



CLARITY  
ACOUSTICS



Report R01 23016

19 April 2023

18 Mason Street, Warragul  
Consulation Acoustic Assessment

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**PROJECT SUMMARY:**

R01 23016  
18 Mason Street, Warragul  
Consultation Acoustic Assessment

**PREPARED FOR:**

Housing Choices Australia Limited  
Level 3, 350 Queen Street  
Melbourne VIC 3000

**ATTENTION:**

Clara Friedhoff

REFERENCE	REV	STATUS	DATE	AUTHOR	REVIEWER
R01 23016	-	DRAFT	16 APR 2023	RL	AC
R01 23016	-	ISSUED	19 APR 2023	RL	AC

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## 1.0 INTRODUCTION

It is proposed to construct a 4-level affordable housing development at 18 Mason Street, Warragul. The development is to include the following:

- Bike storage and car parking within the basement
- A community space, HCA offices, bike storage area and nine (9) apartments on the ground level
- Fourteen (14) apartments per level on levels 1, 2 and 3.

Clarity Acoustics Pty Ltd (Clarity Acoustics) has been engaged by Housing Choices Australia Limited to prepare an acoustic report as part of the planning application to address Clause 52.20-7.7 of the planning provisions, review the potential for noise impact from the neighbouring venue and to provide commentary on the potential for noise impact from the subject site to neighbouring receivers.

This report provides details of the proposed development, external noise sources in the surrounding area, proposed noise sources associated with the development, relevant acoustic criteria and recommended noise controls to achieve the relevant acoustic criteria.

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

## 2.0 PROJECT DESCRIPTION

### 2.1 Subject site

The subject site is located at 18 Mason Street in Warragul and is bounded by the following:

- A Government Road to the north with commercial premises on Mason Street beyond
- Paper Road to the east with vacant commercial premises beyond
- Commercial Hotel to the south
- Mason Street to the west with commercial properties beyond.

The subject site is located in a Commercial 1 Zone (C1Z) with further C1Z and Transport Zone Significant Municipal Road (TRZ3) in the immediate environs. The relevant planning map for the subject site is provided in APPENDIX B.

The nearest noise sensitive receiver (other than future noise sensitive receivers associated with the proposed development) is the Mercure Hotel at 23 Mason Street to the north-west of the subject site.

An aerial photograph of the subject site and immediate surrounds is provided in Figure 1.



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



## 2.2 Commercial Hotel operation

The operation of the Commercial Hotel which is located to the south of the subject site is subject to the conditions of Liquor Licence 31903633 which includes the following:

On license trading as follows:

- Sunday – between 1000 hours and 2300 hours
- Good Friday & ANZAC Day (not being a Sunday) – between 12 noon and 0100 hours the following morning
- ANZAC Day Sunday – between 12 noon and 2300 hours
- On any other day – between 0700 hours and 0100 hours the following morning

Capacity of 89 patrons on the decking area and 314 patrons internally with an overall maximum capacity of 399 patrons.

### 3.0 ACOUSTIC CRITERIA

The following sections outline the key noise legislation in Victoria and related guidelines and standards commonly referenced in the assessment of noise associated with the proposed development.

#### 3.1 Noise intrusion to the proposed development

Clause 52.20-7.7 of the Victorian planning provisions requires that:

*New dwellings should be designed and constructed to include acoustic attenuation measures to reduce noise levels from off-site noise sources.*

*Buildings within a noise influence area specified in Table 6 should be designed and constructed to achieve the following noise levels:*

- *Not greater than 35dB(A) for bedrooms, assessed as an  $L_{Aeq,8h}$  from 10pm to 6am.*
- *Not greater than 40dB(A) for living areas, assessed  $L_{Aeq,16h}$  from 6am to 10pm.*

*Buildings, or part of a building screened from a noise source by an existing solid structure, or the natural topography of the land, do not need to meet the specified noise level requirements.*

*Noise levels should be assessed in unfurnished rooms with a finished floor and the windows closed.*

Table 1 provides details regarding the relevant noise influence area and comments in relation to the subject site.

**Table 1 – Noise influence area and comments in relation to the subject site**

Noise Source	Noise influence area	Comment
Zone Interface		
<b>Industry</b>	300 m from the Industrial 1, 2 and 3 zone boundaries	No industrial zoned land within 300 m of the subject site
<b>Roads</b>		
Freeways, tollways and other roads carrying 40,000 Annual Average Daily Traffic (AADT) Volume	300 m from the nearest trafficable lane	No freeway, tollway and other road carrying more than 40,000 AADT Volume within 300 m of the subject site
<b>Railway</b>		
Railway servicing passengers in Victoria	80 m from the centre of the nearest track	No railway servicing passengers in Victoria within 80 m of the subject site
Railway servicing freight outside Metropolitan Melbourne	80 m from the centre of the nearest track	No railway servicing freight outside Metropolitan Melbourne within 80 m of the subject site
Railway servicing freight in Metropolitan Melbourne	135 m from the centre of the nearest track	No railway servicing freight in Metropolitan Melbourne within 135 m of the subject site

The subject site is not considered within a noise influence area as specified in Table B6 of Clause 52.20-7.7.

Notwithstanding the above, we have considered the noise criteria detailed in Clause 52.20-7.7 for the design of the proposed development.

### 3.2 Noise from the proposed development

Noise from base building mechanical plant (i.e., common property plant) is required to comply with noise limits derived in accordance with Part I of EPA Publication 1826-4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol).

Noise limits under the Noise Protocol are determined on the basis of land zoning and background noise levels and are separately defined for the day, evening and night periods.

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 ( $L_{eff}$ ).

Refer to APPENDIX D3 for further detail.

### 3.3 Noise from the Commercial Hotel

#### 3.3.1 Music noise

It's noted that the Commercial Hotel's website states that the venue operation includes Friday night DJs and live music in the warmer months and includes a photograph of a musician in the outdoor area. For the purposes of this assessment, we have assumed that the venue has live music both internally and externally.

