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ACOUSTICAL REPORT

PROPOSED CHILDCARE CENTRE EXPANSION

20 EARLWOOD AVENUE, EARLWOOD NSW

Date: Wednesday, 15 December 2021

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Approved by	Nick Koikas M.A.A.S Director
Client	Joe Loufty C/- Arch. M. Pty Ltd Attention: Magued Tawfik - magued@archm.net.au

ACOUSTICAL REPORT

PROPOSED CHILDCARE CENTRE EXPANSION

20 EARLWOOD AVENUE, EARLWOOD NSW

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1.0 INTRODUCTION

Koikas Acoustics Pty Ltd was commissioned by Arch. M. Pty Ltd to prepare a noise impact assessment for the proposed childcare centre expansion at 20 Earlwood Avenue, Earlwood seeking approval for the expansion of the current childcare centre to increase its capacity from 29 children to 39 children.

For this DA, the acoustical adequacy of the proposed design must be assessed in terms of standard planning guidelines issued by the 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 the following acoustical components require an assessment at the current DA stage:

- Mechanical plant noise emission from the development to neighbouring dwellings.
- Noise emission from children occupying the outdoor and indoor areas to neighbouring dwellings.
- Noise from the increase in traffic on the local road network as a result of the proposed expansion.

This report presents the results and findings of an acoustical assessment for the subject proposal. In-principle acoustic treatments and noise control recommendations are included (where required) so that the premises may operate in compliance with the nominated acoustical planning levels/project noise objectives.

2.0 PROPOSED DEVELOPMENT

The proposed childcare centre is located at 20 Earlwood Avenue, Earlwood and consists of:

- Pick-up/drop-off zones on Gueudecourt Avenue.
- Indoor play areas on the ground and first-floor level.
- Outdoor play areas in the Eastern yard and first-floor balcony.
- Various other rooms such as a staff room, kitchen, office and bathrooms.

Being a corner block, the site has street frontages to Earlwood Avenue and Gueudecourt Avenue.

This acoustic report and any associated recommendations are based solely on the architectural design and drawings by Arch. M. Pty Ltd (dated 29/06/2021). Any unapproved changes to the design may impact the findings of this report and associated noise control recommendations.

2.1 OCCUPANCY LEVELS

The proposed centre can accommodate a total of 39 children. The breakdown per age bracket is:

- 4 children aged 0-2 years,
- 5 children aged 2-3 years, and
- 30 children aged 3-5 years.

2.2 OPERATING HOURS

The proposed hours of operation of the child care centre are between 7:30 am and 6 pm, Monday to Friday.

If staff arrive just before 7 am, further consideration of potential sleep disturbance impacts on neighbours will be considered in this assessment.

3.0 AMBIENT NOISE SURVEY

An unattended noise logging survey was conducted between 17 November 2021 and 23 November 2021. The microphone was placed in the rear yard of 60 Gueudecourt Avenue at approximately 1.5 metres above the natural ground level in 'free-field' conditions.

Figure 1. Noise logging location – Image from SixMaps

A Type 1 Svantek 949 noise logger was used for the 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 recurring 15 minutes intervals.

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.

BOM weather records (**Appendix A**) for the nearest available weather station indicate that

inclement weather conditions may have impacted the noise survey. Noise data from affected periods throughout the survey were removed following standard requirements of the NSW Environmental Protection Authority (EPA).

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}
60 Gueudecourt Avenue	Day	47	31
	Evening	46	28
	Night	39	20
	Early morning[2]	44	25

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. An 'Early Morning' shoulder period from 6 am to 7 am has been adopted for the determination of sleep disturbance criteria for staff arrivals before 7 am, and consideration of this period is more representative of the expected noise levels than considering the entire night-time period.

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

4.0 NOISE ASSESSMENT GUIDELINES

4.1 COUNCIL GUIDELINES

The first stage when determining noise objectives specific to a development or a proposal is to review specific guidelines that may apply under the Council's DCP and/or LEP.

Under the Canterbury LEP 2012, a child care centre is permitted with consent within an R2 land use zone.

Chapter 10, Part 1 'Centre-Based Child Care Facilities' of the Canterbury Bankstown Development Control Plan 2021 (DRAFT December 2020, hereafter referred to as 'CBDCP2021') provides the following guidelines:

- Clause 5.1: Air conditioning, mechanical ventilation or any other continuous noise source must not exceed the ambient level at any specified boundary by more than 5 dB(A).
- Clause 5.2(c): The noise of children playing in outdoor areas does not exceed 10 dB(A) above the background noise level.
- Clause 5.3: The maximum height for noise attenuation walls and fences along the boundary of the site is 2 metres.

4.2 NSW PLANNING AND ENVIRONMENT

The Child Care Planning Guideline (CCPG) under item C23 and C24 recommend the following to minimise noise impacts from the facility on residential neighbours:

- Provision of an acoustic fence along the property boundary.
- Ensure that mechanical plant and equipment is suitably screened to reduce noise.
- That an acoustic report is provided with an application that establishes an appropriate background noise level for times the outdoor play area will be in use, identifies an appropriate target noise level (noise criteria) for child care centre noise emission, recommends appropriate heights for any acoustic fences.

Item C25 that relates to external noise impacts on the proposed child care centre is not relevant in this case as the site is not adjacent to any significant external noise sources.

4.3 SEPP (EDUCATIONAL ESTABLISHMENTS AND CHILD CARE FACILITIES) 2017

The State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017 outlines assessment requirements for educational establishments and child care facilities across NSW. The policy does not present any specific noise criteria.

To establish suitable noise emission objectives from the use and operation of the proposed child care centre, the Association of Australasian Acoustical Consultants (AAAC) *Guidelines for Child Care Centres Acoustic Assessment* are referenced.

The AAAC guidelines do not present noise objectives for an assessment of vehicle noise attributed to additional cars on local roads. The NSW Environmental Protection Authority Road Noise Policy (EPA RNP) is referenced for specific noise objectives related to on-road vehicular noise emissions.

4.4 AAAC GUIDELINES

4.4.1 Outdoor play areas

The AAAC recognise that childcare centres will generally be located in residential areas. Some of these areas will have very low pre-existing background noise levels. In such areas where the background noise level (RBL) is lower than 40 dB(A), the AAAC recommend adopting a base criterion of $L_{Aeq,\ 15\ minutes}$ 45 dB rather than defining a criterion based on a specified emergence of noise above the existing background.

Where the background noise is greater than 40 dB(A), the contributed $L_{Aeq,\ 15\ minutes}$ of noise emitted from outdoor play must not exceed the background noise level by more than 5 or 10 dB at the assessment location depending on the total duration of an outdoor play area.

If the outdoor play area is limited to two (2) hours or less in the morning and a further two (2) hours or less in the afternoon, thus a total usage of four (4) hours per day, the $L_{Aeq,\ 15\ minutes}$ noise emitted from the outdoor play area shall not exceed the background noise level by more than 10 dB.

If the above time limits are not adopted and the duration of outdoor play exceeds two (2) hours in the morning and two (2) hours in the afternoon, the $L_{Aeq,\ 15\ minutes}$ noise level emitted from the outdoor play area shall not exceed the RBL by more than 5 dB.

To summarise, the noise emitted from outdoor play ($L_{Aeq,\ 15\ minutes}$) must not exceed:

- A base criterion of $L_{Aeq,\ 15\ minutes}$ 45 dB in areas where the RBL is below 40 dB(A).
- The RBL + 10 dB in areas where the RBL is greater than 40 dB(A) and where outdoor play **is less** than two (2) hours in the morning and two (2) hours in the afternoon.
- The RBL + 5 dB in areas where the RBL is greater than 40 dB(A) and where outdoor play **is more** than two (2) hours in the morning and two (2) hours in the afternoon.

The assessment location is at the most affected point on or within the residential boundary:

- At 1.5 metres above the ground,
- On a balcony at 1.5 metres above the floor level,
- Outside a window on the ground or upper floors.

4.4.2 Indoor play area, mechanical plant, pick-up and drop-off

The noise that is generated by indoor activities, mechanical plant & equipment, and site pick-up/drop-off zones must not exceed the RBL by more than 5 dB when assessed at the most noise affected point within any residential property. Childcare centre noise is assessed as the $L_{Aeq,\ 15\text{-}minutes}$.

4.4.3 Sleep disturbance

Activity on-site before 7 am or during the night hours, such as staff arrivals, cleaning etc must be assessed for potential sleep disturbance impacts to nearby residential receptors. The sleep disturbance assessment criterion adopted by the AAAC is for a L_{Amax} (the maximum hold sound pressure level) not exceeding the background noise level by more than 15 dB outside the window of the nearest habitable space.

4.4.4 Commercial receptors and other sensitive receivers

No commercial receptors are surrounding the subject site meaning this component of the guideline has no relevance in this case.

4.4.5 Noise intrusion from external sources

The development site is not affected by existing external noise sources meaning this component of the guideline has no relevance in this case.

4.5 EPA ROAD NOISE POLICY

Traffic generating development such as a child care centre will introduce additional vehicles onto the local road network. The noise that is associated with these additional vehicles forms part of the acoustical assessment of the proposed development.

The EPA RNP recommends that traffic noise levels should not exceed $L_{Aeq,\ 1\text{-hour}}$ 55 dB during daytime hours (7 am to 10 pm) at an assessment location of (one) 1 metre from the façade of an affected residential building and at a height of 1.5 metres above the ground. Outside of daytime hours, the objective becomes $L_{Aeq,\ 1\text{-hour}}$ 50 dB.

