

MEMORANDUM



250622 - HomeCo Roselands Mall - Council RFI 2 (August 2026) - Acoustic Responses - R0

TO: Jacob Barsoum **DATE:** 19 August 2026
COMPANY: HMC Capital
EMAIL: Jacob.Barsoum@hmccapital.com.au
FROM: Matthew Furlong
SUBJECT: HomeCo Roselands Mall - Council RFI 2 (August 2026) - Acoustic Responses - R0

CONFIDENTIALITY

This document is confidential and may contain legally privileged information. If you are not a named or authorised recipient you must not read, copy, distribute or act in reliance on it. If you have received this document in error, please telephone our operator immediately and return the document by mail.

Pulse White Noise Acoustics Pty Ltd (PWNA) has been requested by HMC Capital to undertake a review and respond to the comments provided by SLR Consulting Australia (SLR) as part of the independent *Noise and Vibration Impact Assessment Peer Review (dated 18th August 2026)*.

The peer review was commissioned in response to the Request for Further Information issued by Canterbury-Bankstown Council (dated 22nd July 2026) in relation to DA-52/2026 which was for the Alterations and Additions to the existing Roselands Shopping Centre.

Outlined below is the timeline and proceedings of the peer review undertaken:

1. The PWNA report titled *HomeCo Roselands Mall Noise and Vibration Impact Assessment* (reference "250622 – HomeCo Roselands Mall – Noise and Vibration Impact Assessment – R1", dated 12th June 2026) was issued to SLR for peer review.
2. Preliminary comments were raised by SLR.
3. Subsequently, PWNA prepared an updated report *HomeCo Roselands Mall Noise and Vibration Impact Assessment* to Revision 2, which was dated 17th August 2026. This was issued to SLR for them to complete their peer review.
4. SLR prepared their *Peer Review of Noise and Vibration Impact Assessment*, dated 18th August 2026.
5. PWNA have updated the *HomeCo Roselands Mall Noise and Vibration Impact Assessment* to **Revision 3**, dated **19th August 2026** for submission to Council as part of this document. To which the items raised in the SLR Peer Review are addressed by PWNA.

Note: It is recommended that Appendix A is read prior to reviewing the comments below. Attached to this document is SLR peer review (**Appendix A**) and PWNA's updated *HomeCo Roselands Mall Noise and Vibration Impact Assessment, Revision 3* in response (**Appendix B**).

Outlined below are PWNA responses to each of the three (3) items raised by SLR within their Peer Review of Revision 2 of the PWNA NVIA.

SLR Comment 1 (Reversing Alarm):

2.4.1 Reversing Alarms

NVIA Position

It is understood that reversing alarms have been excluded from both the operational noise assessment and the sleep disturbance assessment on the basis that the site has been designed to minimise reversing movements.

Our View

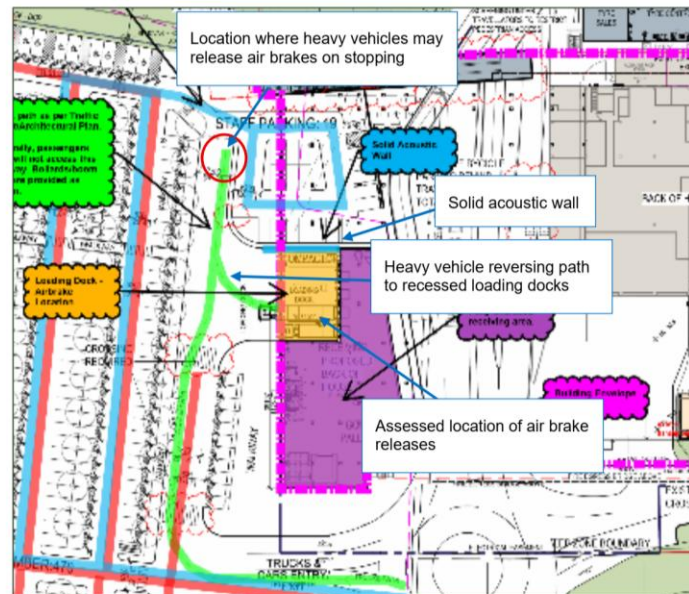
As shown in **Figure 1**, the development includes a recessed loading dock arrangement, and the indicated heavy vehicle route (green line) shows that heavy vehicles are required to reverse into the loading bays.

While the NVIA report states that the site has been designed to minimise reversing movements, the site plan and vehicle routes indicate that reversing manoeuvres are a part of normal operations. If reversing is required, reversing alarm noise would represent a relevant operational noise source that may also contribute to sleep disturbance impacts.

Recommended Action

- Demonstrate that reversing movements are not required as part of normal site operations, or
- Update the assessment to consider operational noise and maximum noise (sleep disturbance) impacts from broadband reversing alarms.

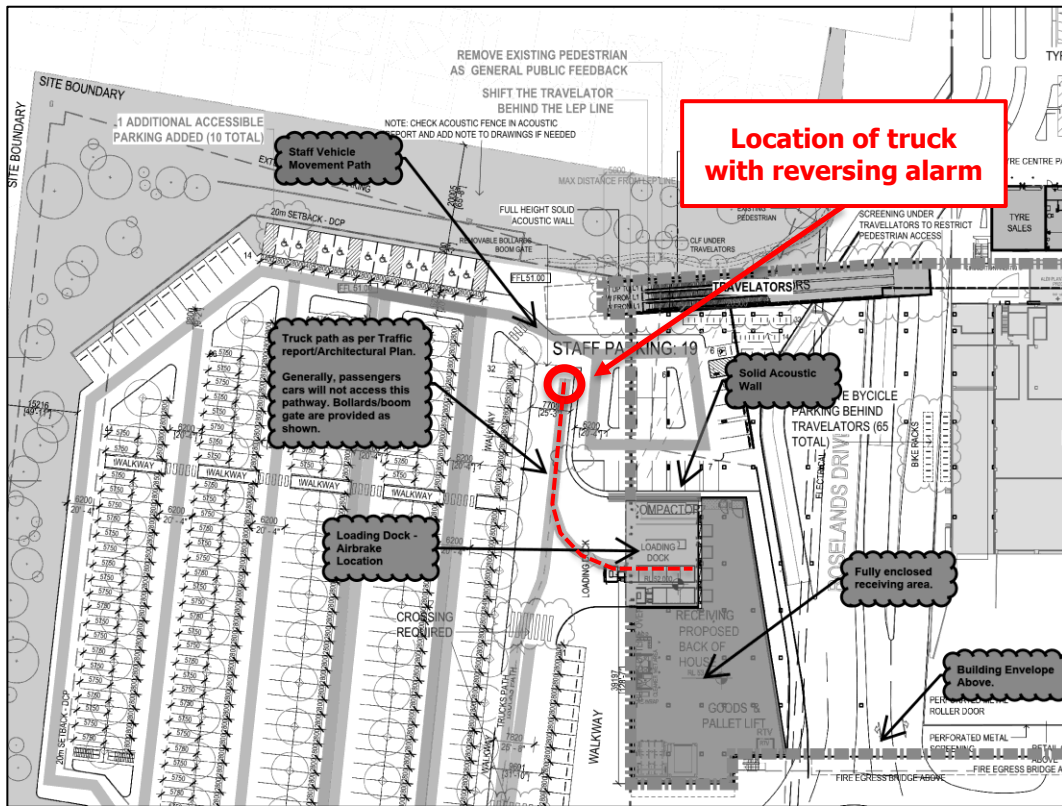
Figure 1 Source Location Map (Ref: Figure 7 of NVIA)



PWNA Response:

- In the first instance, SLR are correct. For the noise modelling, we did not assume a reversing alarm.
- In the updated acoustic assessment (revision 3) we have included the noise modelling of reversing alarm as recommended by SLR.
- In accordance with the SLR comments, a worst-case scenario assumption of a reversing alarm at the end of the truck pathway (assuming then reversing into the loading dock) has been modelled. This is indicated in the figure below.

Figure 1 Truck Reversing Alarm – Sleeping Disturbance Assessment



- With regards to an assumed noise level the following reversing alarm (assuming a 5dB penalty for tonality – a worst case) has been assumed:

Table 1 Single event source noise levels, L_{Max} SWL, dB.

Source	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4 kHz	8 kHz	Overall, dB(A)
Reversing alarm, L_{AFmax} (including 5dB tonality penalty)	108	108	97	98	104	97	94	94	106

Note 1 Octave band data is presented unweighted, overall level is presented A-weighted.

- This information has been included in updated acoustic assessment (revision 3).

Therefore, we believe this item is closed out.

SLR Comment 2 & 3 – Item 2.4.2 & 2.4.3 (Airbrake):

2.4.2 Air-Brake Event Location

NVIA Position

The sleep disturbance assessment is based on air brake releases occurring at the loading dock area (shown in **Figure 1**, and Figure 7 of the NVIA).

Our View

Heavy vehicles may reasonably stop at alternative locations along the manoeuvring route prior to reversing into the recessed loading docks. **Figure 1** indicates that heavy vehicles access the loading docks by travelling past the loading area before reversing into the docks.

It is therefore plausible that air-brake releases may occur at the location where heavy vehicles initially stop prior to reversing into the assigned loading dock (shown in **Figure 1**). This location appears to be closer to receivers within NCA1 than the assessed air-brake location adopted in the NVIA. Higher maximum noise levels than those presented in the assessment may occur if air-brake releases take place at this alternative location.

Based on the additional location of air brake releases, the maximum noise levels presented in the NVIA may be underestimated at the receivers in NCA1.

Recommended Action

- Demonstrate that the adopted airbrake source location represents a reasonable worst-case scenario, or
- Update the sleep disturbance assessment to consider the impacts from the location along the heavy vehicle route, closer to NCA1.

2.4.3 Air-Brake Event Assumptions

NVIA Position

The sleep disturbance assessment identifies air-brake releases as the dominant noise source and assumes approximately 9 air-brake events per night, based on a single air-brake release per heavy vehicle delivery.

Our View

We generally agree that air-brake releases are likely to be the dominant source of maximum noise associated with on-site heavy vehicle operations. However, based on the alternate heavy vehicle manoeuvring requirements described in **Sections 2.1** and **2.4.2**, it is possible that heavy vehicles may release air brakes:

- Upon initially stopping before commencing reversing manoeuvres, and
- Again, after completing manoeuvring and coming to a stop within the loading dock.

If multiple air-brake releases occur per delivery, the number of night-time maximum-noise events may materially exceed the approximately nine events assumed within the sleep disturbance assessment. This may influence the conclusions reached regarding sleep disturbance risk.

Recommended Action

- Provide justification demonstrating that one air-brake release per delivery is representative of a worst-case operating scenario, or
- Revise the assessment of sleep disturbance impacts, assuming multiple air-brake releases per heavy vehicle delivery.

PWNA Response:

- Section 2.4.2 and 2.4.3 of the SLR are discussing the same item, as such we will address both items collectively.
- In response to item **2.4.3** first, we note:
 - SLR suggestion that airbrakes will need to occur when changing directions (forward to reverse) is incorrect.
 - We do agree with SLR that once the truck is parked within the loading dock, an airbrake will occur. This is currently modelled in the acoustic assessment.
 - As such, the assumption of that several airbrake releases as suggested by SLR is required is not accurate nor representative of how will trucks operate.
- Therefore, to address comment **2.4.1**, simply an airbrake release will not occur closer to the NCA1 as airbrakes do not need to occur when changing direction as assumed/suggested by SLR.
- As such, the PWNA assumed location of Airbrake during the night period is still valid and representative of the acoustic impacts to occur onsite.
- To address this concern, the Plan of Management (PoM) can be updated to prevent truck airbrakes been used during the night (10:00pm and 7:00am) from occurring outside the loading dock. Additionally, signage can be provided which reminds trucks to prevent air-brake usage outside the loading dock area.

Therefore, we believe this item is closed out.

SLR Comment 4:

2.4.4 Heavy Vehicle Movements

NVIA Position

Heavy vehicle movements have been included in the operational assessment, and the sleep disturbance assessment is based on air-brake releases.

Our View

Only the L_{Aeq} sound power level (SWL) for heavy vehicle movement has been presented. Short-term increases in heavy vehicle noise levels are common due to engine throttling. As such, it is expected that this source would also be considered part of the sleep disturbance, and the L_{AFmax} SWL should be presented.

It is agreed that air-brake releases are expected to be the highest maximum noise source, however, it has not been demonstrated that maximum noise levels from heavy vehicle movements remain below the relevant sleep disturbance criteria.

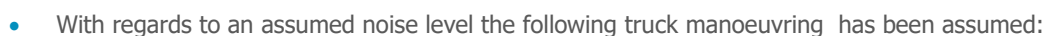
Recommended Action

- Consider maximum noise from heavy vehicle movements as part of the sleep disturbance assessment, or
- Provide justification for the exclusion of this source from the sleep disturbance assessment

PWNA Response:

- In the first instance, SLR are correct. For the "sleep disturbance assessment" noise modelling, we did not assume a truck manoeuvring.
- In the updated acoustic assessment (revision 3) we have included the noise modelling of truck manoeuvring as recommended by SLR.

- ### Figure 2 Truck manoeuvring – Sleeping Disturbance Assessment

[illegible]

- Therefore, we believe this item is closed out.**

If you have any additional questions, please contact us should you have any further queries.

Regards,

A handwritten signature in blue ink, appearing to read 'mfurlong', enclosed within a blue oval shape.

Matthew Furlong
Principal Acoustic Engineer
PULSE WHITE NOISE ACOUSTICS PTY LTD
AAS Member and AAAC Member Firm

Appendix A – SLR Peer Review – Noise and Vibration Impact Assessment

18 August 2026

SLR Ref No.: 610.034287.00001-L01-v1.0-20260818.docx

Attention: Jacob Barsoum
HM Capital
Level 7, 1 Macquarie Place
Sydney NSW 2000

SLR Project No.: 610.034287.00001

Client Reference No.: L01

**RE: HomeCo Roselands Shopping Centre Expansion, Roselands NSW
Noise and Vibration Impact Assessment Peer Review**

1.0 Introduction

SLR Consulting Australia (SLR) has been engaged by HMC Capital (HMC) to undertake an independent peer review of the Noise and Vibration Impact Assessment (NVIA) prepared for the proposed expansion to the existing Roselands Shopping Centre located at 24 Roselands Avenue, Roselands, NSW.

This review has been undertaken in response to Canterbury-Bankstown Council's (Council) request for an independent acoustic review of the submitted NVIA. Council's Environmental Health Officer's request is reproduced below:

Environmental Health has reviewed the proposal and still raises concerns regarding the potential noise and amenity impacts associated with the proposed Costco Warehouse development on adjoining residential properties.

Environmental Health notes that it is atypical for a development of this scale and operational nature, such as a Costco Warehouse, to be situated immediately adjacent to residential premises. Council has also received numerous submissions from adjoining residents, raising concerns relating to noise and general amenity. As such, Environmental Health recommends that the acoustic report prepared by Pulse White Noise Acoustics Pty Ltd, titled 'HomeCo Roselands Mall – Noise and Vibration Impact Assessment – R1', dated 12 June 2026, report reference number 250622, be reviewed by an external acoustic consultant. The purpose of the review would be to verify that the noise predications are accurate and that proposed noise mitigation measures as adequate, including the height of the proposed 'crash barrier acoustic wall'.

The external acoustic assessment should also confirm that the submitted acoustic report has been prepared with reference to the most recent traffic report, ensuring that noise impacts associated with vehicle movements have been accurately assessed and considered.

This document summarises the outcome of the review and is focused on operational noise and sleep disturbance impacts associated with the proposed development and the methodology adopted within the acoustic assessment.

The following documents were reviewed as part of this peer review:

- Pulse White Noise Acoustics (PWNA), *HomeCo Roselands Mall – Noise and Vibration Impact Assessment – R2*, dated 17 August 2026.

- Pulse White Noise Acoustics (PWNA), *HomeCo Roselands Mall – Council RFI 1 – Acoustic Responses – R0*, dated 12 June 2026.
- Taylor Thomson Whitting (TTW), *Roselands Shopping Centre Alterations & Additions – Traffic Impact Assessment*, prepared for HMC Capital, Project No. 241764, Revision 4 (WIP Issue for Submission), dated 17 August 2026.
- Canterbury-Bankstown Council Request for Additional Information letter, DA-52/2026, dated 22 July 2026.

2.0 Peer Review Findings

2.1 Review of Traffic Impact Assessment

A review of the Traffic Impact Assessment (TIA) indicates the following:

- The TIA confirms that the proposed loading dock is designed to accommodate vehicles up to 20 m articulated vehicles (AVs).
- Based on the loading dock layout and truck access arrangements, it is reasonable to infer that reversing manoeuvres will form part of normal loading dock operations.
- The light vehicle movements (day and evening) adopted in the NVIA appear to be conservative. The TIA predicts a maximum traffic generation of 275 vehicle trips per hour (approximately 69 vehicle movements per 15 minutes), which is less than the 83 15-minute day and evening vehicle movements adopted in the NVIA.
- The TIA does not quantify heavy vehicle delivery frequencies and therefore does not provide sufficient information to independently verify the heavy vehicle movement assumptions adopted in the NVIA.

PWNA advised that the heavy vehicle assumptions were based on typically expected truck movements provided by the future tenant, however, these movements have not yet been confirmed.

Furthermore, the NVIA conservatively assumes that all 19 staff parking spaces are occupied within a single 15-minute assessment period at night-time.

2.2 Assessment Assumptions

As part of our review, we accept the following aspects of the NVIA as-is, and have no objection to their use:

- Nominated residential amenity classification and the operational noise criteria for the three Noise Catchment Areas (NCA)
- Worst-case operational assumptions (see Tables 12 and 13 of the NVIA) listed below:
 - Selection of operational noise sources, including heavy and light vehicle movements, heavy vehicle engine starts and airbrakes
 - Internal loading operations within the back house receiving
 - Number of light vehicle movements adopted in the worst-case 15-minute assessment periods.
 - Number of heavy vehicle engine starts and airbrake releases in a worst-case 15-minute period



- Identification of air-brake releases as the likely dominant maximum-noise source
- Source sound power levels (understood to be based on measurements conducted at similar sites)
- Assessment of rooftop plant on an in-principle basis.
- Internal noise levels within the future retail premises and internal un/loading areas
- Occurrence of 24-hour loading operations
- Assumed barriers listed below:
 - 1.5m height crash barrier and acoustic wall (see Figures 5 and 6 of the NVIA)
 - Property boundary fences, understood to be 1.5 m in height (Figures C.1 to C.3 of the NVIA). PWNA has separately advised that the screening benefit attributed to the property boundary fence is minimal due to the higher ground elevation of the future car park and loading areas, relative to the surrounding receivers
 - Loading dock acoustic wall near the western end of the partially enclosed loading dock area, understood to be full height to soffit above (see **Figure 1** below and Figure 7 of the NVIA)
- Approach to the sleep disturbance assessment
- The use of the CONCAWE propagation algorithm, which accounts for noise-enhancing weather conditions, including temperature inversions and downwind

It is noted that the assessment relies on shielding from barriers, buildings and other screening structures to achieve compliance at a number of surrounding receivers. As ISO 9613 incorporates an integrated approach to barrier attenuation under adverse meteorological conditions, it may be more appropriate for this assessment.

***Note:** As the TIA does not provide sufficient information to independently verify the heavy vehicle movement frequencies adopted in the NVIA, PWNA has advised that these assumptions are based on indicative truck movement information provided by the future tenant.*

2.3 Verification of Predicted Noise Levels

As part of this review, a series of simplified point-source propagation calculations were undertaken to verify the predicted operational noise levels and maximum noise levels presented in the NVIA.

The verification calculations indicate that the predicted operational noise levels ($L_{Aeq}(15 \text{ minute})$) and maximum noise levels (L_{AFmax}) presented in the NVIA are considered reasonable, taking into account the simplified nature of the verification calculations and the more detailed modelling approach adopted in the NVIA.

Overall, based on our verification calculations, we are generally in agreement with the operational noise and maximum noise predictions under the various assessment assumptions.



2.4 Matters Requiring Further Clarification

2.4.1 Reversing Alarms

NVIA Position

It is understood that reversing alarms have been excluded from both the operational noise assessment and the sleep disturbance assessment on the basis that the site has been designed to minimise reversing movements.

Our View

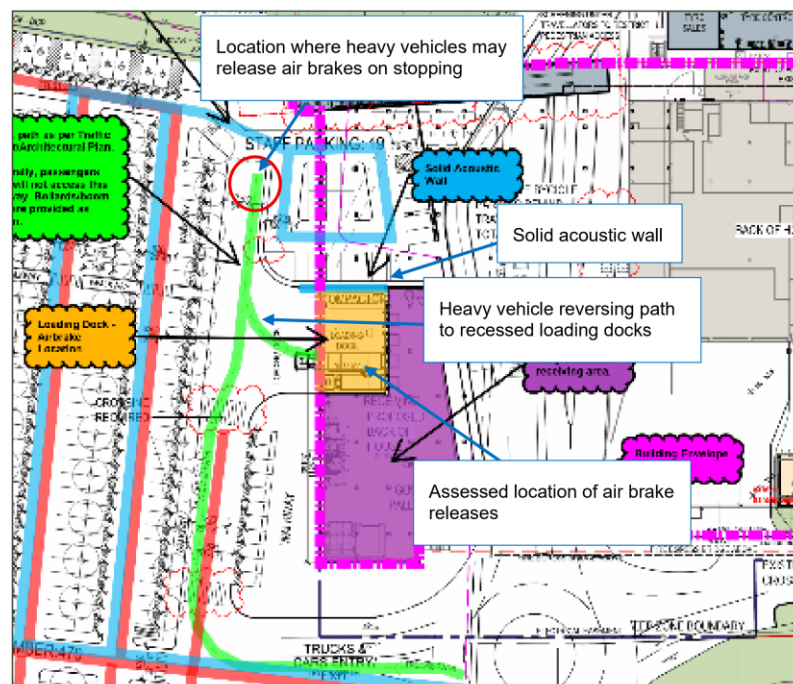
As shown in **Figure 1**, the development includes a recessed loading dock arrangement, and the indicated heavy vehicle route (green line) shows that heavy vehicles are required to reverse into the loading bays.

While the NVIA report states that the site has been designed to minimise reversing movements, the site plan and vehicle routes indicate that reversing manoeuvres are a part of normal operations. If reversing is required, reversing alarm noise would represent a relevant operational noise source that may also contribute to sleep disturbance impacts.

Recommended Action

- Demonstrate that reversing movements are not required as part of normal site operations, or
- Update the assessment to consider operational noise and maximum noise (sleep disturbance) impacts from broadband reversing alarms.

Figure 1 Source Location Map (Ref: Figure 7 of NVIA)



2.4.2 Air-Brake Event Location

NVIA Position

The sleep disturbance assessment is based on air brake releases occurring at the loading dock area (shown in **Figure 1**, and Figure 7 of the NVIA).