EPA Publication 1826-4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol) outlines the EPA's approach to the determination of noise limits and to the measurement, prediction and analysis of noise.

Part II of the Noise Protocol outlines the methodology to establish noise limits for indoor and outdoor entertainment venues and outdoor entertainment events in Victoria. Music noise from the operation of the nearby venue at 115 Queen Street must comply with the noise limits derived under Part II of the Noise Protocol at existing receivers.

Clause 53.06 of the Victorian Planning Provisions (VPP) is intended to protect live music entertainment venues from the encroachment of noise sensitive residential uses and to protect noise sensitive uses from unreasonable levels of live music and entertainment noise. For new noise sensitive residential uses, Clause 53.06 places the onus on the developer to design and construct the proposed use to reduce noise levels from any existing live music entertainment venue within 50 m of the proposed use.

The Noise Protocol includes a section on the Agent of Change principle which is consistent with Clause 53.06 of the VPP. Where Clause 53.06 of the VPP applies to an indoor live music entertainment venue, the noise limit at pre-existing noise sensitive residential uses is to be calculated in accordance with the methodology outlined in Part II of the Noise Protocol for indoor entertainment venues.

Under the Noise Protocol and Clause 53.06, for the proposed developments located within 50 m of a live music venue, the dwellings should be designed to comply with the noise limits within the venue with windows and doors closed. For the purposes of this assessment, we have considered the base noise limits of the Noise Protocol as the internal music noise design criteria.

Refer to APPENDIX D4 for further detail.

### 3.3.2 Patron noise

Noise from patrons associated with licensed venues is not covered by the Statutory Regulation No. 47/2021 or any Victorian guideline. In the absence of relevant state policy or criterion, Clarity Acoustics recommend that patron activity associated with the Commercial Hotel be assessed against the targets provided in the City of Yarra Planning Scheme Clause 37.01 (Schedule 6) with the proposed development's facade being designed to achieve the internal targets.

Table 2 provides the proposed internal patron noise targets.

**Table 2 – Proposed internal patron noise targets, dB**

Period	Equivalent average patron noise level, $L_{Aeq}$	Maximum patron noise level, $L_{Amax}$
Day	35 dB	-
Evening	35 dB	-
Night	35 dB	50-55

Refer to APPENDIX D5 for further detail.

## 4.0 SURROUNDING NOISE ENVIRONMENT

In order to quantify the existing noise environment in the vicinity of the proposed development, noise monitoring was undertaken at the subject site between Wednesday, 8 and Thursday, 9 March 2023. Additionally, attended measurements of traffic noise levels were undertaken on 9 March 2023 in close proximity to the subject site to ascertain the influence of traffic noise at the subject site. Table 3 provides a summary of the noise survey and noise monitoring undertaken.

**Table 3 – Summary of noise measurements and noise monitoring**

Investigation type	Description	Measurement equipment
Attended traffic noise measurements	Undertaken between 0830 and 0900 hours on 9 March 2023 adjacent to the western boundary of the subject site. The microphone was set at a height of 1.5 m above ground level	Class 1 noise monitor (Svante 977A sound and vibration analyser - serial number 69799) and Svante Class 1 Calibrator (Serial number 58085).
Noise monitoring at the subject site to capture background noise levels and ambient noise levels from noise sources in the vicinity of the subject site	Undertaken between 1845 hours on Wednesday, 8 March and 0900 hours on Thursday, 9 March 2023 at the northern boundary of the subject site. The microphone was set at a height of 1.5 m above ground level.	Class 1 noise monitor (Svante 977C sound and vibration analyser - serial number 98849) and Svante Class 1 Calibrator (Serial number 58085).



The noise monitoring and measurement positions are provided in Figure 2.

**Figure 2 – Noise measurement and monitoring positions (source: Nearmap)**



#### 4.1 Ambient and traffic noise measurement results

The results of the ambient and traffic noise measurement and monitoring are summarised in Table 4.

**Table 4 – Ambient and traffic noise measurement and monitoring results, dB**

Description	Measured noise level, $L_{Aeq}$
Daytime ambient noise level, $L_{Aeq}$ , 7 hour (1900-2200 hours and 0600-0900 hours)	52
Night-time ambient noise level, $L_{Aeq}$ , 8 hour (2200-0600 hours)	43
Traffic noise level, $L_{Aeq}$ , 30 minute	51

The measured noise levels detailed above have been used to calibrate a computerised noise model to predict future noise levels at the most exposed facades of the proposed development.

## 4.2 Background noise measurement results

The mechanical plant and music noise limits (under the Noise Protocol) are set accounting for existing background noise levels in the vicinity of the nearby properties.

The measured lowest daily average background noise levels are detailed in Table 5. It is noted that the assessment time periods vary under Part I and II of the Noise Protocol methodology. As such, these are presented separately below.

**Table 5 – Measured background noise levels, dB**

Period	Time Period (relevant to subject site operating hours)	Measured background noise level
<i>Noise Protocol – Part I</i>		
Day	0700 - 1800 hours	48 dB L <sub>A90</sub> , 15 minute
Evening	1800 - 2200 hours	45 dB L <sub>A90</sub> , 15 minute
Night	2200 - 0700 hours	39 dB L <sub>A90</sub> , 15 minute
<i>Noise Protocol – Part II</i>		
Day/ Evening	0700 - 2300 hours (Monday to Saturday) 1000 - 2200 hours (Sunday)	42 dB L <sub>A90</sub> , 15 minute

Table 6 provides the lowest 15-minute background noise level (L<sub>A90</sub>) spectrum measured in accordance with the Noise Protocol during the night time period (i.e., between 2300 hours and 0100 hours Monday to Saturday and 2200 hours and 2300 hours Sunday).

