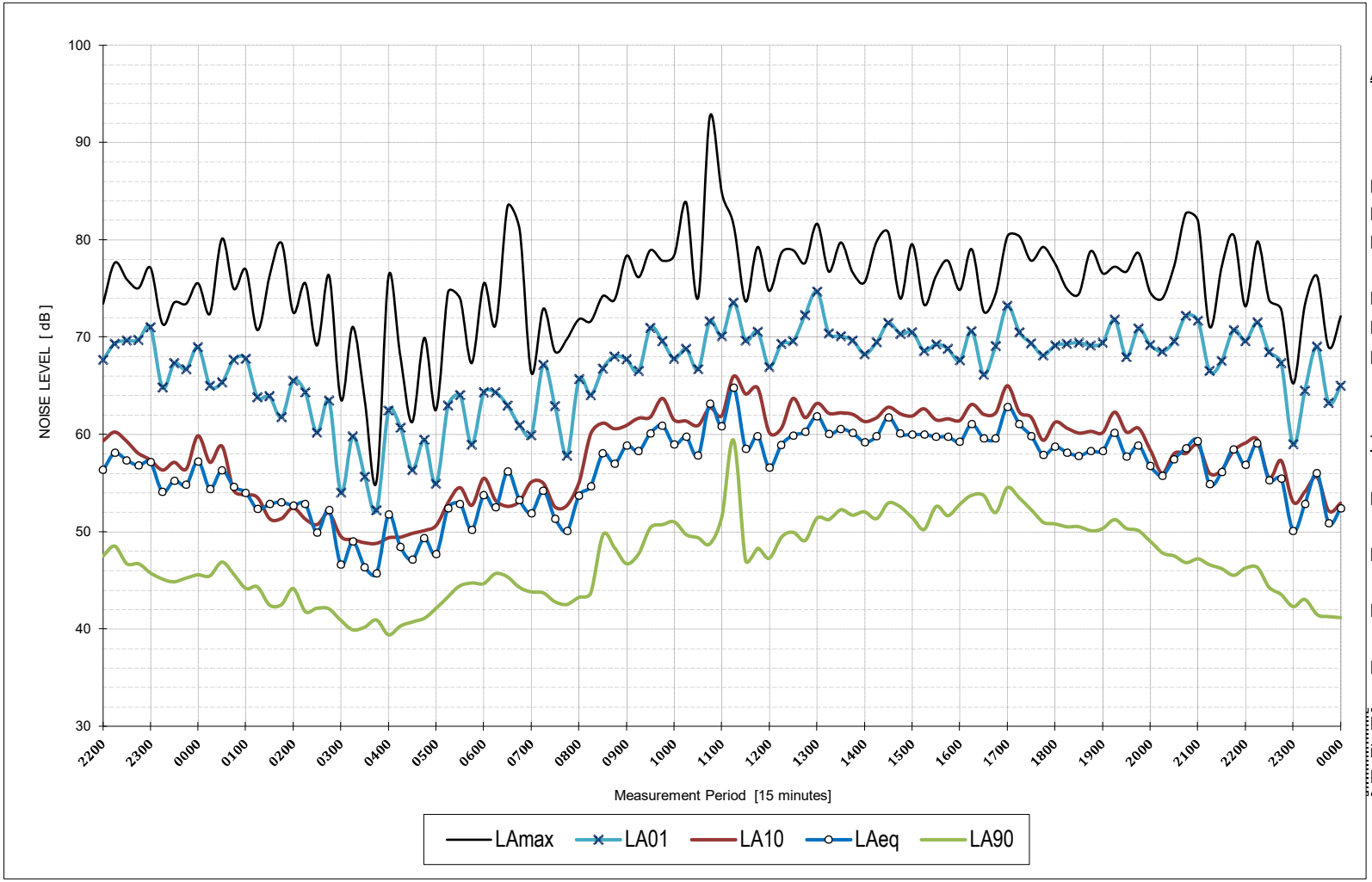
CONSULTANTS IN NOISE & VIBRATION

DAY 2 LOGGER LOCATION: 2 Corbett Street, Bankstown DATE: Sunday, 6 November 2022



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0800-1800	47	dB
LA90 Evening	1800-2200	46	dB
LA90 Night-time	2200-0800	41	dB
LAeq Daytime	0800-1800	60	dB
LAeq Evening	1800-2200	58	dB
LAeq Night-time	2200-0800	54	dB

