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CLARITY
ACOUSTICS



Report R01 22147

8 May 2023

158-162a High Street, Belmont
Planning Application - Acoustic Assessment

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PROJECT SUMMARY:

R01 22147
158-162a High Street, Belmont
Planning Application - Acoustic
Assessment

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R01 22147	-	DRAFT	14 APR 2023	A CHANDHOK	R LEO
R01 22147	-	ISSUED	8 MAY 2023	A CHANDHOK	R LEO

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1.0 INTRODUCTION

It is proposed to redevelop the existing Coles Belmont supermarket and co-located Liquorland at 158-162a High Street, Belmont. The redevelopment seeks to replace the existing supermarket with a full line Coles supermarket and Liquorland store and on grade as well as basement car parking.

Clarity Acoustics Pty Ltd (Clarity Acoustics) has been engaged by Coles Group Property Development Ltd (CGPD) to conduct an acoustic assessment of the proposed development to be submitted as part of the planning application. This report provides details of the proposed site operations, relevant environmental noise criteria, an assessment of operational noise from the site and recommended noise controls.

A glossary of acoustic terminology used in this report is provided in APPENDIX A.

2.0 PROJECT DESCRIPTION

2.1 Subject site

The subject is located at 158-162a High Street in Belmont and is bounded by the following:

- Church Street to the north-west with commercial premises beyond
- Geelong Masonic Centre to the north-east
- Commercial premises on High Street to the east and to the south
- A council car park to the south-west with commercial premises beyond.

The subject site is located in a Commercial 1 Zone (C1Z) with further C1Z, General Residential Zone 4 (GRZ4), Neighbourhood Residential Zone 2 (NRZ2) and Transport Zone 3 – Significant Municipal Road (TRZ3) in the immediate environs.

The relevant planning map for the subject site is provided in APPENDIX B.

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2.2 Nearest affected receivers

The nearest potentially affected receivers are dwellings to the north and north east on Regent Street. Alexander Thomson Uniting Kindergarten at 42-48 Thomson Street is also considered a noise sensitive receiver during its hours of operation (understood to be 0830-1600 hours, Monday to Friday).

Table 1 provides details of the nearest affected receivers that have been considered as representative in the following assessment.

Table 1 - Details of the nearest noise sensitive receivers

ID	Address	Description
R1	42-48 Thomson Street	Kindergarten located to the west of the subject site
R2	29 Regent Street	Single storey dwelling to the north of the subject site
R3	30 Regent Street	Single storey dwelling to the north of the subject site
R4	28 Regent Street	Double storey dwelling to the north-east of the subject site
R5	26 Regent Street	Double storey dwelling to the north-east of the subject site
R6	24 Regent Street	Single storey dwelling to the north-east of the subject site
R7	22 Regent Street	Double storey dwelling to the north-east of the subject site

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An aerial photograph of the subject site and nearest affected receivers is provided in Figure 1.

Figure 1 - Aerial photograph of the subject site and receivers (source: Nearmap)



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2.3 Proposed operations

The proposed development will include a 3,480 m² Coles Supermarket, a 206 m² Liquorland bottle shop and parking for 189 cars. Table 2 provides a description of the proposed operation of the site.

Table 2 – Proposed operation of subject site

Description	Proposed operation
Deliveries and waste collection	<p>The Coles supermarket and Liquorland store will have a dedicated on-grade loading dock to the north of the supermarket building. The loading dock is to include a turntable arrangement to accommodate deliveries via delivery trucks up to 19 m in length.</p> <p>The waste room and compactor will be located at the rear of the loading dock and waste collection (including compacted waste) from the subject site will also occur from the loading dock.</p> <p>The supermarket is proposed to operate 24 hours a day, 7 days a week. Deliveries associated with the supermarket can occur at any time during the operation of the supermarket.</p>
Mechanical plant	<p>Mechanical plant associated with the subject site will be located within an enclosed plant room located above the loading dock area and external condenser deck located adjacent to the plant room. In addition, exhaust and supply air fans associated with the site will be installed on the roof of the supermarket building. All mechanical plant associated with the subject site has the potential to operate 24 hours a day.</p>
Car parking	<p>Parking for 189 cars will be provided at the subject site with 24 on grade car park spaces located on-grade adjacent to the supermarket building and 165 car park spaces located within a basement parking area.</p>

The proposed site layout is provided in APPENDIX C.

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3.0 VICTORIAN GUIDELINES AND LEGISLATION

A summary of the key noise legislation and related guidelines and standards commonly referenced in Victoria in relation to the proposed development is provided in Table 3 below.

Table 3 – Relevant legislation and standards

Legislation/ Guideline	Description
Environment Protection Act 2017 (the Act)	Legislative framework for the protection of the environment in Victoria that establishes obligations for environmental noise control.
Environment Protection Regulations 2021 (S.R. No. 47/2021)	The Environment Protection Regulations set out the framework for noise from residential, commercial, industrial and trade premises as well as from indoor and outdoor entertainment venues and events. The Regulations require that noise levels from commercial, industrial and trade premises and indoor and outdoor entertainment venues and events are set to protect noise sensitive areas from unreasonable noise.
EPA Publication 1826-4 <i>Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues</i> (Noise Protocol)	<p>The Noise Protocol outlines the EPA's approach to the determination of noise limits and outlines the methodology used to establish noise limits applicable to noise from commercial, industrial or trade premises in both urban and rural areas of Victoria. For commercial, industrial or trade premises in urban areas, noise limits are derived on the basis of land zoning and background noise levels.</p> <p>Noise limits for residential premises and waste collection associated with the subject site must comply with the noise limits derived under Part I of the Noise Protocol.</p>
NSW Road Noise Policy (RNP)	<p>The NSW Environmental Protection Authority (EPA) conducted a review of sleep disturbance studies the results of which are outlined in the NSW EPA's RNP. Based on the conclusions of the EPA in relation to sleep disturbance, it is recommended that night-time maximum noise levels from on-site activities:</p> <ul style="list-style-type: none"> generally, not exceed 65 dB L_{Amax} outside an openable window of nearby dwellings be limited to only one or two noise events per night with maximum external noise levels of 80 dB L_{Amax}. <p>It should be noted that the sleep disturbance criterion is not a legislative requirement.</p>
Australian Standard 2107-2016 Acoustics - Recommended design sound levels and reverberation times for building interiors (AS 2107)	<p>AS 2107 nominated acceptable internal noise levels for a number of occupancies / activities. AS 2107 provides the following recommended internal noise levels relevant to the application:</p> <ul style="list-style-type: none"> supermarkets < 55 dB L_{Aeq} small retail shops < 50 dB L_{Aeq}