4.6 CONSOLIDATION OF CRITERIA

To comply with relevant planning guidelines, child care centres require a plan of management and noise mitigation measures to satisfy the noise criteria summarised below.

Table 2. Summary of criteria

Noise component	Document	Noise Metric	Criteria
Outdoor/indoor play areas	Council DCP	$L_{Aeq,\ 15\ minutes}$	RBL + 10 dB (**41**)
Mechanical plant & carpark noise levels	Council DCP	$L_{Aeq,\ 15\ minutes}$	RBL + 5 dB (**36**)
Outdoor play areas (limited to 4 hours total use)	AAAC	$L_{Aeq,\ 15\ minutes}$	**45** dB
Outdoor play areas (more than 4 hours total use)	AAAC	$L_{Aeq,\ 15\ minutes}$	**45** dB
Indoor play areas, mechanical plant & carpark noise levels	AAAC	$L_{Aeq,\ 15\ minutes}$	RBL + 5 dB (**36**)
Sleep disturbance	AAAC	L_{Amax}	RBL + 15 dB (**40**)[1]
On-road vehicle noise	NSW RNP	$L_{Aeq,\ 1\ hour}$	**55** (7 am to 10 pm)[2] **50** (10 pm to 7 am)[2]

Notes:
1. The RBL for the Early Morning period (6 am to 7 am) has been adopted for this criteria.
2. In all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB to maintain acceptable acoustic amenity for residential neighbours.

5.0 CHILD CARE CENTRE NOISE ASSESSMENT

5.1 DESIGN SCENARIOS

The proposed child care centre has been assessed in terms of its impact on neighbouring properties from noise attributed to:

- Children in outdoor play areas
- Children in indoor play areas
- Drop-off and pick-up (parking) zones
- Mechanical plant and equipment
- On-road vehicle noise
- Potential sleep disturbance from staff arriving before 7 am

To fully assess the impact from and to the child care centre, several assessment scenarios are required. These are summarised below for clarity:

1. Noise emission from the outdoor play area
2. Noise emission from the indoor play areas, parking zones, and mechanical plant and equipment
3. On-road vehicle noise
4. Sleep disturbance – Early morning staff arrival

5.2 ASSESSMENT OF OUTDOOR PLAY AREA NOISE

5.2.1 Noise sources

Noise levels of children playing are referenced from the AAAC guidelines that present effective sound power levels and associated noise spectra for groups of 10 children in age groups of 0-2 years, 2-3 years, and 3-5 years. Outdoor play noise levels are directly calculated from these sound levels.

Table 3. Effective sound power levels ($L_{Aeq\ 15\ mins}$) for groups of 10 children playing									
Number and age of children	**1/1 octave band centre frequency [Hz]**								**Total**
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
10 children – 0 to 2 years	54	60	66	72	74	71	67	64	78
10 children – 2 to 3 years	61	67	73	79	81	78	74	70	85
10 children – 3 to 5 years	64	70	75	81	83	80	76	72	87
Notes: 1. An effective sound power level takes into account the directionality of sound from a source where the source orientation is varying, such as for children in outdoor play areas. 2. The AAAC states that passive play noise levels are approximately 6 dB lower than for active play.									

Using a logarithmic average, a correction of -3 dB was applied for children aged 2-3 years, given there will be 5 children in this age range at the centre. Similarly, a correction of -4 dB was applied for children aged 0-2 years, given there will be 4 children in this age range at the centre.

It has also been noted that music occasionally plays during outdoor activities. Whilst on-site, it was observed by Koikas Acoustics that the noise from the outdoor play areas was dominated by the noise of children, and music was barely audible. As such, this assessment is conducted assuming that the contribution of music to the noise levels at receivers is negligible.

5.2.2 Assessment locations

Noise levels are assessed at the most affected point on or within the boundary of neighbouring residential receivers and 1.5 metres above either the ground or relevant upper floor level. Each assessment location is shown in the image below and further qualified in the following table.

Table 4. Assessment locations		
ID	**Receiver type and address**	**Assessment location**
R1	Residential / 21 Earlwood Avenue	Nearest boundary
R2	Residential / 19 Earlwood Avenue	Nearest boundary
R3	Residential / 17 Earlwood Avenue	Nearest boundary
R4	Residential / 18 Earlwood Avenue	Upper floor level
R5	Residential / 49 Gueudecourt Avenue	Upper floor level
R6	Residential / 58 Gueudecourt Avenue	Nearest boundary
R7	Residential / 60 Gueudecourt Avenue	Nearest boundary
R8	Residential / 22 Earlwood Avenue	Nearest boundary
R9	Residential / 24 Earlwood Avenue	Upper floor level
Notes: 1. Noise is assessed at 1.5 metres above the ground, or for upper floor locations, at 1.5 metres above the floor level.		

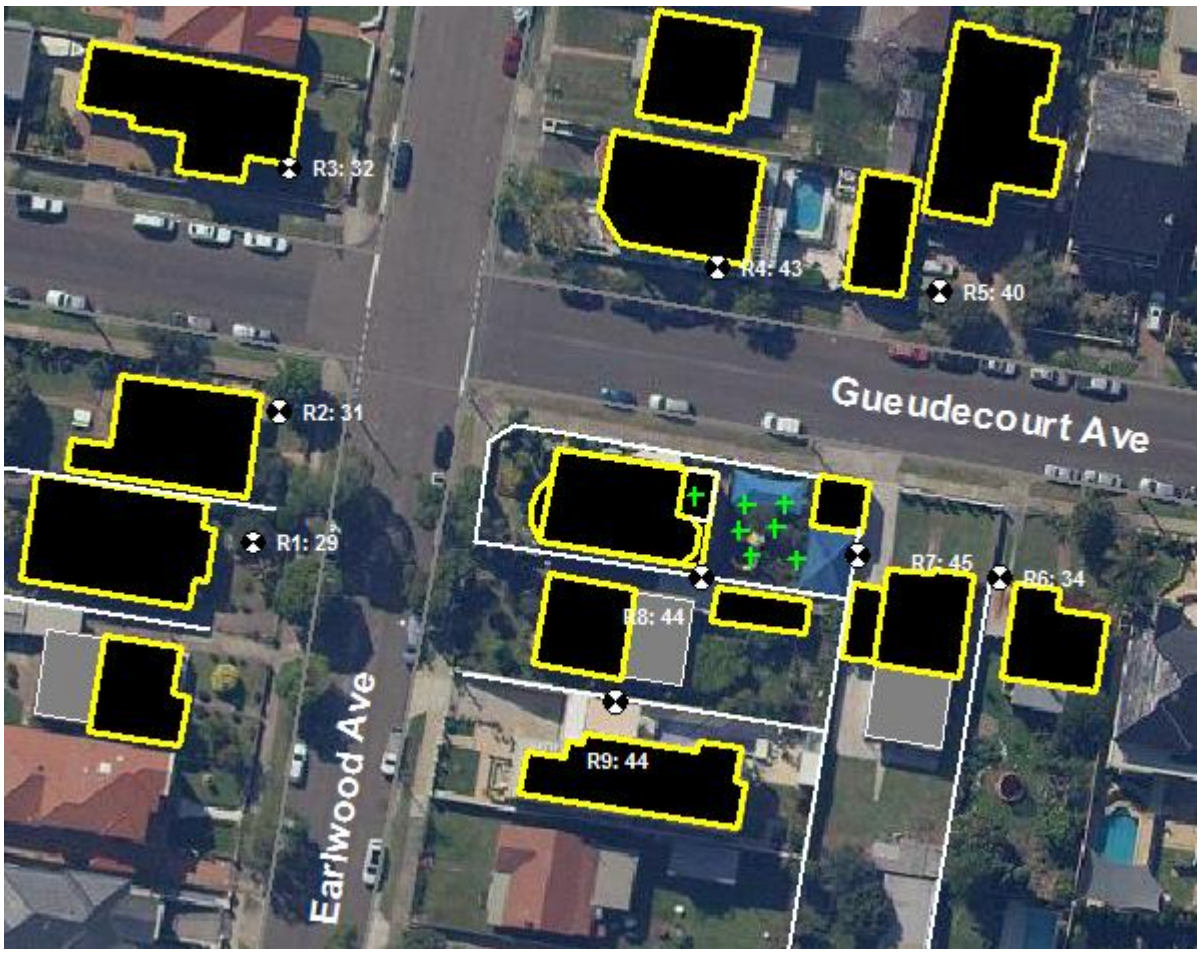


Figure 2. Receiver locations

5.2.3 Calculated receiver levels

The following noise levels are calculated to each of the identified assessment locations:

Table 5. Calculated noise levels, $L_{Aeq\ 15\ minutes}$ [dB]

Assessment location	Noise criteria	Calculated noise level – Full capacity	Calculated noise level – Half capacity
R1: 21 Earlwood Avenue – ground floor	**41 (CBDCP2021)** **45 (AAAC)**	29	26
R2: 19 Earlwood Avenue – ground floor		31	28
R3: 17 Earlwood Avenue – ground floor		32	29
R4: 18 Earlwood Avenue – first floor		43	40
R5: 49 Gueudecourt Avenue – first floor		40	37
R6: 58 Gueudecourt Avenue – ground floor		34	31
R7: 60 Gueudecourt Avenue – ground floor		45	41
R8: 22 Earlwood Avenue – ground floor		44	41
R9: 24 Earlwood Avenue – first floor		44	41

The calculated noise levels at full capacity are found to be in exceedance of the RBL + 10 criteria outlined in the Council DCP. However, all receivers are calculated to comply based on the criteria indicated for the AAAC, which accounts for developments with very low measured background noise levels.

The above noise levels are inclusive of all recommended acoustic controls and treatments from below.

