AMENDMENT C269YARA TO THE YARRA PLANNING SCHEME

Acoustic Evidence

Prepared for:
Yarra City Council
Instructed by: Maddocks

SLR Ref: 640.10090.99991-R02
Version No: -v1.0
20 September 2021
PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
Level 11, 176 Wellington Parade
East Melbourne VIC 3002 Australia

T: +61 3 9249 9400
E: melbourne@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Yarra City Council (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

DOCUMENT CONTROL

<table>
<thead>
<tr>
<th>Reference</th>
<th>Date</th>
<th>Prepared</th>
<th>Checked</th>
<th>Authorised</th>
</tr>
</thead>
<tbody>
<tr>
<td>640.10090.99991-R02-v1.0</td>
<td>20 September 2021</td>
<td>Jim Antonopoulos</td>
<td>Dianne Williams</td>
<td>Jim Antonopoulos</td>
</tr>
</tbody>
</table>
CONTENTS

1 WITNESS STATEMENT ........................................................................................................................................... 4
2 INSTRUCTIONS AND SUPPLIED INFORMATION ........................................................................................................ 4
3 BACKGROUND INFORMATION .................................................................................................................................... 5
4 REVIEW OF CLAUSE 13.07-1L (INTERFACE USES AND AMENITY) ............................................................................. 5
5 REVIEW OF GUIDELINE ............................................................................................................................................. 6
6 REVIEW OF N&V DISCUSSION REPORT ..................................................................................................................... 7
7 SUBMISSIONS REVIEW ................................................................................................................................................ 7
7.1 EPA Submission ....................................................................................................................................................... 8
7.1.1 EPA Item 4 response – Referencing PPN83 instead of NSW Interim Guideline ...................................................... 11
7.1.2 EPA Item 5 response – Noise Masking .................................................................................................................. 11
7.1.3 EPA Item 6 response – Lmax design levels for patron noise .................................................................................. 11
7.1.4 Item 7 response – Lmax design levels for carpark equipment .................................................................................. 12
7.1.5 Item 8 response – Reference VCAT cases and references for terms acoustic rating curves (NR, RC, NC) .......... 12
8 CLAUSE 13.07-1L INTERACTION WITH EXISTING PLANNING PROVISIONS ..................................................... 12
8.1 Clause 13.05-1S (Noise Abatement) ...................................................................................................................... 12
8.2 13.07-3S (Live Music) and Clause 53.06 (Live Music Entertainment Venues) and Planning Practice Note 81 ................................ ................................................................................................................................. 13
8.3 Planning Practice Note 83 ........................................................................................................................................... 15
9 CONCLUSION AND SUMMARY OF OPINIONS ........................................................................................................... 15

DOCUMENT REFERENCES

TABLES
Table 1 EPA Submission and SLR Response Summary ................................................................................................. 9

APPENDICES
Appendix A Curriculum Vitae’s – Jim Antonopoulos and Dianne Williams
Appendix B Memorandum to Expert dated 1 September 2021 and supplied information
Appendix C Noise and Vibration Considerations Discussion Report, 20 September 2021
1  Witness Statement

1. My name is Jim Antonopoulos and I am an acoustical consultant employed by SLR Consulting Australia Pty Ltd at Level 11, 176 Wellington Parade, East Melbourne, Victoria. I have previously worked for Graeme E. Harding & Associates (1996 to 2003) and Heggies Pty Ltd (2003 to 2010). SLR Consulting Australia Pty Ltd acquired Heggies Pty Ltd in 2010.

2. My academic qualifications include a Bachelor of Applied Science (Applied Physics) and I am a Member of the Australian Acoustical Society (M.A.A.S). I am employed as a Principal Grade consultant and am the manager of the SLR Victorian acoustics and vibration division. A short CV is provided in Appendix A.

3. I have worked as an acoustical consultant in Melbourne since 1996. My areas of expertise include building and environmental acoustics. I have provided numerous acoustical assessments for development applications for residential, commercial and industrial developments throughout Melbourne and Victoria, provided planning related review services to Councils, and have been involved in numerous VCAT and planning panel hearings over the last 10 years.

4. My colleague Dianne Williams, also a Principal Grade consultant (CV also attached in Appendix A) and I have provided ongoing acoustic review and advice services to City of Yarra since 2011. This has included review of over 500 development application acoustic reports addressing a large range of acoustic issues. This work has formed the basis of our advice provided to Council in relation to this Amendment. Dianne Williams also peer reviewed this Statement of evidence as required under our company quality assurance system, but the views expressed in this Statement are my own.

5. I have received and prepared this Statement with reference to the Planning Panels Victoria G:7 Guide to the Expert Evidence.

6. I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

2  Instructions and Supplied Information

7. My instructions and supplied information were provided by Maddocks in their Memorandum to Expert dated 1 September 2021 as attached (Appendix B). Specific instructions are provided in Item 32.2.3 of the Memorandum and reproduced below.