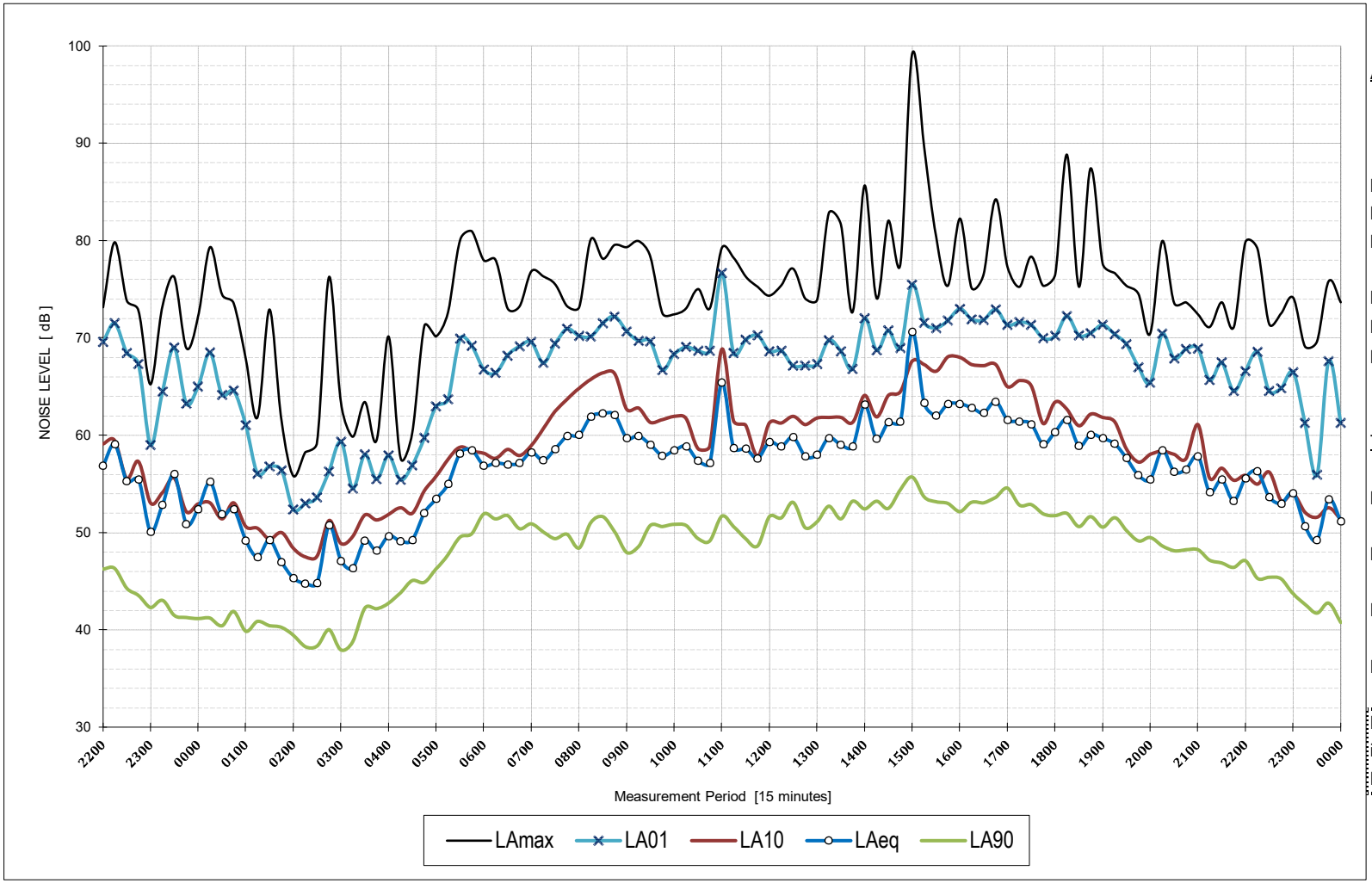
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	59	dB
LAeq 9 hours	2200-0700	54	dB
Max LAeq 1 hour	0700-2200	61	dB
Max LAeq 1 hour	2200-0700	56	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	33

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 3 LOGGER LOCATION: 2 Corbett Street, Bankstown DATE: Monday, 7 November 2022



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	49	dB
LA90 Evening	1800-2200	47	dB
LA90 Night-time	2200-0700	39	dB
LAeq Daytime	0700-1800	62	dB
LAeq Evening	1800-2200	58	dB
LAeq Night-time	2200-0700	54	dB