A detailed description of the noise legislation and guidelines referred to in Table 3 and their application is provided in APPENDIX D.

4.0 EXISTING NOISE ENVIRONMENT

4.1 Background noise

As outlined in Section 3.0 and APPENDIX D3, noise limits for sites in major urban areas are set accounting for the background noise levels in the vicinity of the proposed use. As such, noise monitoring was undertaken at the subject site in accordance with the procedures set out in the Noise Protocol between 1500 hours on Tuesday, 25 October and midday on Wednesday, 2 November 2022.

The background noise measurements were undertaken using a Class 1 sound level meter (Svantek 977C Sound & Vibration Analyser - serial number 98849). The noise monitor was placed at the adjacent commercial premises at 49 Church Street with the microphone installed at a height of approximately 1.5 m above ground level.

Figure 2 provides the noise monitoring location.

Figure 2 – Location of background noise monitor (source: Nearmap)



The equipment was checked before and after the survey using a Svantek Class 1 Calibrator (Serial number 58085) and no significant calibration drifts were observed.

Weather data for the monitoring period has been sourced from the Bureau of Meteorology weather station at Geelong Racecourse and periods of rainfall or high wind (i.e., above 5 m/s) have been excluded from the noise monitoring data.

The measured minimum daily average background noise levels are detailed in Table 4.

Table 4 – Measured background noise levels, dB LA90, 1 hour

Period	Time Period	Measured background noise level
Day	0700-1800 hours, Monday to Saturday	44
Evening	1800 – 2200 hours, Monday to Saturday 0700 – 2200 hours, Sunday	38
Night	2200 – 0700 hours, Monday to Sunday	35

The measured background noise levels have been used to derive the noise limits applicable to the subject site under Part I of the Noise Protocol.

4.2 Traffic noise

The noise monitoring data was also used to derive traffic noise levels in the vicinity of the subject site. During the noise monitoring period, the highest measured hourly traffic noise level was 57 dB LAeq, 1 hour which has been used to assess traffic noise impacts on the development.

5.0 RECOMMENDED NOISE CONTROLS

A 3-D noise model of the site and surrounding area has been created to predict noise from the subject site to neighbouring residential properties. Outcomes of the noise modelling indicate that the following noise mitigation measures are required for the subject site.

5.1 Screening to loading dock

It is recommended that the proposed full height wall to the north-east of the loading dock area be constructed of a material with a minimum surface density of 12 kg/m² and be free from holes and gaps. Masonry construction or materials such as 9 mm thick fibre cement sheet, 25 mm thick plywood timber panelling, 12 mm thick Perspex or proprietary acoustic panels such as *ModularWalls AcoustiMax* panels or *Wallmark EVO* panels will achieve the required surface density. Any other approved material which meets the minimum surface density specification can also be used.

If a material which meets the above acoustic requirements and does not restrict light is required, 12 mm thick Perspex or 6 mm thick float glass can be used.