Our View

Heavy vehicles may reasonably stop at alternative locations along the manoeuvring route prior to reversing into the recessed loading docks. **Figure 1** indicates that heavy vehicles access the loading docks by travelling past the loading area before reversing into the docks.

It is therefore plausible that air-brake releases may occur at the location where heavy vehicles initially stop prior to reversing into the assigned loading dock (shown in **Figure 1**). This location appears to be closer to receivers within NCA1 than the assessed air-brake location adopted in the NVIA. Higher maximum noise levels than those presented in the assessment may occur if air-brake releases take place at this alternative location.

Based on the additional location of air brake releases, the maximum noise levels presented in the NVIA may be underestimated at the receivers in NCA1.

Recommended Action

- Demonstrate that the adopted airbrake source location represents a reasonable worst-case scenario, or
- Update the sleep disturbance assessment to consider the impacts from the location along the heavy vehicle route, closer to NCA1.

2.4.3 Air-Brake Event Assumptions

NVIA Position

The sleep disturbance assessment identifies air-brake releases as the dominant noise source and assumes approximately 9 air-brake events per night, based on a single air-brake release per heavy vehicle delivery.

Our View

We generally agree that air-brake releases are likely to be the dominant source of maximum noise associated with on-site heavy vehicle operations. However, based on the alternate heavy vehicle manoeuvring requirements described in **Sections 2.1** and **2.4.2**, it is possible that heavy vehicles may release air brakes:

- Upon initially stopping before commencing reversing manoeuvres, and
- Again, after completing manoeuvring and coming to a stop within the loading dock.

If multiple air-brake releases occur per delivery, the number of night-time maximum-noise events may materially exceed the approximately nine events assumed within the sleep disturbance assessment. This may influence the conclusions reached regarding sleep disturbance risk.

Recommended Action

- Provide justification demonstrating that one air-brake release per delivery is representative of a worst-case operating scenario, or
- Revise the assessment of sleep disturbance impacts, assuming multiple air-brake releases per heavy vehicle delivery.



2.4.4 Heavy Vehicle Movements

NVIA Position

Heavy vehicle movements have been included in the operational assessment, and the sleep disturbance assessment is based on air-brake releases.

Our View

Only the L_{Aeq} sound power level (SWL) for heavy vehicle movement has been presented. Short-term increases in heavy vehicle noise levels are common due to engine throttling. As such, it is expected that this source would also be considered part of the sleep disturbance, and the L_{AFmax} SWL should be presented.

It is agreed that air-brake releases are expected to be the highest maximum noise source, however, it has not been demonstrated that maximum noise levels from heavy vehicle movements remain below the relevant sleep disturbance criteria.

Recommended Action

- Consider maximum noise from heavy vehicle movements as part of the sleep disturbance assessment, or
- Provide justification for the exclusion of this source from the sleep disturbance assessment

3.0 Conclusion

SLR has completed a peer review of the Noise and Vibration Impact Assessment prepared for the proposed expansion to the existing Roselands Shopping Centre located at 24 Roselands Avenue, Roselands.

We generally agree with the nominated operational noise and sleep disturbance criteria as well as the assessment methodology and assumptions.

Review of the TIA indicates that the NVIA has adopted conservative light vehicle movement assumptions and that reversing manoeuvres are likely to form part of normal loading dock operations, however, the heavy vehicle movement assumptions could not be independently verified from the available traffic documentation.

The peer review has identified a number of matters that may influence the assessment conclusions. These are listed below:

- Exclusion of reversing alarms from the operational noise and sleep disturbance assessments
- The adopted location and frequency of air-brake release events
- Exclusion of heavy vehicle movement noise from the sleep disturbance assessment

Subject to clarification of the matters identified above, we consider that confidence can be provided regarding the robustness of the outcome of the NVIA.



Regards,

SLR Consulting Australia Pty Ltd



Jason Rasquinha, MAAS
Senior Project Consultant
jrasquinha@slrconsulting.com

Mark Irish. M.AAS
Principal Consultant – Acoustics and Vibration
mirish@slrconsulting.com



Appendix B – PWNA Updated – Noise and Vibration Impact Assessment (Revision 3)



HomeCo Roselands Mall

Noise and Vibration Impact Assessment

HMC Capital

Report Reference: 250622 – HomeCo Roselands Mall – Noise and Vibration Impact Assessment – R3

Date: 19 August 2026

Revision: R3

Project Number: 250622

DOCUMENT CONTROL

Project Name:	HomeCo Roselands Mall – Noise and Vibration Impact Assessment
Project Number:	250622
Report Reference:	250622 – HomeCo Roselands Mall – Noise and Vibration Impact Assessment – R3
Client:	HMC Capital

Revision	Description	Reference	Date	Prepared	Checked	Authorised
R0	Final	250622 – HomeCo Roselands Mall – Noise and Vibration Impact Assessment – R0	18/12/25	JL	MF	MF
R1	Updated – Council Comments	250622 – HomeCo Roselands Mall – Noise and Vibration Impact Assessment – R1	12/06/26	MF	MF	MF
R2	Updated – Council Comments	250622 – HomeCo Roselands Mall – Noise and Vibration Impact Assessment – R2	17/08/26	MF	MF	MF
R3	Updated – SLR Peer Review Comments	250622 – HomeCo Roselands Mall – Noise and Vibration Impact Assessment – R3	19/08/26	MF	MH	MF

PREPARED BY:

Pulse White Noise Acoustics Pty Ltd

ABN: 95 642 886 306

Address: Suite 601, Level 6, 32 Walker Street, North Sydney, 2060

Phone: 1800 4 PULSE

This report has been prepared by Pulse White Noise Acoustics Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with HMC Capital.

Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of HMC Capital

No warranties or guarantees are expressed or should be inferred by any third parties.

This report may not be relied upon by other parties without written consent from Pulse White Noise Acoustics.

This report remains the property of Pulse White Noise Acoustics Pty Ltd until paid for in full by the client, HMC Capital.

Pulse White Noise Acoustics disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.



CONTENTS

1	INTRODUCTION	4
1.1	Background	4
1.2	Scope of this report.....	4
2	EXISTING AMBIENT NOISE ENVIRONMENT	5
2.1	Land uses	5
2.2	Noise Catchment Ares (NCA)	5
2.3	Noise survey.....	6
3	NOISE AND VIBRATION CRITERIA	9
3.1	Operational facility noise criteria	9
3.1.1	Intrusive noise impacts – residential receivers	9
3.1.2	Protecting noise amenity	10
3.1.3	Corrections for annoying noise characteristics	10
3.1.4	Low frequency noise correction	10
3.1.5	Residential Receivers – Area Classification.....	11
3.1.6	Project specific noise trigger levels	11
3.2	Operational road traffic noise	12
3.3	Construction Noise and Vibration Criteria	13
3.3.1	Construction Noise Criteria	13
3.3.1.1	NSW EPA (Former DECC) Interim Construction Noise Guideline (ICNG) 2009	13
3.3.2	Vibration Criteria (Construction)	14
3.3.2.1	Vibration Criteria – Human Comfort	15
3.3.2.2	Vibration Criteria – Building Contents and Structure.....	15
3.3.2.2.1	British Standard BS 7385 Part 2 – 1993	16
3.3.2.2.2	German Standard DIN 4150 Part 3 - 1999	17
3.3.3	Construction Traffic Noise Criteria.....	17
4	OPERATIONAL NOISE IMPACTS	18
4.1	Modelling methodology	18
4.2	Operational site noise emissions	18
4.3	Source noise levels	22
4.4	Annoying characteristics of noise	23
4.5	Predicted site operational noise impacts.....	23
4.6	Predicted Maximum Noise Level Assessment.....	24
4.7	Rooftop Mechanical Plant	32
5	CONSTRUCTION NOISE AND VIBRATION IMPACTS.....	34
5.1	Construction Activity Noise Assessment.....	34
5.2	Construction Traffic Noise Assessment	34
5.3	Vibration Assessment	34
5.4	Preparation of a Site Specific CNVMSP	35
5.5	Discussion of Resulting Construction Noise Levels with Mitigation	35
6	RECOMMENDED ACOUSTIC MITIGATION MEASURES	36
7	CONCLUSION	37
APPENDIX A.	ACOUSTIC TERMINOLOGY	38



APPENDIX B. NOISE LOGGING DATA	39
B.1. Noise Logger 01	39
B.2. Noise Logger 02	45
B.3. Noise Logger 03	51
APPENDIX C. PREDICTED OPERATIONAL NOISE LEVELS – GRAPHICAL REPRESENTATION	57
C.1. Operational noise impact contours – DAY	58
C.2. Operational noise impact contours – EVENING	59
C.3. Operational noise impact contours – NIGHT	60

Figures

Figure 1	Site map, measurement locations and surrounding receivers – site map sourced from SixMaps	6
Figure 2	NSW ePlanning Spatial viewer	11
Figure 3	- BS 7385 Part 2 – 1993, Graph of transient vibration values for cosmetic damage	16
Figure 4	Assumed Staff Vehicle Pathway – Night Period	19
Figure 5	Landscape Drawing – L-2005	20
Figure 6	Landscape Drawing – L-2007	20
Figure 7	Source Location Map	23
Figure 8	Extract - Figure B3, “Awakenings due to noise” - NSW EPA’s ECRTN 1999	27
Figure 9	Rooftop Mechanical Plant Location	32

Tables

Table 1:	Measured ambient noise levels, dB(A).	7
Table 2	Intrusive noise criteria, dB(A)	10
Table 3	Amenity noise levels, dB(A)	10
Table 4	Project specific noise trigger level, $L_{Aeq,15minute}$ dB(A)	12
Table 5	Road noise criteria.	12
Table 6	NMLs for Quantitative Assessment at Residences	14
Table 7	Continuous vibration acceleration criteria (m/s ²) 1 Hz-80 Hz	15
Table 8	Impulsive vibration acceleration criteria (m/s ²) 1 Hz-80 Hz	15
Table 9	Intermittent vibration impacts criteria (m/s ^{1.75}) 1 Hz-80 Hz	15
Table 10	Transient vibration criteria as per standard BS 7385 Part 2 – 1993	16
Table 11	Structural damage criteria as per standard DIN 4150 Part 3 – 1999	17
Table 12	Predicted worst-case site operations	21
Table 13	Single event source noise levels, L_{Aeq} & L_{Max} SWL, dB.	22
Table 14	Predicted operational noise impacts, $L_{Aeq,15minute}$, dB(A).	24
Table 15	Predicted maximum noise level screening assessment, L_{Max} , dB(A).	26
Table 16	Detailed Sleep-disturbance Assessment – Airbrake Release	Error! Bookmark not defined.
Table 17	Detailed Sleep-disturbance Assessment – Airbrake Release	Error! Bookmark not defined.
Table 18	Detailed Sleep-disturbance Assessment – Airbrake Release	Error! Bookmark not defined.
Table 19	Recommended indicative safe working distances for vibration intensive plant	35
Table 20	Summary of Acoustic Mitigation Measures	36

1 INTRODUCTION

1.1 Background

HMC Capital (the Client) is proposing to undertake an expansion to the existing Roselands Shopping centre at the site located at 24 Roselands Avenue, Roselands including new a new speciality retail premise ("premise") which spans across Roselands Avenue.

The proposed core operational hours of the premise will be between 7:00am to 9:00pm Monday to Sunday with the use of the loading dock and back of house facilities to operate 24 hours Monday to Sunday.

1.2 Scope of this report

Pulse White Noise Acoustics (PWNA) has been engaged to undertake a Noise and Vibration Impact Assessment (NVIA) for the proposed development. This NVIA is developed to form part of the designated and integrated development application to address noise and vibration impacts that have the potential to be generated by the proposal.

This report:

- Identifies the existing noise sensitive receivers,
- Presents details about existing noise environment, including existing noise measurements of the existing operation on site.

2 EXISTING AMBIENT NOISE ENVIRONMENT

2.1 Land uses

The project site is located within the established commercial precinct of Roselands, NSW, and forms part of the existing Roselands Shopping Centre at 24 Roselands Avenue. The site is bounded by Roselands Avenue and existing commercial zoning to the north, low density residential to the south.

The nearest existing residential receivers are located immediately to the site, across Roselands Avenue, at distances of approximately 10-20 m from the site boundary. Additional residential areas are located further to the east and west, forming part of the surrounding low-density suburban neighbourhood. These receivers are permanent residential dwellings within land-use zones as residential use and are therefore considered in this assessment in accordance with the NPfI.

At the time of this assessment (December 2025), no new residential rezonings or development approvals have been identified in the immediate vicinity of the shopping centre that would introduce additional sensitive receivers beyond those already established.

The project site is located within a busy commercial setting characterised by retail activity, service vehicle movements, and traffic flows along both Roselands Avenue and King Georges Road. The acoustic environment of the nearest residential receivers is therefore influenced by typical suburban road traffic noise and commercial interface activity associated with the shopping centre and surrounding mixed-use development.

2.2 Noise Catchment Areas (NCA)

For the purpose of this assessment, the surrounding environment has been divided into distinct acoustic zones and corresponding noise catchment areas to identify sensitive receivers that may be impacted by noise emissions from the proposed redevelopment at Roselands Shopping Centre.

The project site is situated within an established commercial precinct, with residential areas located predominantly to the west, south and east of the redevelopment. These residential receivers are grouped into specific noise catchment areas based on their orientation, separation distance; etc.

Western Noise Catchment Area (NCA 1):

This area comprises of residential properties located along Roseview Avenue situated along the western boundary of the existing on grade carpark to the south of Roselands Drive. These receivers are the closest to the project site (approximately 10 m) and have a relatively direct line of sight to portions of the expansion. Noise exposure in this zone is influenced by commercial activity associated with the centre and existing road traffic along Roselands Drive and King Georges Road. See below.

Eastern Catchment Area (NCA 2):

Areas located to the south of the site fall within a suburban residential noise environment, characterised by low density residential zoning. See below.

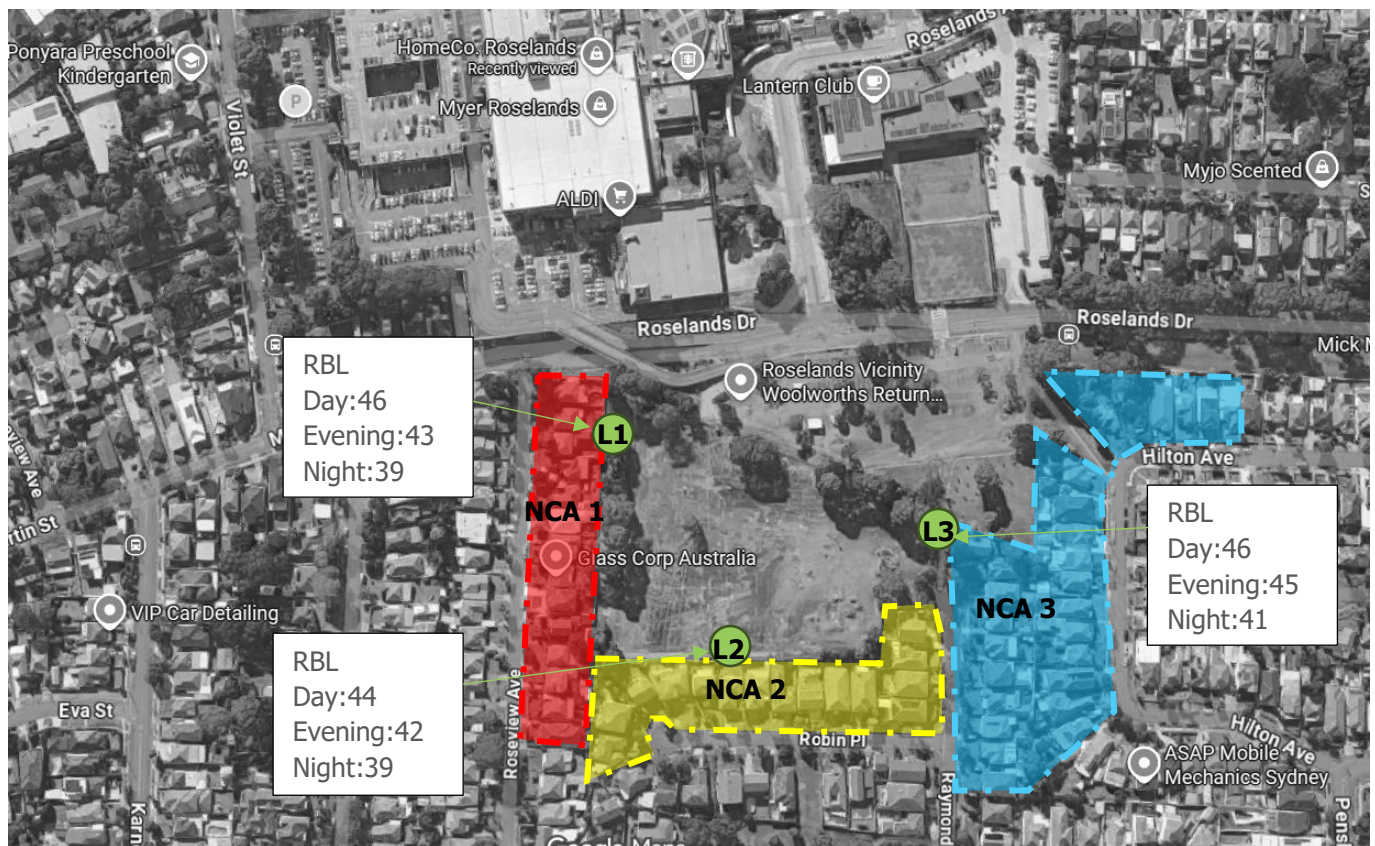
Southern Catchment Area (NCA 3):

Areas located to the Eastern of the proposed site fall within a residential noise environment, ambient background noise is characterised by King Georges Road. See below.

The identification of these acoustic zones enables a representative assessment of noise impacts by recognising the variation in land use, and the differing sensitivity levels of nearby receivers. These noise catchment areas form the basis for the selection of assessment locations and the evaluation of predicted noise emissions presented in this report.

Presented below are the location of the potentially most affected sensitive receivers within the catchment area. Catchment area locations are illustrated in Figure 1 below.

Figure 1 Site map, measurement locations and surrounding receivers – site map sourced from SixMaps



2.3 Noise survey

Background noise logging was undertaken in three locations between the 23rd of September 2025 and the 2nd of October 2025. Noise Logger were positioned along the west, south and east boundary of the project site. The results from all three loggers have been presented in Appendix B.1, and not been corrected (i.e., raw data is presented).

Instrumentation for the survey comprised one sound level meters (RION NL-42 Logger 01 - Serial number 00396931, NGARA Logger 02 - Serial number 87826B and SVANTEK-977A Logger 03 - Serial number 81362). Calibration of the logger was checked prior to and following the measurements. Drift in calibration did not exceed $\pm 0.5\text{dB}$. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

Charts presenting summaries of the measured daily noise data are attached in Appendix B.1, B.2 and B.3. The charts present each 24-hour period and show the L_{A01} , L_{A10} , L_{Aeq} and L_{A90} noise levels for the corresponding 15-minute periods. This data has been filtered to remove periods affected by adverse weather conditions based on weather information.

Data affected by adverse meteorological conditions and by spurious and uncharacteristic events have been excluded from the results, and also excluded from the data used to determine the noise emission criteria. Meteorological information has been obtained from the Canterbury Racecourse AWS which is located within 15 km of the project site. Noise levels provided are processed results with extraneous weather events removed.

The noise logger location illustrated in Figure 1 above and has been selected to measure the existing noise environment representative of the nearby noise sensitive receivers.

The Rating Background Noise Level (RBL) is the background noise level used for assessment purposes at the nearest potentially affected receiver. It is the 90th percentile of the daily background noise levels during each assessment period, being day, evening and night. The L_{Aeq} is the ambient noise level (logarithmically averaged) over the period.

The standard measurement periods used in NSW for site noise impacts are:

- Daytime – 7:00 am to 6:00 pm
- Evening – 6:00 pm to 10:00 pm
- Night-time – 10:00 pm to 7:00 am

Presented in Table 1 is a summary of the ambient and RBL noise levels measured over the entire measurement period. Noise logging charts are presented in Appendix B.1. These noise levels are used throughout the assessment to determine the existing noise environment and establish appropriate site-specific noise criteria.

Table 1: Measured ambient noise levels, dB(A).

ID	Rating background level			Ambient noise level, $L_{Aeq,period}$		
	Daytime	Evening	Night	Daytime	Evening	Night
Noise Logger 01 (NCA01)	46	43	39	56	49	48
Noise Logger 02 (NCA02)	44	42	39	50	48	46
Noise Logger 03 (NCA03)	46	45	41	53	50	49

The dominant noise sources influencing Noise Logger 01 consisted primarily of road traffic movements along Roselands Drive, general residential activity, and intermittent commercial noise associated with the nearby Roselands Shopping Centre precinct. Minor contributions from local service vehicle movements and surrounding suburban activity were also observed. An inspection of the logger location and the adjacent residential receivers confirmed that Noise Logger 01 was suitably positioned and provides a representative measurement of the ambient noise environment for all nearby sensitive receivers within this catchment.

The noise environment at Noise Logger 02 was characterised mainly by residential noise sources, including local traffic on surrounding streets, pedestrian activity, and typical suburban daytime and evening behaviours. Occasional contributions from distant commercial operations and car park activity associated with the centre were also identified. Based on the site inspection and review of its relationship to nearby dwellings, Noise Logger 02 was considered representative of the prevailing background and ambient noise conditions for receivers in the south noise catchment area.



Noise Logger 03 measured a noise environment dominated by commercial interface noise and traffic flows along King Georges Road, with additional minor contributions from service vehicle access routes and general movement around the shopping centre's southern operational areas. Shielding from existing built form reduced direct exposure to residential noise sources in this zone. Field inspection of the logger placement confirmed that this location adequately reflects the acoustic conditions experienced by receivers within the eastern catchment areas relevant to this assessment.

3 NOISE AND VIBRATION CRITERIA

3.1 Operational facility noise criteria

Responsibility for the control of noise emissions in New South Wales is vested in Local Government and the NSW Environment Protection Authority (EPA).

The EPAs NSW Noise Policy for Industry (NPfI) provides guidance on appropriate noise levels for external noise emissions from fixed facilities on surrounding sensitive receivers. The NPfI criteria for industrial noise sources have two components:

- Controlling the intrusive noise impacts for residents and other sensitive receivers in the short term; and
- Maintaining noise level amenity of defined land uses for residents and sensitive receivers in other land uses.

The intrusiveness noise level protects against significant changes in noise, while the amenity noise level seeks to protect against cumulative noise impacts from industry. Together, these levels are used to assess the potential impact of noise and assess reasonable and feasible noise mitigation measures. Project noise trigger levels are developed through this process. They are not used directly as regulatory limits.

The NPfI requires a project to take consideration of other industrial noise sources in setting amenity noise objectives. In cases of a new development where there are no existing industrial sources, the NPfI accepts a default of the amenity noise level minus 5 dB to take account of future industrial sources.