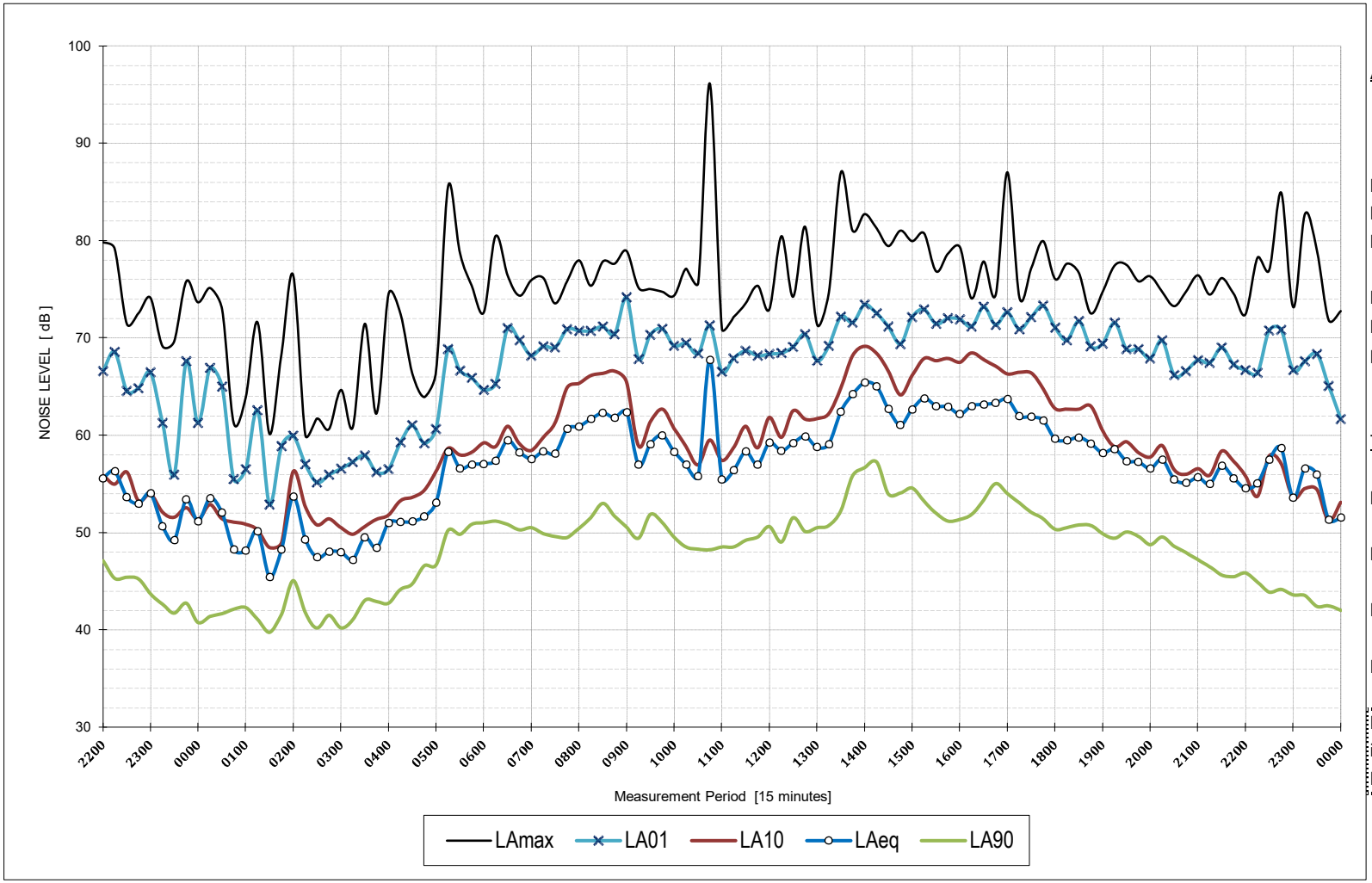
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	61	dB
LAeq 9 hours	2200-0700	54	dB
Max LAeq 1 hour	0700-2200	63	dB
Max LAeq 1 hour	2200-0700	57	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	26

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 4 LOGGER LOCATION: 2 Corbett Street, Bankstown DATE: Tuesday, 8 November 2022



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	49	dB
LA90 Evening	1800-2200	46	dB
LA90 Night-time	2200-0700	41	dB
LAeq Daytime	0700-1800	62	dB
LAeq Evening	1800-2200	58	dB
LAeq Night-time	2200-0700	54	dB

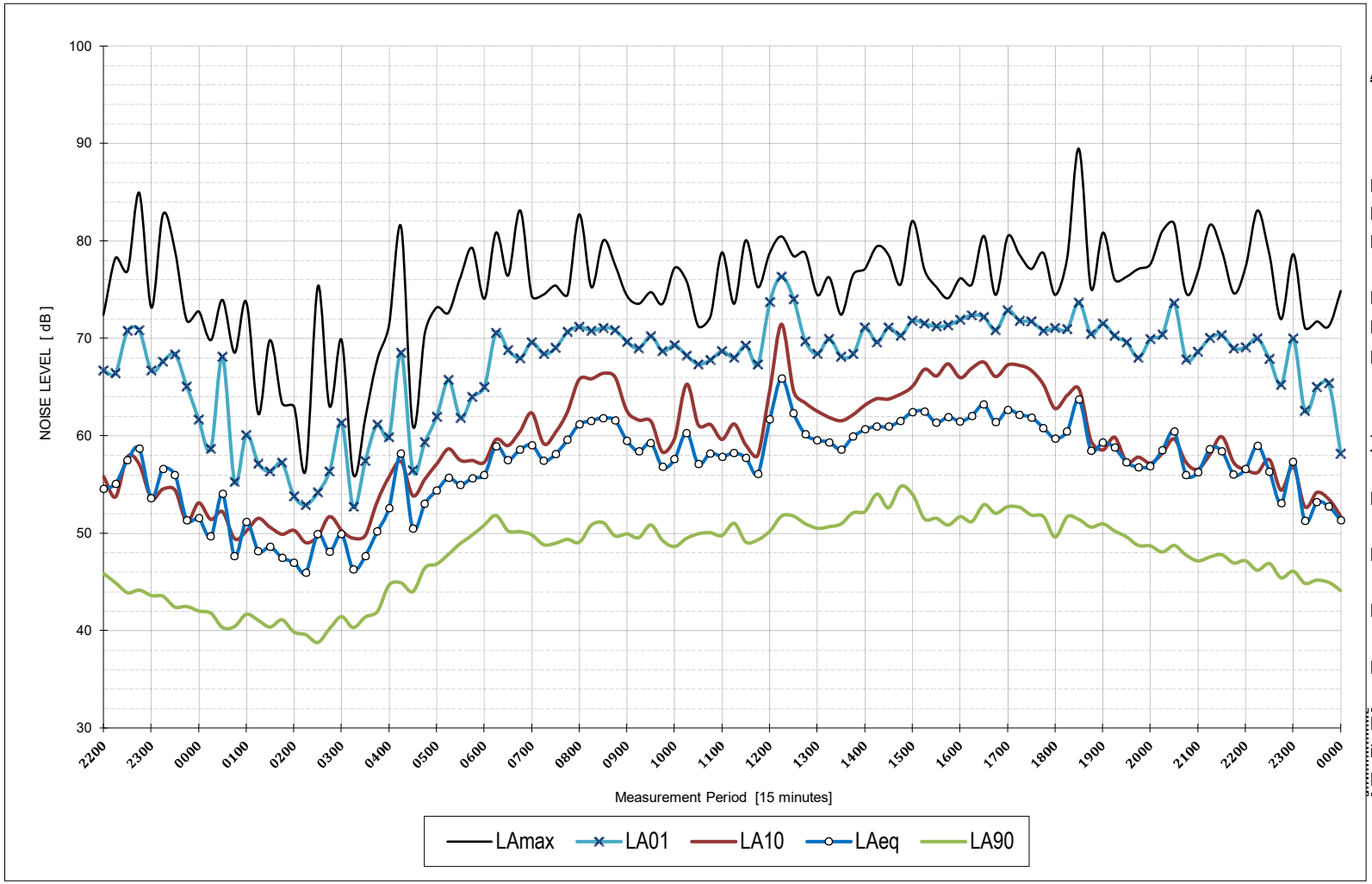
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	61	dB
LAeq 9 hours	2200-0700	54	dB
Max LAeq 1 hour	0700-2200	63	dB
Max LAeq 1 hour	2200-0700	57	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	27