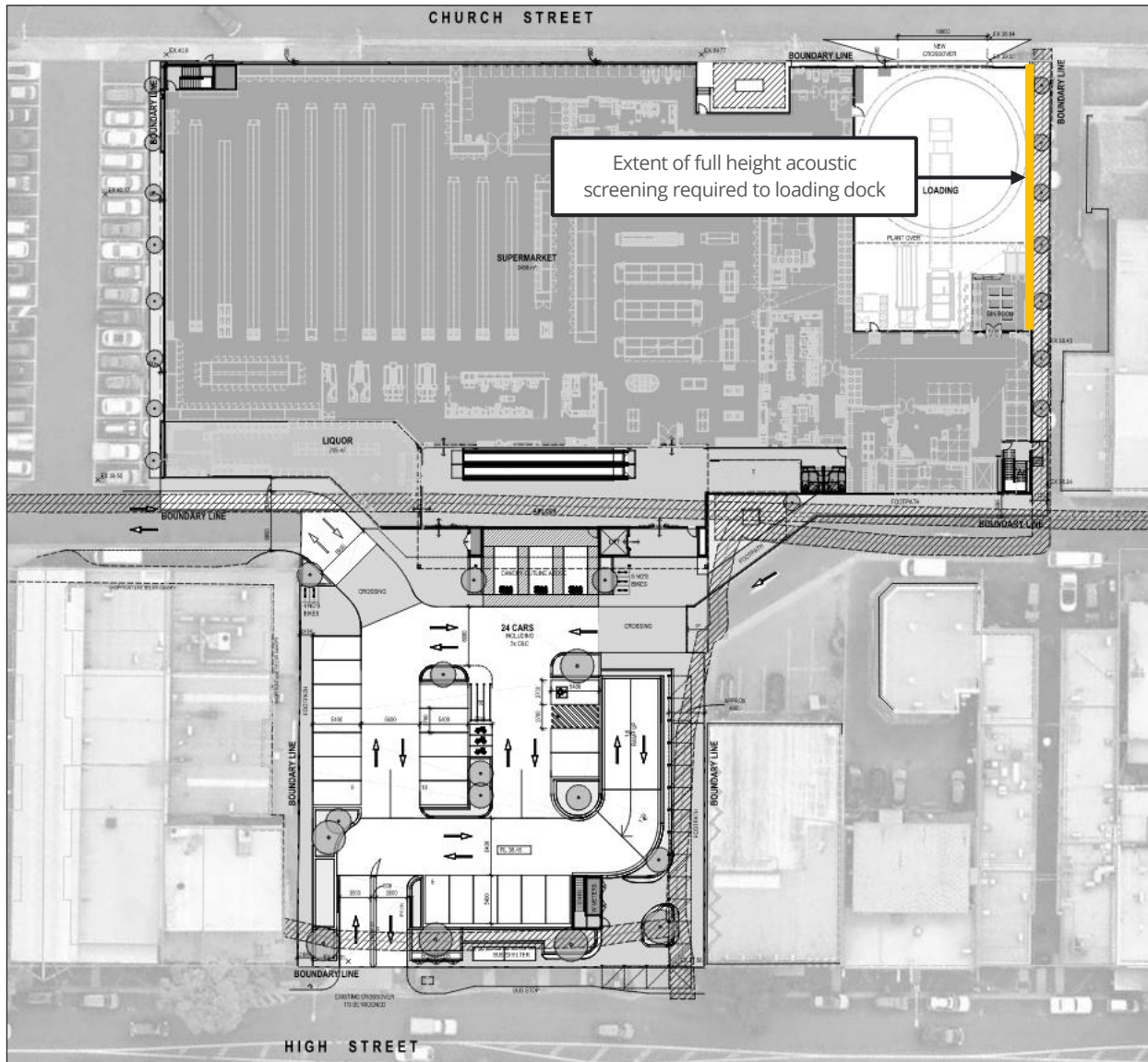
Where a perforated finish or batten screen finish is preferred such as metal or timber perforated balustrades or a timber look batten screen, the chosen finish will require a solid backing such as 12 mm thick Perspex or 6 mm thick glass or any other approved material which meets the minimum surface density specification.

The location and extent of the full height wall to the loading dock is provided in Figure 3.

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Figure 3 - Location and extent of acoustic screening to loading dock area



5.2 Operational controls

To enable compliance with the environmental noise criteria, it is recommended that the following operational controls are implemented:

- Waste collection from the subject site should be scheduled to only occur during the Noise Protocol Day and evening periods (i.e., 0700-2200 hours, 7 days a week)
- Deliveries via vehicles greater than 8.8 m in length should be scheduled to only occur during the Noise Protocol Day and evening periods (i.e., 0700-2200 hours, 7 days a week). Night time deliveries should be limited to delivery vans, Light Rigid Vehicles (LRVs) and Medium Rigid Vehicles (MRVs) i.e., trucks no greater than 8.8 m in length
- The operation of the compactor should be restricted to the day time period Noise Protocol Day and evening periods (i.e., between 0700-2200 hours, 7 days a week).

5.3 Mechanical plant

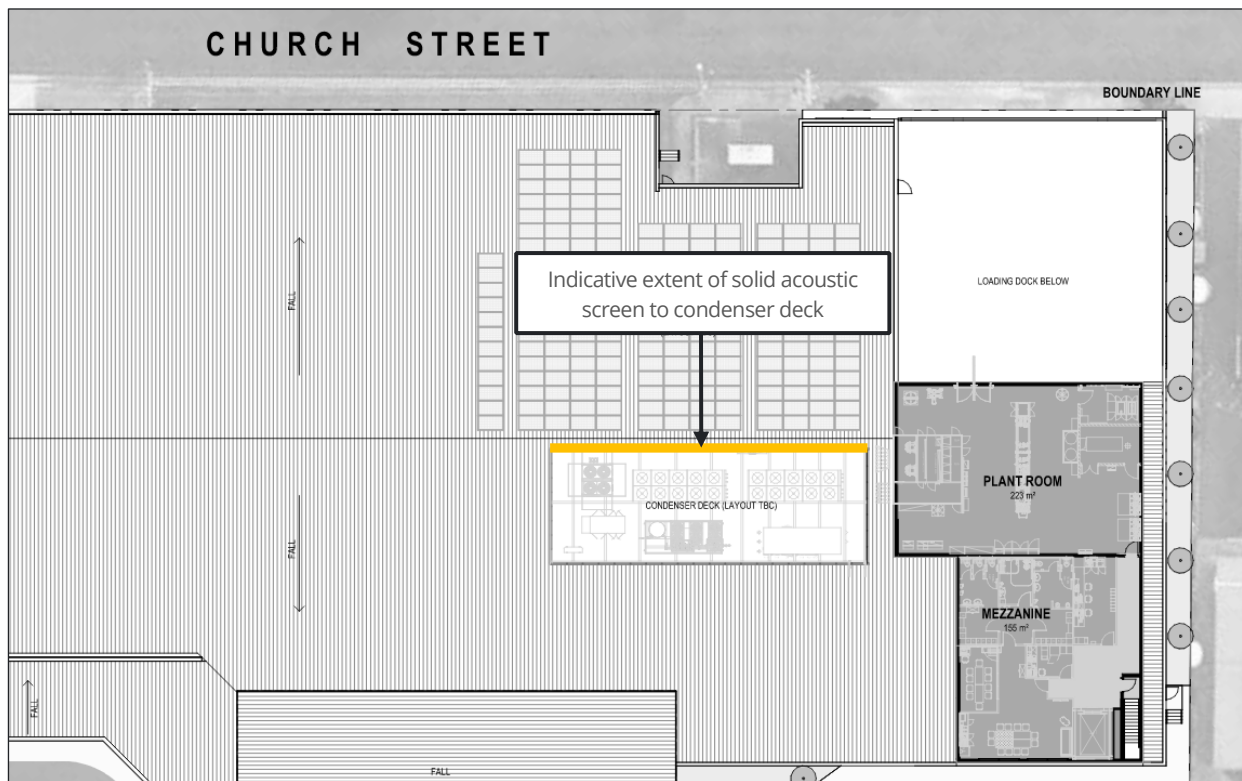
All plant associated with the proposed development will need to be designed to be compliant with the Noise Protocol noise limits at the nearest affected receivers in conjunction with all other noise sources associated with the site that are covered under the Noise Protocol.