5.2.4 Recommendations – outdoor play – based on AAAC noise criterion

The following noise controls are recommended for the outdoor play areas:

- No more than 10 children aged 3-5 years shall occupy the upstairs balcony outdoor play area. All children in this area must be engaged in passive/educational play.
- No more than 20 children aged 3-5 years shall occupy the main outdoor play area at the rear of the premises. Of these 20 children, 10 must be engaged in passive/educational play.
- No more than 5 children aged 2-3 years shall occupy the main outdoor play area at the rear of the premises. All of these children may be engaged in free play.
- No more than 4 children aged 0-2 years shall occupy the main outdoor play area at the rear of the premises. All of these children may be engaged in free play.

5.2.5 Recommendations – outdoor play – based on CBDCP2021 noise criterion

The following noise controls are recommended for the outdoor play areas in order to comply with the CBDCP2021 criteria of $L_{Aeq\ 15\ minutes}$:

- Use of the outdoor play areas must be limited to no more than 2 hours in the morning and 2 hours in the afternoon, for a total not exceeding 4 hours per day.
- Option 1: All children in all outdoor play areas are to be engaged in passive/educational play at all times.
- Option 2: Only half of the children are to be playing in outdoor play areas at any given time, and the remaining children are to be inside engaged in other activities. One possible configuration for this may be:

Group 1

- No more than 10 children aged 3-5 years shall occupy the upstairs balcony outdoor play area. All children in this area must be engaged in passive/educational play.
- No more than 5 children aged 3-5 years shall occupy the main outdoor play area. All 5 of these children must be engaged in passive/educational play.
- No more than 5 children aged 2-3 years shall occupy the main outdoor play area at the rear of the premises. All of these children may be engaged in free play.
- No more than 4 children aged 0-2 years shall occupy the main outdoor play area at the rear of the premises. All of these children may be engaged in free play.

Group 2

- No more than 15 children aged 3-5 years shall occupy the main outdoor play area. Of these 15 children, 5 must be engaged in passive/educational play.

The measures required for outdoor play areas to comply with the CBDCP2021 are highly stringent and may impact on the ability of children to either play freely or play with a number of other children. Given this, it is our professional opinion that the criteria provided by the AAAC ($L_{Aeq\ 15\ minutes}$ 45 dB) is appropriate for this development on account of the unusually low measured background noise levels. The measured daytime background noise levels were L_{A90} 31 dB, which is comparable to the indoor noise levels in a typical quiet bedroom, and is considered very quiet even for a suburban area. Compliance with the AAAC criterion is achieved as per the recommendations detailed in Section 5.2.4.

5.3 ASSESSMENT OF INDOOR PLAY / MECHANICAL PLANT / PARKING ZONES

5.3.1 Noise sources

Indoor playroom noise levels are derived from the aforementioned sound levels as well as applying a correction for the reverberant field in the room. The reverberant room noise level presumes an internal reverberation time within each playroom not exceeding 0.7 sec.

The calculated indoor playroom noise levels are:

Table 6. Indoor playroom noise levels ($L_{Aeq\ 15\ mins}$)									
Room type	**1/1 octave band centre frequency [Hz]**								**Total**
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
Ground floor[1]	54	60	66	72	74	71	67	64	78
First floor[2]	61	67	73	79	81	78	74	70	85
Notes 1. 2.	20 children aged 3-5 years, 5 children aged 2-3 years, and 4 children aged 0-2 years 10 children aged 3-5 years								

As the pick up/drop off area(s) are located outside of the boundary of the premises on the nearby streets, they are not assessable.

Mechanical plant and equipment currently installed to service the existing childcare centre and upstairs residential unit will remain. The equipment schedule nominates the following:

Table 8. Mechanical plant sound power levels L_{Aweq} [dB]									
Source	**1/1 octave band centre frequency [Hz]**								**Total**
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	
Fujitsu 9kW Split System	38	52	55	56	56	55	47	38	62
Mitsubishi 12kW Ducted System	43	57	60	61	61	60	52	43	67

5.3.2 Assessment locations

Assessment locations are as indicated previously in Table 4 and Figure 2.

5.3.3 Calculated receiver levels

The following noise levels are calculated to each of the identified assessment locations:

Table 9. Calculated noise levels, $L_{Aeq\ 15\ minutes}$ [dB]		
Assessment location	**Noise criteria**	**Calculated noise level**
R1: 21 Earlwood Avenue	**36**	22
R2: 19 Earlwood Avenue		26
R3: 17 Earlwood Avenue		23
R4: 18 Earlwood Avenue		29
R5: 49 Gueudecourt Avenue		27
R6: 58 Gueudecourt Avenue		21
R7: 60 Gueudecourt Avenue		23
R8: 22 Earlwood Avenue		36
R9: 24 Earlwood Avenue		28

The calculated noise levels comply with the adopted target noise level of $L_{Aeq\ 15\ minutes}$ 36 dB per the requirements of the CBDCP2021 and AAAC criteria.

5.4 ASSESSMENT OF ON-ROAD VEHICLE NOISE

5.4.1 Noise sources

On-road vehicle noise is predicted via the road noise module in CadnaA on the presumption of up to 31 cars arriving or departing during 1-hour. Due to the location of a pick up/drop off area on Gueuedecourt Avenue, it is assumed that 25 vph will travel along this street, and 6 vph will travel along Earlwood Avenue.

5.4.2 Assessment locations

Noise levels are assessed at 1 metre from the residential facades most impacted by on-road vehicle noise. Each assessment location is shown in the image below and further qualified in the following table.

Table 10. Assessment locations

ID	Receiver type and address	Assessment location
R1	Residential / 21 Earlwood Avenue	1m from façade
R2	Residential / 19 Earlwood Avenue	1m from façade
R3	Residential / 17 Earlwood Avenue	1m from façade
R4	Residential / 18 Earlwood Avenue	1m from façade
R5	Residential / 49 Gueudecourt Avenue	1m from façade
R6	Residential / 58 Gueudecourt Avenue	1m from façade
R7	Residential / 60 Gueudecourt Avenue	1m from façade
R8	Residential / 22 Earlwood Avenue	1m from façade
R9	Residential / 24 Earlwood Avenue	1m from façade
Notes: 1.	Noise is assessed at 1.5 metres above the ground, or for upper floor locations, at 1.5 metres above the floor level.	

Figure 3. Receiver locations

5.4.3 Calculated receiver levels

The following noise levels are calculated to each of the identified assessment locations:

Table 11. Calculated noise levels, $L_{Aeq\ 1\ hour}$ [dB]

Assessment location	Noise criteria	Calculated noise level
R1: 21 Earlwood Avenue	**55**	43
R2: 19 Earlwood Avenue		49
R3: 17 Earlwood Avenue		50
R4: 18 Earlwood Avenue		50
R5: 49 Gueudecourt Avenue		48
R6: 58 Gueudecourt Avenue		47
R7: 60 Gueudecourt Avenue		47
R8: 22 Earlwood Avenue		44
R9: 24 Earlwood Avenue		43

The calculated noise levels comply with the adopted target noise level of $L_{Aeq\ 1\text{-}hour}$ 55 dB per the EPA

RNP.

5.5 ASSESSMENT OF POTENTIAL SLEEP DISTURBANCE

Staff arrivals before 7 am are considered under a sleep disturbance assessment to review early morning noise generated as the vehicles enter the site. Maximum noise level events that may impact sleep include car doors opening/closing and engine starting. As the vehicles will be arriving and not leaving, engine ignition need not be considered. Car doors opening/closing are assessed for potential sleep disturbance.

5.5.1 Noise sources

The L_{Amax} noise level used to assess potential sleep disturbance impacts to residential neighbours from car doors is L_{Amax} SWL 93 dB.

5.5.2 Assessment locations and noise levels

As has previously been identified, the proposed hours of operation are between 7:30 am and 6 pm. As a result, it is unlikely that staff will arrive before 7 am.

In the case where staff do arrive before 7 am, this will occur in one of two ways. Firstly, they may park inside the rear garage at the east of the development, in which case the noise of car doors will be contained within the garage and minimal noise is expected to emit from this structure. Alternatively, staff may park on the street, in which case the activities are occurring outside the boundary of the premises and are therefore not assessable. In both cases, there is not expected to be any considerable potential for sleep disturbance.

6.0 CONCLUSION

Koikas Acoustics was requested to conduct an acoustical assessment and prepare a report for the proposed child care expansion at 20 Earlwood Avenue, Earlwood. The acoustical report is to accompany a development application to be submitted to the Canterbury Bankstown Council. The assessment considers potential noise impacts to future occupants of the development, and to surrounding residents such that acceptable acoustic amenity is maintained.

Acoustic planning levels have been referenced from current the Canterbury Bankstown Council DCP, SEPP, AAAC and NSW Road Noise Policy acoustic planning guidelines and requirements. The included recommendations are based on designs prepared by Arch. M. 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. Of the assessed components of noise, the following conclusions have been reached:

- Noise intrusion from the play areas (external and internal), mechanical plant and car park of the child care centre to neighbouring residential premises are predicted to comply with the relevant acoustic planning guidelines provided the recommendations detailed in this report are adhered to.
- Traffic noise attributed to additional vehicle movement generated on the local road network as a result of the proposed child care centre is predicted to not exceed relevant EPA Road Noise Policy guidelines.
- Noise from staff arriving before 7 am will either be contained within the garage at the rear of the premises, or will occur on the street and therefore be outside the boundary and the assessable area. No sleep disturbance impacts are expected.

In our professional opinion, there is sufficient scope to achieve the acoustical planning guidelines.