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 5 LOGGER LOCATION: 2 Corbett Street, Bankstown DATE: Wednesday, 9 November 2022



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	49	dB
LA90 Evening	1800-2200	47	dB
LA90 Night-time	2200-0700	40	dB
LAeq Daytime	0700-1800	61	dB
LAeq Evening	1800-2200	59	dB
LAeq Night-time	2200-0700	54	dB

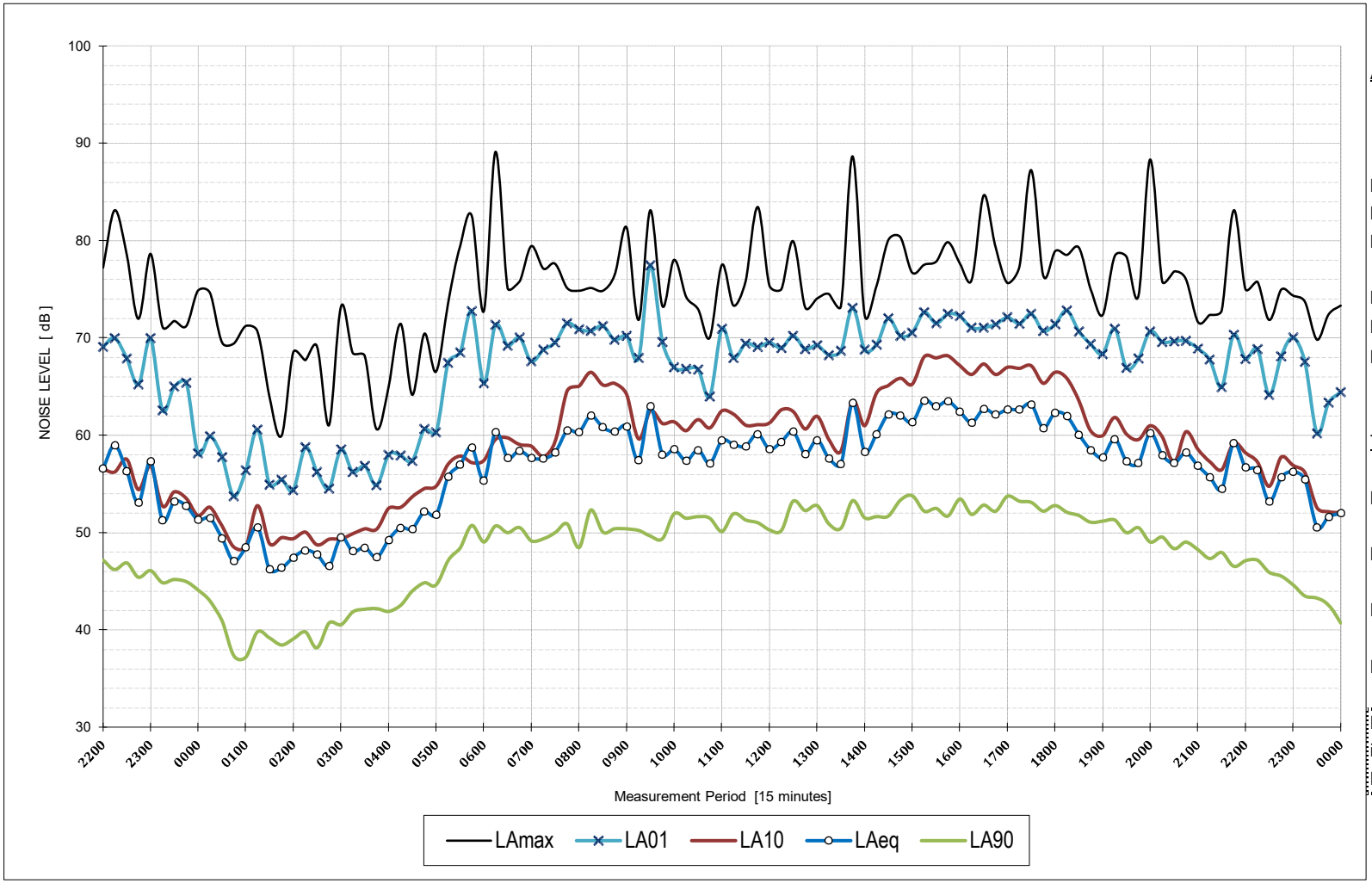
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	60	dB
LAeq 9 hours	2200-0700	54	dB
Max LAeq 1 hour	0700-2200	62	dB
Max LAeq 1 hour	2200-0700	57	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	30