At this stage, the mechanical services plant selections have not been undertaken for the site. Based on the indicative plant layout provided, it is understood that two (2) gas coolers, a heat pump and a standby generator may be located within the rooftop condenser deck.

Based on the above indicative plant selections, it is recommended that the proposed screen to the north-west end of the condenser be constructed of a material with a minimum surface density of 12 kg/m² and be free of holes and gaps. Alternatively, the screen could be constructed from acoustic louvres with a minimum sound insulation of 25 dB R_w. Any access doors to the north-west of the condenser deck screen will need to be constructed of the same material so as to not derate the performance of the acoustic screen.

The location and extent of the acoustic screening required to the condenser deck is provided in Figure 4.

Figure 4 - Location and extent screening to loading dock area



Indicative selections for supply and exhaust fans associated with the proposed development have also been reviewed as part of this assessment and based on the indicative selections, it is expected that no further acoustic treatment is likely to be required to the exhaust fans. Review of the fan noise levels and attenuator requirements will need to be undertaken during the detailed design phase.

Discharge vents associated with the basement car park ventilation are proposed to be provided at the rear of the on-grade car park along the side of the proposed raised planter beds. It is recommended that the car park exhaust fans be designed so as to achieve a maximum sound pressure level of 60 dB L_{Aeq} at 1 m from the discharge vents.

It is recommended that a detailed assessment of noise associated with the subject site mechanical plant is undertaken once the plant selections are finalised during the detailed design stage. However, the assessment provided subsequently demonstrates that typical mechanical plant associated with the subject site can be designed to be compliant with the requirements of the Noise Protocol.

6.0 ASSESSMENT OF OPERATIONAL NOISE AGAINST THE NOISE PROTOCOL

Noise associated with the operation of the proposed development must comply with the noise limits derived under the Noise Protocol. Compliance is determined by comparing the predicted effective noise level (L_{eff}) from the operation of the subject site to the derived noise limits at the nearest affected receivers.

A 3-D noise model of the subject site and surrounding area has been created to predict noise from the proposed development to neighbouring receivers. The following sections detail the methodology for noise prediction from the proposed development, the noise limits applicable to the subject site under Part I the Noise Protocol and compare the predicted operational noise levels with the noise limits applicable to the subject site.

6.1 Assessment methodology

Noise levels from the subject site have been calculated using the proprietary noise modelling software SoundPLAN v8.2 which implements International Standard ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613-2).

The noise modelling considers the following:

- The noise prediction methodology outlined in APPENDIX E
- Source noise levels for noise sources associated with the proposed operation of the site as provided in APPENDIX F
- Attenuation of noise provided by distance between the source and receiver, built form of the subject site and any intervening screening structures
- Attenuation provided by the noise controls outlined in Section 5.0
- Reflections from built form, adjacent buildings, screening structures and the ground surface
- Adjustments for specific noise characteristics such as tonality or intermittency, where necessary
- Duration of exposure at the receiver locations, assessed over a 30-minute period in accordance with the requirements of the Noise Protocol.

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6.2 Noise limits

Noise limits applicable to the subject site have been calculated in accordance with the methodologies prescribed in Part I of the Noise Protocol and are summarised in Table 5. Noise limits applicable at the kindergarten located at 48 Thomson Street are only applicable during its hours of operation (0830-1600 hours) and have been derived accordingly.

Table 5 – Noise limits derived under Part I of the Noise Protocol

Period	Noise limit, dB L _{eff} (R1 - Kindergarten)	Noise limit, dB L _{eff} (Residential receivers – R2-R7)
Day	55	53
Evening	-	47
Night	-	42

Refer to APPENDIX D3 for further detail on the noise limit derivation.

To comply with the requirements of the Noise Protocol, the total noise level from all of the subject site noise sources covered under the Noise Protocol must not exceed the above noise limits in the day, evening, and night-time periods when assessed over a 30-minute period.

6.3 Source noise data and operational assumptions

Noise sources associated with the subject site assessable under the Noise Protocol include:

- Operation of mechanical services plant
- Goods deliveries to the subject site
- Waste collection from the subject site
- Operation of the cardboard compactor.

Late night patron and vehicular activity is not covered under the Noise Protocol. An assessment of maximum noise levels from late night activity associated with the subject site is provided in subsequent sections.

Source noise levels for the proposed development associated with deliveries, waste collection and operation of the compactor have been taken from measurements conducted at similar facilities. These measurements have been incorporated in our noise model to predict the noise level contribution from each noise source associated with the subject site at the nearest affected receivers. Source noise levels for indicative mechanical plant associated with the supermarket/bottle shop have been taken from manufacturer data.

A detailed schedule of the noise source sound power level data used in our noise model is provided in APPENDIX F.