For this project, the default amenity noise level minus 5 dB adjustment will be used to account for cumulative noise sources.

3.1.1 Intrusive noise impacts – residential receivers

The intrusiveness noise level protects against significant changes in noise levels and is applicable to residential receivers only. The criterion is defined by the formula below:

$$L_{Aeq,15min} = \text{rating background noise level} + 5 \text{ dB}$$

The RBL is the average background noise level over a measurement period of at least one week. Using the RBL results in the intrusiveness criterion being met for 90% of the time. Adjustments are to be applied to the level of noise produced by the source that is received at the assessment point where the noise source contains annoying characteristics such as tonality or impulsiveness.

Presented below in Table 2 is a summary of the measured RBL and corresponding intrusiveness level for each time period.

Table 2 Intrusive noise criteria, dB(A).

Location	Rating background level			Intrusive noise level, $L_{Aeq,15min}$		
	Daytime	Evening	Night-time	Daytime	Evening	Night-time
NCA 1	46	43	39	51	48	44
NCA 2	44	42	39	49	47	44
NCA 3	46	45	41	51	50	46

3.1.2 Protecting noise amenity

The amenity noise level seeks to protect against cumulative noise impacts from industry.

The NPfI uses project noise trigger levels measured over a 15-minute time period, assessed as an $L_{Aeq,15min}$. To account for converting $L_{Aeq,period}$ to $L_{Aeq,15min}$, the NPfI accepts a default conversion factor of $L_{Aeq,15min} = L_{Aeq,period} + 3$ dB.

To ensure industrial noise levels do not gradually increase with new developments, a minus 5 dB correction is applied to the amenity noise level. The amenity noise levels have been presented in Table 3.

Table 3 Amenity noise levels, dB(A).

Receiver	Noise amenity area	Time of day	Recommended amenity noise level
Residential	Suburban	Day	55
		Evening	45
		Night	40
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day		
Passive recreation	All	When in use	50
Commercial	All	When in use	65
Industrial	All	When in use	70
Industrial interface	Add 5 dB(A) to recommended noise amenity area		

3.1.3 Corrections for annoying noise characteristics

Table C1 of the NPfI provides corrections for tonality, intermittency, irregularity or dominant low-frequency content. These corrections are to be added to the measured or predicted noise levels at the receiver before comparison with the project noise trigger levels. NPfI also provides adjustments for duration that can increase the project noise criterion for unusual or one-off high-noise level events.

3.1.4 Low frequency noise correction

A difference of 15 dB or more between the C- and A-weighted noise measurements, identifies the potential for an unbalanced spectrum and an increased likelihood of low frequency noise annoyance.

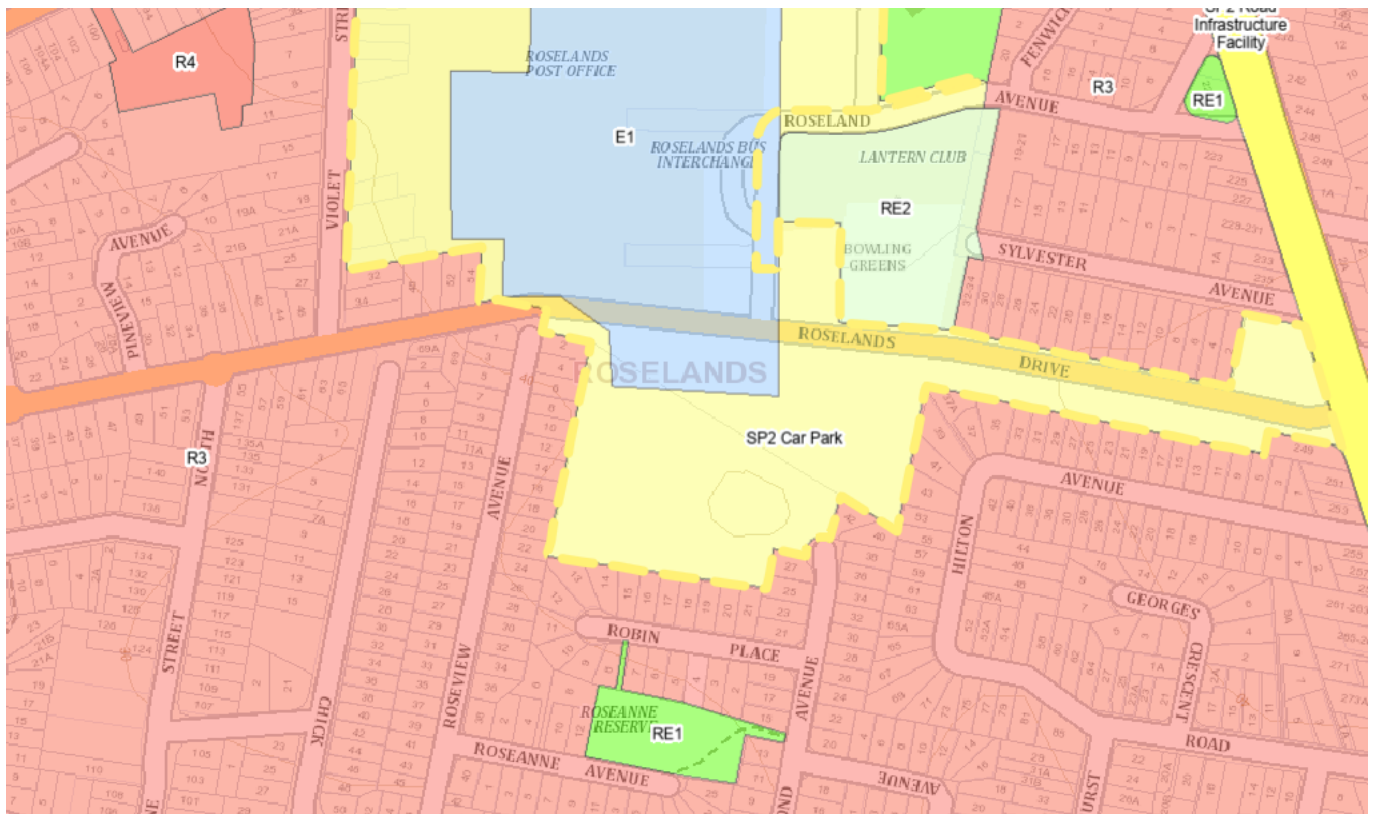
The difference between C- and A-weighted noise levels is typically used as a screening tool to determine if further investigation is required. Where further investigation confirms significant low frequency content, a low frequency noise correction is applied to the predicted or measured noise levels.

The NPFI identifies that the corrections should “reflect external assessment locations”, or sensitive receiver locations so the existing noise environment should be considered.

3.1.5 Residential Receivers – Area Classification

As shown in Figure 2 below, the development site is located within an area classified as E1 (Local Centre). All Noise Catchment Area are located within an area classified as R3 (Medium density residential).

Figure 2 NSW ePlanning Spatial viewer



3.1.6 Project specific noise trigger levels

The NPFI characterises a Suburban Residential area noise environment as an area with an acoustical environment that is:

As area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristics: evening ambient noise levels defined by the natural environment and human activity.

Based on the above description, the surrounding residential receivers would be best classed as Suburban Residential.

More stringent RBL level have been adopted out of all the three noise logging locations to form part of the project noise trigger levels. Presented below in Table 4 is a summary of the project specific noise trigger levels.

Table 4 Project specific noise trigger level, $L_{Aeq,15\text{minute}}$ dB(A)

Receiver	Time period	RBL	Intrusiveness	Amenity ¹	Overall ²
Residential (NCA1,2 and 3)	Daytime	44	49	53	49
	Evening	42	47	43	43
	Night-time	39	44	38	38
Active Recreation	When in use	N/A	N/A	53	53
Commercial	When in use	N/A	N/A	63	63

Note 1 As previously discussed, the amenity noise level has been reduced by 5 dB(A) to account for other industrial noise sources and increased by 3 dB(A) to convert from $L_{Aeq,period}$ to $L_{Aeq,15\text{minute}}$.

Note 2 The overall PNTL is the more stringent of the intrusiveness and amenity criteria (shown in bold).

3.2 Operational road traffic noise

Industrial developments have the potential to generate additional road traffic and associated noise impacts from the vehicles accessing the site. The EPAs Road Noise Policy provides guidance on appropriate noise criteria which should be considered.

Presented below are the applicable noise criteria for road traffic on local roads and arterial / sub-arterial roads. Access routes for vehicles accessing the site will utilise the following routes: Roseland Avenue (Local Road).

The road noise criteria for local roads and sub-arterial / arterial roads for residential receivers are presented in Table 5 below.

Table 5 Road noise criteria.

Road category	Type of project / land use	Assessment criteria, dB(A)	
		Daytime 7am-10pm	Night-time 10pm-7am
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq,1\text{ hour}}$ 55 (external)	$L_{Aeq,1\text{ hour}}$ 50 (external)
Freeway /arterial / sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq,15\text{hour}}$ 60 (external)	$L_{Aeq,9\text{hour}}$ 55 (external)

Where the predicted noise levels with the project indicate likelihood to exceed the noise criteria presented in Table 5, it is considered not reasonable and feasible to provide noise mitigation measures if the project does not increase noise by greater than 2.0 dB. A change of 2 dB to 3 dB in road traffic noise is often considered to be indiscernible.

3.3 Construction Noise and Vibration Criteria

3.3.1 Construction Noise Criteria

Relevant construction noise criteria applicable to this project are outlined below.

3.3.1.1 NSW EPA (Former DECC) Interim Construction Noise Guideline (ICNG) 2009

Noise criteria for construction and demolition activities are discussed in the Interim Construction Noise Guideline (ICNG). The ICNG also recommends procedures to address potential impacts of construction noise on residences and other sensitive land uses. The main objectives of the ICNG are summarised as follows:

- Promote a clear understanding of ways to identify and minimise noise from construction works.
- Focus on applying all “feasible” and “reasonable” work practices to minimise construction noise impacts.
- Encourage construction to be undertaken only during the recommended standard hours unless approval is given for works that cannot be undertaken during these hours.
- Streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage; and
- Provide flexibility in selecting site-specific feasible and reasonable work practices to minimise noise impacts.

The ICNG contains a quantitative assessment method which is applicable to this project. Guidance levels are given for airborne noise at residences and other sensitive land uses.

The quantitative assessment method involves predicting noise levels at sensitive receivers and comparing them with the Noise Management Levels (NMLs). The NML affectation categories for residential receivers have been reproduced from the guideline and are listed in the table below.

Table 6 NMLs for Quantitative Assessment at Residences

Time of Day	Noise Management Level $L_{Aeq(15\text{minute})}$ ^{1,2}	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 (NAL) RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq(15\text{minute})}$ 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 (HNAL) 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences). 2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside the recommended standard hours above	Noise affected RBL + 5 dB	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 5 dB above the noise affected level, the proponent should notify the community.
<i>Note 1 Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.</i> <i>Note 2 The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NSW Industrial Noise Policy (EPA 2000) (Now NSW EPA NPI 2017).</i>		

3.3.2 Vibration Criteria (Construction)

Effects of ground borne vibration on buildings may be segregated into the following three categories:

- Human comfort – vibration in which the occupants or users of the building are inconvenienced or possibly disturbed.
- Effects on building contents – where vibration can cause damage to fixtures, fittings, and other non-building related objects.
- Effects on building structures – where vibration can compromise the integrity of the building or structure itself.

3.3.2.1 Vibration Criteria – Human Comfort

Vibration effects relating specifically to the human comfort aspects of the project are taken from AV-TG. This type of impact can be further categorised and assessed using the appropriate criterion as follows:

- Continuous vibration – from uninterrupted sources.
- Impulsive vibration – up to three instances of sudden impact e.g., dropping heavy items, per monitoring period.
- Intermittent vibration – such as from drilling, compacting or activities that would result in continuous vibration if operated continuously.

Table 7 Continuous vibration acceleration criteria (m/s²) 1 Hz-80 Hz

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Anytime	0.020	0.014	0.04	0.028

Table 8 Impulsive vibration acceleration criteria (m/s²) 1 Hz-80 Hz

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Anytime	0.64	0.46	1.28	0.92

Table 9 Intermittent vibration impacts criteria (m/s^{1.75}) 1 Hz-80 Hz

Location	Daytime		Night-time	
	Preferred Values	Maximum Values	Preferred Values	Maximum Values
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80

3.3.2.2 Vibration Criteria – Building Contents and Structure

The vibration effects on the building itself are assessed against international standards as follows:

- For transient vibration: British Standard BS 7385: Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration" (BSI 1993); and
- For continuous or repetitive vibration: German DIN 4150: Part 3 – 1999 "Effects of Vibration on Structure" (DIN 1999).

3.3.2.2.1 British Standard BS 7385 Part 2 – 1993

For transient vibration, as discussed in standard BS 7385 Part 2-1993, the criteria are based on peak particle velocity (mm/s) which is to be measured at the base of the building. These are summarised in Table 10 and illustrated in Figure 3.

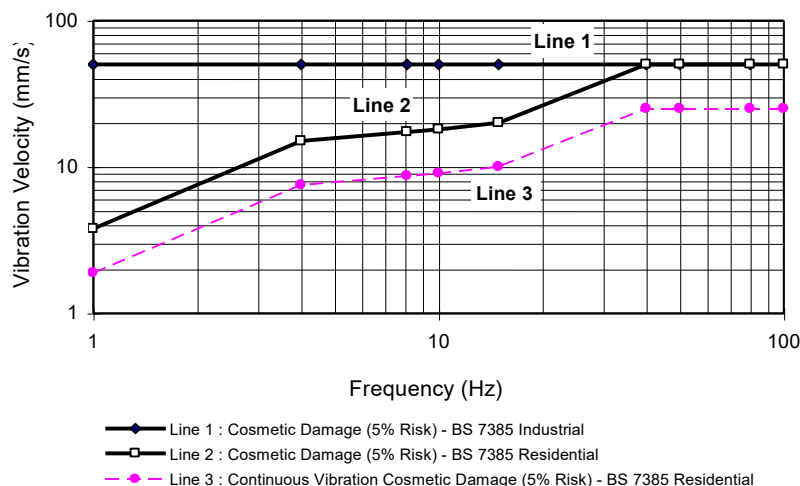
Table 10 Transient vibration criteria as per standard BS 7385 Part 2 – 1993

Line in Figure 3	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz and Above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Standard BS 7385 Part 2 – 1993 states that the values in Table 10 relate to transient vibration which does not cause resonant responses in buildings.

Where the dynamic loading caused by continuous vibration events is such that it results in dynamic magnification due to resonance (especially at the lower frequencies where lower guide values apply), then the values in Table 10 may need to be reduced by up to 50% (refer to Line 3 in Figure 3).

Figure 3 - BS 7385 Part 2 – 1993, Graph of transient vibration values for cosmetic damage



In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the recommended values corresponding to Line 2 are reduced. Below a frequency of 4 Hz, where a high displacement is



associated with the relatively low peak component particle velocity value, a maximum displacement of 0.6 mm (zero to peak) is recommended. This displacement is equivalent to a vibration velocity of 3.7 mm/s at 1 Hz.

The standard also states that minor damage is possible at vibration magnitudes which are greater than twice those given in , and major damage to a building structure may occur at values greater than four times the tabulated values.

Fatigue considerations are also addressed in the standard, and it is concluded that unless the calculation indicates that the magnitude and number of load reversals is significant (in respect of the fatigue life of building materials) then the values in should not be reduced for fatigue considerations.

3.3.2.2.2 German Standard DIN 4150 Part 3 - 1999

For continuous or repetitive vibration, standard DIN 4150 Part 3-1999 provides criteria based on values for peak particle velocity (mm/s) measured at the foundation of the building; these are summarised in Table 11. The criteria are frequency dependent and specific to particular categories of structures.

Table 11 Structural damage criteria as per standard DIN 4150 Part 3 – 1999

Type of Structure	Peak Component Particle Velocity, mm/s			
	Vibration at the foundation at a frequency of			Vibration of horizontal plane of highest floor at all frequencies
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz ¹	
Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
Structures that, because of their sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

3.3.3 Construction Traffic Noise Criteria

For existing residences and other sensitive land uses affected by additional traffic on existing roads, the NSW Road Noise Policy (RNP) states that for noise associated with increased road traffic generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB during both day and night-time periods. An increase of 2 dB represents a minor impact that is considered barely perceptible to the average person.

4 OPERATIONAL NOISE IMPACTS

4.1 Modelling methodology

Site operational noise emissions have been calculated using the CONCAWE algorithm. The CONCAWE algorithm has been selected to ensure that noise enhancing weather conditions including temperature inversions and downwind conditions have been appropriately considered in the noise assessment.

CONCAWE provides six meteorological categories, which are different to the Pasquil Stability Category usually referenced. Both adverse wind and temperature inversions fall into CONCAWE Category 6.

The meteorological assessment has assessed a worst-case situation, which entails the calculation of the worst-case weather in all directions for all receivers. The following weather conditions have been included in the assessment, in accordance with the requirements of the NPfI – Fact Sheet D.

Standard meteorological conditions:

- 0.5 m/s wind speeds; and
- Stability category D.

This is equivalent to CONCAWE Meteorological Category 4

Daytime and evening noise enhancing properties:

- 3 m/s wind speeds; and
- Stability category D.

This is equivalent to CONCAWE Meteorological Category 5

Night-time noise enhancing properties:

- 2 m/s wind speeds; and
- Stability category F.

This is equivalent to CONCAWE Meteorological Category 6 (the highest category)

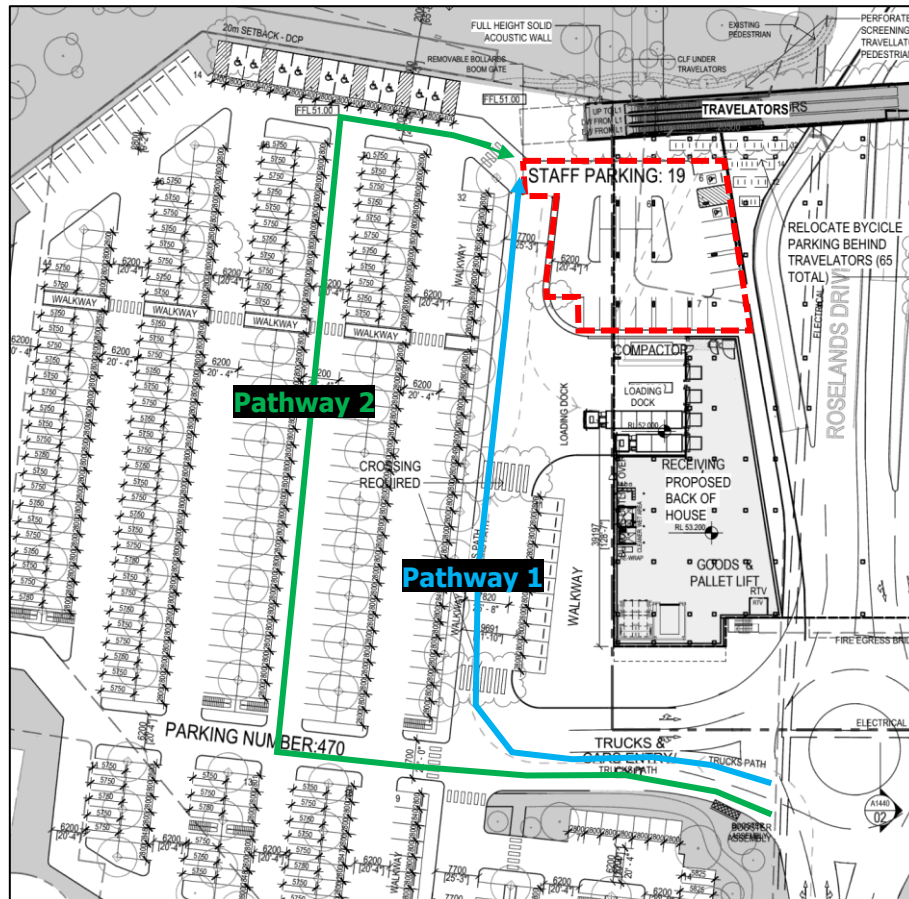
4.2 Operational site noise emissions

Typical operations of the site include retail activities, loading and unloading operations, and the movement of heavy and light vehicles. Retail operations are proposed to occur between 7:00 am and 9:00 pm, while the loading dock is proposed to operate on a 24-hour basis.

Whilst the retail areas will not be in use during the night period (10:00pm to 7:00am), the use of carpark is likely for any staff associated with the retail tenancy are working overnight (as currently proposed). As such the nighttime assessment include the provision of all nineteen (19) staff parking spaces to either arrive or depart in a worst-case 15-minute period. For reference the staff carpark is located adjacent to the loading dock and travelators. See below.

It is also assumed that the path of travel for any staff vehicles during the night period would be via either of the two pathways indicated below.

Figure 4 Assumed Staff Vehicle Pathway – Night Period



For the purpose of the assessment the assumed noise level within the future speciality retail premise is 70dBA. It is also assumed the building envelope (glazing, external walls and roof) have an R_w 25-30 construction.

Located on the roof of the future building is mechanical plant area which is designed to be within 3dBA of each relevant PTNL of each relevant period.

Vehicle movements associated with the site include both heavy vehicles (trucks) accessing the loading dock and light vehicles accessing designated on-site parking. The number and locations of these vehicle movements have been considered in the noise assessment based on the proposed site layout and operational requirements.

As indicated on the architectural and landscape drawings, a combination of a “crash barrier and acoustic wall” is located around a portion of the carpark as shown below.

Figure 5 Landscape Drawing – L-2005



Figure 6 Landscape Drawing – L-2007



The proposed "Crash Barrier and Acoustic Screen" nominated on the drawings is proposed to be 1,500mm AFFL (when measured from the carpark side). Notwithstanding the acoustic and safety benefits the screen will also reduce light spill.

The proposed construction of the fence should be a solid (non-perforated) material. Given the intention for light spill it is also proposed to be a solid material such as Fibre Cement, Lapped and Capped Timber, Colorbond, Masonry etc. The exact selection will be further developed.

The site has been designed to minimise the need for heavy vehicle reversing movements. Accordingly, the use of reversing beepers has not been assumed in the assessment. In the event that reversing alarms are required, it is recommended that broadband (non-tonal) reversing beepers be used in lieu of tonal alarms to minimise potential noise impacts. Noise associated with air-brake releases from heavy vehicles departing the site has been included in the noise emission modelling.

Noise breakout from internal operations associated with loading, unloading and on-site activities has been assessed assuming a maximum internal sound pressure level of 65 dBA, representing a conservative worst-case scenario.

A range of activities may occur across the site; however, only the highest noise-generating activities within each assessment period have been modelled. This approach has been adopted to represent a realistic worst-case operational scenario in accordance with the requirements of the Noise Policy for Industry (NPI). With compliance demonstrated for these worst-case scenarios, it can be reasonably concluded that all other site operations would also comply with the applicable noise criteria.