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 6 LOGGER LOCATION: 2 Corbett Street, Bankstown DATE: Thursday, 10 November 2022



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	50	dB
LA90 Evening	1800-2200	48	dB
LA90 Night-time	2200-0700	39	dB
LAeq Daytime	0700-1800	61	dB
LAeq Evening	1800-2200	59	dB
LAeq Night-time	2200-0700	54	dB

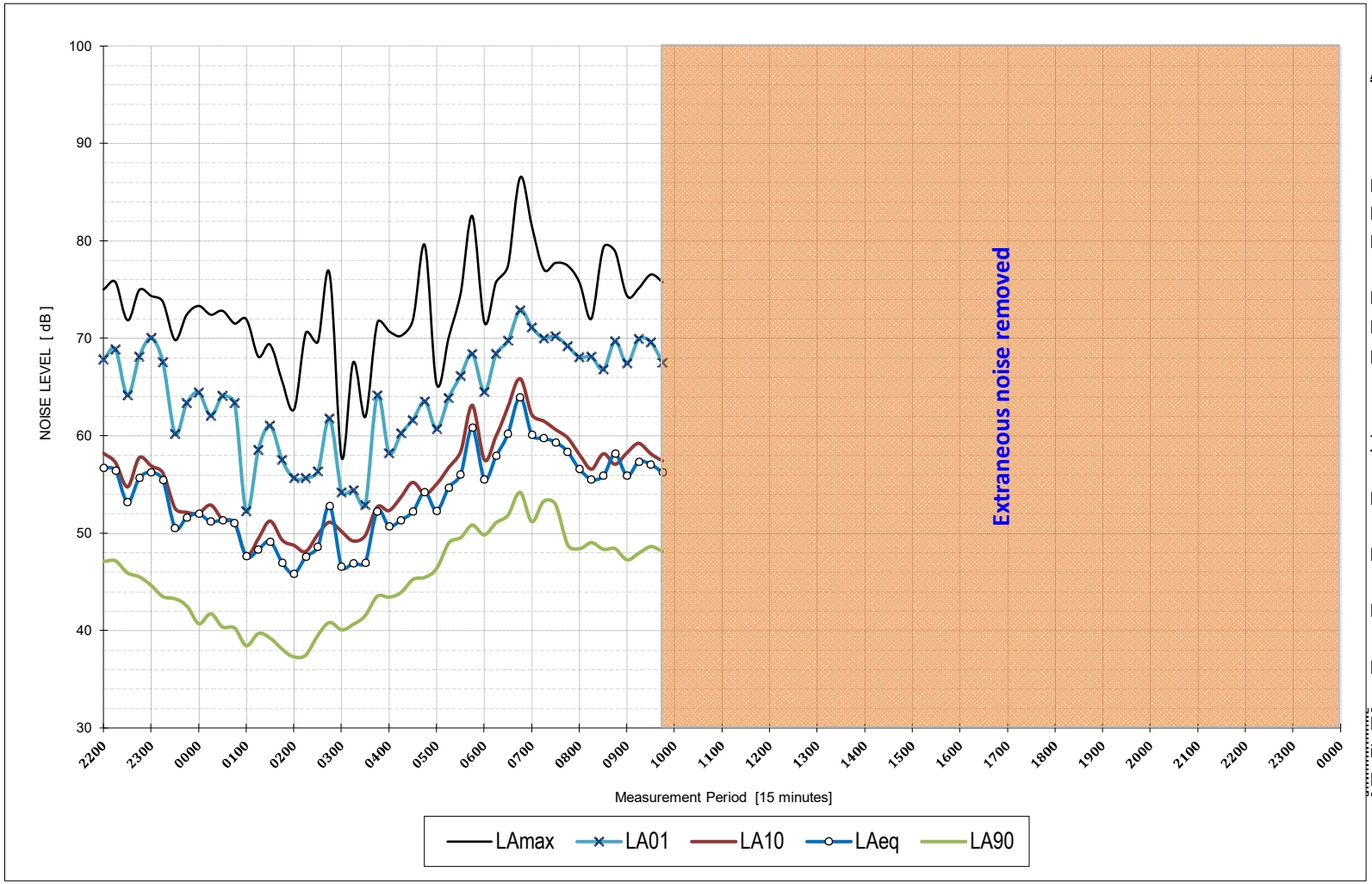
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	60	dB
LAeq 9 hours	2200-0700	54	dB
Max LAeq 1 hour	0700-2200	63	dB
Max LAeq 1 hour	2200-0700	57	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	31