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6.4 Predicted noise levels

Predicted noise levels from the proposed operation of the subject site at the nearest affected receivers are provided below based on the following operational assumptions for a worst-case 30-minute period:

Table 6 – Operational assumptions for worst case 30-minute period

Period	Deliveries & Waste Collection from loading dock	Compactor operation	Mechanical plant operation
Day	1 x waste collection 1 x compacted waste collection <u>OR</u> 1 semi-trailer delivery 1 x Heavy Rigid Vehicle (HRV) delivery 30 minutes continuous unloading activity	30 minutes of continuous operation	All plant assumed to operate at full capacity
Evening	1 x waste collection 1 x compacted waste collection <u>OR</u> 1 semi-trailer delivery 1 x Heavy Rigid Vehicle (HRV) delivery 30 minutes continuous unloading activity	30 minutes of continuous operation	All plant assumed to operate at full capacity
Night	1 x MRV delivery 1 x LRV delivery 30 minutes continuous unloading activity	No compactor operation	All plant assumed to operate at full capacity

The predicted noise levels presented in the following sections account for the proposed built form of the subject site and the noise control measures outlined in Section 5.0.

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6.4.1 Day-time operation

Predicted noise levels from the proposed day time operation of the subject site are presented in Table 7.

Table 7 – Predicted operational noise levels (Day), dB

Source	Predicted noise level at receiver (Day)						
	48 Thomson St	29 Regent St	30 Regent St	28 Regent St	26 Regent St	24 Regent St	22 Regent St
Deliveries/ waste collection ¹	25	44	32	23	28	24	22
Mechanical Plant	38	40	36	40	39	37	39
Compactor operation	21	41	25	27	10	< 10	< 10
Cumulative noise level	38	47	38	40	40	37	39
Noise Limit	55	53	53	53	53	53	53
Compliance?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1: The higher of the semi-trailer and HRV delivery to the loading dock and waste collection from the loading dock has been presented to represent a worst-case 30-minute period.

As outlined in Table 7, compliance with the day time Noise Protocol noise limit is predicted to be achieved at the nearest affected receivers based on the recommended noise controls provided in Section 5.0.

6.4.2 Evening period operation

Predicted noise levels from the proposed evening period operation of the subject site are presented in Table 8.

Table 8 – Predicted operational noise levels (Evening), dB

Source	Predicted noise level at receiver (Evening)					
	29 Regent St	30 Regent St	28 Regent St	26 Regent St	24 Regent St	22 Regent St
Deliveries/ waste collection ¹	44	32	23	28	24	22
Mechanical Plant	40	36	40	39	37	39
Compactor operation	41	25	27	10	< 10	< 10
Cumulative noise level	47	38	40	40	37	39
Noise Limit	47	47	47	47	47	47
Compliance?	Yes	Yes	Yes	Yes	Yes	Yes

1: The higher of the semi-trailer delivery to the loading dock and waste collection from the loading dock has been presented to represent a worst-case 30-minute period.

As outlined in Table 8 compliance with the evening period noise limit is predicted to be achieved at the nearest affected receivers based on the recommended noise controls provided in Section 5.0.

6.4.3 Night-time operation

Predicted noise levels from the proposed night time operation of the subject site are presented in Table 9.

Table 9 – Predicted operational noise levels (Night), dB L_{eff}

Source	Predicted noise level at receiver (Night)					
	29 Regent St	30 Regent St	28 Regent St	26 Regent St	24 Regent St	22 Regent St
Deliveries	32	23	16	20	13	12
Mechanical Plant	41	36	40	39	37	39
Cumulative noise level	42	36	40	39	37	39
Noise Limit	42	42	42	42	42	42
Compliance?	Yes	Yes	Yes	Yes	Yes	Yes

As outlined in Table 9, compliance with the night time period noise limit is predicted to be achieved at the nearest affected receivers based on the recommended noise controls provided in Section 5.0.

7.0 ASSESSMENT OF TRAFFIC NOISE IMPACTS

There are no specific building fabric requirements for the retail component to enable compliance with AS 2107 i.e., conventional building construction will result in internal traffic noise levels that are compliant with AS 2107 by a significant margin.

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8.0 SLEEP DISTURBANCE ASSESSMENT

Noise from night time activity associated with the proposed development has been assessed against the sleep disturbance criterion at the nearest affected receivers. Night time noise associated with the use of the subject site could include delivery vehicles (limited to LRVs and MRVs during the night time period), car movements within the car parking areas, cars braking, doors closing and cars accelerating away from a stationary position. Noise from patrons talking in the car parking area has also been considered.

Predicted maximum noise levels from the above activities are provided in Table 10.

Table 10 - Predicted maximum noise levels from late night activity, dB L_{Amax}

Receiver	'Normal' car ¹	Worst case car ^{1,2}	Patron voices	Car pass by	LRV	MRV	Compliance with 65 dB L _{Amax} ?
29 Regent Street	27	35	30	25	53	65	Yes
30 Regent Street	24	32	30	23	45	58	Yes
28 Regent Street	30	38	35	28	46	59	Yes
26 Regent Street	38	48	40	38	33	46	Yes
24 Regent Street	42	47	45	41	33	46	Yes
22 Regent Street	42	52	45	39	32	45	Yes

¹ Includes door closing and vehicle start up from stationary

² A 'worst-case' car includes a V8 or high-powered vehicle driving in an aggressive manner

It can be seen from Table 10 that the night-time maximum levels from delivery vehicles, voices in the carpark and car movements within the subject site are predicted comply with the sleep disturbance criteria of 65 dB L_{Amax} at the nearest affected receivers.

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9.0 SUMMARY

It is proposed to redevelop the existing Coles Belmont supermarket and co-located Liquorland at 158-162a High Street, Belmont. The redevelopment seeks to replace the existing supermarket with a full line Coles and Liquorland, and on grade as well as basement car parking.