APPENDIX A

APPENDIX A

APPENDIX A

Daily Rainfall (millimetres)

MARRICKVILLE GOLF CLUB

Station Number: 066036 · State: NSW · Opened: 1904 · Status: Open · Latitude: 33.92°S · Longitude: 151.14°E · Elevation: 6 m

2021	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	*3.0*	*1.0*	*0*	*8.0*	*1.0*	*0*	*2.0*	*0*	*0*	*1.0*	*0*	
2nd	*1.0*	*21.0*	*0*	*0*	*0*	*0*	*2.0*	*0*	*0*	*12.0*	*0*	
3rd	*6.0*	*0*	*0*	*0*	*0*	*0*	*1.0*	*3.0*	*0*	*6.0*	*0*	
4th	*5.0*	*0*	*0*	*0*	*0*	*9.0*	*0*	*0*	*0*	*0*	*0*	
5th	*9.0*	*0*	*0*	*0*	*28.0*	*0*	*0*	*0*	*12.0*	*0*	*11.0*	
6th	*3.0*	*0*	*0*	*2.0*	*21.0*	*0*	*0*	*0*	*1.0*	*0*	*0*	
7th	*1.0*	*1.0*	*0*	*9.0*	*38.0*	*8.0*	*0*	*0*	*0*	*0*	*0*	
8th	*4.0*	*0*	*0*	*7.0*	*1.0*	*0*	*0*	*1.0*	*0*	*0*	*13.0*	
9th	*1.0*	*0*	*0*	*1.0*	*0*	*7.0*	*0*	*0*	*0*	*0*	*3.0*	
10th	*0*	*1.0*	*0*	*0*	*0*	*1.0*	*5.0*	*0*	*0*	*0*	*0*	
11th	*0*	*0*	*0*	*0*	*0*	*6.0*	*15.0*	*0*	*0*	*8.0*	*13.0*	
12th	*0*	*0*	*0*	*0*	*0*	*0*	*1.0*	*0*	*0*	*1.0*	*22.0*	
13th	*0*	*8.0*	*42.0*	*0*	*1.0*	*0*	*1.0*	*0*	*0*	*3.0*	*0*	
14th	*0*	*12.0*	*19.0*	*0*	*0*	*0*	*0*	*0*	*27.0*	*4.0*	*0*	
15th	*0*	*0*	*15.0*	*0*	*0*	*0*	*2.0*	*0*	*3.0*	*24.0*	*0*	
16th	*0*	*7.0*	*1.0*	*0*	*0*	*0*	*1.0*	*0*	*0*	*0*	*0*	
17th	*0*	*22.0*	*5.0*	*0*	*0*	*7.0*	*1.0*	*0*	*0*	*0*	*0*	
18th	*0*	*2.0*	*14.0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	
19th	*0*	*4.0*	*53.0*	*0*	*0*	*2.0*	*0*	*0*	*1.0*	*0*	*0*	
20th	*0*	*0*	*55.0*	*0*	*0*	*4.0*	*0*	*0*	*0*	*0*	*0*	
21st	*0*	*0*	*107.0*	*0*	*1.0*	*2.0*	*0*	*0*	*0*	*0*	*15.0*	
22nd	*0*	*0*	*24.0*	*0*	*2.0*	*2.0*	*0*	*0*	*0*	*0*	*17.0*	
23rd	*0*	*0*	*42.0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*3.0*	
24th	*0*	*18.0*	*25.0*	*0*	*4.0*	*0*	*1.0*	*32.0*	*0*	*0*	*0*	
25th	*0*	*3.0*	*0*	*0*	*2.0*	*1.0*	*0*	*43.0*	*0*	*2.0*	*4.0*	
26th	*0*	*7.0*	*0*	*0*	*0*	*0*	*0*	*0*	*5.0*	*0*		
27th	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*		
28th	*15.0*	*1.0*	*0*	*0*	*0*	*2.0*	*0*	*0*	*0*	*0*		
29th	*8.0*		*0*	*0*	*0*	*10.0*	*0*	*0*	*0*	*0*		
30th	*15.0*		*1.0*	*0*	*0*	*9.0*	*0*	*1.0*	*3.0*	*0*		
31st	*0*		*4.0*		*0*		*0*	*0*		*0*		
Highest daily	*15.0*	*22.0*	*107.0*	*9.0*	*38.0*	*10.0*	*15.0*	*43.0*	*27.0*	*24.0*	*22.0*	
Monthly Total	*71.0*	*108.0*	*407.0*	*27.0*	*99.0*	*70.0*	*32.0*	*80.0*	*52.0*	*61.0*		

↓ This day is part of an accumulated total
Quality control: 12.3 Done & acceptable, *12.3* Not completed or unknown

Product code: IDCJAC0009 reference: 80450594

Daily Rainfall (millimetres)

MARRICKVILLE GOLF CLUB

Station Number: 066036 · State: NSW · Opened: 1904 · Status: Open · Latitude: 33.92°S · Longitude: 151.14°E · Elevation: 6 m

Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	80.0	104.9	111.1	102.4	93.3	110.6	79.6	65.8	55.4	63.3	68.2	73.6
Median	66.4	75.4	89.2	74.3	65.8	82.0	48.0	41.8	46.2	46.3	58.3	59.2
Highest daily	139.7	*194.0*	215.9	*123.0*	111.8	*104.0*	127.0	78.7	73.7	*124.0*	143.5	88.9
Date of highest daily	13th 1911	10th 2020	9th 1913	21st 2015	5th 1919	5th 2016	10th 1904	31st 1906	29th 1916	15th 2014	14th 1969	13th 1910

1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

3) Further information

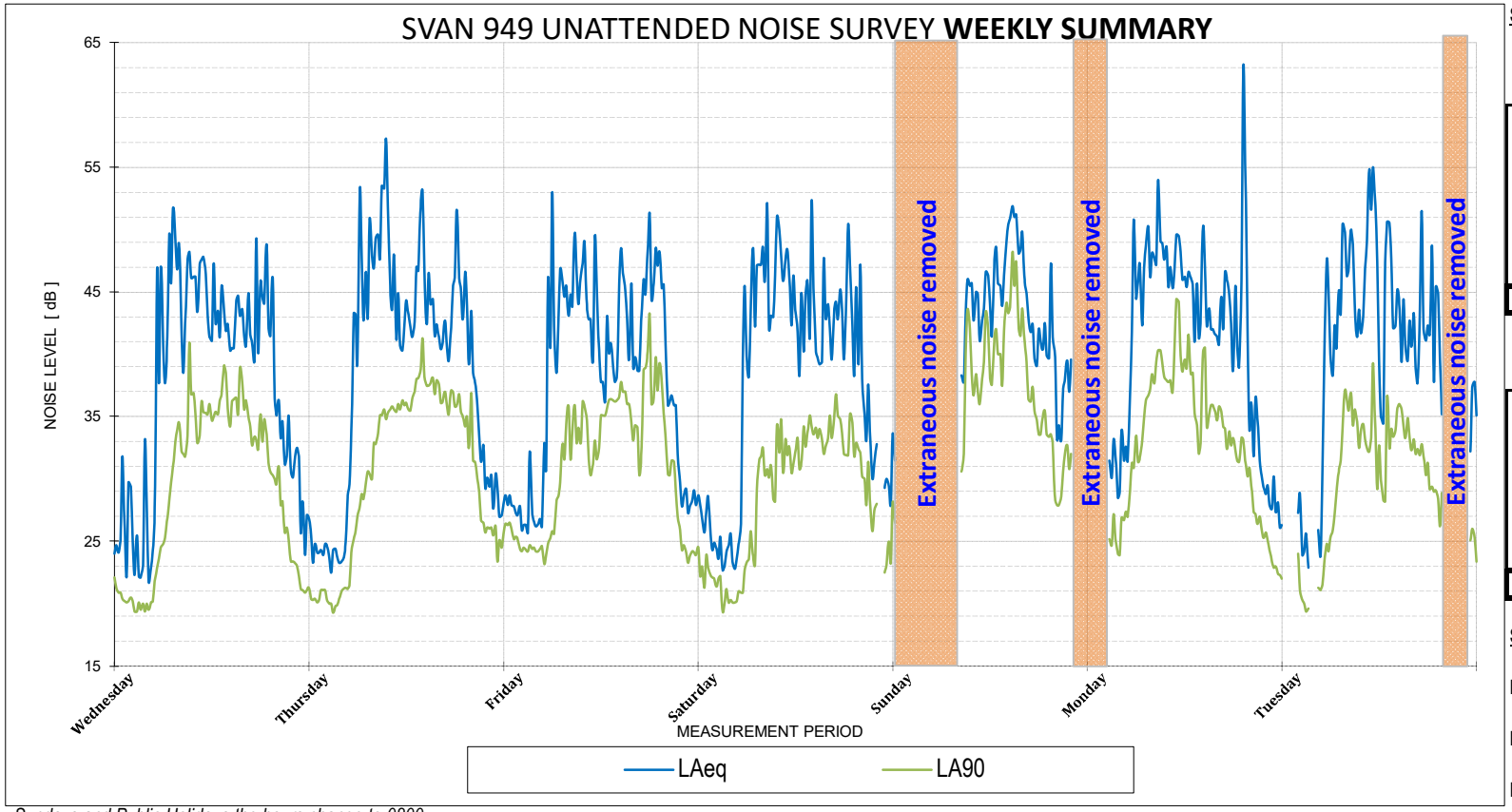
http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml.