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 7 LOGGER LOCATION: 2 Corbett Street, Bankstown DATE: Friday, 11 November 2022



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	48	dB
LA90 Evening	1800-2200	N/A	dB
LA90 Night-time	2200-0700	39	dB
LAeq Daytime	0700-1800	58	dB
LAeq Evening	1800-2200	N/A	dB
LAeq Night-time	2200-0700	55	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	58	dB
LAeq 9 hours	2200-0700	55	dB
Max LAeq 1 hour	0700-2200	59	dB
Max LAeq 1 hour	2200-0700	57	dB

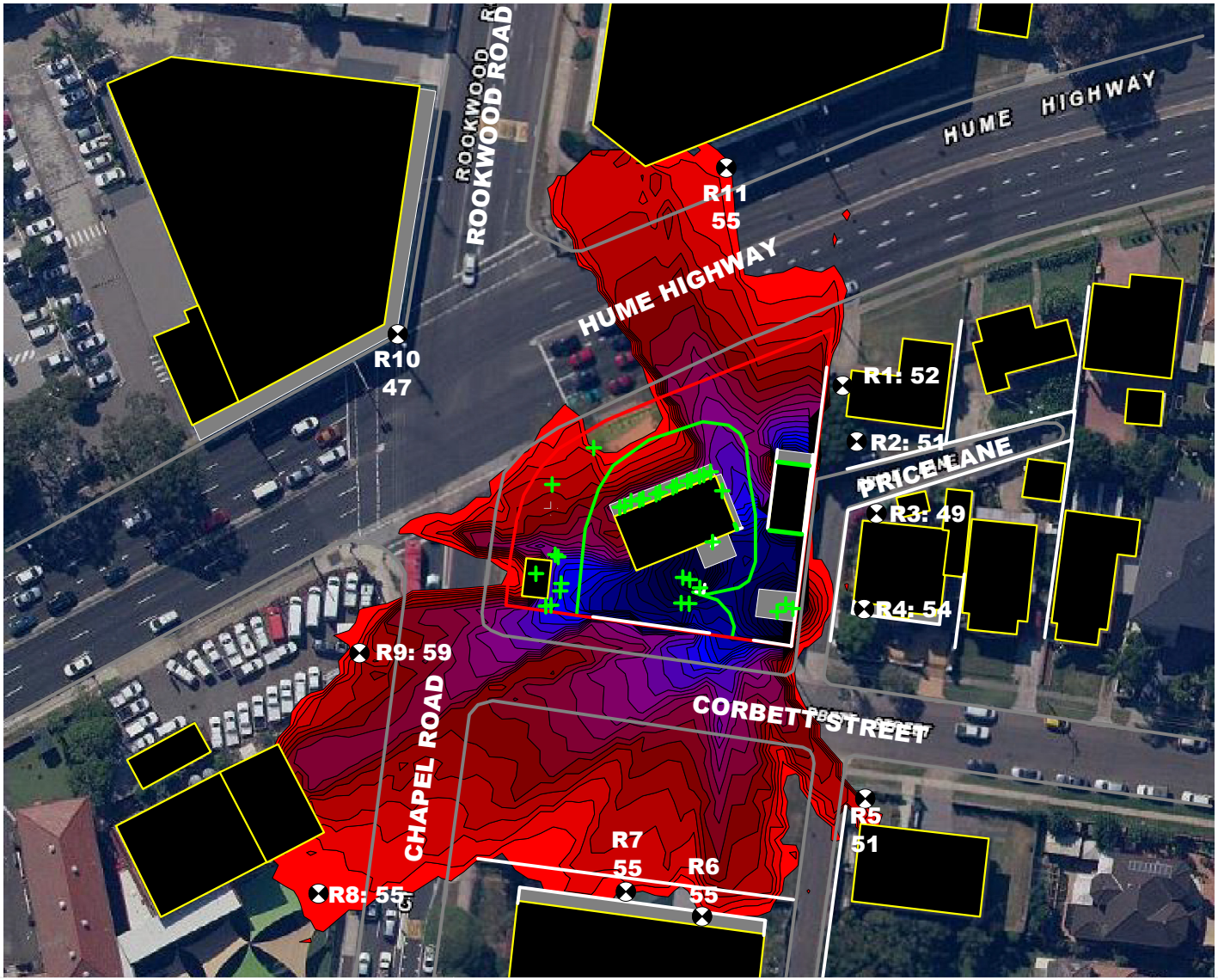
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	33

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

APPENDIX B

APPENDIX B

APPENDIX B



Scenario 1
(Full Daytime Operation)
**** NOISE SOURCES ****

~ 4 x light-vehicles at 5 km/hr
~ 4 x light-vehicles engines starting
~ 4 x doors open/close
~ Breakout noise from Auto Carwash
~ Breakout noise of generator with closed door
~ 2 x Pullman CB80-3-SS
~ 1 x Vacuum + Fragrance
~ 1 x Power Vac
~ 2 x Kitchen exhaust fans
~ 20 x people talking normal vocal effort

Note:
- LAeq,15mins noise level contours and receiver points shown are at a height of 1.5 m above the ground, except R4 and R6 are at 4.5m above the ground.