Clarity Acoustics has carried out an environmental noise assessment of the proposed development in accordance with relevant Victorian EPA legislation, guidelines and accepted industry practice. Based on the proposed design of the development, the relevant noise criteria for the subject site can be met by implementing the following noise mitigation measured and operational controls:

- Providing a full height wall/acoustic screen along the north-eastern end of the loading dock. The screen should be constructed of a material with minimum surface density of 12 kg/m² as outlined in Section 5.1 of this report
- Designing all mechanical plant associated with the subject site to be compliant with the Noise Protocol noise limits at the nearest affected receivers in conjunction with all other noise sources associated with the site. This could include the provision of a 2.1 m high acoustic screen to the north-western end of the rooftop condenser deck. It is recommended that a detailed assessment of mechanical plant noise be undertaken once plant selections have been finalised
- Scheduling waste collection from the subject site to only occur during the day and evening period (0700-2200 hours, 7 days a week)
- Restricting deliveries via vehicles greater than 8.8 m in length to only occur during the day and evening periods (i.e., 0700-2200 hours, 7 days a week). Night time deliveries should be limited to delivery vans, LRVs and Medium Rigid Vehicles MRVs i.e., trucks no greater than 8.8 m in length.
- Limiting the use of the compactor associated with the supermarket to the day time period only (0700-1800 hours, 7 days a week).

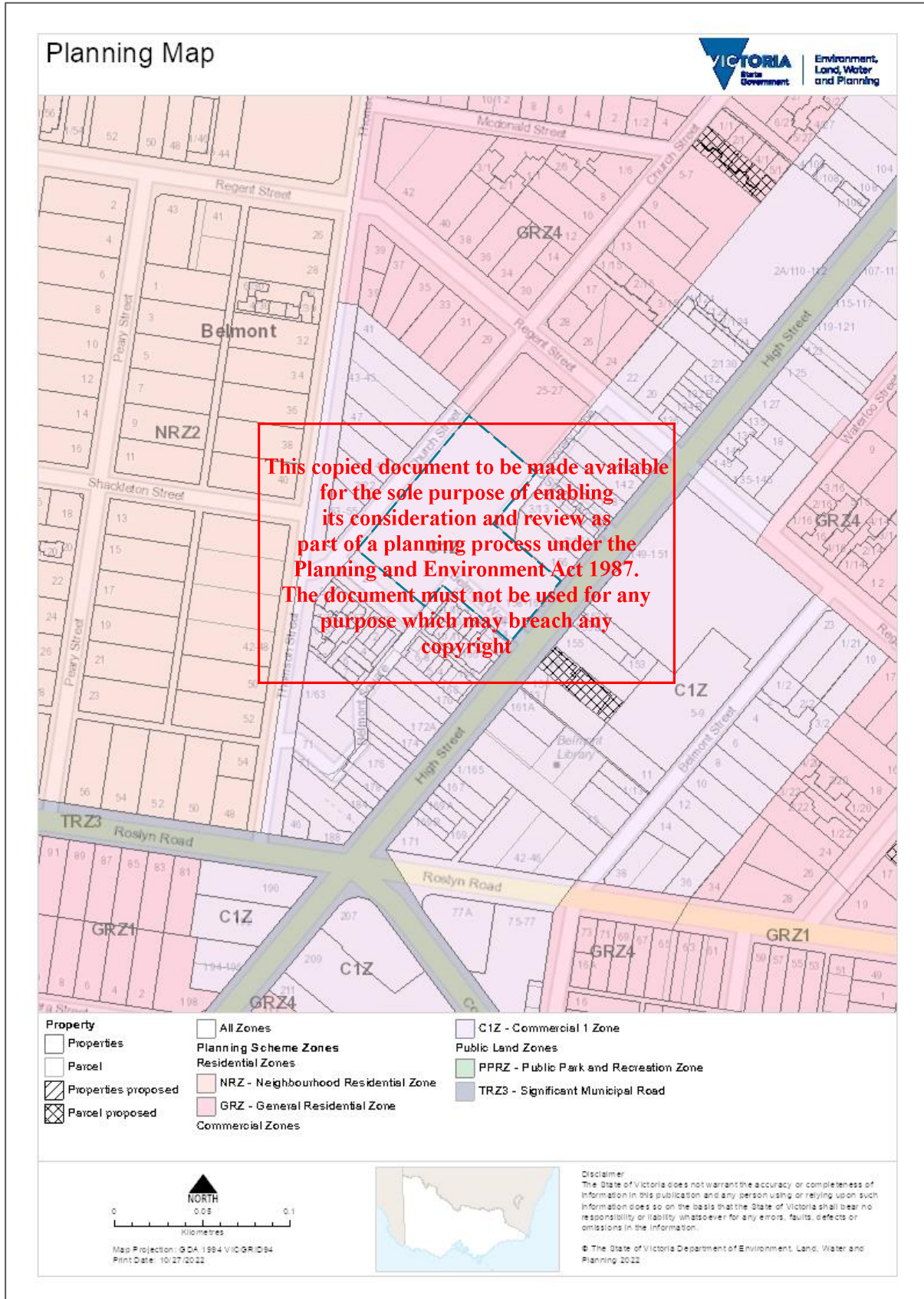
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APPENDIX A GLOSSARY OF TERMINOLOGY

dB	Decibel (dB) a relative unit of measurement widely used in acoustics, electronics and communications. The dB is a logarithmic unit used to describe a ratio between the measured sound level and a reference or threshold level of 0 dB.
A-weighting	The A-weighting filter covers the full audio range - 20 Hz to 20 kHz and the shape is similar to the response of the human ear at lower levels. A-weighted measurements correlate well with the perceived loudness at low sound levels, as originally intended.
Hz	Hertz (Hz) the unit of Frequency or Pitch of a sound. One hertz equals one cycle per second. 1 kHz = 1000 Hz, 2 kHz = 2000 Hz, etc.
$L_{A90}(t)$	The sound level exceeded for 90% of the measurement period, A-weighted and averaged over time (t) and commonly referred to as the background sound level.
$L_{Aeq}(t)$	A -weighted equivalent continuous sound Level is the sound level equivalent to the total sound energy over a given period of time (t). Commonly referred to as the average sound level.
L_{Amax}	The A-weighted maximum noise level. The highest sound level which occurs during the measurement period or a noise event.
L_{eff}	The level of noise emitted from the commercial, industrial or trade premises and adjusted, if appropriate, for character and duration.