**Table 6 – Measured lowest background noise levels, dB L<sub>90</sub>, 15 minute**

Description	Octave Band Centre Frequency							
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	A
Night-time background noise level	39	40	35	34	33	26	20	37

The measured background noise levels detailed in Table 5 and Table 6 have been used to determine the relevant noise criteria applicable to music associated with the operation of the Commercial Hotel and to operation of mechanical plant associated with the subject site.

## 5.0 RECOMMENDATIONS REGARDING BUILDING FABRIC

A 3-D noise model of the subject site and surrounding area has been created to predict noise from the proposed operation of the subject site to neighbouring receivers. Outcomes of the noise modelling indicate the following noise mitigation measures are required in order to achieve the internal amenity criteria outlined in Sections 3.1 and 3.3.1.

**Table 7 – Recommended facade sound insulation requirements**

Description	Sound insulation, $R_w$	Indicative construction
External facade type 1	47 dB	Masonry with internal plasterboard lining or lightweight construction such as: <ul style="list-style-type: none"> <li>– 9 mm thick compressed fibre cement sheet</li> <li>– Minimum 75 mm wide steel or timber stud with 50 mm cavity insulation</li> <li>– 2 layers of 13 mm thick fire rated or acoustic plasterboard.</li> </ul>
External facade type 2	44 dB	Masonry with internal plasterboard lining or lightweight construction such as: <ul style="list-style-type: none"> <li>– 9 mm thick compressed fibre cement sheet</li> <li>– Minimum 75 mm wide steel or timber stud with 50 mm cavity insulation</li> <li>– 13 mm thick fire rated or acoustic plasterboard.</li> </ul>
External facade type 3	41 dB	Masonry with internal plasterboard lining or lightweight construction such as: <ul style="list-style-type: none"> <li>– 9 mm thick compressed fibre cement sheet</li> <li>– Minimum 75 mm wide steel or timber stud with 50 mm cavity insulation</li> <li>– 13 mm thick standard plasterboard.</li> </ul>
Glazing type 1	37 dB	Single-glazed system consisting of 12.76 mm laminated glass or double-glazed system consisting of 6 mm monolithic glass / 12 mm airgap / 6.38 mm laminated glass.
Glazing type 2	35 dB	Single-glazed system consisting of 6.76 mm laminated glass or double-glazed system consisting of 6 mm monolithic glass / 12 mm airgap / 6 mm monolithic glass.
Glazing type 3	31 dB	Single-glazed system consisting of 6 mm monolithic glass or double-glazed system consisting of 4 mm monolithic glass / 10 mm airgap / 4 mm monolithic glass.

Refer to APPENDIX E for further details regarding where each facade/glazing type is required.

## 6.0 ASSESSMENT OF EXTERNAL NOISE INTRUSION

The following sections provide details of the assessment of internal noise levels from patrons and music from the Commercial Hotel and from the external ambient noise environment.

### 6.1 Assessment methodology

The assessment considers the following:

- The building fabric recommendations outlined in Section 5.0 and APPENDIX E
- Measured ambient noise levels as outlined in Table 4
- Duration of exposure at the receiver locations, assessed over an 8-hour and a 16-hour period in accordance with the requirements of the Clause 52.20-7.7
- Development plans as per APPENDIX C.

In terms of patron noise from the Commercial Hotel, APPENDIX G provides patron sound power formulae derived from the *H. Lazarus*<sup>1</sup> sound pressure levels for different vocal efforts. For the outdoor area associated with the venue, tavern patron type (focus on drinking and socialising – patrons mostly seated) has been used for our noise predictions. Table 8 provides the patron input sound power levels used in the noise predictions.

**Table 8 – Patron sound power level data, dB L<sub>w</sub>**

Patron area	Equivalent average sound power level, L <sub>Aeq</sub>	Maximum sound power level, L <sub>Amax</sub>
89 patrons within the outdoor area	96	104

Music noise emissions from the Commercial Hotel must comply with a noise limit of 47 dB L<sub>Aeq, 15 minute</sub> at the Mercure Hotel during the day and evening periods. The night time music noise limit applicable to music noise emissions from the Commercial Hotel at the Mercure Hotel is outlined in Table 9.

**Table 9 – Noise Protocol night period music noise limit, dB**

Description	Octave Band Centre Frequency						
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
Night time Noise Protocol music noise limit, L <sub>10, 15 minute</sub>	47	48	43	42	41	34	28

<sup>1</sup> 1986 H. Lazarus paper *Prediction of Verbal Communication in Noise – A Review*



Table 10 provides the calculated music noise levels associated with internal and external music noise from The Commercial Hotel which results in compliance with the relevant Noise Protocol noise limits at the nearest existing receiver i.e., the Mercure Hotel. These music noise levels have been considered in the design of the building fabric of the proposed development.

**Table 10 – Commercial Hotel music noise levels for compliance with noise limits at the Mercure Hotel, dB**

Description	Octave Band Centre Frequency							
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	A
Day and Evening period, $L_{eq}$ , 15 minute								
Internal reverberant music noise level	104	103	101	99	97	97	97	104
External music noise level at 1 m from performer/speaker	98	98	93	90	89	82	78	92
Night period, $L_{10}$ , 15 minute								
Internal reverberant music noise level	97	96	94	92	90	90	90	97
External music noise level at 1 m from performer/speaker	87	87	82	79	78	71	67	81

## 6.2 Predicted external noise intrusion

Table 11 provides the predicted internal traffic/ambient noise levels within future dwellings associated with the proposed development, based on the measured ambient noise levels presented in Table 4 and the recommended facade sound insulation performance outlined in Section 5.0 and APPENDIX E.