- Noise contour end at the limiting criteria of 54 dB(A).

- The maximum reading at the nearest resident is 55 dB(A).

PRINT DATE: 09/01/23

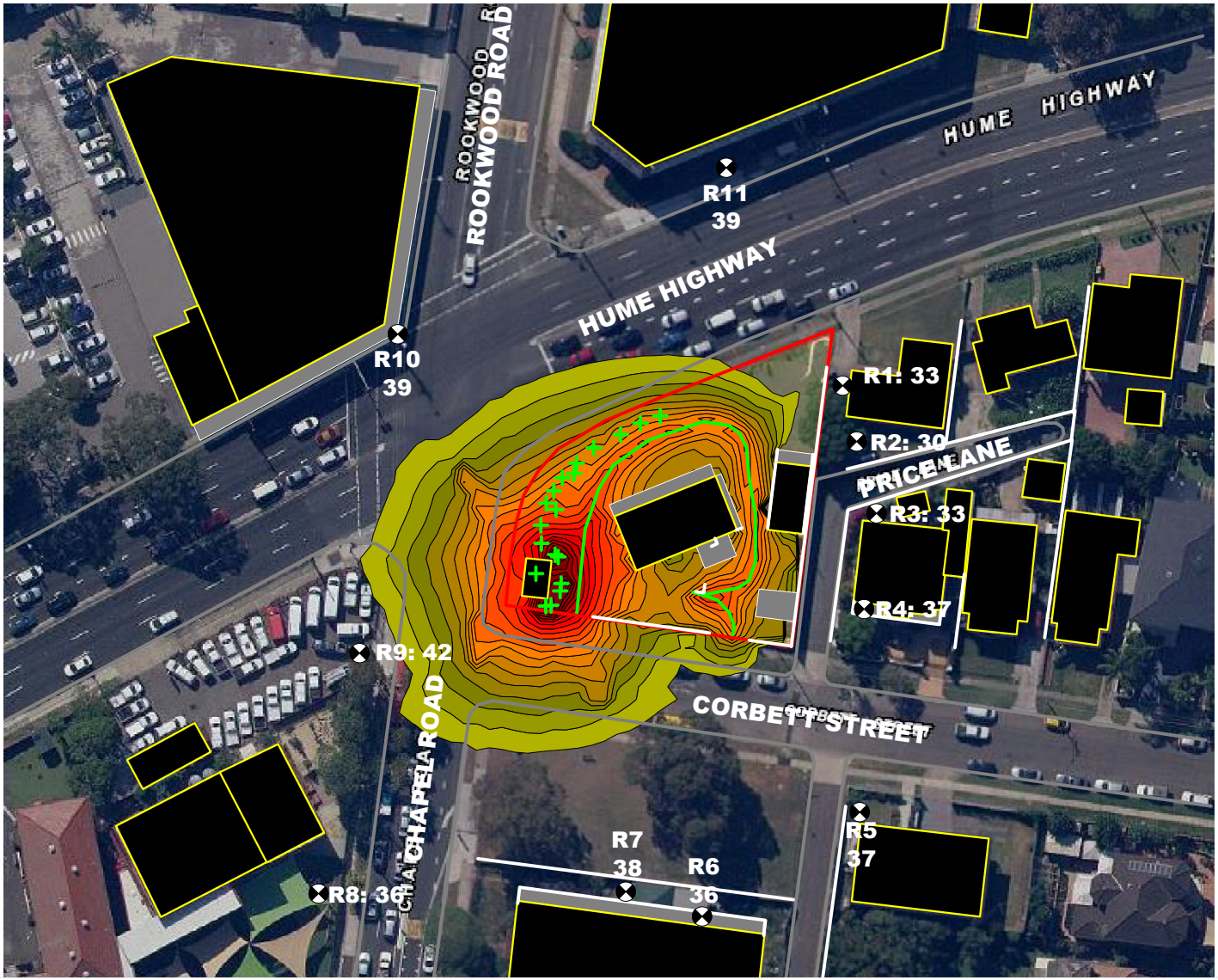
Point Source
Line Source
vert. Area Source
Building
Barrier
3D-Reflector
Contour Line
Receiver
Calculation Area

> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB
> 75.0 dB
> 80.0 dB

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

JOB NUMBER: 5491
CLIENT: Alwyn Carwash & Cafe
SITE ADDRESS: 345 Hume Highway Bankstown
ASSESSED TO: EPA's Noise Policy for Industry
LIMITING CRITERIA: 57 dB(A) - Hume Highway (0700-1800)
54 dB(A) - Corbett Street (0700-1800)

N
W
S



Scenario 2
(Night-time Operation)
**** NOISE SOURCES ****

~ 6 x light-vehicles at 5 km/hr
~ 6 x light-vehicles engines starting
~ 6 x doors open/close
~ 1 x Kitchen exhaust fans
~ 6 x people talking normal vocal effort

Note:
- LAeq,15mins noise level contours and receiver points shown are at a height of 1.5 m above the ground, except R4 and R6 are at 4.5m above the ground.

- Noise contour end at the limiting criteria of 43 dB(A).

- The maximum reading at the nearest resident is 38 dB(A).