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APPENDIX B PLANNING MAP



APPENDIX C PROPOSED SITE LAYOUT

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DEVELOPMENT SCHEDULE			
USE	AREA (m ²)	DESIGN RATE	CARS REQUIRED
SUPERMARKET	3480+150	5 CARS PER 100m ²	181
LIQUOR	206	4 CARS PER 100m ²	8
TOTAL CARS REQUIRED			189
TOTAL CARS PROVIDED			189
BIKE PARKING REQUIRED			8 STAFF 8 PUBLIC
BIKE PARKING PROVIDED			8 STAFF 10 PUBLIC

CHURCH STREET

BOUNDARY LINE

BOUNDARY LINE

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SUPERMARKET
3480 m²

LOADING

PLANT OVER

BIN ROOM

LIQUOR
206 m²

DISCOVERY LANE

REGENT STREET

24 CARS INCLUDING 3x CAB

HIGH STREET

APPENDIX D ENVIRONMENTAL LEGISLATION AND GUIDELINES

D1 Environment Protection Act 2017

The Environment Protection Act 2017 (the Act) provides a legislative framework for the protection of the environment in Victoria and establishes obligations for environmental noise control. The Act does not specify noise limits but sets out the legal requirements for compliance with the subordinate legislation tools. Subordinate legislation tools have been designed to support the Act which include the Environment Protection Regulations.

D2 Environment Protection Regulations 2021

The Environment Protection Regulations 2021 (S.R. No. 47/2021) set out the framework for noise from residential, commercial, industrial and trade premises as well as from indoor and outdoor entertainment venues and events. The Regulations require that noise levels from commercial, industrial and trade premises and indoor and outdoor entertainment venues and events are set to protect noise sensitive areas from unreasonable noise.

The Regulations outline:

- noise limits that apply to commercial, industrial and trade premises
- noise sensitive areas where noise limits apply
- how the noise level at noise sensitive areas is determined and the levels at which noise is considered to be aggravated.

Regulation 113 (Part 5.3) of the Regulations requires that the prediction, measurement and analysis of noise from commercial, industrial and trade premises and indoor and outdoor entertainment venues and events must be undertaken in accordance with the Noise Protocol (i.e. EPA Publication 1826-4).

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D3 1826-4 – Part I

The Environment Protection Regulations 2021 (S.R. No. 47/2021) set out a framework for noise from residential, commercial, industrial and trade premises. Regulation 113 (Part 5.3) of the Regulations requires that the prediction, measurement and analysis of noise from commercial, industrial and trade premises and indoor and outdoor entertainment venues and events must be undertaken in accordance with the Noise Protocol (i.e., EPA Publication 1826-4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues*).

Part I of the Noise Protocol outlines the methodology to establish noise limits applicable to noise from commercial, industrial or trade premises in both urban and rural areas of Victoria. The subject site is not located within a Major Urban Area (MUA) boundary and, therefore, noise limits for the subject site are derived using the rural area method.

For commercial, industrial or trade premises in rural areas of Victoria, noise limits are defined based on the land zoning designations near the noise generator and the noise sensitive receiver area. An adjustment for the background noise level can be made if the noise sensitive receiver area is located within a background relevant area.

Once a noise limit is established, the noise level from the premises is measured or predicted as a 30-minute equivalent average noise level ($L_{Aeq, 30 \text{ min}}$) and if necessary, adjusted to account for duration, measurement position and noise character (such as tonality, intermittency and impulsiveness) to determine the effective noise level (L_{eff}).

Table 11 provides a summary of relevant definitions.

Table 11 – Noise Protocol Part I definitions

Term	Definition
Commercial, industrial and trade premises	<p>any premises except the following:</p> <p>(a) residential premises (other than common plant under the control of an owners corporation);</p> <p>b) a street or road, including every carriageway, footpath, reservation and traffic island on any street or road;</p> <p>(c) a railway track used by rolling stock in connection with the provision of a freight service or passenger service –</p> <p>(i) while travelling on a railway track or tramway track; or</p> <p>(ii) while entering or exiting a siding, yard, depot or workshop;</p> <p>(d) a railway track used by rolling stock in connection with the provision of a passenger service, while in a siding yard, depot or workshop and is –</p> <p>(i) powering up to commence to be used in connection with the provision of a passenger service; or</p> <p>(ii) shutting down after being used in connection with the provision of a passenger service;</p> <p>(e) the premises situated at Lower Esplanade, St Kilda and known as “Luna Park” and being the whole of the land more particularly described in Certificate of Title Volume 1204 Folio 109.</p>
Residential premises	<p>any building or part of a building used as or for the purposes of a private residence or residential flat.</p>
Noise sensitive residential use	<p>a community care accommodation, dependent person’s unit, dwelling, residential aged care facility, residential village, retirement village or rooming house</p>
Noise sensitive area	<p>(a) that part of the land within the boundary of a parcel of land that is -</p> <p>(i) within 10 metres of the outside of the external walls of any of a dwelling (including a residential care facility but not including a caretaker’s house), a residential building, a noise sensitive residential use; or</p> <p>(ii) within 10 metres of the outside of the external walls of any dormitory, ward, bedroom or living room of one of more of a caretaker’s house, a hospital, a hotel, a residential hotel, a motel, a specialist disability accommodation, a corrective institution, a tourist establishment, a retirement village, a residential village; or</p> <p>(iii) within 10 metres of the outside of the external walls of a classroom or any room in which learning occurs in a child care centre, a primary school, a secondary school (during their operating hours); or</p> <p>(b) in the case of a rural area only, that part of the land within the boundary of –</p> <p>(i) a tourist establishment, or</p> <p>(ii) a campground; or</p> <p>(iii) a caravan park.</p>