Below Table 12 depicts the modelled worst-case noise scenarios for each time of operation. The operational equipment represents a single movement and corrected for the number of vehicle movements / operational equipment sources in a 15-minute period.

Table 12 Predicted worst-case site operations

Scenario	Description – Peak 15-minute period
Daytime operations (7:00 am – 6:00 pm)	Heavy vehicle movements – 4 vehicle peak movements in a 15-minute period Heavy vehicle engine starts – 2 Heavy vehicle airbrake release – 2 Light vehicle movements – 83 vehicle peak movements in a 15-minute period ¹
Evening operations (6:00 pm – 10:00 pm)	Heavy vehicle movements – 2 vehicle peak movements in a 15-minute period Heavy vehicle engine starts – 2 Heavy vehicle airbrake release – 2 Light vehicle movements – 83 light vehicle peak movements in a 15-minute period ¹
Night operations (10:00 pm – 7:00 am)	Heavy vehicle movements – 1 Heavy vehicle engine starts – 1 Heavy vehicle airbrake release – 1
<i>Note 1 Light vehicle movements are based on the traffic inputs provided for PM movement as a worst-case scenario.</i>	

4.3 Source noise levels

Heavy vehicle (including forklifts) has been modelled at a height of 1.5 m above the hardstand. Light vehicles have been modelled at a height of 1 m above the hardstand.

Elevation changes have been considered for both heavy and light vehicle movements. All vehicles have been assessed travelling at a speed of 10 km/h.

The source noise levels have been based on measured noise levels of light / heavy vehicles operating on similar sites / manufacturers data sheets.

Presented in Table 13 are the sound power levels (SWL) used for this assessment. The SWL represents a single movement and corrected for the number of vehicles movements in a 15-minute period.

Table 13 Single event source noise levels, L_{Aeq} & L_{Max} SWL, dB.

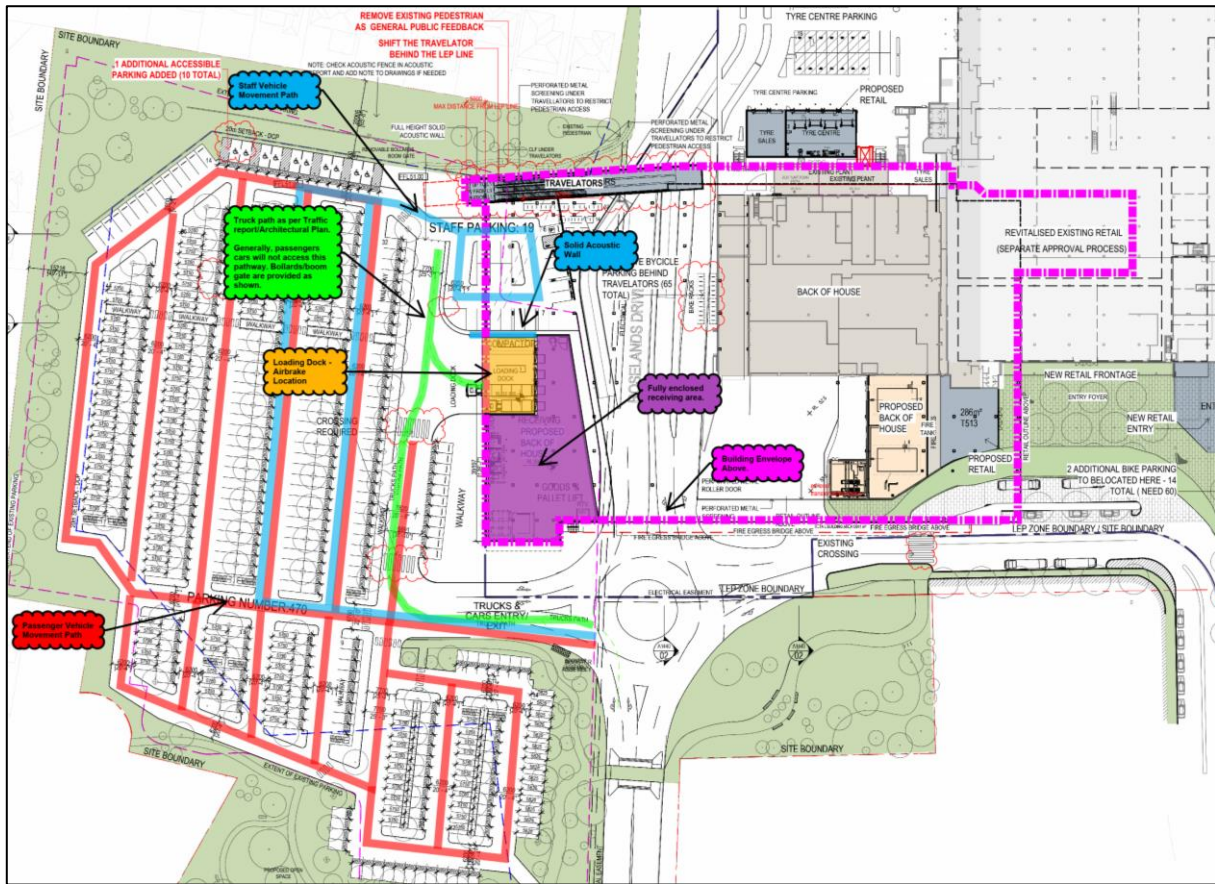
Source	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4 kHz	8 kHz	Overall, dB(A)
Light vehicle movements	63	61	62	76	79	72	61	51	81
Heavy vehicle movements L_{Aeq}	107	101	101	100	99	95	90	84	103
Heavy vehicle movements L_{AFmax}	112	106	106	105	104	100	95	89	108
Heavy vehicle airbrake release, L_{AFmax}	125	120	108	109	109	109	104	100	115
Heavy vehicle airbrake release, L_{Aeq}	113	108	96	97	97	97	92	88	103
Heavy vehicle reversing with alarm, L_{AFmax} (including 5dB tonality penalty)	108	108	97	98	104	97	94	94	106

Note 1 Octave band data is presented unweighted, overall level is presented A-weighted.

Note 2 For forklifts to be able to operate externally, during the daytime period, they must be equipped with broadband reversing alarms. As such, forklifts have not been considered to be a tonal noise source.

In addition to above, the following locations of source noise levels have been adopted in the acoustic modelling.

Figure 7 Source Location Map



4.4 Annoying characteristics of noise

The NPfI requires annoying characteristics of noise to be taken into consideration in the assessment of noise. Annoying characteristics include:

- Tonal noise – noise containing a prominent frequency and characterised by a defined pitch.
- Low frequency noise – where a source has a significant component of noise in the 10 – 160 Hz range
- Intermittent noise – where the noise source at the receiver varies by more than 5 dB(A)

For the characteristics to be relevant, they must be assessed at the receiver location, so the propagation characteristics of noise and existing ambient noise level should be taken into consideration.

Of the noise sources identified in Table 13, no sources are considered to feature annoying characteristics. Hence, no additional corrections have been applied to any of the considered sources.

4.5 Predicted site operational noise impacts

Presented below in Table 14 is a summary of the predicted noise levels for each scenario and the applicable noise criteria. Noise contours of these scenarios are presented in B.3.

Table 14 Predicted operational noise impacts, $L_{Aeq,15\text{minute}}$, dB(A).

Receiver	PSNTL	Predicated Noise Level 1.5m AFFL, 1.5m from Boundary Fence <u>OR</u> Elevated Façade Window
Day (7:00 am to 6:00 pm)		
NCA 1	53	44
NCA 2	53	45
NCA 3	53	43
Evening (6:00 pm to 10:00 pm)		
NCA 1	43	41
NCA 2	43	43
NCA 3	43	42
Night time (10:00 pm to 7:00 am)		
NCA 1	38 (including staff vehicle movements)	38
NCA 2	38 (including staff vehicle movements)	38
NCA 3	38 (including staff vehicle movements)	38
<i>Note 1 Where the calculated noise levels are within +/- 2 dB of the specified level given above, the criteria will be considered achieved. The reason for this is because a 1-2 dB difference is difficult to perceive subjectively.</i>		

The results in Table 14 indicate that compliance with the noise criteria is achieved at all locations under neutral weather conditions.

Compliance is also achieved under enhancing meteorological conditions for all receivers.

Despite this, recommendations have been included in Section 5 to minimise the potential for noise impacts to the surrounding community.

4.6 Predicted Maximum Noise Level Assessment

The potential for sleep disturbance associated with short-duration maximum noise events has been assessed in accordance with Section 2.5 of the NSW EPA Noise Policy for Industry 2017 (NPfI).

The NPfI identifies that a detailed maximum noise level event assessment should be undertaken where noise from the subject premises during the night-time period exceeds either:

- an $L_{Aeq, 15\text{-minute}}$ level of 40 dB(A), or the prevailing rating background noise level (RBL) plus 5 dB, whichever is greater; and/or
- an L_{Max} level of 52 dB(A), or the prevailing RBL plus 15 dB, whichever is greater.

The NPfI screening levels identify when a detailed assessment is required. They do not represent absolute limits or the point at which sleep-disturbance impacts necessarily become unacceptable. Where a screening level is exceeded,

the assessment is required to consider the magnitude of maximum noise events, their emergence above the background noise level, the number and distribution of events during the night-time period and feasible and reasonable mitigation measures.

PWNA understands that approximately nine truck deliveries are expected to occur during the night-time period between 10:00 pm and 7:00 am, likely between 4:00am and 7:00am for freshly baked goods and the like.

For the purposes of this assessment, it has conservatively been assumed that:

- each truck delivery may generate one short-duration air-brake release, a short duration of a reversing alarm and movement noise while entering/leaving the site at the assessed maximum noise level in the table above;
- For the airbrake:
 - Approximately nine relevant L_{Max} events may therefore occur during a night-time period;
 - Each air-brake release is a discrete and relatively short-duration event;
 - No more than one airbrake or equivalent maximum noise event at the predicted level would normally occur during each delivery.
- For the reversing alarm:
 - This will only occur during the reversing movement into the loading dock.
 - No more than one reversing movement has been assumed.
- For the truck movement:
 - This will only during both the entering and leaving into the loading dock.
 - It is assumed that only movement one movement will occur in any 15-minute interval.

The applicable receiver-specific maximum noise level screening levels and predicted maximum noise levels are presented in the table below.

Table 15 Predicted maximum noise level screening assessment, L_{Max} , dB(A).

Receiver	NPfI screening level, dB(A) (L_{Max})	Predicted external level, dB(A) (L_{Max})	Margin relative to screening level	Assumed maximum events between 10:00 pm and 7:00 am	Screening outcome
Night (10:00 pm to 7:00 am)					
NCA 1					
Airbrake Release	54	45–48	6–9 dB below	Approximately 9	Screening level satisfied
Reversing alarm	54	49–62	5–7 dB above	Approximately 9	Detailed assessment required
Truck movement	54	51–64	7–10 dB above	Approximately 9	Detailed assessment required
NCA 2					
Airbrake Release	54	61–63	7–9 dB above	Approximately 9	Detailed assessment required
Reversing alarm	54	52–55	Up to 1 dB above	Approximately 9	Detailed assessment required
Truck movement	54	54–57	Up to 3 dB above	Approximately 9	Detailed assessment required
NCA 3					
Airbrake Release	56	58–59	2–3 dB above	Approximately 9	Detailed assessment required
Reversing alarm	56	52–59	Up to 3 dB above	Approximately 9	Detailed assessment required
Truck movement	56	54–61	Up to 5 dB above	Approximately 9	Detailed assessment required

At NCA01, the predicted maximum noise level is between 5 dB and 10 dB above the applicable NPfI screening level. A detailed assessment of the potential for sleep disturbance has therefore been undertaken below.

At NCA02, the predicted maximum noise level is between 1 dB and 9 dB above the applicable NPfI screening level. A detailed assessment of the potential for sleep disturbance has therefore been undertaken below.

At NCA03, the predicted maximum noise level is between 2 dB and 5 dB above the applicable NPfI screening level. A detailed assessment of the potential for sleep disturbance has therefore been undertaken below.

Section 5.4 of the NSW Road Noise Policy 2011 (RNP) identifies the following as the principal characteristics influencing potential sleep disturbance:

- the number of events that are heard distinctly above the background noise level;
- the emergence of the events above the background noise environment; and
- the highest noise level associated with the events.

The RNP refers to planning guidance under which an internal maximum noise level of approximately 45 dB(A) should not be exceeded more than approximately 10–15 times during an eight-hour night. The RNP also concludes from the available research that maximum internal noise levels below approximately 50–55 dB(A) are unlikely to awaken people from sleep. One or two events with internal maximum levels of approximately 65–70 dB(A) are not expected to significantly affect health and wellbeing.

As 27 component maximum noise events have been assumed, the RNP finding concerning one or two events at 65–70 dB(A) has not been directly adopted as the acceptance criterion. It is used only to provide context regarding the comparatively moderate magnitude of the predicted internal levels.

Additional consideration has been given to Figure B3, “Awakenings due to noise,” contained in Appendix B of the NSW EPA’s *Environmental Criteria for Road Traffic Noise* (ECRTN) 1999.

Figure 8 Extract - Figure B3, “Awakenings due to noise” - NSW EPA’s ECRTN 1999

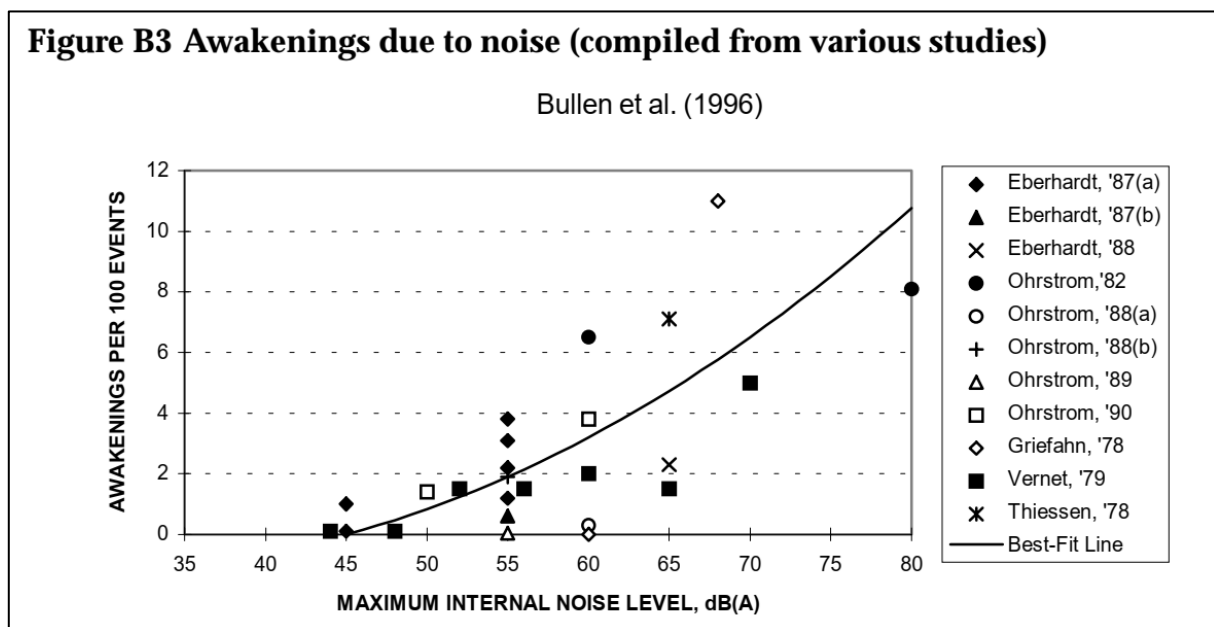


Figure B3 presents the relationship between the level of an individual noise event and the associated awakening response. Importantly, the figure illustrates that awakening is a probabilistic response, with the likelihood or proportion of awakenings increasing progressively as the internal maximum noise level increases. It does not indicate a single noise level below which awakening is impossible or above which every event will result in awakening.

Accordingly, the Figure B3 provides supporting context for considering the predicted internal maximum noise levels together with the number of events, their emergence above the existing background noise level and the short-duration nature of these events.

The primary assessment remains based on the NPfI screening procedure and the updated sleep-disturbance findings presented in Section 5.4 of the RNP.

The probabilistic relationship illustrated in Figure B3 is consistent with the RNP conclusion that internal maximum noise levels below approximately 50–55 dB(A) are generally unlikely to awaken people from sleep. It also reinforces that a low awakening risk is not equivalent to a zero risk, particularly for noise-sensitive occupants or where events are repeated frequently.

For this assessment, a 10 dB external-to-internal noise reduction has been conservatively adopted to represent a bedroom with a partially open window. The resulting internal maximum noise levels are presented in Table 16. Greater reductions would generally be achieved where windows are closed or where alternative ventilation enables the dwelling façade to remain closed; however, the assessment does not rely on that additional assumption (i.e. worst-case).

The highest estimated internal maximum noise level is 54 dB(A), associated with truck movements at NCA01. All predicted internal maximum noise levels are therefore at or below the upper end of the RNP's approximate 50–55 dB(A) range below which awakening is considered unlikely.

4.6.1 Event-Frequency Consideration

The potential number of events exceeding 45 dB(A) internally is summarised in Table 16.

Table 16 Event-frequency review

Receiver	Number of delivery sequences per night	Total component events per night	Overall estimated internal range, dB(A) (LAFmax)	Potential component events above 45 dB(A), based on predicted ranges	Highest estimated internal level
NCA01	9	27	35–54	Up to 18	54
NCA02	9	27	42–53	Approximately 9–18	53
NCA03	9	27	42–51	Approximately 9–27	51

At the upper end of the predicted ranges, the number of individual component events exceeding 45 dB(A) internally could exceed the RNP-cited planning reference. Strict satisfaction of that conservative planning rule is therefore not claimed for every upper-bound combination.

However, the following matters are relevant when interpreting the event-frequency comparison:

- the 27 component events form part of nine delivery sequences rather than 27 separate deliveries;
- the air-brake release, reversing manoeuvre and truck movement associated with each delivery would be grouped within a relatively short period;
- the deliveries are assumed to be distributed throughout the nine-hour night-time period rather than concentrated within a short period;
- the 45 dB(A)/10–15 event recommendation is planning guidance rather than a stand-alone NPfI compliance limit;
- all predicted internal maximum levels remain at or below 54 dB(A);
- no predicted event exceeds the upper end of the RNP's approximate 50–55 dB(A) awakening range; and
- all predicted internal levels are at least 11 dB below the lower 65 dB(A) level discussed by the RNP in relation to infrequent maximum noise events.



Accordingly, although a number of the events would be audible inside a bedroom and the possibility of an occasional awakening cannot be completely excluded, the predicted levels do not indicate a high likelihood of repeated awakening.

4.6.2 Consideration of ECRTN Figure B3 — Awakenings Due to Noise

Further consideration has been given to **Figure B3, “Awakenings due to noise,”** contained in Appendix B of the NSW EPA’s *Environmental Criteria for Road Traffic Noise* (ECRTN), 1999.

Figure B3 illustrates an exposure-response relationship under which the awakening response increases progressively with the level of an individual noise event. The relationship is probabilistic rather than a binary pass-or-fail threshold. Consequently:

- a screening-level exceedance does not mean that every event will awaken an occupant;
- the likelihood of awakening is lower at moderate internal maximum noise levels and increases as event levels rise; and
- the event level must be considered together with the number, timing, emergence and character of the events.

The estimated internal maximum levels of 35–54 dB(A) fall within the lower-level portion of the Figure B3 relationship. The figure therefore supports the conclusion that the probability of awakening from any individual event would be relatively low, although not zero, particularly for noise-sensitive occupants and for the upper predicted levels at NCA01 and NCA02.

The ECRTN was superseded by the RNP from 1 July 2011. Figure B3 has therefore been used as supporting exposure-response information rather than as the primary assessment criterion. The primary assessment remains based on the NPfI screening process and the sleep-disturbance research conclusions contained in the RNP.

4.6.3 Receiver-Specific Sleep Disturbance Assessment

NCA01

The air-brake release is predicted to generate an internal maximum noise level of approximately 35–38 dB(A), which is below both the 45 dB(A) frequency reference and the RNP’s approximate 50–55 dB(A) awakening range.

Reversing alarms and truck movements may generate internal maximum levels of up to approximately 52 dB(A) and 54 dB(A), respectively. These events would be clearly audible at the upper end of the predicted ranges. However, the levels remain below 55 dB(A), and Figure B3 indicates that awakening response at these levels is probabilistic and relatively low rather than certain.

While up to 18 component events may exceed 45 dB(A) internally under the conservative upper-bound scenario, these events would be grouped into nine delivery sequences and distributed throughout the night. On balance, the predicted maximum noise levels at NCA01 are considered to present a low risk of material sleep disturbance, subject to the operational controls identified below.



NCA02

The dominant maximum noise event at NCA02 is the air-brake release, with an estimated internal level of approximately 51–53 dB(A). This is within the RNP's approximate 50–55 dB(A) range but remains 2–4 dB below its upper value.

The estimated internal levels from reversing alarms and truck movements are lower, at approximately 42–45 dB(A) and 44–47 dB(A), respectively. Reversing alarms are therefore expected to remain at or below the 45 dB(A) planning reference, while truck-movement events would exceed that value only toward the upper end of the predicted range.

Having regard to the maximum internal level, the short duration of an air-brake release, the distribution of nine deliveries throughout the night and the exposure-response relationship illustrated in Figure B3, the risk of repeated awakening at NCA02 is considered low. The predicted impact is therefore considered acceptable subject to minimising unnecessary or repeated air-brake releases.

NCA03

The estimated internal maximum noise levels at NCA03 are:

- 48–49 dB(A) for air-brake releases;
- 42–49 dB(A) for reversing alarms; and
- 44–51 dB(A) for truck movements.

The air-brake and reversing-alarm levels remain below the lower end of the RNP's approximate 50–55 dB(A) awakening range. The upper truck-movement level is approximately 51 dB(A), which is within the lower portion of that range and remains 4 dB below its upper value.

Although a conservative component-event count could result in more than 15 events exceeding 45 dB(A) internally, the individual event levels are comparatively low and the events would be grouped into nine delivery sequences. Figure B3 supports a relatively low awakening probability at the predicted internal levels.

Sleep disturbance at NCA03 is therefore considered unlikely to be material, subject to the stated operating assumptions and controls.

4.6.4 Sleep Disturbance Assessment Summary

The initial NPfI maximum noise level screening criterion is satisfied for the air-brake release at NCA01. One or more reversing-alarm, air-brake or truck-movement scenarios exceed the initial screening criteria at NCA01, NCA02 and NCA03, thereby triggering a detailed assessment.