APPENDIX B

APPENDIX B

APPENDIX B

WEEKLY SUMMARY **LOGGER LOCATION:** 20 Earlwood Avenue, Earlwood **PERIOD:** 17th to the 23rd November 2021



Sundays and Public Holidays the hours change to 0800

SUMMARY OF AMBIENT LEVELS

	LA90 Daytime	*LA90* Evening	*LA90* Night-time
Day 1	32	26	19
Day 2	31	28	20
Day 3	30	30	24
Day 4	29	27	20
Day 5	36	28	22
Day 6	34	26	24
Day 7	30	28	20
RBL	**31**	**28**	**20**

	LAeq Daytime	*LAeq* Evening	*LAeq* Night-time
Day 1	45	42	38
Day 2	48	44	40
Day 3	45	45	39
Day 4	46	43	37
Day 5	47	41	31
Day 6	47	52	42
Day 7	48	44	38
Average	**47**	**46**	**39**

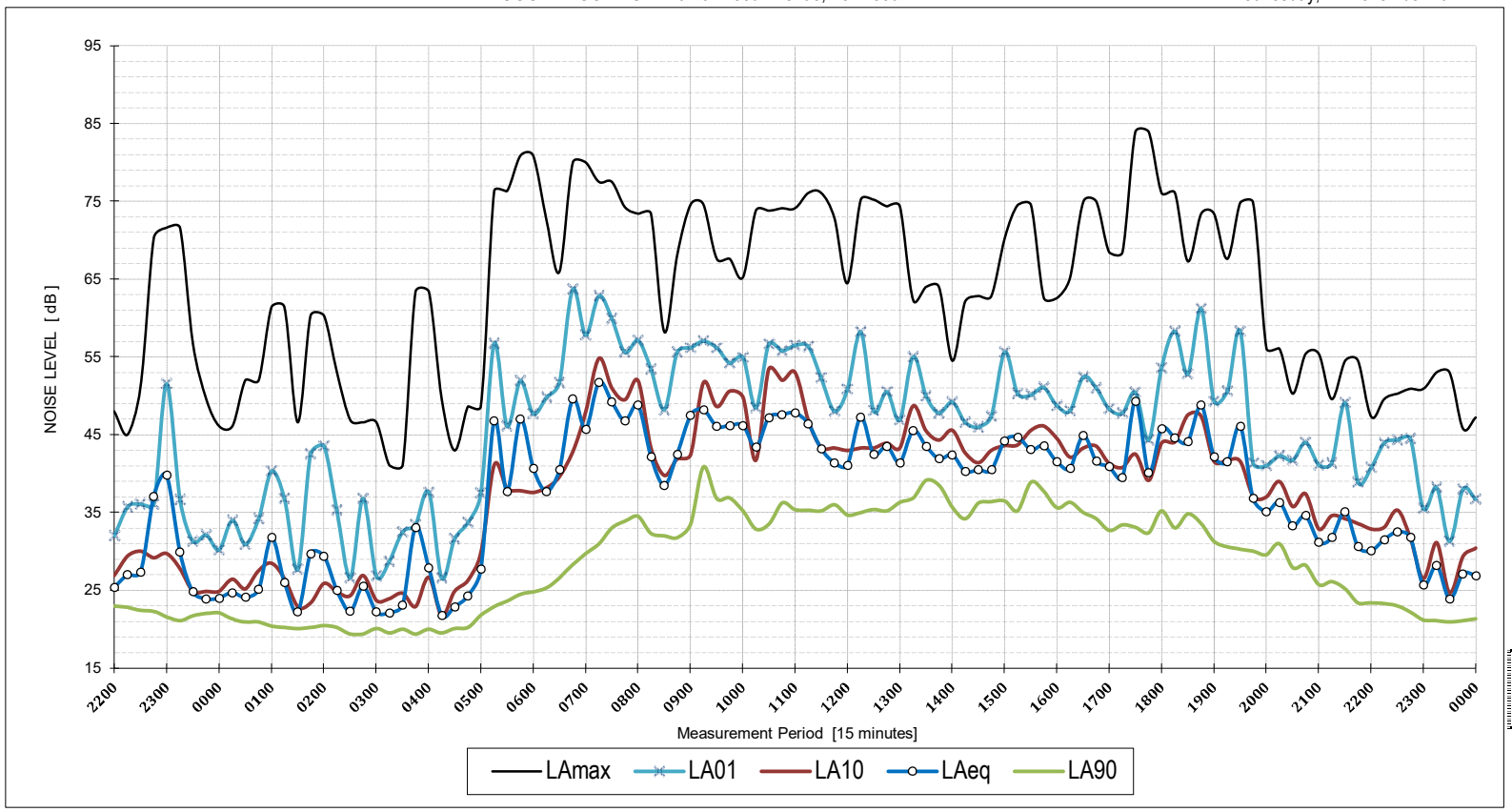
SUMMARY OF TRAFFIC LEVELS

LAeq 15 hrs	0700-2200	46	dB
LAeq 9 hrs	2200-0700	39	dB
Max LAeq 1 hr	0700-2200	50	dB
Max LAeq 1 hr	2200-0700	43	dB

Maximum noise events as defined in the Environmental Noise Management Manual 7 day average - [LAmax - LAeq ≥ 15]	25

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 1 **LOGGER LOCATION:** 20 Earlwood Avenue, Earlwood **DATE:** Wednesday, 17 November 2021



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	32	dB
LA90 Evening	1800-2200	26	dB
LA90 Night-time	2200-0700	19	dB
LAeq Daytime	0700-1800	45	dB
LAeq Evening	1800-2200	42	dB
LAeq Night-time	2200-0700	38	dB

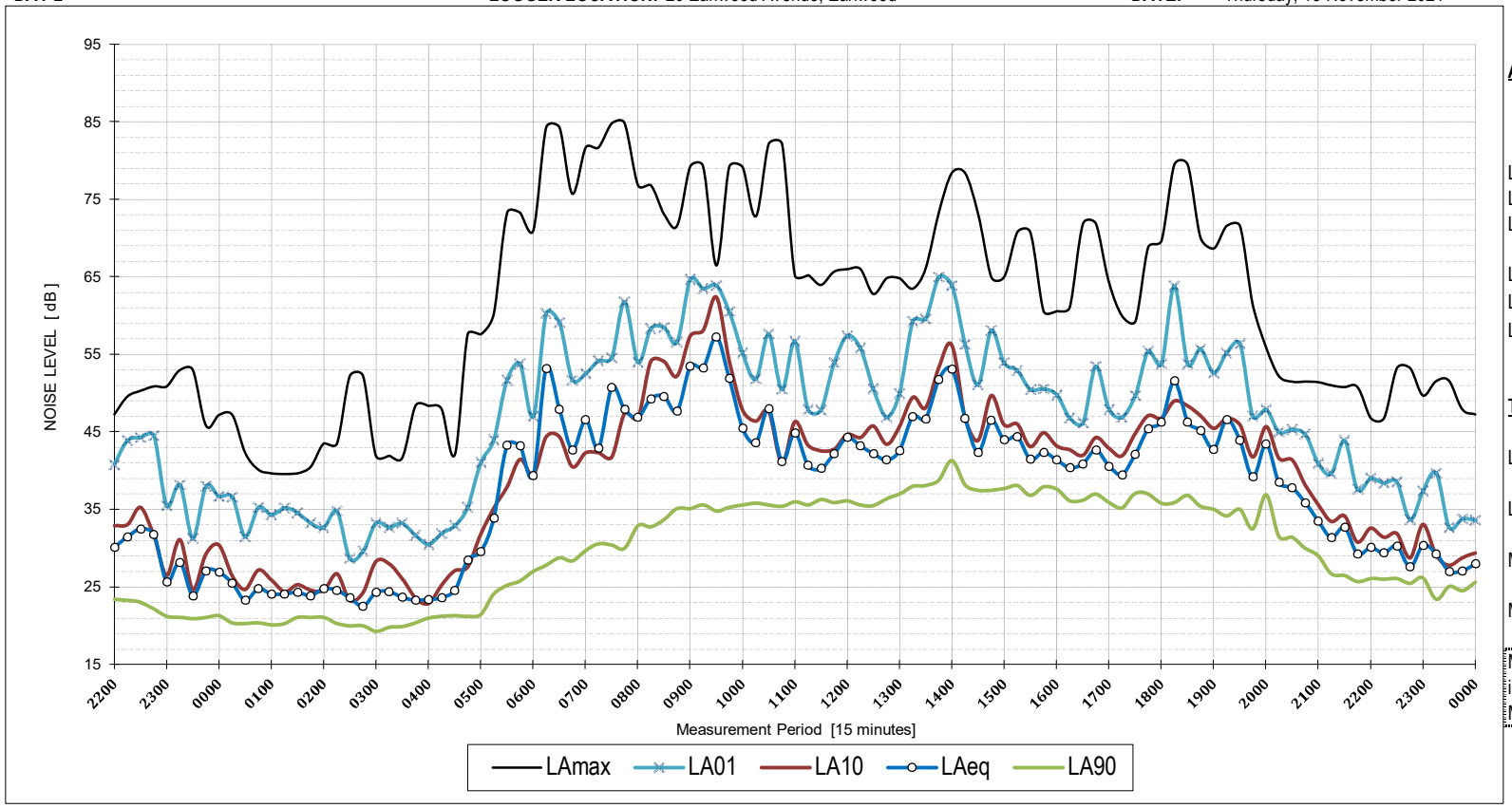
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	45	dB
LAeq 9 hours	2200-0700	38	dB
Max LAeq 1 hour	0700-2200	47	dB
Max LAeq 1 hour	2200-0700	43	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	36

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 2 **LOGGER LOCATION:** 20 Earlwood Avenue, Earlwood **DATE:** Thursday, 18 November 2021