**Table 11 – Predicted internal traffic/ambient noise levels**

Description	Predicted internal noise level, dB	Clause 52.20 Criteria, dB
Day-time noise level within living rooms, $L_{Aeq}$ , 16 hour	29	40
Night-time noise level within bedrooms, $L_{Aeq}$ , 8 hour	20	35

It can be seen from Table 11 that the predicted internal traffic/ambient noise levels comply with the Clause 52-20 acoustic criteria by a margin of at least 11 dB.

### 6.3 Predicted patron noise intrusion

Table 11 provides the predicted internal patron noise levels, based on the patron noise input noise levels presented in Table 8 and the recommended facade sound insulation performance outlined in Section 5.0 and APPENDIX E.

**Table 12 – Highest predicted internal patron noise levels**

Description	Predicted internal patron noise level, dB	Patron noise criteria, dB
Highest predicted equivalent average patron noise levels, $L_{Aeq}$ , 15 minutes	31	35
Highest predicted maximum patron noise levels – bedrooms, $L_{Amax}$	44	50-55

It can be seen from Table 12, that the predicted internal noise levels comply with the internal patron noise targets by a margin of at least 4 dB.

### 6.4 Predicted music noise intrusion

Table 13 provides the predicted day and evening period internal music noise levels, based on compliant music noise levels associated with the Commercial Hotel presented in Table 10 and the recommended facade sound insulation performance outlined in Section 5.0 and APPENDIX E.

**Table 13 – Highest predicted day and evening period internal music noise levels**

Description	Predicted internal music noise level (Day/Evening), dB	Noise Protocol internal music limit (Day/Evening), dB
Day/Evening period internal music noise level, $L_{Aeq}$ , 15 minute	28	32

It can be seen from Table 13, that the predicted day and evening internal music noise levels comply with the Noise Protocol day and evening period music noise limit by a margin of at least 4 dB.

Table 14 provides the predicted night time internal music noise levels, based on compliant music noise levels associated with the Commercial Hotel presented in Table 10 and the recommended facade sound insulation performance outlined in Section 5.0 and APPENDIX E.

**Table 14 – Highest predicted night time internal music noise levels, dB  $L_{10}$ , 15 minute**

Description	Octave Band Centre Frequency						
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
Night-time internal music noise level - bedroom, $L_{A10}$ , 15 minute	37	28	19	9	4	2	-
Noise Protocol night time noise limit	40	30	20	20	15	10	10
Compliance?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

It can be seen from Table 14, that the predicted night time internal music noise levels comply with the Noise Protocol night period noise limit.

## 7.0 NOISE FROM ROOFTOP PLANT

The noise limits applicable to the operation of common plant associated with the development have been calculated in accordance with the methodologies prescribed in Part I of the Noise Protocol based on the measured background noise levels and are summarised in Table 15.

**Table 15 – Noise limits derived under the Noise Protocol**

Period	Zoning level	Measured background noise level, $L_{A90}$	Background relative to zoning level	Noise limit, $L_{eff}$
Day	59	48	Neutral	<b>59</b>
Evening	52	45	Neutral	<b>52</b>
Night	47	39	Neutral	<b>47</b>

The rooftop condenser deck associated with the development is proposed to house 30 air-conditioning condenser units which are screened with louvres. For the purposes of this assessment, we have assumed that the rooftop condensers are to be Mitsubishi PUMY80SPVKMD-A or the equivalent which have a sound power level of 74 dB  $L_{WA}$  each.

Based on the above, noise from the condenser deck will achieve compliance with the Noise Protocol night time noise limits at the nearest affected receiver by a margin of at least 10 dB with all units operating at full capacity.

Compliance with the night period noise limit under these conditions will result in compliance with the less stringent day and evening period noise limits.

## 8.0 SUMMARY

It is proposed to construct a 4-level affordable housing development at 18 Mason Street, Warragul. The development is to include the following:

- Bike storage and car parking within the basement
- A community space, HCA offices, bike storage area and nine (9) apartments on ground level
- Fourteen (14) apartments per level on levels 1, 2 and 3.

Clarity Acoustics has carried out of noise associated with the proposed development and found that based on the recommend building fabric sound insulation:

- the predicted internal traffic/ambient noise levels are expected to comply with the internal noise level criteria outlined in Clause 52.20-7.7
- the predicted internal patron noise levels are expected to comply with the internal patron noise targets
- the predicted internal music noise levels are expected to comply with the Noise Protocol music limits/Clause 53.06 requirements.

Additionally, based on typical selections, noise from the rooftop condenser deck is predicted to achieve compliance with the Noise Protocol night time noise limits by a margin of at least 10 dB with all units operating at full capacity.