Following application of a nominal 10 dB external-to-internal reduction, the predicted internal maximum noise levels are:

Receiver	Air-brake release, dB(A) LAFmax	Reversing alarm, dB(A) LAFmax	Truck movement, dB(A) LAFmax	Highest internal level
NCA01	35–38	39–52	41–54	54



Receiver	Air-brake release, dB(A) LAFmax	Reversing alarm, dB(A) LAFmax	Truck movement, dB(A) LAFmax	Highest internal level
NCA02	51–53	42–45	44–47	53
NCA03	48–49	42–49	44–51	51

All predicted internal maximum noise levels are at or below 54 dB(A) and therefore do not exceed the upper end of the RNP's approximate 50–55 dB(A) range below which awakening is considered unlikely. Figure B3 of the ECRTN similarly supports the conclusion that awakening is a probabilistic response and that individual events at the predicted internal levels would have a relatively low, although not zero, probability of causing awakening.

The conservative event-frequency assessment identifies that the number of component events above 45 dB(A) internally could exceed the 10–15 event planning reference at some receivers. However, these component events would occur as part of nine delivery sequences, would be short in duration and would be distributed throughout the night-time period. The predicted levels are also substantially below the RNP's 65–70 dB(A) internal range discussed in relation to infrequent events.

On balance, the proposed truck deliveries are considered to present a **low risk of material sleep disturbance and are acoustically acceptable**, subject to implementation of the following controls:

- no more than nine truck deliveries are to occur between 10:00 pm and 7:00 am;
- drivers are to avoid unnecessary or repeated air-brake releases;
- vehicles are to travel at low and consistent speeds within the site;
- unnecessary horn use, abrupt acceleration, prolonged idling and vehicle-door slamming are to be avoided;
- reversing alarms are to be maintained and set at the minimum level necessary to satisfy applicable safety requirements, with broadband or ambient-sensitive alarms considered where operationally and legally permissible;
- truck routes and manoeuvring areas are to be arranged to maximise available building and barrier screening from residential receivers; and
- the assessment is to be reviewed where more than nine deliveries occur, multiple events of the same type routinely occur during a delivery, or measured maximum noise levels exceed the predicted ranges.

Subject to these assumptions and operational controls, specific receiver-side acoustic treatment is not considered warranted solely on the basis of the assessed maximum noise events.

4.7 Rooftop Mechanical Plant

At this stage of the project, the exact equipment selections have not been determined. Without the detailed information regarding the selections and their associated noise levels a detailed acoustic review cannot be undertaken.

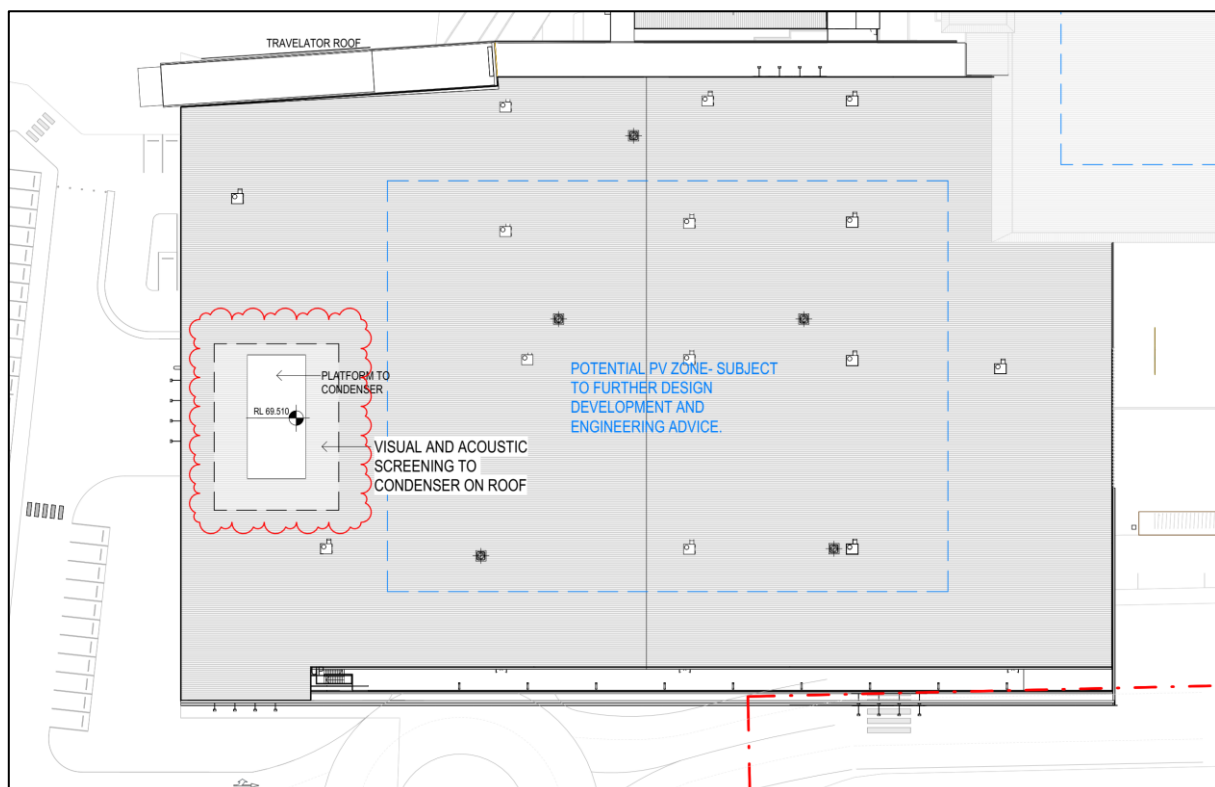
However, to ensure the proposal is suitable, and can be shown to comply with the noise emission requirements listed in section 3 of this report, an in principle assessment has been conducted. This assessment is based on our experience with similar type developments and the associated plant items which serve them.

For the general ventilation systems, it is anticipated that the physical fans would be installed on the roof as currently shown. From our experience and assumption of typically noise levels associated with the system isolation of the fan from the base building structure with a correctly sized vibration isolator is recommended. Other standard mechanical components will be sufficient.

Regarding the toilet exhaust systems, it is anticipated that the physical fans would also be installed on the roof. From our experience and assumption of typically noise levels associated with the system isolation of the fan from the base building structure with a correctly sized vibration isolator is recommended. Other standard mechanical components will be sufficient.

With regards to air conditioning plant, the a large format condenser platform is provided along the southern portion of the roof (see below). Based on assumed noise levels of plant decks of a similar size on other projects we would recommend the preliminary treatments:

Figure 9 Rooftop Mechanical Plant Location



- Isolate the air conditioning condensers from the base building structure with a correctly sized vibration isolator.



-
- Acoustic louvres or acoustic screens around the roof air conditioning plant enclosure will likely be required.
 - Any rigid ductwork is to include 50mm thick internally lined insulation.

Based on the information provided above, the location of the rooftop plant/enclosure is capable of complying with the relevant **Project Trigger Noise Levels (PTNL's)** established in section 3 above. Nonetheless, we recommended that prior to the issue of any Construction Certificate (or equal). This is to ensure that once the final plant selections have been made the emissions from these systems fully comply with the **Project Trigger Noise Levels (PTNL's)** outlined in our report are achieved.

5 CONSTRUCTION NOISE AND VIBRATION IMPACTS

5.1 Construction Activity Noise Assessment

A review of the noise levels likely to be emitted from the site because of the demolition and construction works has been undertaken. Based on the proximity of the surrounding receivers and the works area, we expect there is likely to be periods where noise emission is likely to exceed the *Noise Affected Level (NAL)* and in some cases the *Highly Noise Affected Level (HNAL)*. As such the works will require a site-specific *Construction Noise & Vibration Sub Plan (CNVMSP)* to be prepared for the site.

This plan should be undertaken in accordance with the relevant NSW EPA documents around noise and vibration (such as the ICNG and Assessing Vibration- a technical guideline.).

5.2 Construction Traffic Noise Assessment

From the criteria, it is noted that vehicle numbers on surrounding roads would need to increase by around 60% from existing traffic flows, for a 2 dB increase in road traffic noise to occur. As noted previously, a 2 dB increase in road traffic noise is not considered to be noticeable.

Based on the number of vehicles projected over each of the construction phases, it is concluded that noise impacts from construction traffic is unlikely to have an impact at the nearest affected properties. As a result, no further assessment is required

5.3 Vibration Assessment

In order to maintain compliance with the human comfort vibration criteria discussed in Section 3.3.2, it is recommended that the indicative safe distances listed in Table 17 should be maintained. These indicative safe distances should be validated prior to the start of construction works by undertaking measurements of vibration levels generated by construction and demolition equipment to be used on site.

Since the criteria for scientific or medical equipment (should any of these exist close to the site) can be more stringent than those required for human comfort, vibration validating measurements should be conducted at each site to determine the vibration level and potential impact onto this sensitive equipment.

Additionally, any vibration levels should be assessed in accordance with the criteria discussed in Section 3.3.2. This information should also be included as part of a Construction Noise Vibration Management Plan (CNVMP).

Table 17 Recommended indicative safe working distances for vibration intensive plant

Plant	Rating / Description	Safe Working Distances (m)	
		Cosmetic Damage (BS 7385: Part 2 DIN 4150: Part 3)	Human Comfort (AVTG)
Vibratory roller	< 50 kN (Typically 1 – 2 tonnes)	5	15 – 20
	< 100 kN (Typically 2 – 4 tonnes)	6	20
	< 200 kN (Typically 4 – 6 tonnes)	12	40
	< 300 kN (Typically 7 – 13 tonnes)	15	100
	> 300 kN (Typically more than 13 tonnes)	20	100
Small hydraulic hammer	300 kg, typically 5 – 12 tonnes excavator	2	7
Medium hydraulic hammer	900 kg, typically 12 – 18 tonnes excavator	7	23
Large hydraulic hammer	1600 kg, typically 18 – 34 tonnes excavator	22	73
Vibratory pile driver	Sheet piles	2 – 20	20
Jackhammer	Hand held	1	Avoid contact with structure and steel reinforcements

5.4 Preparation of a Site Specific CNVMSP

5.5 Discussion of Resulting Construction Noise Levels with Mitigation

Like any other project, should the project be awarded approval a site-specific *Construction Noise Management Sub-Plan (CNVMSP)* would be prepared in conjunction with the client, managing contractor and other relevant design team members to further assess the impacts however more importantly determine the exact noise and vibration mitigation measures that are to be implemented.

Therefore, we would recommend in the event of project approval the preparation of a site-specific *Construction Noise Management Sub-Plan (CNVMSP)* be conditioned to ensure all mitigation measures are developed and implemented prior to construction works commencing onsite. Ensuring the site achieves a high standard of acoustic mitigation.

6 RECOMMENDED ACOUSTIC MITIGATION MEASURES

Detailed below is a summary of the relevant acoustic mitigation measures required to be implemented.

Table 18 Summary of Acoustic Mitigation Measures

Project Stage	Mitigation Measures	Relevant Section of Report
Design (D)	Design of building envelope (i.e. Glazing Construction, External Wall Construction and Roof Construction) should meet the minimum acoustic design requirements.	Section 4.
	A detailed acoustic review of all proposed building services is required to be undertaken prior to installation once final selections are made to ensure compliance with the relevant PTNLs as part of the Construction Certificate (as applicable).	Section 4.
Construction (C)	A dedicated site-specific <i>Construction Noise and Vibration Sub-Plan (CNVMSP)</i> must be prepared for the site outlining the relevant noise and vibration mitigation measures required.	Section 5.5
Operation (O)	An active Plan of Management (PoM) reminding all visitors to be mindful of noise when onsite.	Section 4.

7 CONCLUSION

HMC Capital (the Client) is proposing to undertake an expansion to the existing Roselands Shopping centre at the site located at 24 Roselands Avenue, Roselands including new a new speciality retail premise which spans across Roselands Avenue.

This report presents a noise and vibration impact assessment to support the Development Application.

Background noise logging was undertaken in one location between the 23rd of September 2025 and the 2nd of October 2025. Positioned along the south, west and east boundary of the project site. The results from loggers have been presented in Appendix B.1, and not been corrected (i.e., raw data is presented).

Operational noise emission criteria have been derived from the background noise logging in accordance with the EPAs Noise Policy for Industry and background noise logging undertaken for this project.

An operational noise model has been developed using SoundPLAN v9.1. The noise model assessed the dominant noise sources generated from the operation of the site. The predicted noise levels identified compliance with the applicable noise criteria is achieved with the inclusion of appropriate noise mitigation measures.

Like any other project, should the project be awarded approval a site-specific *Construction Noise Management Sub-Plan (CNVMSP)* would be prepared in conjunction with the client, managing contractor and other relevant design team members to further assess the impacts however more importantly determine the exact noise and vibration mitigation measures that are to be implemented.

Therefore, we would recommend in the event of project approval the preparation of a site-specific *Construction Noise Management Sub-Plan (CNVMSP)* be conditioned to ensure all mitigation measures are developed and implemented prior to construction works commencing onsite. Ensuring the site achieves a high standard of acoustic mitigation.

If you have any additional questions, please contact us should you have any further queries.

Regards,

A handwritten signature in blue ink, appearing to read 'M Furlong', is positioned above the printed name and title.

Matthew Furlong
Principal Acoustic Engineer
PULSE WHITE NOISE ACOUSTICS PTY LTD
AAS Member and AAAC Member Firm



APPENDIX A. ACOUSTIC TERMINOLOGY

The following is a brief description of the acoustic terminology used in this report:

Ambient Sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds; 0 dB the faintest sound we can hear 30 dB a quiet library or in a quiet location in the country 45 dB typical office space. Ambience in the city at night 60 dB Martin Place at lunch time 70 dB the sound of a car passing on the street 80 dB loud music played at home 90 dB the sound of a truck passing on the street 100 dB the sound of a rock band 115 dB limit of sound permitted in industry 120 dB deafening
dBA	<i>A-weighted decibels</i> The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dBA. Practically all noise is measured using the A filter. The sound pressure level in dBA gives a close indication of the subjective loudness of the noise.
Frequency	Frequency is synonymous to <i>pitch</i> . Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
L _{max}	The maximum sound pressure level measured over a given period.
L _{min}	The minimum sound pressure level measured over a given period.
L ₁	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L ₁₀	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L ₉₀	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L ₉₀ noise level expressed in units of dBA.
L _{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Sound Pressure Level, LP dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.
Sound Power Level, Lw dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt.

APPENDIX B. NOISE LOGGING DATA

B.1. Noise Logger 01

HomeCo. Roselands, Roselands

Ambient noise monitoring report



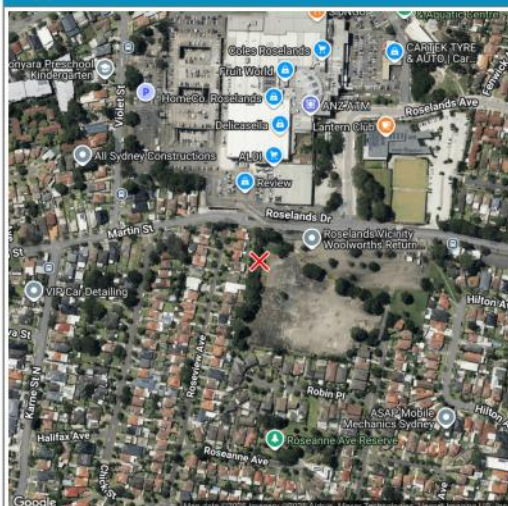
Item	Information
Logger Type	NL-42
Serial number	00396931
Address	HomeCo. Roselands, Roselands
Location	HomeCo. Roselands, Roselands
Facade / free field	Free field
Environment	

Measured noise levels

Logging date	Rating Background Level			L _{Aeq,period}		
	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am
Tue 23 Sep 2025	-	40	-	-	49	-
Wed 24 Sep 2025	48	46	41	60	50	49
Thu 25 Sep 2025	48	45	42	59	50	49
Fri 26 Sep 2025	46	44	40	54	50	47
Sat 27 Sep 2025	44	43	41	50	52	46
Sun 28 Sep 2025	46	43	38	52	48	46
Mon 29 Sep 2025	46	38	34	52	46	47
Tue 30 Sep 2025	44	42	38	50	47	47
Wed 01 Oct 2025	47	45	38	54	49	49
Thu 02 Oct 2025	-	-	-	56	-	47
Summary	46	43	39	56	49	48

Note: Results with a '-' identify that there were not enough measurements available to correctly calculate the level, in accordance with the Noise Policy for Industry. The data has been excluded either from weather or manual exclusions. See the charts for more information