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	31	dB
LA90 Evening	1800-2200	28	dB
LA90 Night-time	2200-0700	20	dB
LAeq Daytime	0700-1800	48	dB
LAeq Evening	1800-2200	44	dB
LAeq Night-time	2200-0700	40	dB

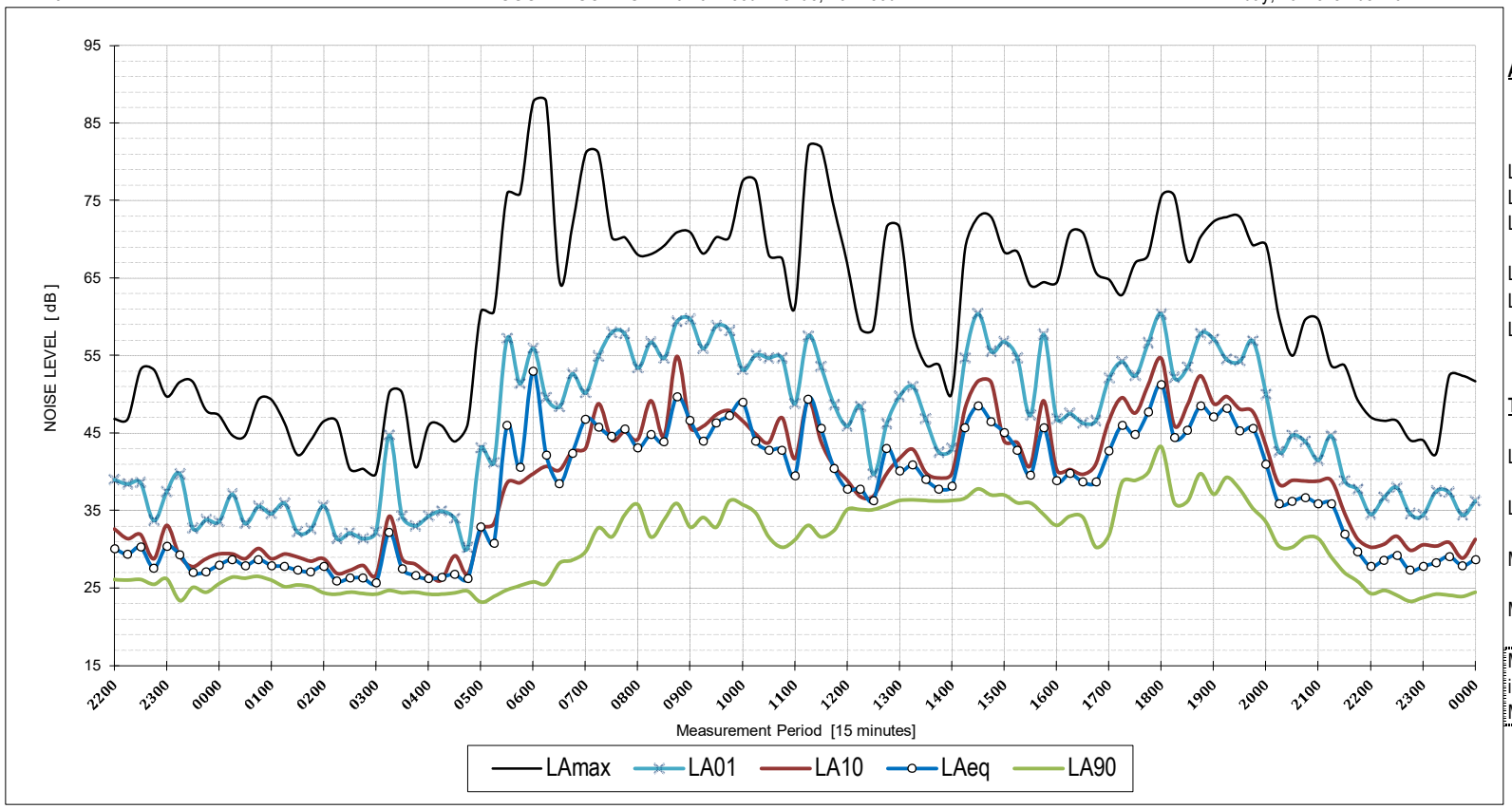
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	47	dB
LAeq 9 hours	2200-0700	40	dB
Max LAeq 1 hour	0700-2200	51	dB
Max LAeq 1 hour	2200-0700	41	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	36

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 3 **LOGGER LOCATION:** 20 Earlwood Avenue, Earlwood **DATE:** Friday, 19 November 2021



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	30	dB
LA90 Evening	1800-2200	30	dB
LA90 Night-time	2200-0700	24	dB
LAeq Daytime	0700-1800	45	dB
LAeq Evening	1800-2200	45	dB
LAeq Night-time	2200-0700	39	dB

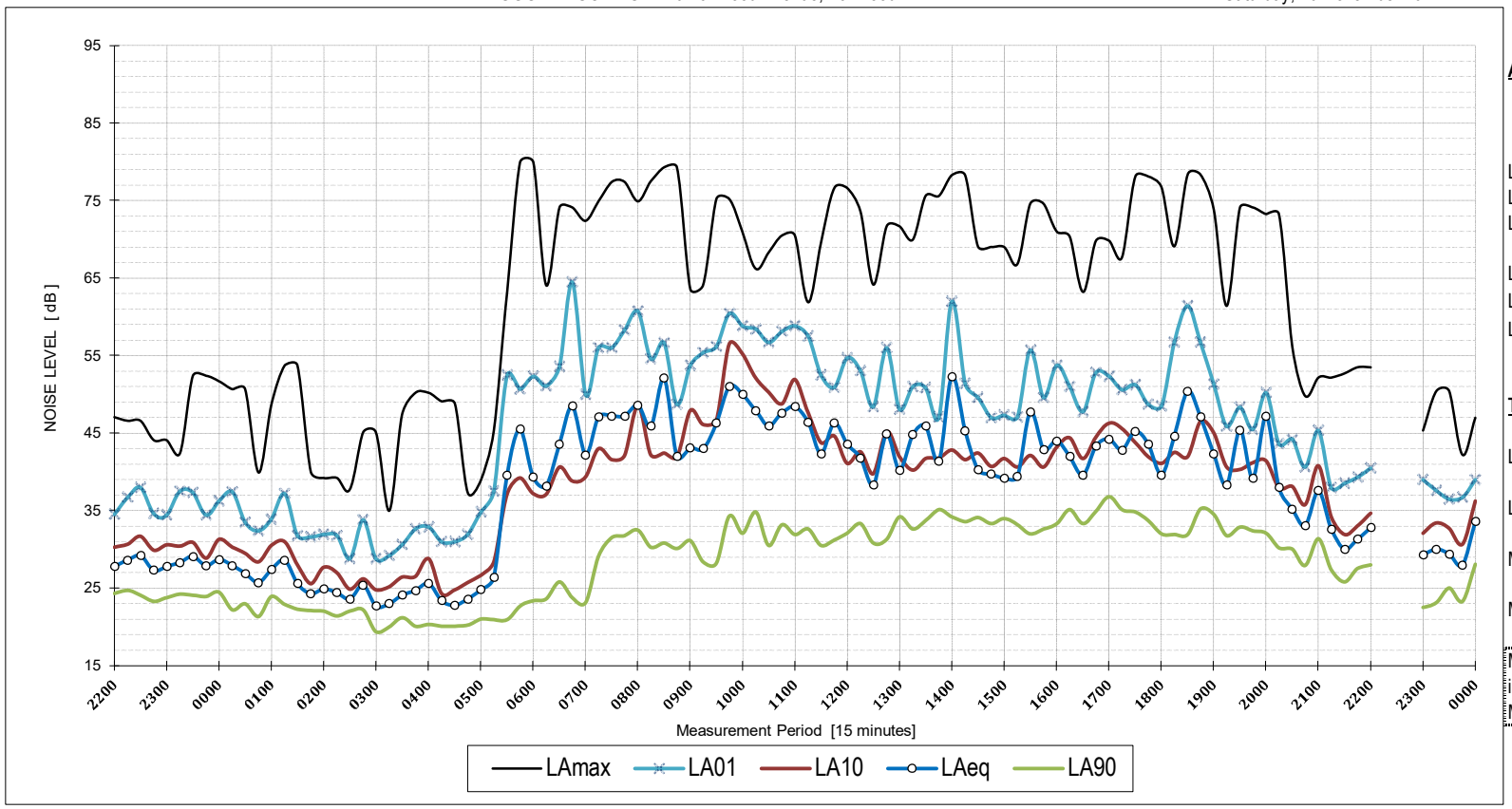
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	45	dB
LAeq 9 hours	2200-0700	39	dB
Max LAeq 1 hour	0700-2200	47	dB
Max LAeq 1 hour	2200-0700	46	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 4 **LOGGER LOCATION:** 20 Earlwood Avenue, Earlwood **DATE:** Saturday, 20 November 2021



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	29	dB
LA90 Evening	1800-2200	27	dB
LA90 Night-time	2200-0700	20	dB
LAeq Daytime	0700-1800	46	dB
LAeq Evening	1800-2200	43	dB
LAeq Night-time	2200-0700	37	dB