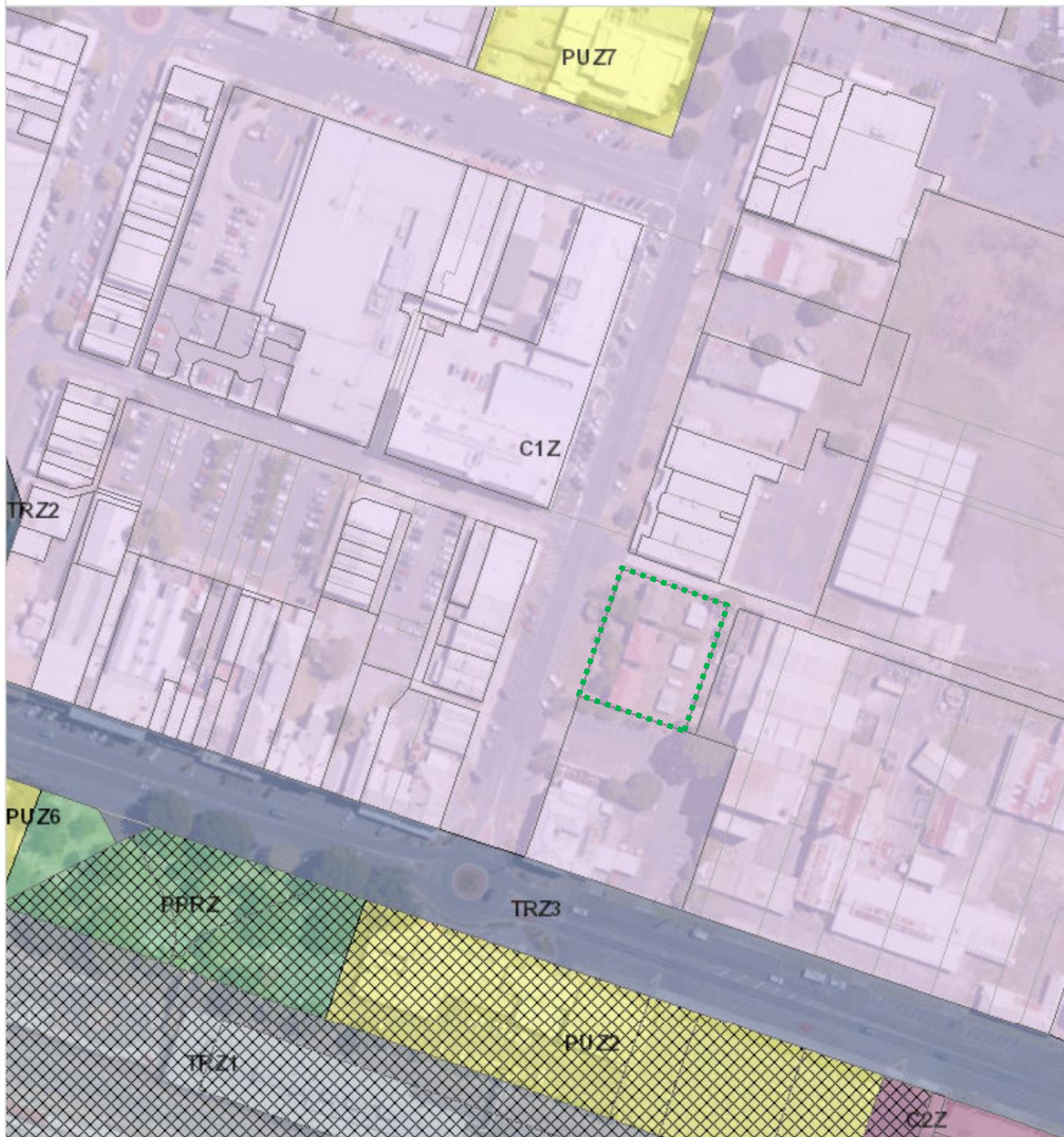















## APPENDIX A GLOSSARY OF TERMINOLOGY

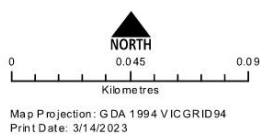
dB	Decibel (dB) a relative unit of measurement widely used in acoustics, electronics and communications. The dB is a logarithmic unit used to describe a ratio between the measured sound level and a reference or threshold level of 0 dB.
A-weighting	The A-weighting filter covers the full audio range - 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.
Hertz	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.
$L_{A10}(t)$	The sound level exceeded for 10 % of the measurement period, A-weighted and averaged over time (t) and commonly referred to as the average maximum sound level.
$L_{A90}(t)$	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 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.
$R_w$	Weighted Sound Reduction Index – A single number rating of airborne sound insulation between rooms, over a range of frequencies – laboratory measurement.

## APPENDIX B PLANNING MAP

### Planning Map



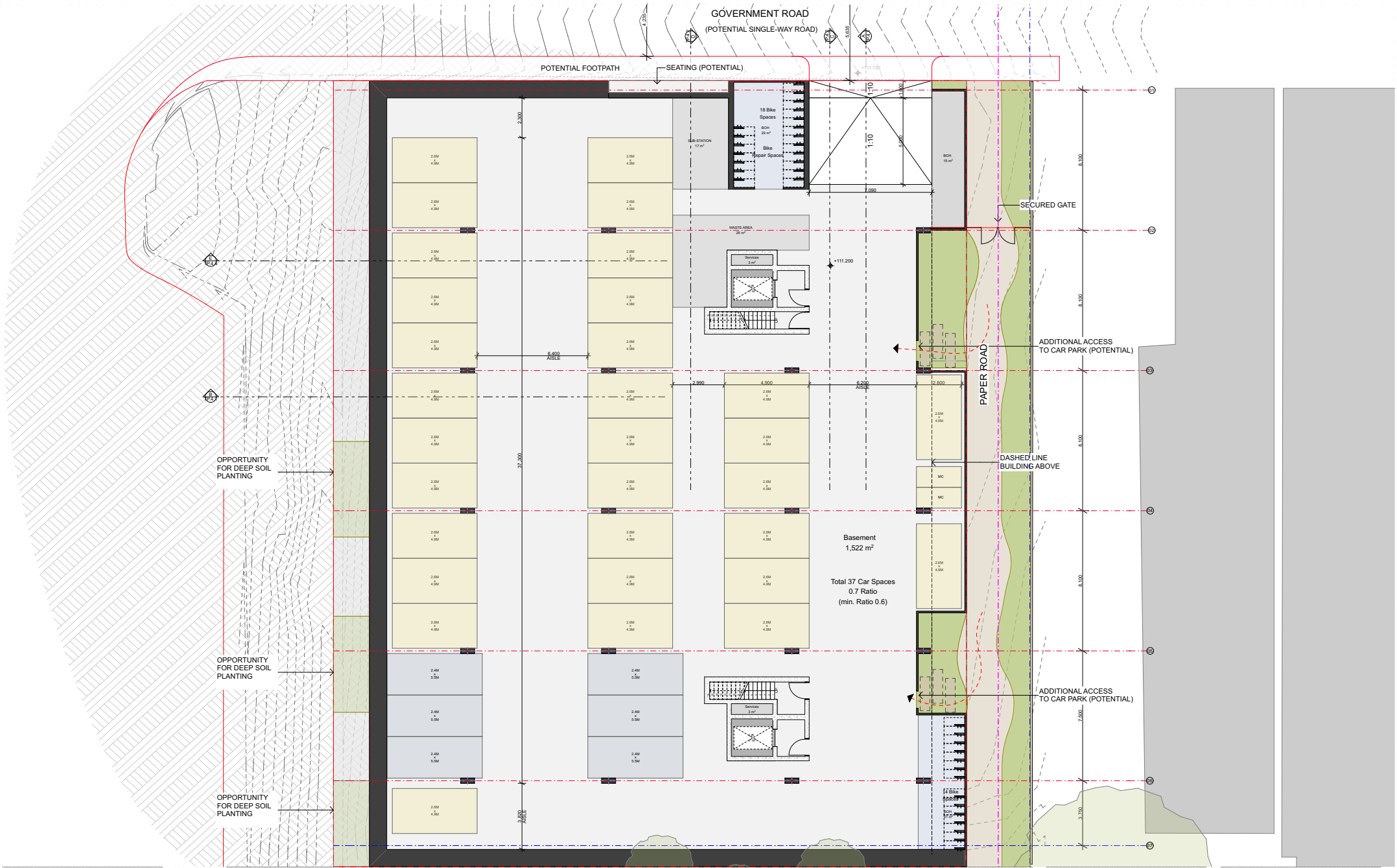
<b>Property</b>	<b>Commercial Zones</b>	<b>Public Land Zones</b>
 Properties	 C1Z - Commercial 1 Zone	 PUZ7 - Public Use Zone-Other Public Use
 Parcel	 C2Z - Commercial 2 Zone	 PPRZ - Public Park and Recreation Zone
 Parcel proposed	 PUZ2 - Public Use Zone-Education	 TRZ1 - State Transport Infrastructure
 All Zones	 PUZ6 - Public Use Zone-Local Government	 TRZ2 - Principal Road Network
<b>Planning Scheme Zones</b>		 TRZ3 - Significant Municipal Road