Logger location



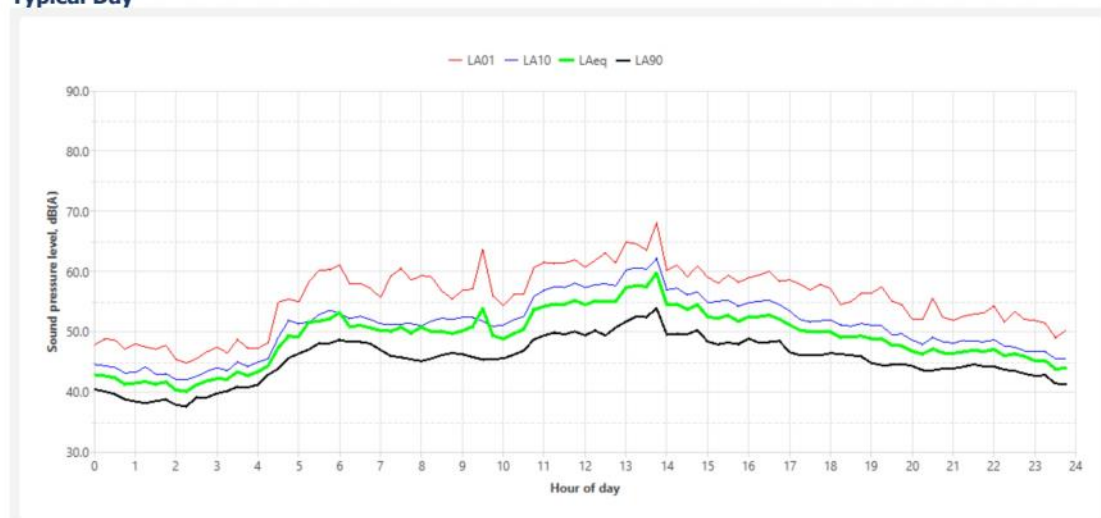
HomeCo. Roselands, Roselands

Logger deployment photo



Page 1

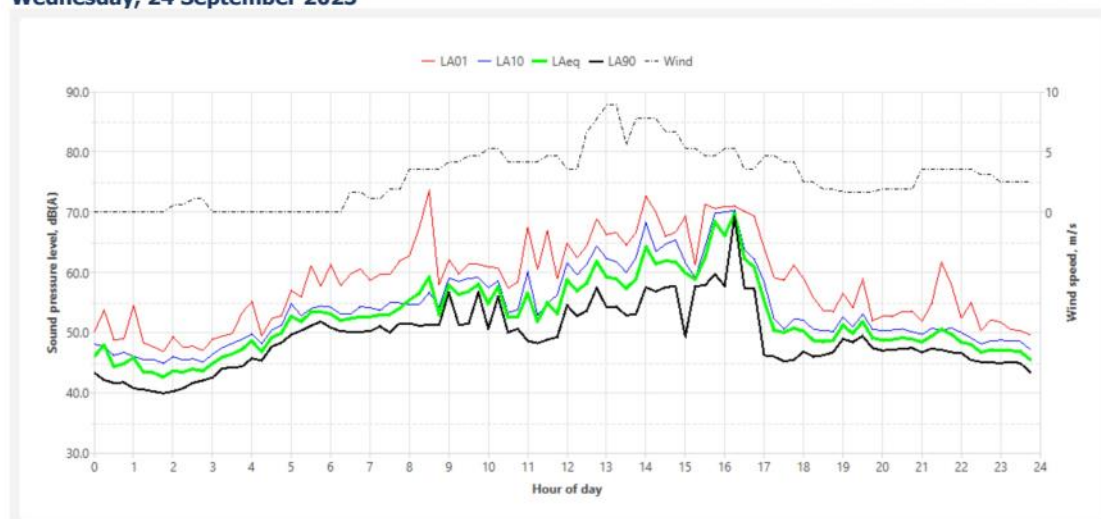
Typical Day



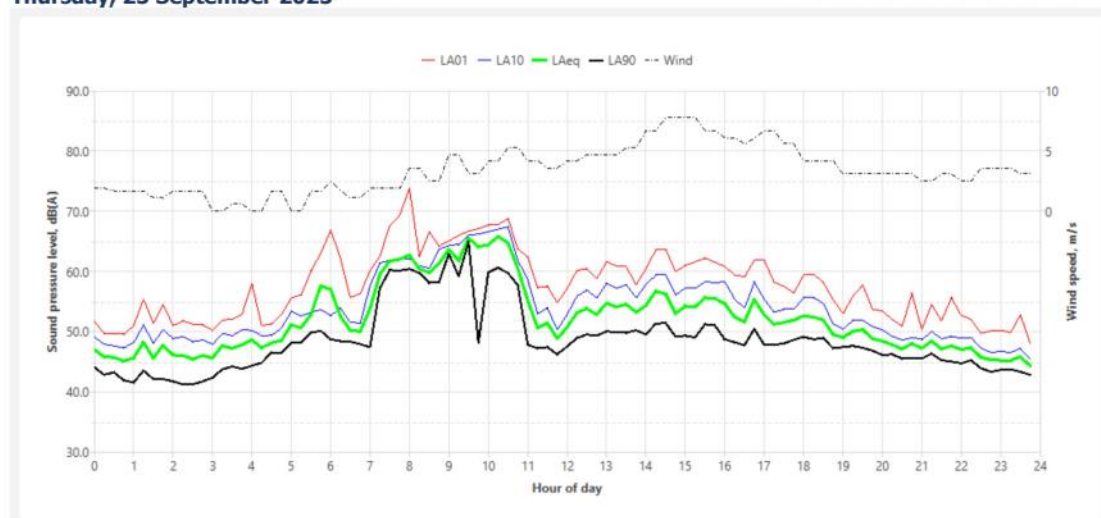
Tuesday, 23 September 2025



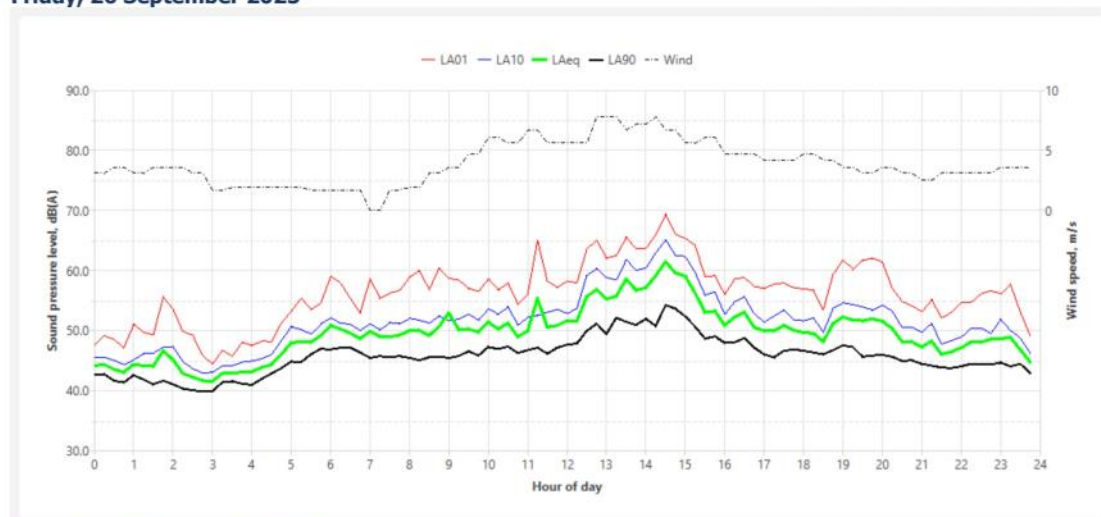
Wednesday, 24 September 2025



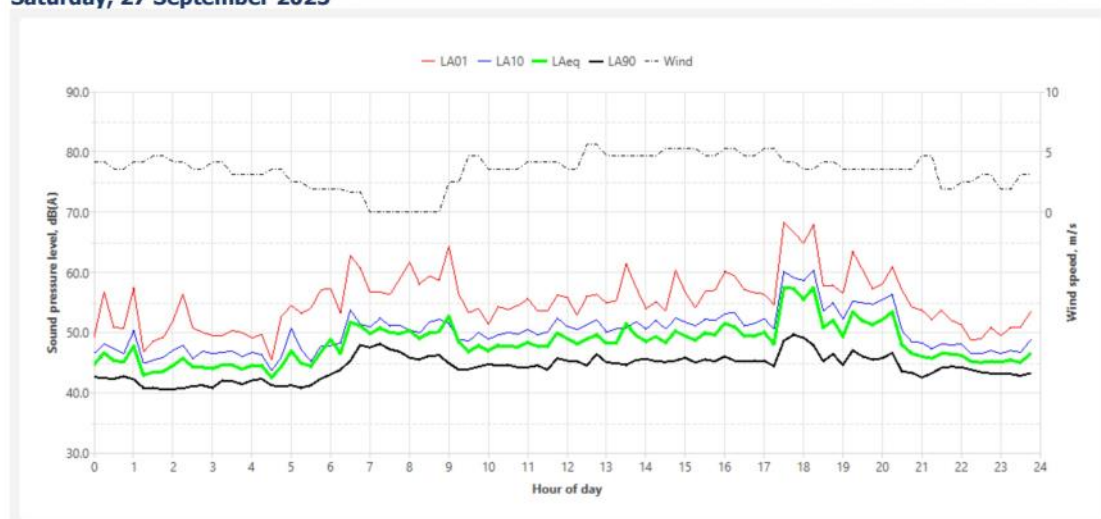
Thursday, 25 September 2025



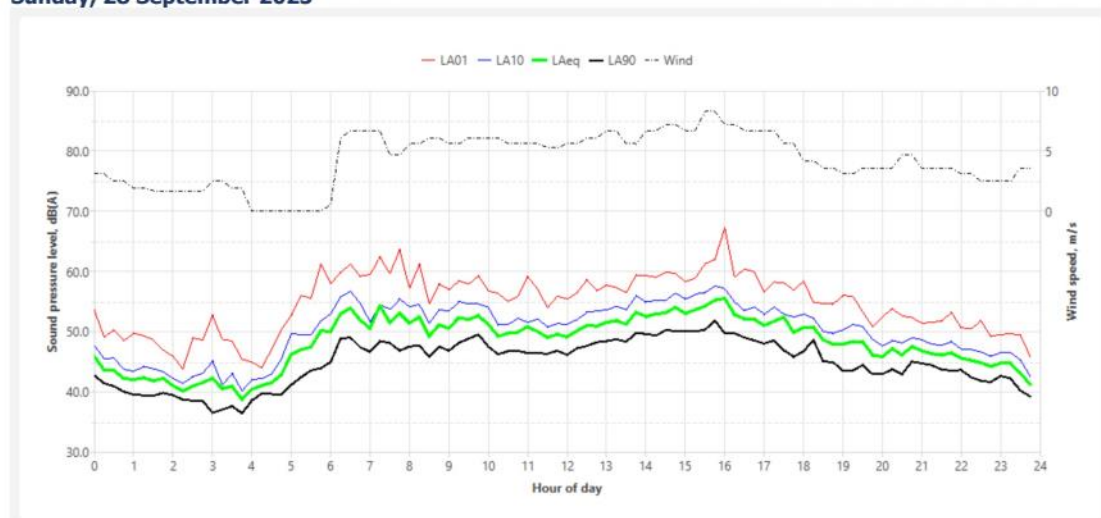
Friday, 26 September 2025



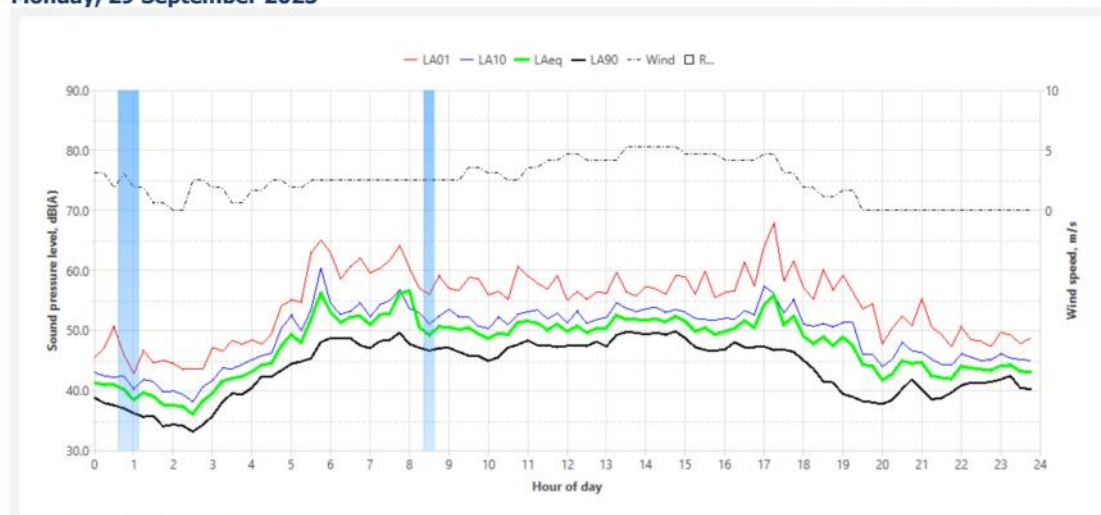
Saturday, 27 September 2025



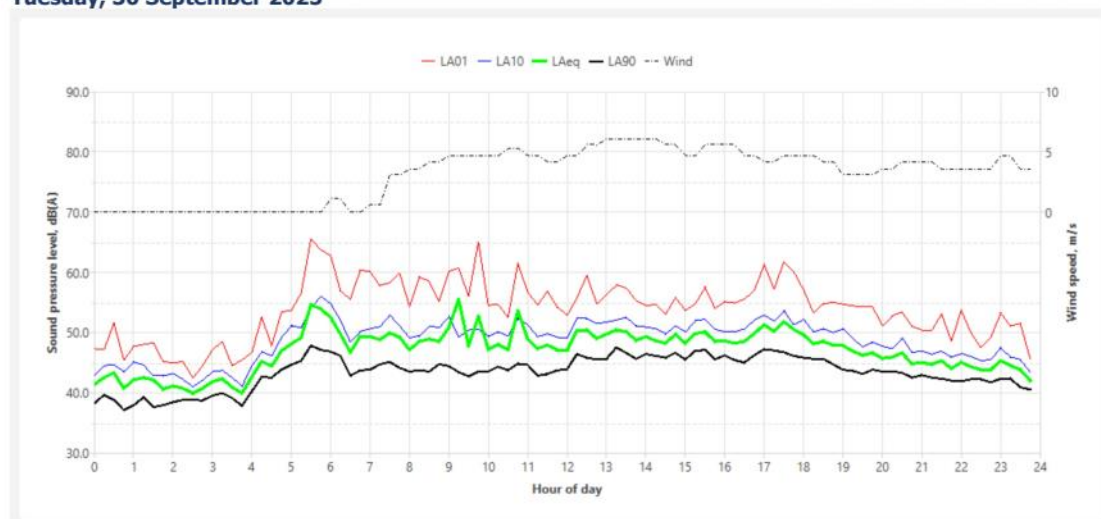
Sunday, 28 September 2025



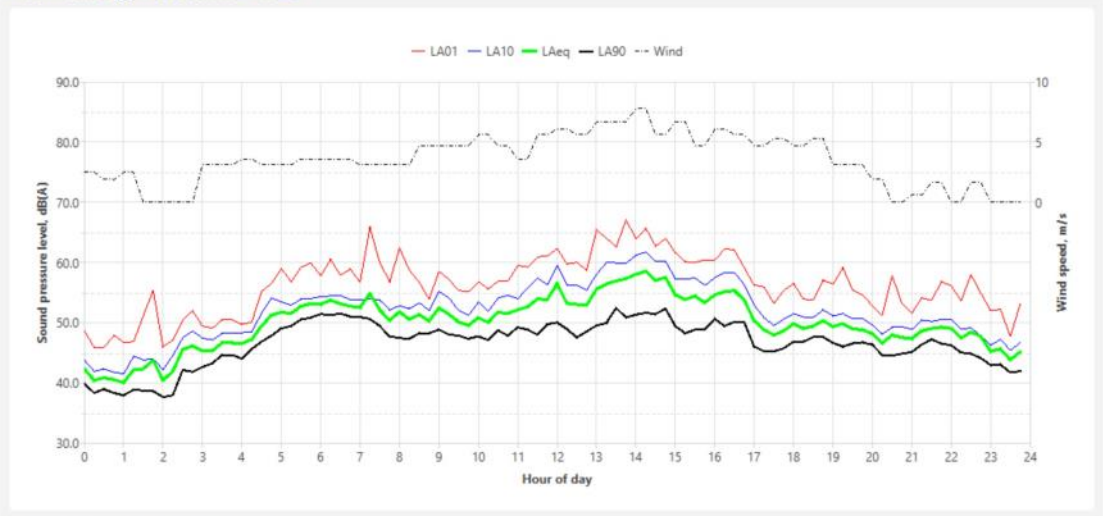
Monday, 29 September 2025



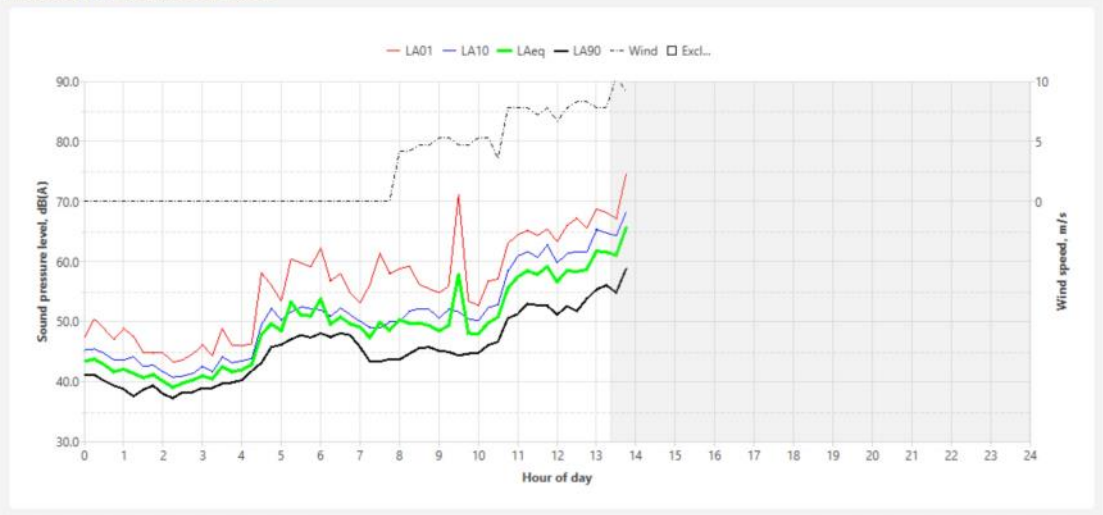
Tuesday, 30 September 2025



Wednesday, 1 October 2025



Thursday, 2 October 2025



B.2. Noise Logger 02

HomeCo. Roselands, Roselands

Ambient noise monitoring report



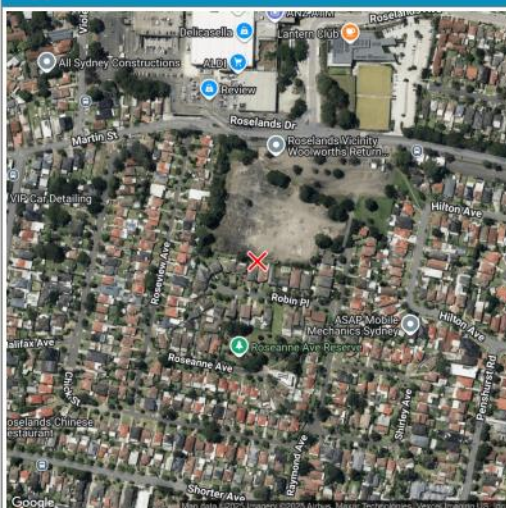
Item	Information
Logger Type	NGARA
Serial number	87826B
Address	HomeCo. Roselands, Roselands
Location	HomeCo. Roselands, Roselands
Facade / free field	Free field
Environment	

Measured noise levels

Logging date	Rating Background Level			L _{Aeq,period}		
	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am
Tue 23 Sep 2025	-	40	-	-	46	-
Wed 24 Sep 2025	43	41	40	53	44	46
Thu 25 Sep 2025	44	45	38	49	47	46
Fri 26 Sep 2025	45	46	42	50	49	48
Sat 27 Sep 2025	45	46	42	51	49	47
Sun 28 Sep 2025	42	38	36	48	44	45
Mon 29 Sep 2025	41	39	31	48	46	43
Tue 30 Sep 2025	45	47	38	51	51	46
Wed 01 Oct 2025	44	42	39	49	46	46
Thu 02 Oct 2025	-	-	-	50	-	47
Summary	44	42	39	50	48	46

Note: Results with a '-' identify that there were not enough measurements available to correctly calculate the level, in accordance with the Noise Policy for Industry. The data has been excluded either from weather or manual exclusions. See the charts for more information