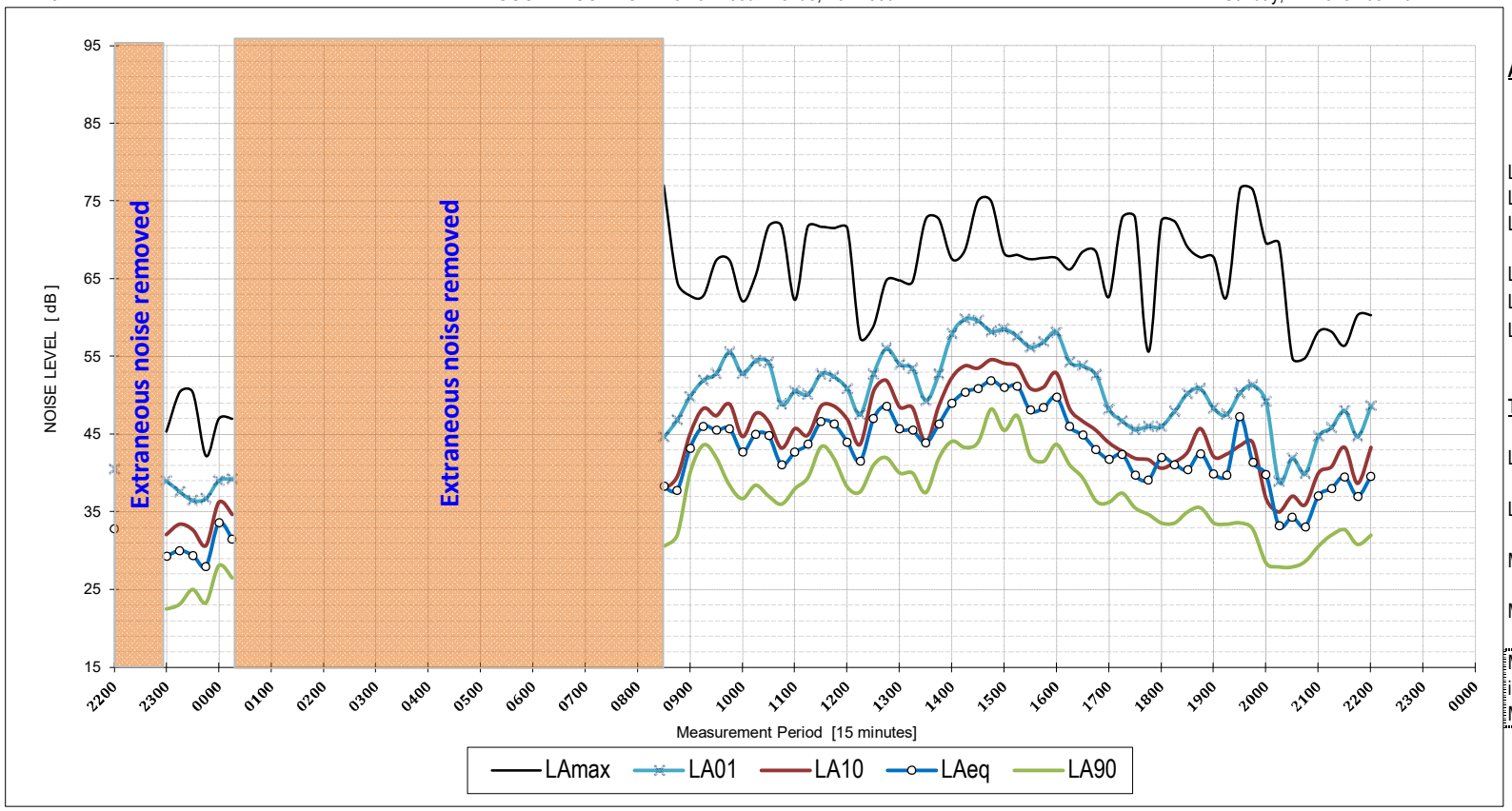
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	45	dB
LAeq 9 hours	2200-0700	37	dB
Max LAeq 1 hour	0700-2200	48	dB
Max LAeq 1 hour	2200-0700	41	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	28

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 5 **LOGGER LOCATION:** 20 Earlwood Avenue, Earlwood **DATE:** Sunday, 21 November 2021



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0800-1800	36	dB
LA90 Evening	1800-2200	28	dB
LA90 Night-time	2200-0800	22	dB
LAeq Daytime	0800-1800	47	dB
LAeq Evening	1800-2200	41	dB
LAeq Night-time	2200-0800	31	dB

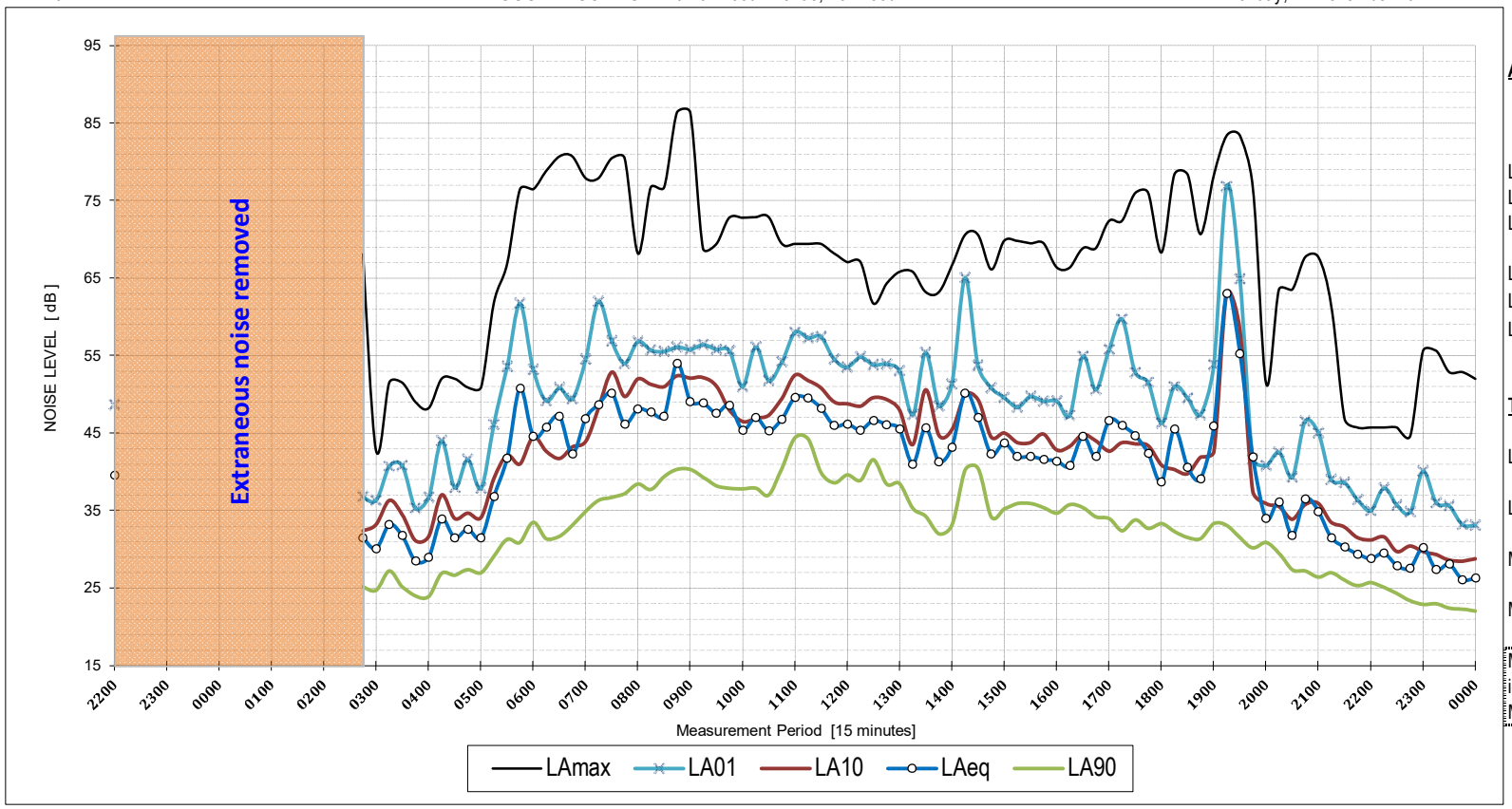
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	46	dB
LAeq 9 hours	2200-0700	31	dB
Max LAeq 1 hour	0700-2200	50	dB
Max LAeq 1 hour	2200-0700	31	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	5

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 6 **LOGGER LOCATION:** 20 Earlwood Avenue, Earlwood **DATE:** Monday, 22 November 2021



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	34	dB
LA90 Evening	1800-2200	26	dB
LA90 Night-time	2200-0700	24	dB
LAeq Daytime	0700-1800	47	dB
LAeq Evening	1800-2200	52	dB
LAeq Night-time	2200-0700	42	dB