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## APPENDIX C      DEVELOPMENT PLANS



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First Nations Advisor	Yemabgin
Traffic Engineer	Traffic Group
Structural Engineer	Brogue Consulting Engineers

REVISION

CLIENT  
Housing Choices Australia  
18 Mason Street, Warragul,  
VIC, 3820

18 Mason Street,  
Warragul

DWG No  
TP.2.2

TITLE  
BASEMENT PLAN

STATUS  
Town Planning  
FOR DISCUSSION

ISSUE DATE  
2/3/2023

SCALE  
1:100 @ A1



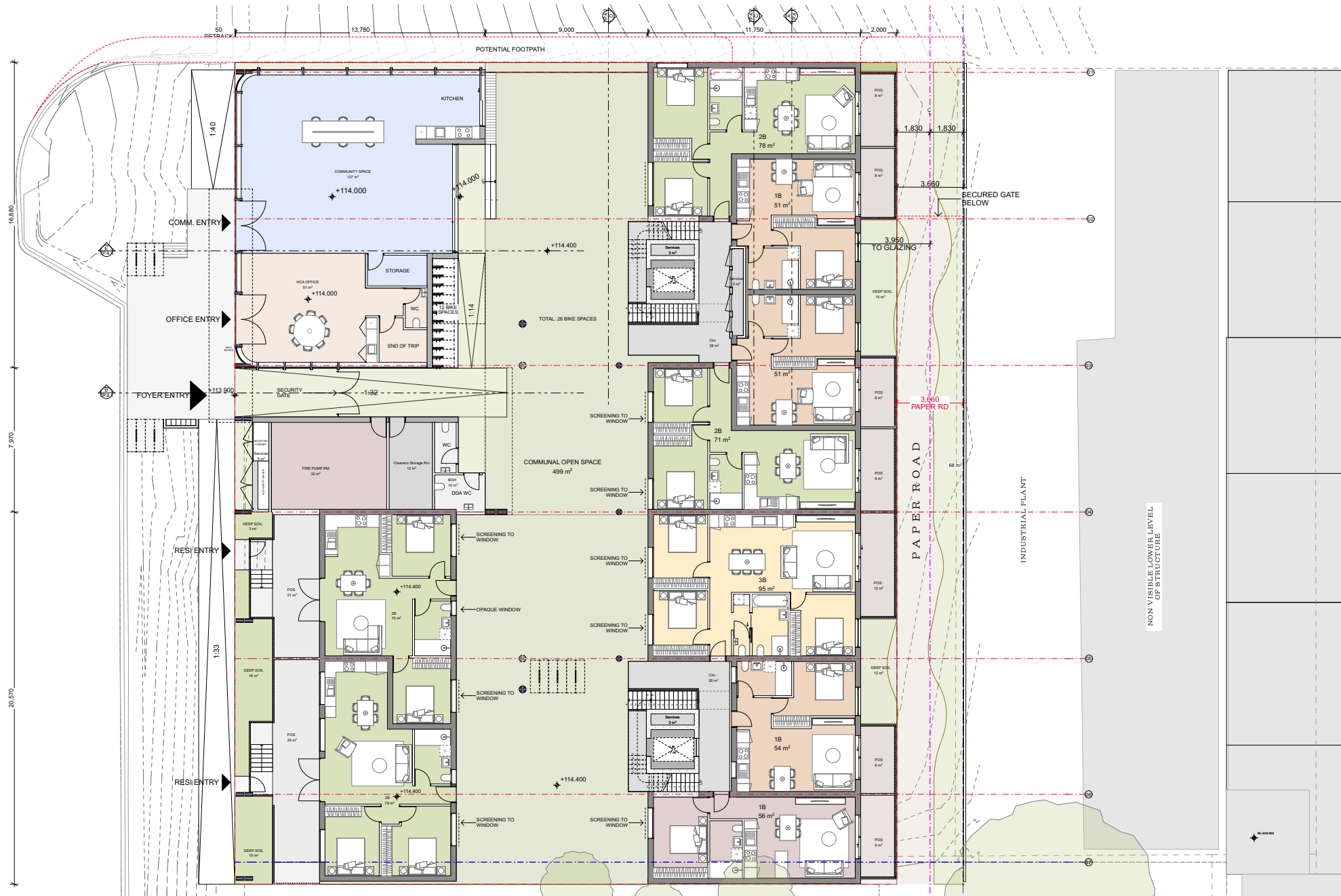
GENERAL NOTES

- Builder and/or Subcontractor to supply one sample each of the proprietary items, finishes, samples materials and shop drawings for sign-off prior to placement of order, fabrication or construction. Once approved one signed item is to be held by the Builder and one duplicate item to be forwarded to Client's Representative.
- Do not scale from this drawing - use figured dimensions
- A signed original of this drawing is retained in Freadman White Architects Offices for verification purposes.
- Information detailed in drawing revisions is for information only and may not be indicative of all changes made.
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## APPENDIX D ENVIRONMENTAL LEGISLATION AND GUIDELINES

The following sections outline the key noise legislation in Victoria and related guidelines and standards commonly referenced in Victoria in relation to the proposed development

### 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 Environment Protection Regulations replace the following legislative instruments:

- *State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1* (SEPP N-1)
- *State Environment Protection Policy (Control of Music Noise from Public Premises) No. N-2* (SEPP N-2)
- *Environment Protection (Residential noise) Regulations 2018*.

For indoor and outdoor entertainment venues and events, the Regulations outline:

- noise limits that apply to indoor and outdoor entertainment venues
- noise sensitive areas where noise limits apply
- how the noise level at noise sensitive areas is determined
- the application of the Agent of Change principle, consistent with the Victorian Planning Provisions.

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).

### D3 1826-4 – Part I

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 Noise Protocol also outlines the methodology to undertake a measurement of prediction of the effective noise level at a noise sensitive area from the noise generator.

The subject site is located within the Warragul Major Urban Area (MUA) boundary and, therefore, noise limits for the subject site are derived using the urban area method.

Table 16 provides a summary of relevant definitions.

**Table 16 – 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 owner's 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	Any building or part of a building used as or for the purposes of a private residence or residential flat
Noise sensitive residential use	a community care accommodation, dependent person's unit, dwelling, residential aged care facility, residential village, retirement village or rooming house
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
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

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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 the following buildings -</p> <p>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 the following buildings -</p> <p>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 the following buildings (during their operating hours) -</p> <p>a child care centre, a primary school, a secondary school; 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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The calculation of noise limits for commercial, industrial and trade premises in urban areas takes into account a zoning noise level, which is based on the land zoning types in the surrounding 200 metre radius of the noise sensitive area, and the background noise level in the vicinity of the relevant noise sensitive areas.