Logger location



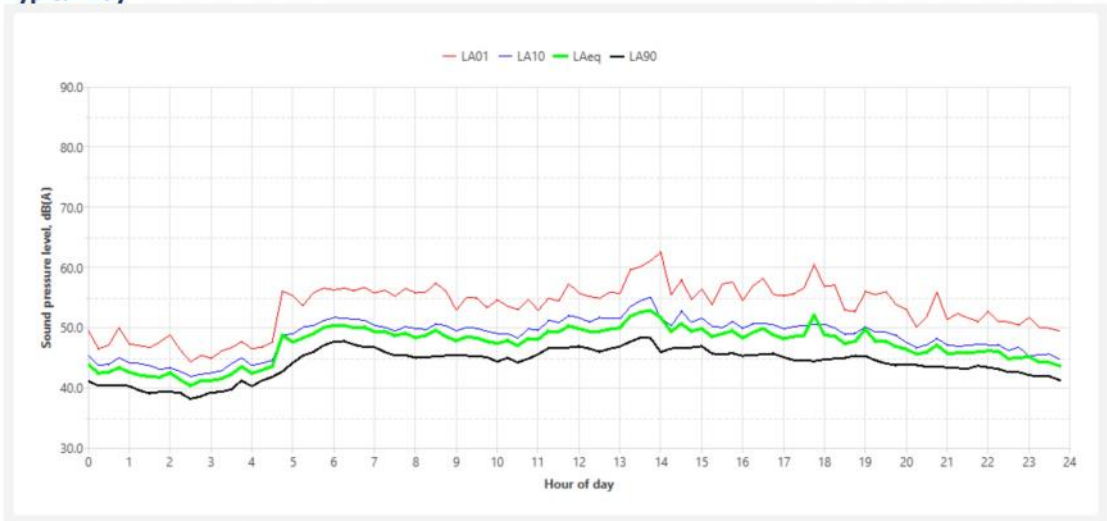
HomeCo. Roselands, Roselands

Logger deployment photo

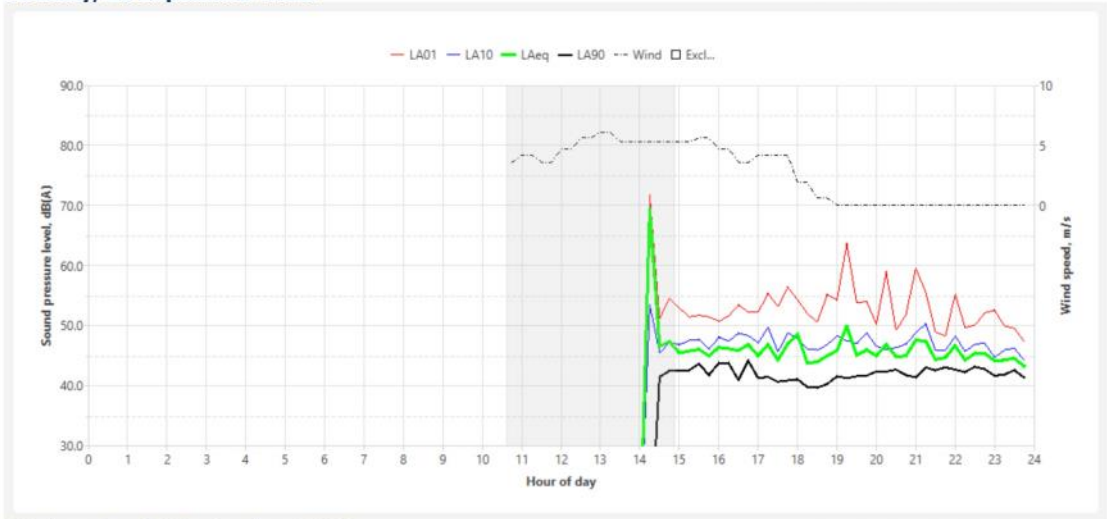


Page 1

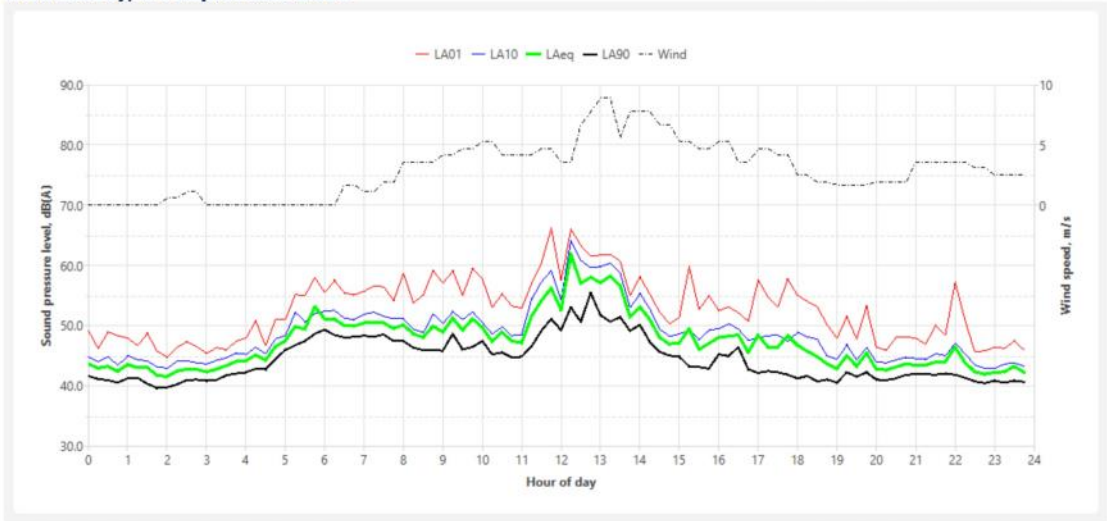
Typical Day



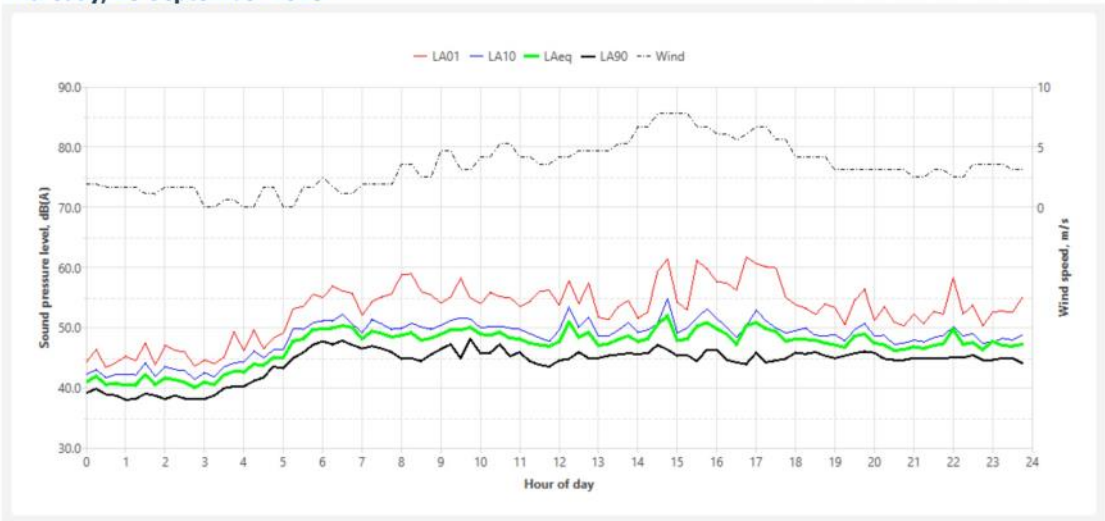
Tuesday, 23 September 2025



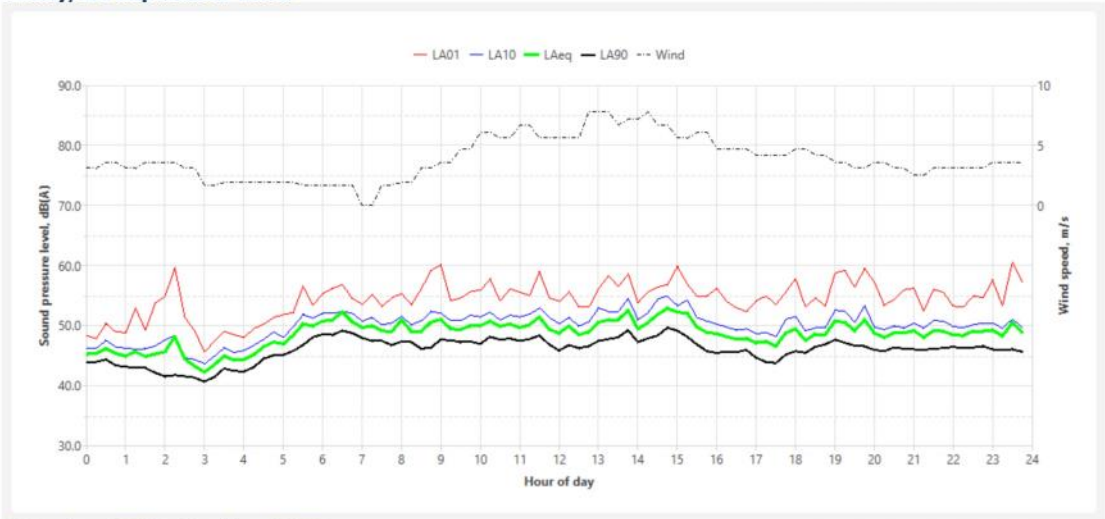
Wednesday, 24 September 2025



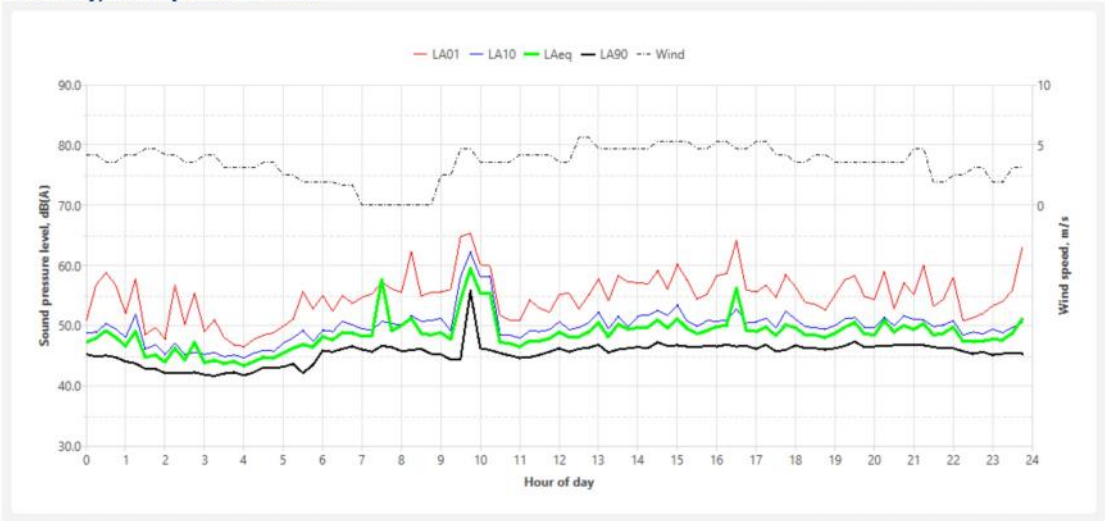
Thursday, 25 September 2025



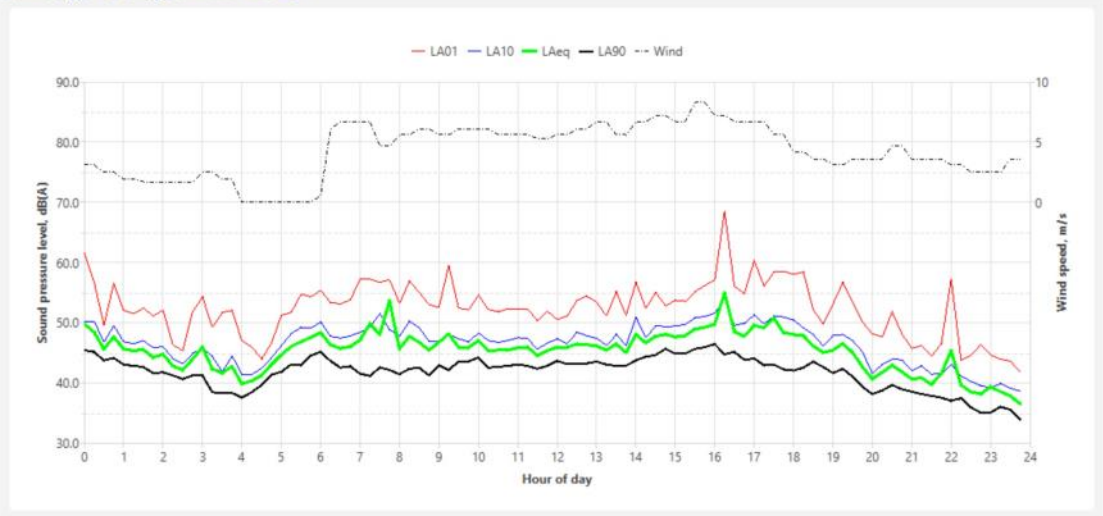
Friday, 26 September 2025



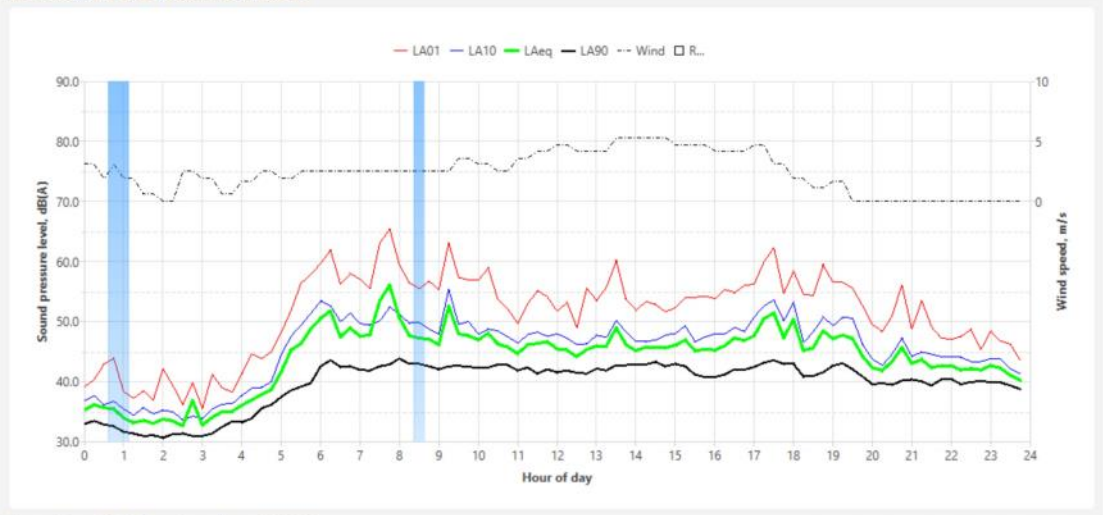
Saturday, 27 September 2025



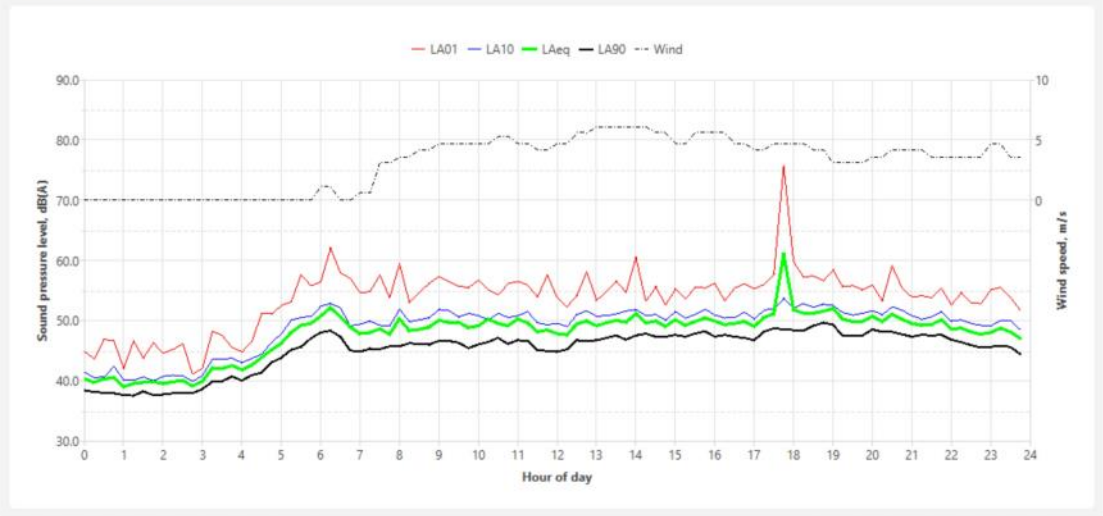
Sunday, 28 September 2025



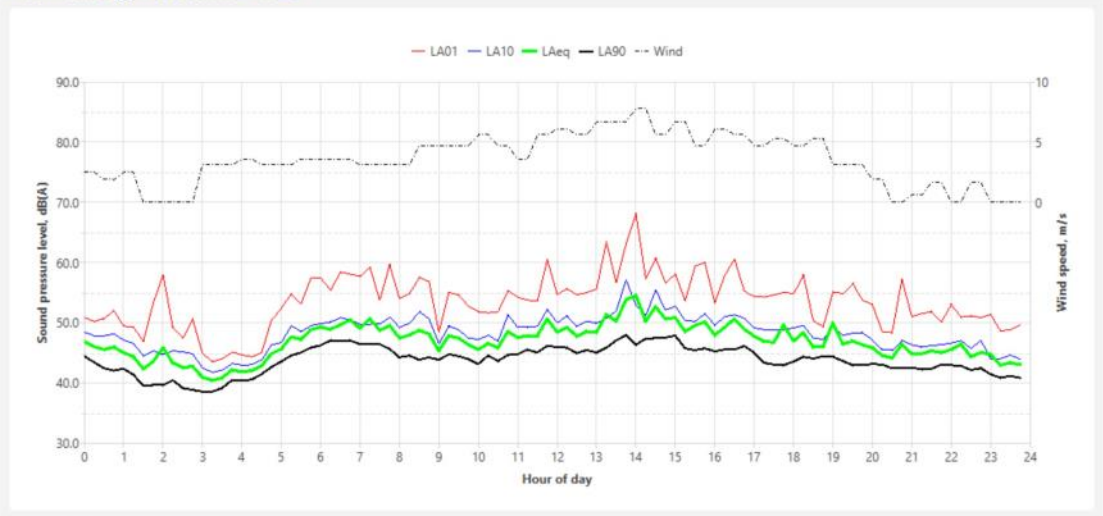
Monday, 29 September 2025



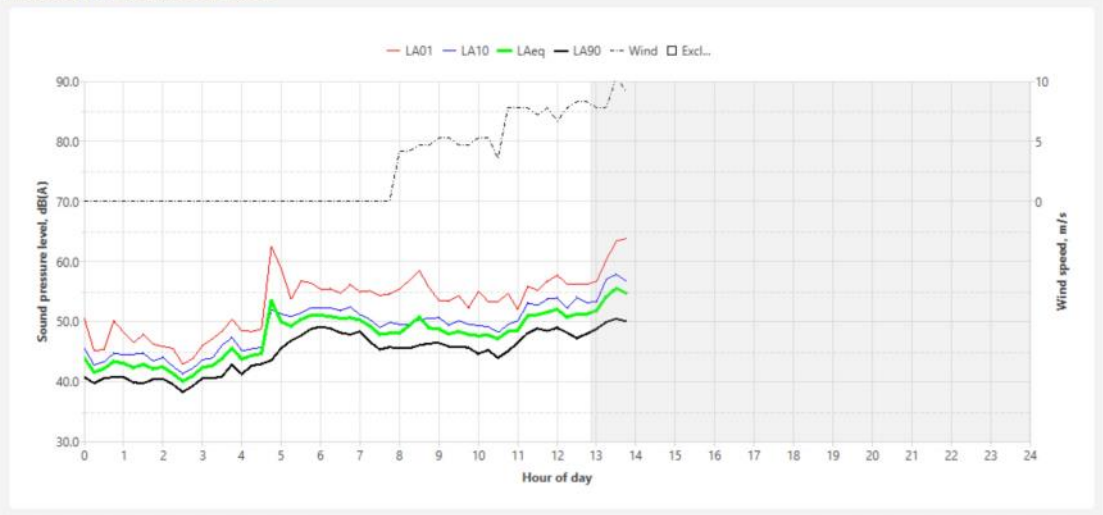
Tuesday, 30 September 2025



Wednesday, 1 October 2025



Thursday, 2 October 2025



B.3. Noise Logger 03

HomeCo. Roselands, Roselands

Ambient noise monitoring report



Item	Information
Logger Type	SVANTEK-977A
Serial number	81362
Address	HomeCo. Roselands, Roselands
Location	Location 3 (East)
Facade / free field	Free field
Environment	

Measured noise levels

Logging date	Rating Background Level			L _{Aeq,period}		
	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am
Tue 23 Sep 2025	-	44	-	-	49	-
Wed 24 Sep 2025	46	45	43	54	50	50
Thu 25 Sep 2025	47	47	42	52	50	49
Fri 26 Sep 2025	47	46	43	53	50	49
Sat 27 Sep 2025	46	45	42	51	49	47
Sun 28 Sep 2025	45	41	39	53	48	46
Mon 29 Sep 2025	45	41	33	51	49	47
Tue 30 Sep 2025	46	46	39	51	51	48
Wed 01 Oct 2025	47	46	41	53	49	49
Thu 02 Oct 2025	-	-	-	55	-	49
Summary	46	45	41	53	50	49

Note: Results with a '-' identify that there were not enough measurements available to correctly calculate the level, in accordance with the Noise Policy for Industry. The data has been excluded either from weather or manual exclusions. See the charts for more information