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Background noise level	The arithmetic average of the hourly L_{A90} levels that represents the background sounds in a noise sensitive area, in the absence of noise from any commercial, industrial or trade premises which appears to be intrusive at the point where the background level is measured, when measured according to Part I, section A4 of the Noise Protocol	
Background relevant area	A noise sensitive area within a rural area where background levels may be higher than usual. This includes areas where freeway or highway traffic is a significant audible background noise source. It also includes coastal areas, where representative background levels are elevated by the sound of surf.	
Effective noise level	the level of noise emitted from commercial, industrial and trade premises and, if appropriate, adjusted to take into account the character and duration of the noise and the measurement conditions, as determined in accordance with the Noise Protocol	
Day period	Monday-Saturday (excluding public holidays)	0700-1800 hours
Evening period	Monday-Saturday	1800-2200 hours
	Sunday and public holidays	0700-2200 hours
Night period	Monday-Sunday/Public Holidays	2200-0700 hours

The noise limits applicable to the subject site have been derived in accordance with the methodology prescribed in Part I of the Noise Protocol and are provided in Table 12.

Table 12 – Noise limits derived under Part I of the Noise Protocol, dB

Period	Time Period	Measured background noise level, L_{A90}	Zoning level	Background relative to zoning level	Noise limit, L_{eff}
<i>Residential Receivers (R2-R7)</i>					
Day	0700-1800 hours	44	53	Neutral	53
Evening	1800-2200 hours	38	47	Neutral	47
Night	2200-0700 hours	35	42	Neutral	42
<i>Kindergarten (R1)</i>					
Day	0830-1600 hours	44	55	Neutral	55

Compliance with the Noise Protocol is achieved when the effective noise level from all of the subject site noise sources covered under the Noise Protocol/Environment Protection Regulations do not exceed the noise limit in the relevant noise period when assessed over a 30-minute period.

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APPENDIX E NOISE PREDICTION METHODOLOGY

Predictions of noise from the subject site have been undertaken on the basis of:

- The sound emissions of noise sources associated with the development as outlined in APPENDIX F
- Worst-case delivery and waste collection assumptions as outlined in Table 6
- A digital noise model of the site and surrounding environment
- International standard(s) used for the calculation of environmental noise propagation.

Details of the prediction methodology are summarised in Table 13 below.

Table 13 - Noise prediction methodology

Detail	Description
Software	Proprietary noise modelling software SoundPLAN v8.2
Method	International Standard ISO 9613-2:1996 <i>Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation</i> (ISO 9613-2)
Ground conditions	Ground factor of $G = 0.3$ i.e., 70 % hard ground
Atmospheric conditions	Temperature 10°C and relative humidity 70% This represents conditions which result in relatively low levels of atmospheric sound absorption.
Receiver heights	1.5 m above floor level

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APPENDIX F NOISE LEVELS OF ON-SITE EQUIPMENT AND ACTIVITIES

The sound power level data used in our assessment is summarised in Table 14.

Table 14 - Sound power level of proposed equipment and activity, dB L_w

Noise source	Octave band centre frequency							A
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
Equivalent Average Noise Level, L _{eq}								
Light Rigid Vehicle (LRV)	95	92	87	84	84	83	77	89
Medium Rigid Vehicle (MRV)	103	97	92	89	90	91	85	96
Heavy Rigid Vehicle (HRV)	105	99	94	91	92	93	87	98
Semi-Trailer (19 m) Truck	106	102	100	99	99	97	92	104
Truck refrigeration unit	95	91	87	84	84	78	75	86
Garbage Truck	97	95	93	91	96	94	90	100
Bin Emptying	105	97	94	91	95	94	89	100
Cardboard compactor	94	93	89	90	85	80	77	91
Heat Pump	92	92	90	90	87	81	77	91
Gas Cooler (800 RPM)	98	90	90	91	88	86	83	93
EF-1	77	72	66	63	58	54	51	65
EF-2	80	78	74	71	62	64	63	73
EF-3	76	73	67	64	56	56	54	66
EF-4	90	91	86	76	74	72	70	82
EF 5a & 5b	79	78	69	66	61	59	57	69
EF 6a & 6b	78	73	67	64	59	55	52	66
EF-7	75	67	63	59	53	53	47	61
SAF-1	81	80	77	80	77	74	70	82
SAF-2	77	76	67	64	59	57	55	67

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Noise source	Octave band centre frequency							A
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
Maximum Noise Level Events, L_{max}								
'Normal' car ¹	108	96	95	90	90	86	79	94
'Worst-case' car ^{1,2}	110	108	101	96	99	98	91	104
Car pass by	104	95	88	88	89	85	79	93
Patron maximal shout	83	92	98	97	92	87	87	98
Light Rigid Vehicle	100	97	92	89	89	88	82	94
Medium Rigid Vehicle	108	103	97	97	98	101	102	107

¹ Includes door closing and vehicle start up from stationary

² A 'worst-case' car includes a V8 or high-powered vehicle driving in an aggressive manner.

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