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 ( $L_{eff}$ ).

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.



## D4 1826-4 – Part II

Part II of the Noise Protocol outlines the methodology to establish noise limits for indoor and outdoor entertainment venues and outdoor entertainment events in Victoria. Indoor entertainment venues include any premises (other than residential premises or outdoor entertainment venues) where music is played. Noise limits for indoor entertainment venues are determined on the basis of background noise levels and are separately defined for day/evening and night periods.

Table 17 provides a summary of relevant definitions under Part II of the Noise Protocol.

**Table 17 – Relevant definitions under Part II of the Noise Protocol**

Term	Definition
Indoor entertainment venue	Indoor entertainment venue means any premises (other than residential premises or an outdoor entertainment venue), where music is played and includes a live music entertainment venue, hotel, tavern, cabaret, night club, discotheque, reception centre, skating rink, restaurant, cafe, health and fitness centre, recording and rehearsal studio, theatre, amusement park, amusement parlour, retail store, shop, public hall and club.
Music noise	Music and associated contemporaneous sounds heard in a noise sensitive area.
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 the following buildings –</p> <p>a dwelling (including a residential care facility but not including a caretaker's house),</p> <p>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 the following buildings –</p> <p>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,</p> <p>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 the following buildings (during their operating hours) –</p> <p>a child care centre, a primary school, a secondary school;</p>

Residential premises	Any building or part of a building used as or for the purposes of a private residence or residential flat.
Noise sensitive residential use	A community care accommodation, dependent person's unit, dwelling, residential aged care facility, residential village, retirement village or rooming house
Background noise level	The noise level of the aggregate of sounds received at a specified measurement point in the absence of contributions of music noise, measured as $L_{A90}$ or $L_{OCT90}$ according to Part II, section A2.1 of the Noise Protocol.
Effective noise level	The level of music noise emitted from an indoor entertainment venue, outdoor entertainment venue or outdoor entertainment event, measured in a noise sensitive area or at an alternative location, as determined in accordance with the Noise Protocol.

The Environment Protection Regulations define the day, evening and night periods for indoor entertainment venues as below:

**Table 18 – Operating times for indoor entertainment venues**

Period	Day of the week	Operating times
Day and Evening	Monday to Saturday	0700-2300 hours
	Sunday or a public holiday (other than if either is preceding a public holiday)	0900-2200 hours
	Sunday or a public holiday (if either is preceding a public holiday)	0900-2300 hours
Night	Monday to Friday (other than a public holiday or a day preceding the public holiday)	2300-0700 hours
	Saturday (or any day preceding a public holiday)	2300-0900 hours
	Sunday or a public holiday (if either is preceding a public holiday)	2200-0700 hours

Under the Noise Protocol, noise limits for indoor venues are determined on the basis of background noise levels and are separately defined for day/evening and night periods. Background noise levels for the day and evening period are established based on the  $L_{A90}$  noise level and for the night period based on the  $L_{OCT90}$  noise level measured for at least 15 minutes.