Logger location

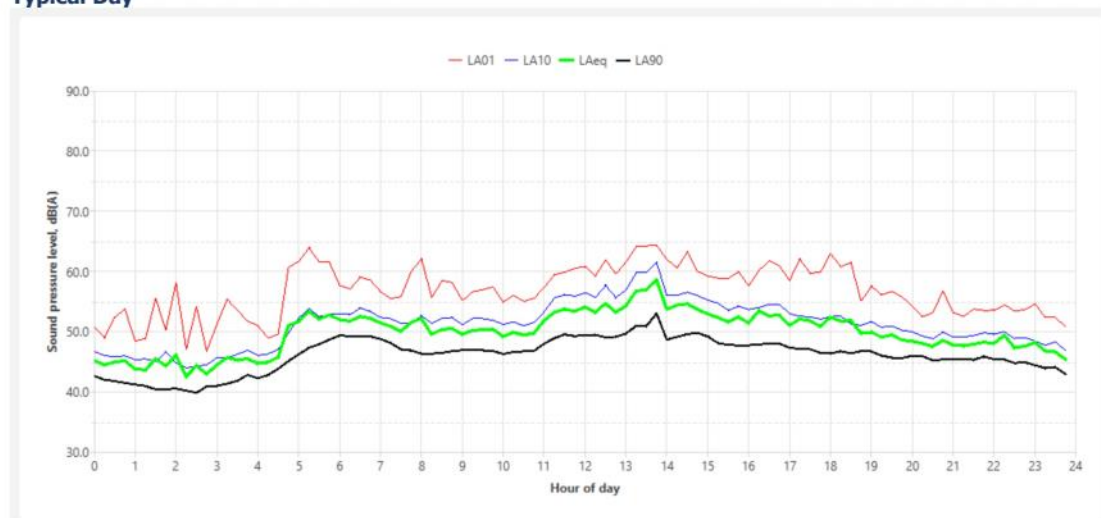


Logger deployment photo

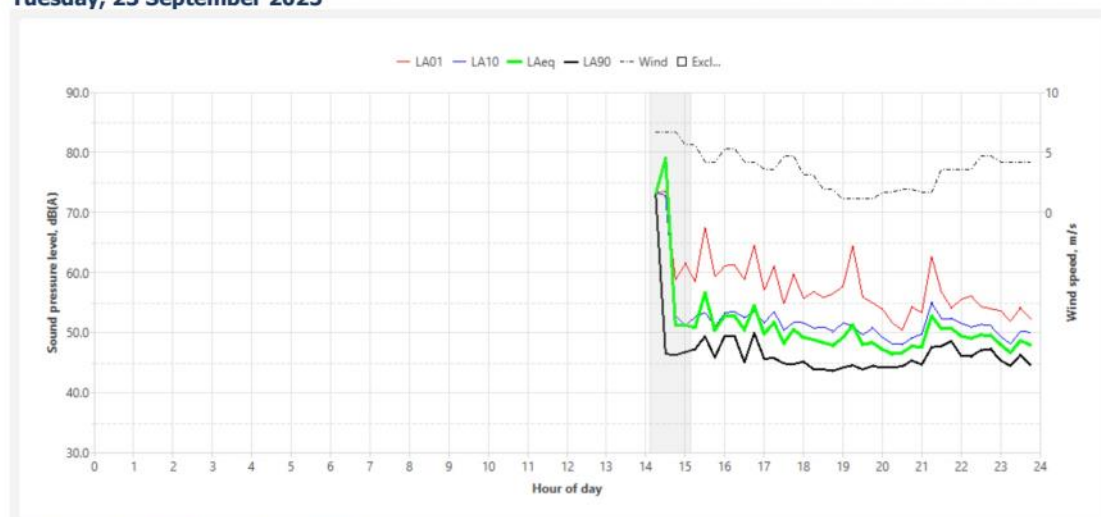


HomeCo. Roselands, Roselands

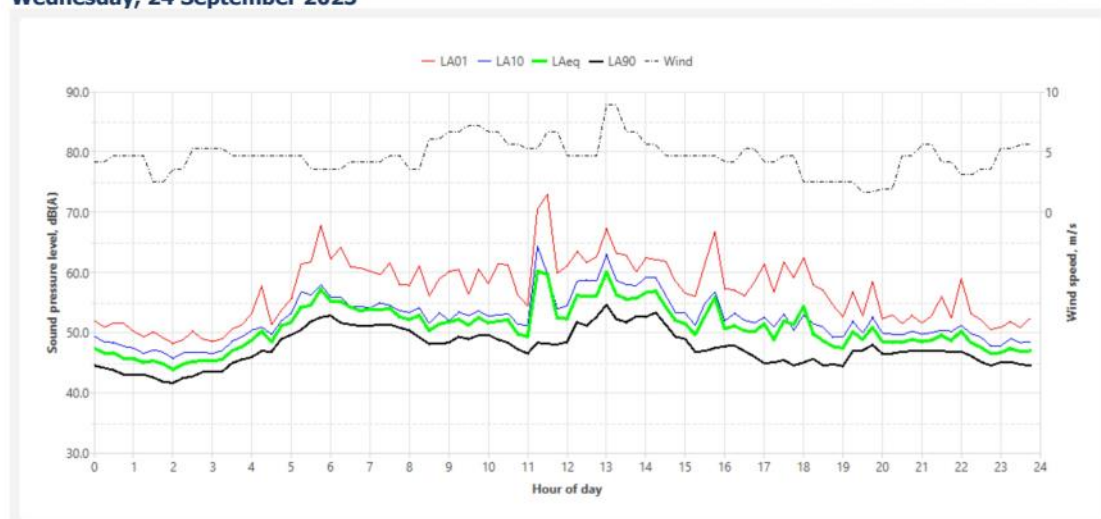
Typical Day



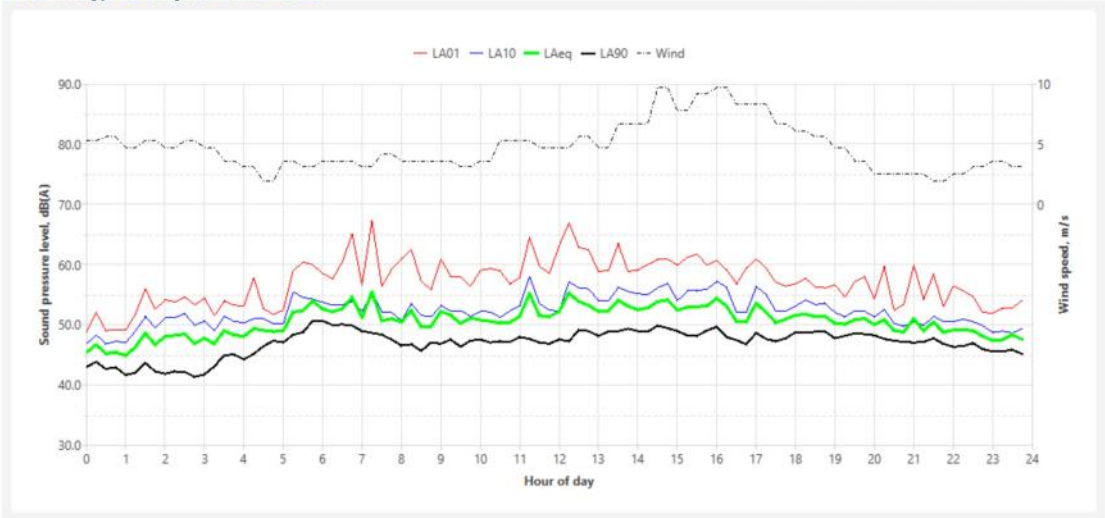
Tuesday, 23 September 2025



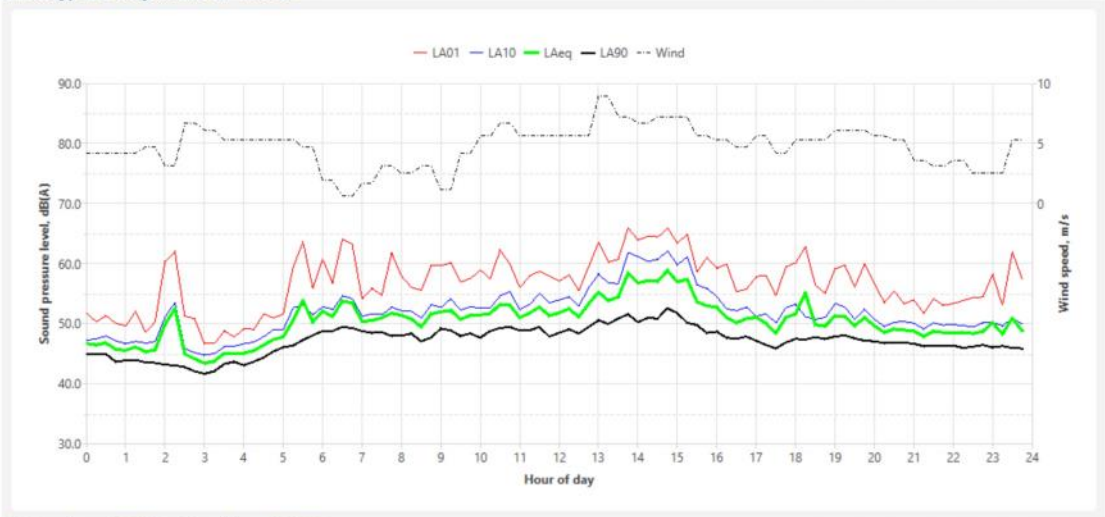
Wednesday, 24 September 2025



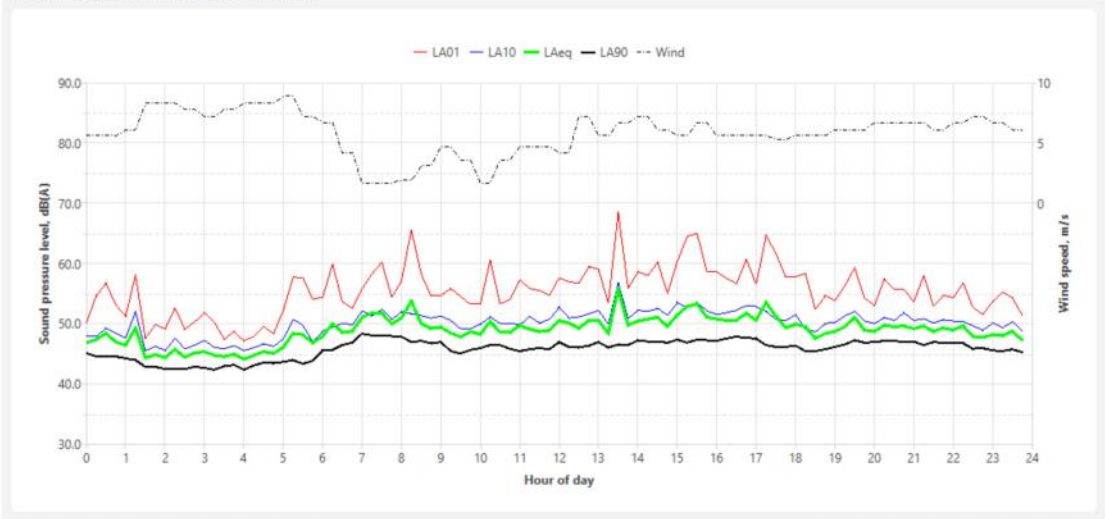
Thursday, 25 September 2025



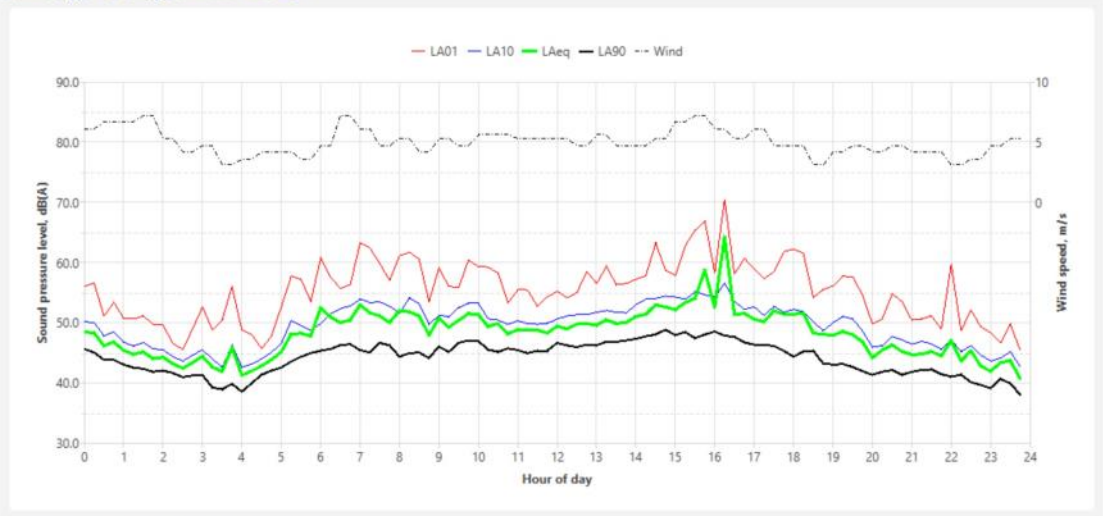
Friday, 26 September 2025



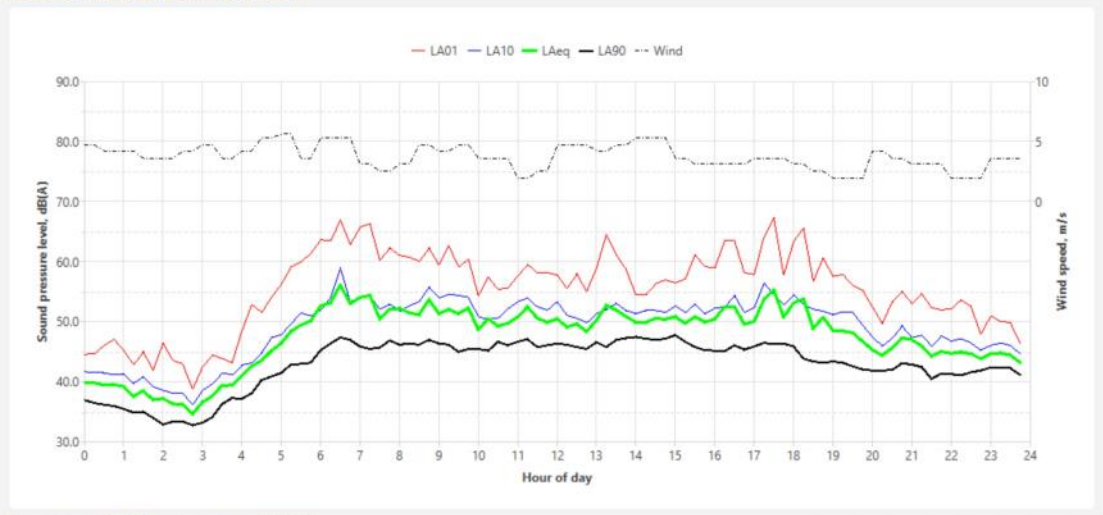
Saturday, 27 September 2025



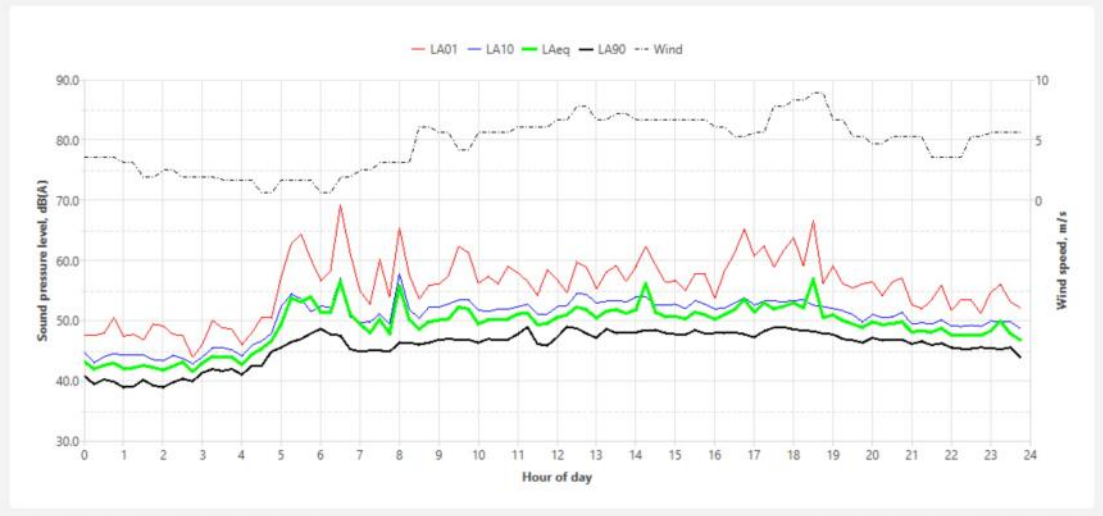
Sunday, 28 September 2025



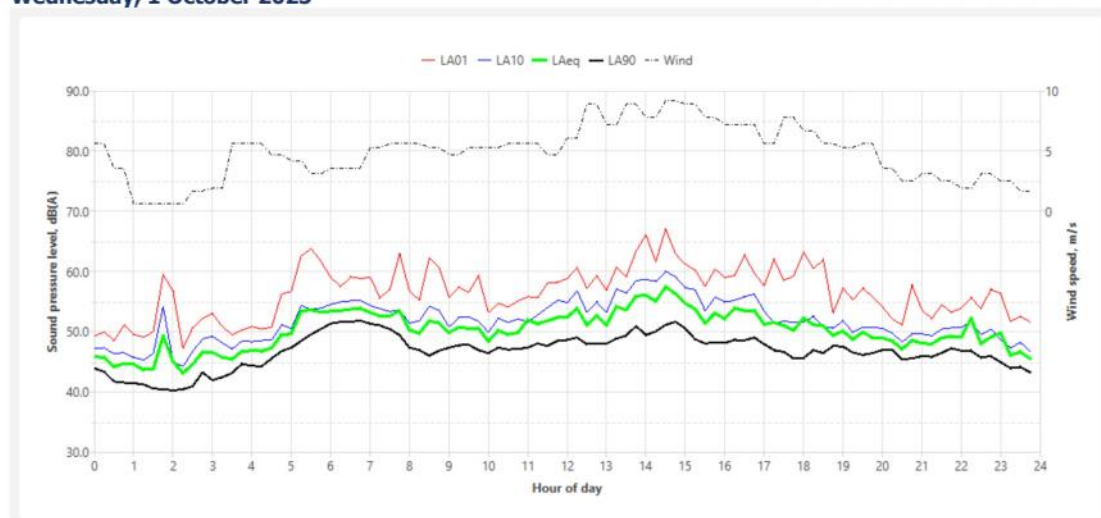
Monday, 29 September 2025



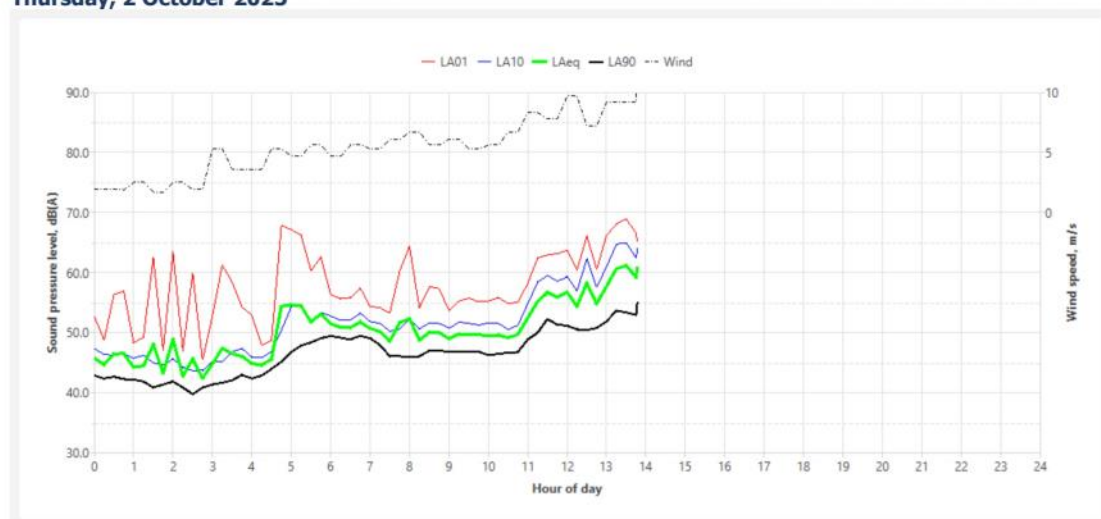
Tuesday, 30 September 2025



Wednesday, 1 October 2025

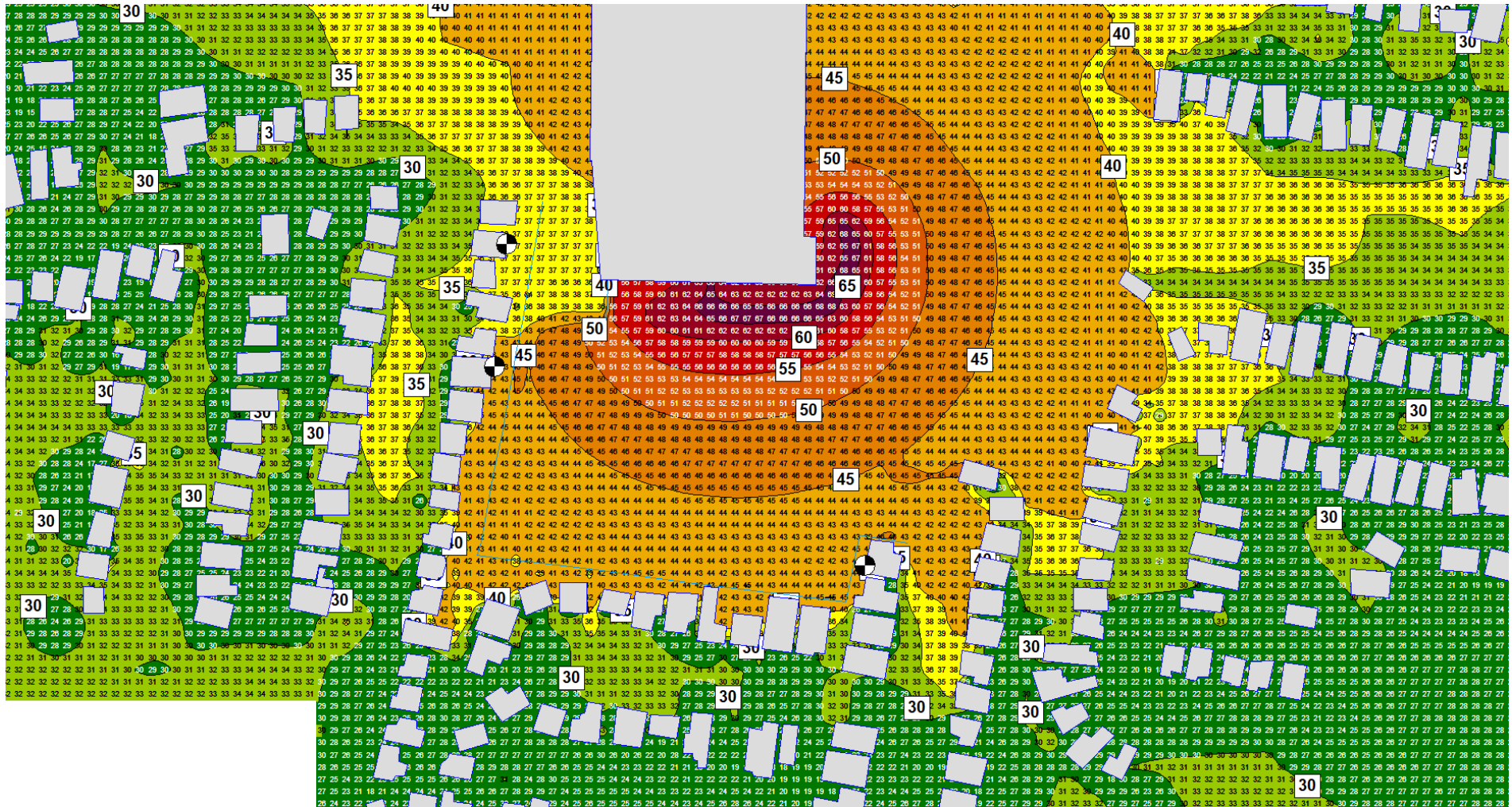


Thursday, 2 October 2025

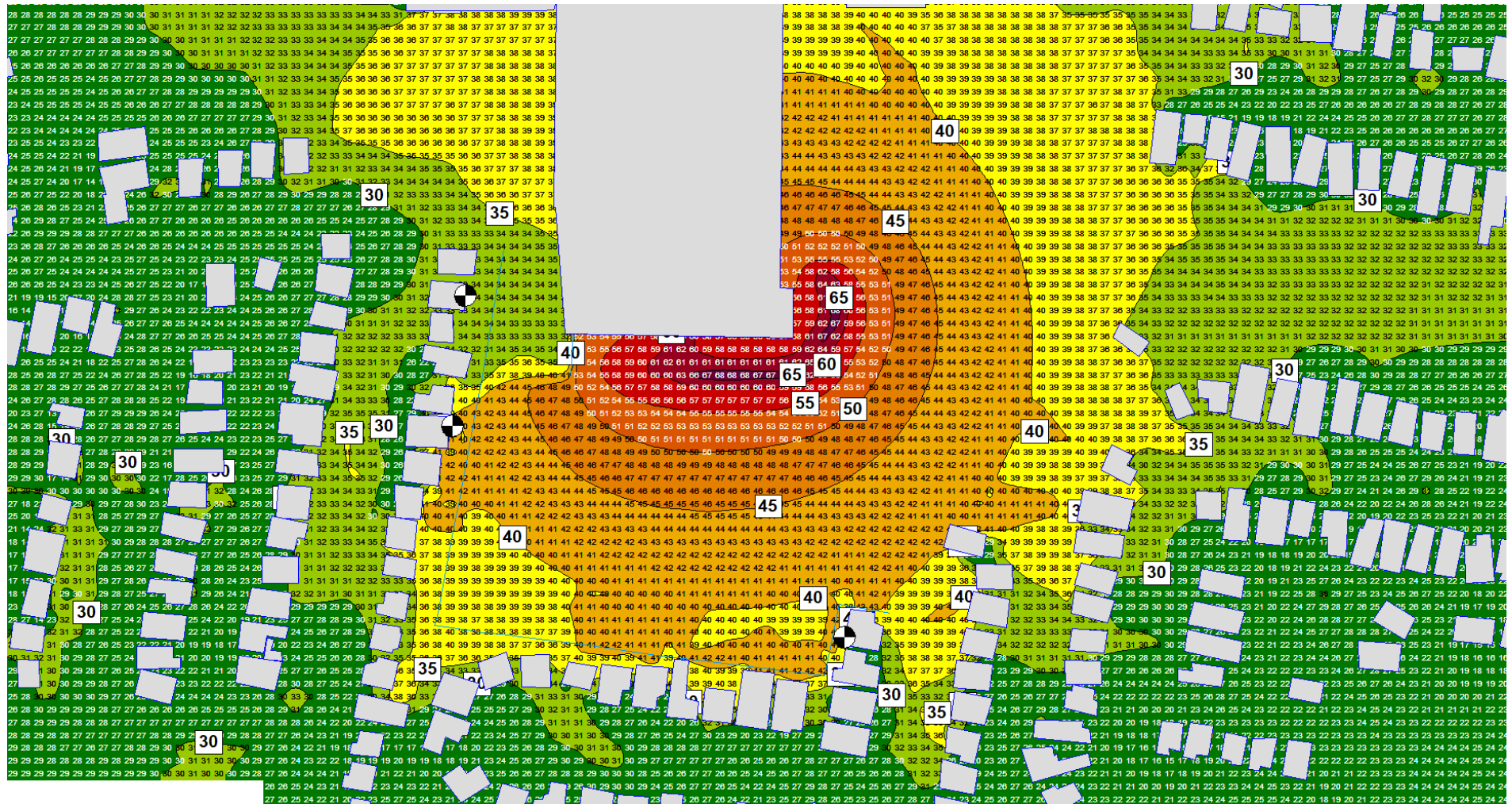


APPENDIX C. PREDICTED OPERATIONAL NOISE LEVELS – GRAPHICAL REPRESENTATION

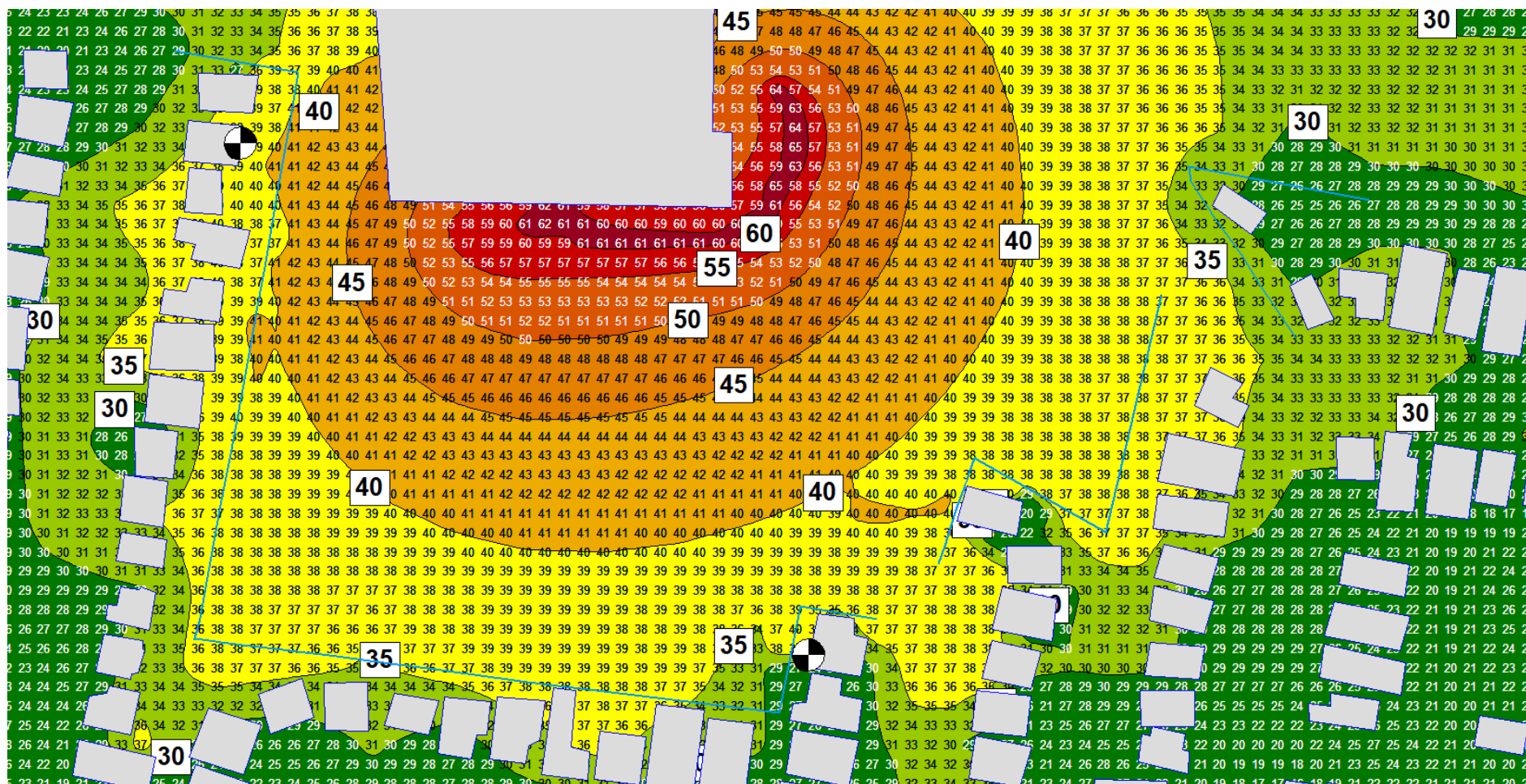
C.1. Operational noise impact contours – DAY



C.2. Operational noise impact contours – EVENING



C.3. Operational noise impact contours – NIGHT



(including staff vehicle movements)