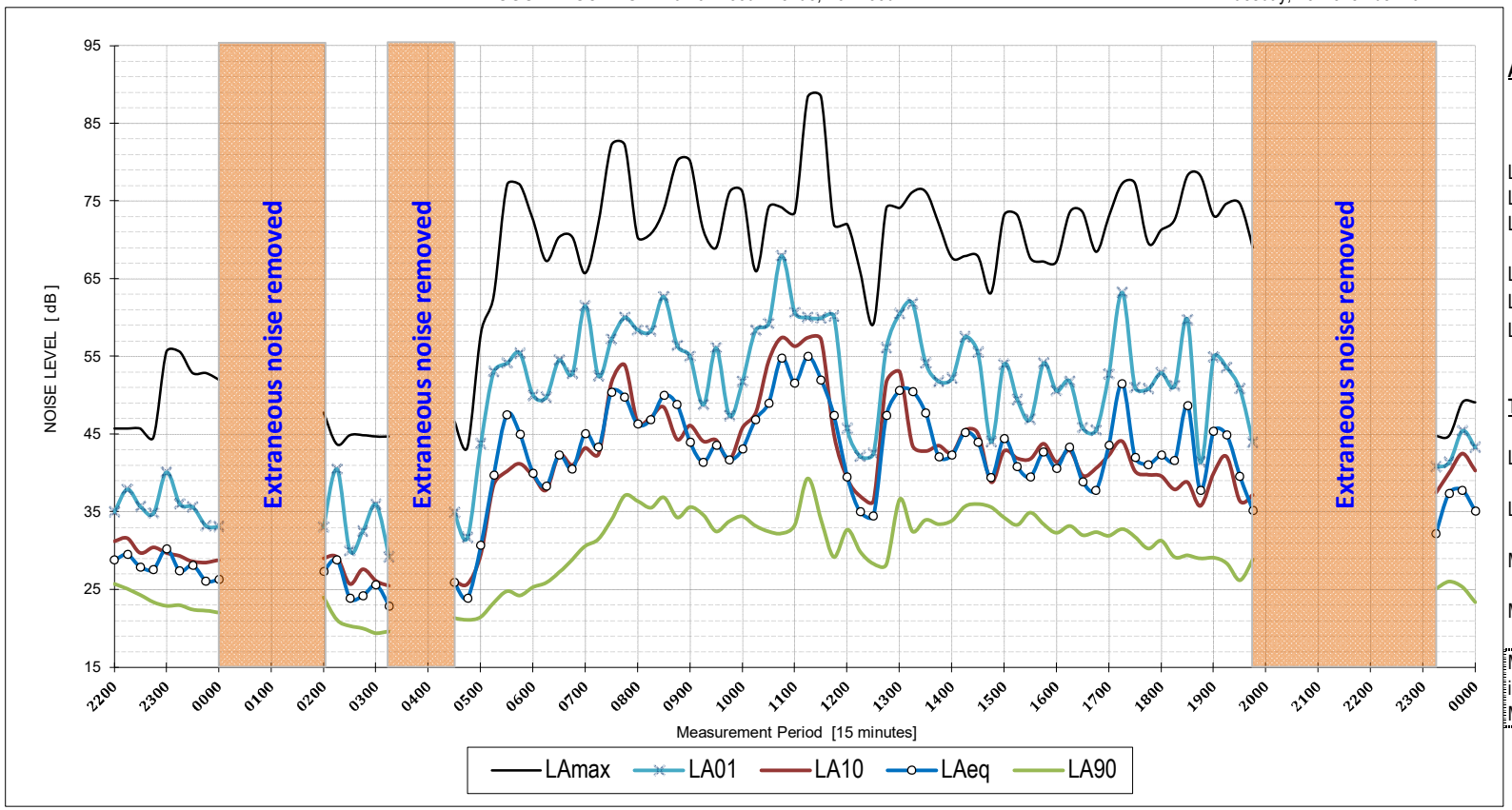
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	49	dB
LAeq 9 hours	2200-0700	42	dB
Max LAeq 1 hour	0700-2200	51	dB
Max LAeq 1 hour	2200-0700	47	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	17

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

DAY 7 **LOGGER LOCATION:** 20 Earlwood Avenue, Earlwood **DATE:** Tuesday, 23 November 2021



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	30	dB
LA90 Evening	1800-2200	28	dB
LA90 Night-time	2200-0700	20	dB
LAeq Daytime	0700-1800	48	dB
LAeq Evening	1800-2200	44	dB
LAeq Night-time	2200-0700	38	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	47	dB
LAeq 9 hours	2200-0700	38	dB
Max LAeq 1 hour	0700-2200	51	dB
Max LAeq 1 hour	2200-0700	44	dB

Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]	24

koikas acoustics PTY LTD
CONSULTANTS IN NOISE & VIBRATION

APPENDIX C

APPENDIX C

APPENDIX C

Scenario 1
(Day)
**** NOISE SOURCES ****

~30 children aged 3-5
~5 children aged 2-3
~4 children aged 0-2

Note:
- LAeq,15minutes noise contours are at a height of 1.5 m above the ground level

- All Receiver points are at 1.5 m above ground level or the first floor level on or within the boundary

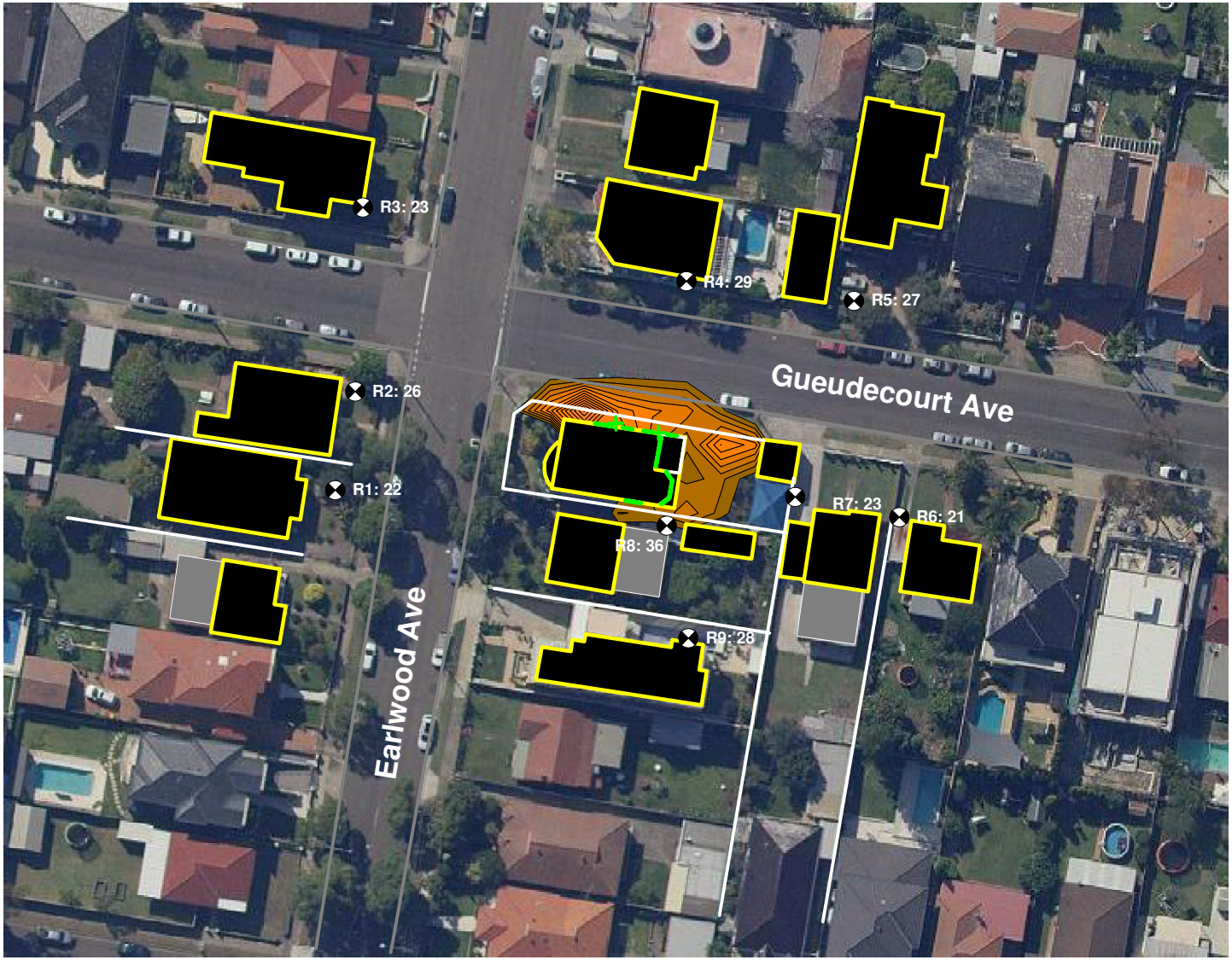
PRINT DATE: 15/12/2021

Point Source
Building
Barrier
3D-Reflector
Contour Line
Receiver

> 40.0 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: 5135
CLIENT: Joe Loufty C/- Arch. M. Pty Ltd
SITE ADDRESS: 20 Earlwood Avenue, Earlwood
ASSESSED TO: AAAC
LIMITING CRITERIA: 45 dB(A)



Scenario 2
(Day)
**** NOISE SOURCES ****

~Breakout noise from indoor play areas
~2 x residential AC condensers

Note:
- LAeq,15minutes noise contours are at a height of 1.5 m above the ground level

- All Receiver points are at 1.5 m above ground level or the first floor level on or within the boundary

PRINT DATE: 15/12/2021

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

- > 30.0 dB
- > 40.0 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: 5135
CLIENT: Joe Loufty C/- Arch. M. Pty Ltd
SITE ADDRESS: 20 Earlwood Avenue, Earlwood
ASSESSED TO: AAAC/CBDCP2021
LIMITING CRITERIA: 36 dB(A)

Scenario 3
(Day)
**** NOISE SOURCES ****

~26 vph on Gueudecourt Ave
~5 vph on Earlwood Ave

Note:
- LAeq,1hour noise contours are at a height of 1.5 m above the ground level

- All Receiver points are at 1.5 m above ground level or the first floor level on or within the boundary

PRINT DATE: 15/12/2021

Road
Building
Barrier
3D-Reflector
Contour Line
Receiver

> 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: 5135
CLIENT: Joe Loufty C/- Arch. M. Pty Ltd
SITE ADDRESS: 20 Earlwood Avenue, Earlwood
ASSESSED TO: NSW RNP
LIMITING CRITERIA: 55 dB(A)