Music noise limits for the day/evening and night-time periods are derived as outlined in Table 19.

**Table 19 – Music noise limits under Noise Protocol Part II**

Period	Criteria
Day/Evening	Music noise ( $L_{Aeq, 15 \text{ minute}}$ ) not to exceed background noise ( $L_{A90, 15 \text{ minute}}$ ) plus 5 dB
Night	Music noise ( $L_{OCT10, 15 \text{ minute}}$ ) is not to exceed the background noise level ( $L_{OCT90, 15 \text{ minute}}$ ) by more than 8 dB in any octave band (63 Hz-4 Hz) at a noise-sensitive area

Once a noise limit is established, the noise level from the indoor entertainment venue is measured or predicted as at least a 15-minute equivalent average noise level ( $L_{Aeq, 15 \text{ minute}}$ ) for the day and evening periods and as at least a 15-minute  $L_{OCT10}$  noise level for the night time period.

## D5 Patron noise

Clause 37.01 Schedule 6 of the City of Yarra Planning Scheme is reproduced below.

*For  $L_{Aeq}$  noise levels, the less stringent of the following:*

*If noise is assessed external to a Noise Sensitive Building, noise emissions must comply with the following patron noise design targets:*

- *Day period (from 0700 to 1800) – 50 dB or background noise ( $L_{A90}$ ) + 10 dB, whichever is higher.*
- *Evening period (from 1800 to 2200) – 45 dB or background noise ( $L_{A90}$ ) + 10 dB, whichever is higher.*
- *Night period (from 2200 to 0700) – 40 dB or background noise ( $L_{A90}$ ) + 5 dB, whichever is higher.*

*If noise is assessed internal to a Noise Sensitive Building, noise emissions must achieve the lower of the design sound level range for (whichever is relevant) houses and apartments in inner city areas, entertainment districts, or near major roads, as provided in Australian Standard AS2107:2016 Acoustics— Recommended design sound levels and reverberation times for building interiors.*

*For  $L_{Amax}$  noise levels, during the hours of 10pm-7am:*

- *‘Sleep Disturbance Criteria’, being a noise level of 55 dB  $L_{Amax}$  assessed inside a habitable room of a Noise Sensitive Building normally used for the purpose of sleeping.*
- *For the purpose of the Patron Noise Criteria, ‘Noise Sensitive Building’ means a building referred to in the definition of ‘Noise sensitive area’ in SEPP N-1, being a Dwelling, Residential Building, Caretaker’s House, Hospital, Hotel, Institutional Home, Motel, Reformatory Institution, Tourist Establishment or Work Release Hostel.*

It should be noted that, in the absence of established guidelines or legislation regarding patron noise, the proposed patron noise targets are provided as guidance as to whether a venue has the potential to cause an unreasonable impact. An exceedance of the design targets does not necessarily mean that the noise levels will affect amenity but indicates the need for a detailed assessment and consideration of reasonable and feasible mitigation measures.

## APPENDIX E      FACADE SOUND INSULATION DRAWING MARKUP

MASON STREET



**Legend**

F1/G1

F2/G2

F3/G3



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Legend

- F1/G1
- F2/G2
- F3/G3



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- F1/G1
- F2/G2
- F3/G3



## APPENDIX F NOISE PREDICTION METHODOLOGY

Predictions of noise from the subject site, as well noise from the Commercial Hotel and the traffic/ambient noise environment has been have been undertaken on the basis of:

- Traffic and ambient noise levels outlined in Table 4
- The sound emissions of music levels outlined in Table 10 and patrons noise levels as outlined in Table 8
- 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 20 below.

**Table 20 - Noise prediction methodology**

Detail	Description
Software	Proprietary noise modelling software SoundPLAN v8.2
Method	International Standard ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO 9613-2).
Ground conditions	Ground factor of $G = 0.5$ i.e., 50 % 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 FFL

## APPENDIX G PATRON NOISE DATA

Patron noise levels vary based on the type of venue, patron numbers, alcohol consumption and the ambient noise environment. The 1986 H. Lazarus paper *Prediction of Verbal Communication in Noise – A Review* is often referenced in terms of vocal effort and corresponding sound pressure levels. Table 21 provides the sound pressure levels of speech for different vocal efforts.

**Table 21 – Equivalent A-weighted sound pressure levels of speech for different vocal efforts**

Vocal Effort	Speech Level at 1m
Whispering	36 dB
Soft	42 dB
Relaxed	48 dB
Relaxed, normal	54 dB
Normal, raised	60 dB
Raised	66 dB
Loud	72 dB
Very loud	78 dB
Shouting	84 dB
Maximal shout	90 dB
Maximal shout (in individual cases)	96 dB

These sound pressure levels are further supported by the 2016 Zelem Etal paper *Analysis of the acoustic behaviour of people in a restaurant* which analyses patron numbers in a restaurant against sound pressure level. For the purpose of predicting noise levels from groups of patrons, Table 22 provides the patron sound power formulae derived from the H. Lazarus sound pressure levels for different vocal efforts.

**Table 22 – Patron sound power formulae**

Crowd type	Description of crowd type	Crowd $L_{Aeq}$ Sound Power Formula, dB	Individual Patron $L_{Amax}$ Sound Power, dB
Smokers	Focus on smoking rather than socialising – includes alcohol consumption	$L_{wAeq}=65+10*\log(N)$	98
Restaurant diners	Focus on eating, drinking, socialising – patrons seated	$L_{wAeq}=71+10*\log(N)$	98
Tavern patrons	Focus on drinking and socialising – patrons mostly seated	$L_{wAeq}=77+10*\log(N)$	104
Vertical drinkers	Focus on drinking and socialising – patrons mostly standing	$L_{wAeq}=83+10*\log(N)$	104