PRINT DATE: 09/01/23

Point Source
Line Source
Building
Barrier
3D-Reflector
Contour Line
Receiver
Calculation Area

> 40.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB
> 75.0 dB
> 80.0 dB

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

JOB NUMBER: 5491
CLIENT: Alwyn Carwash & Cafe
SITE ADDRESS: 345 Hume Highway Bankstown
ASSESSED TO: EPA's Noise Policy for Industry
LIMITING CRITERIA: 43 dB(A) - Hume Highway (2200-0700)
43 dB(A) - Corbett Street (2200-0700)

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W E
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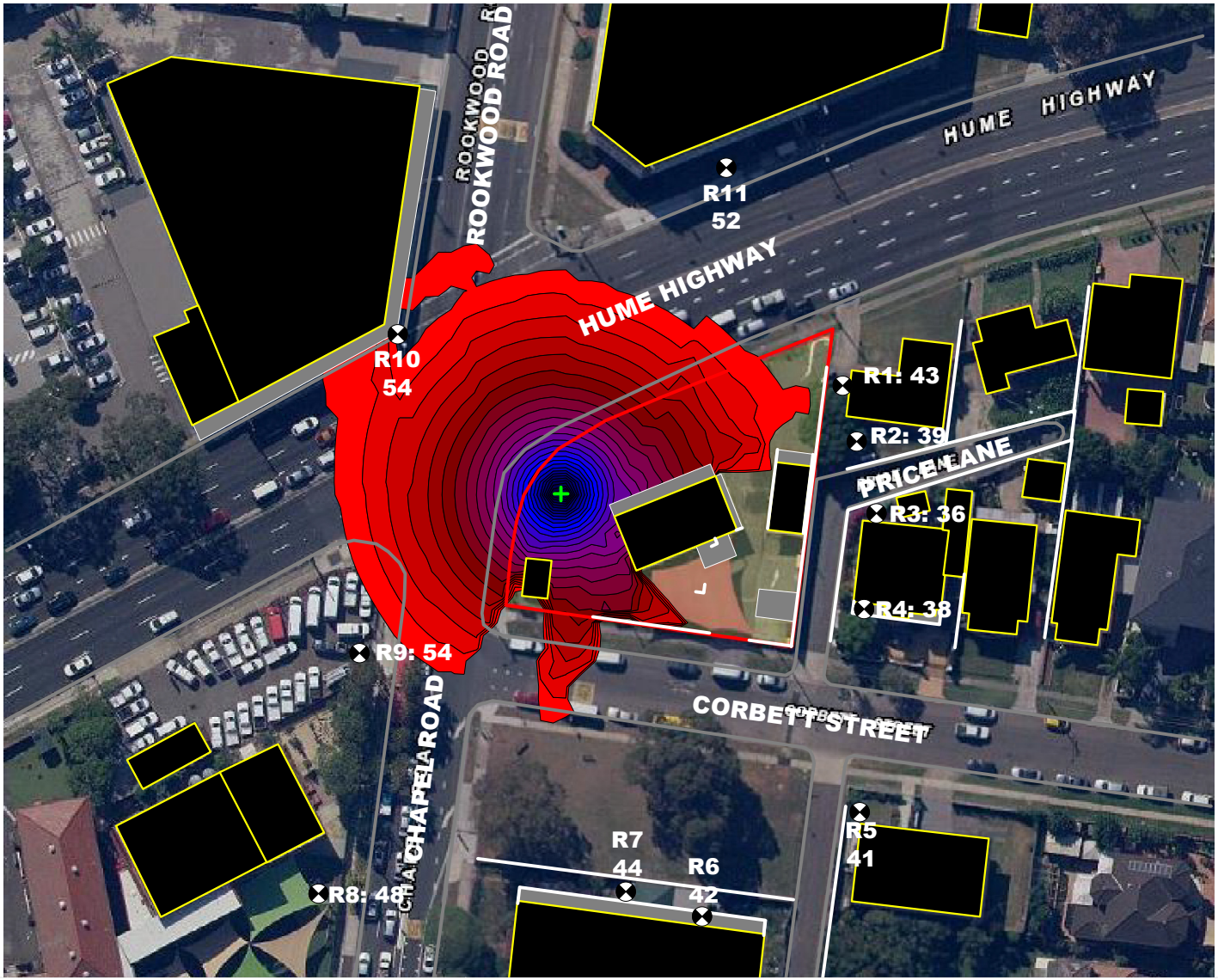

Scenario 3
(Night-time Operation)
**** NOISE SOURCES ****

~ 1 x doors open/close

Note:
- LAmax noise level contours and receiver points shown are at a height of 1.5 m above the ground, except R4 and R6 are at 4.5m above the ground.

- Noise contour end at the limiting criteria of 55 dB(A).

- The maximum reading at the nearest resident is 44 dB(A).

PRINT DATE: 09/01/23

- Point Source
- Building
- Barrier
- 3D-Reflector
- Contour Line
- Receiver
- Calculation Area

- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

JOB NUMBER: 5491
CLIENT: Alwyn Carwash & Cafe
SITE ADDRESS: 345 Hume Highway Bankstown
ASSESSED TO: EPA's Sleep Disturbance
LIMITING CRITERIA: 55 dB(A) - Residential (2200-0700)

N
W E
S