32.2.3 express your opinion on the Amendment insofar as it relates to your area of expertise. In particular, we ask that you consider:

- the Noise and Vibration Considerations Discussion Report, SLR Consulting Pty Ltd (October 2019) and Guidelines – Managing noise impacts in urban development, October 2019’;
- the issues raised in the EPA’s submission and any other submissions relevant to your expertise;
- the exhibited policy documentation in the Amendment, as well as the ‘Panel version’ documentation, on noise and vibration considerations within the City of Yarra;
- the relevant requirements of Planning Practice Note 81 (Live music and entertainment noise) and Planning Practice Note 83 (Assessing external noise impacts for apartments);
- how proposed clause 13.07-1L interacts with existing planning provisions regarding noise, including clause 13.05-1S (Noise Abatement), 13.07-3S (Live Music) and Clause 53.06 (Live Music Entertainment Venues).
3 Background Information

8. Council has prepared Amendment C269yara (Amendment) to the Yarra Planning Scheme (Scheme), which proposes to update Council’s local policies.

9. The exhibited Amendment incorporates new noise related provisions in Clause 13.07-1L (Interfaces and amenity) and a new proposed Incorporated Document, ‘Guidelines – Managing noise impacts in urban development, October 2019’ (the Guideline) that supports clause 13.07-1L. I note the panel version was attached to the Council report which is an updated version issued 31 May 2021.

10. The Guideline document was developed by SLR in consultation with City of Yarra, and was informed by the Noise and Vibration Considerations Discussion Report, SLR Consulting Pty Ltd (N&V Discussion Report). The N&V Discussion Report is proposed to be a background document to the planning scheme and was the original technical review and basis document that fed into development of the Guideline. Both of these documents were developed by myself and my colleague Dianne Williams.

11. The preparation of these guidance documents was undertaken to assist with planning decisions, and to address a gap in noise policy and guidelines relating to the varied noise amenity aspects associated with development applications in City of Yarra, as well as to supplement existing noise policy and guidelines. The Guideline and Clause 13.07-1L also provide consistency and transparency in relation to noise assessments in the City of Yarra, which was identified as a significant issue of concern through the 10 years of review work I have undertaken on behalf of City of Yarra.

4 Review of Clause 13.07-1L (Interface uses and amenity)

12. The Panel Version of this document incorporates our last iteration of recommended amendments as provided to Council. Changes include those relating to the EPA submission responses (Refer to Section 7.1 of this Statement of Evidence), updates in referenced legislation, and other general clarifications and wording improvements.

13. Clause 13.07-1L effectively provides more prescriptive design targets and approaches to address sensitive land use development near existing commercial uses. Importantly, the Clause also triggers consideration of noise related aspects that are not captured by other planning scheme policies, in particular:

   • A trigger is provided for any residential zone development within 30 m of a commercial or industrial zone.
   
   • A trigger is provided for hotels, not just live music venues.
   
   • A trigger is provided for any development that is within 50 m of a major road as nominated in the Main Roads and Train Lines Map.

14. I note that there are potentially some limitations in the policy in terms of it triggering every single type of unique and rare situation. For example, if a business such as a café or bar happen to be within a residential or mixed use zone already, and a new residential development is proposed near it, then it is possible the Clause wont be triggered. However, the café or bar, if already surrounded by residential zoning / dwellings, would have had to be meeting its existing noise obligations (ie music and mechanical plant equipment required to be considered under the mandatory Noise Protocols) in any case to those receivers. As such, this is an unlikely situation, but nonetheless could occur.
15. Overall, the Clause represents a highly favourable implementation to the planning scheme that provides protection of both existing businesses and new sensitive uses.

5 Review of Guideline

16. The Panel Version of this document incorporates our last iteration of recommended amendments as provided to Council. Changes include:

- Additional item addressing EPAs submission. re. building siting, reference to ‘maximum recommended noise levels’, and further clarification on masking system implementation. Refer to Section 7.1 of this Statement of Evidence.
- Updates in referenced new noise legislation and other guidelines,
- General clarifications and wording improvements
- Updates to the Terminology and Bibliography.

17. I have identified some minor typographical errors that require amendment. I also recommend some further wording updates, refer to below excerpts from Terminology section with my recommended amendments:

- Typographical error - ‘nosie’ to be replaced with ‘noise’

<table>
<thead>
<tr>
<th>$L_{eq}$ (dBA)</th>
<th>The ‘A’ weighted equivalent noise level, measured in decibels. $L_{eq}$ is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.</th>
</tr>
</thead>
</table>

- Replace:

<table>
<thead>
<tr>
<th>Noise rating curve, NR, NC or RC</th>
<th>Single number evaluation of the background noise level in a space. The NR, NC and RC overall level is typically around 5 to 6 dB below the ‘A’ weighted noise level. There are small differences in the three curves however they can be used interchangeably.</th>
</tr>
</thead>
</table>

with:

<table>
<thead>
<tr>
<th>Noise Curves - NR, NC, RC</th>
<th>A set of reference curves used to rate the noise level taking into account the frequency content of the noise across the audible spectrum. The curves allow for the determination of a single number rating. The most commonly used curves are the Noise Rating (NR), Noise Criterion (NC), and Room Criteria (RC).</th>
</tr>
</thead>
</table>

I consider the above a better description and explanation of the Noise Curves.

- Replace:

<table>
<thead>
<tr>
<th>Octave-band</th>
<th>Division of the frequency range used for the purpose of acoustic design and noise assessment, allowing for a more targeted control of sound as it varies in frequency. A frequency band where the highest frequency is twice the lowest frequency.</th>
</tr>
</thead>
</table>

with:

<table>
<thead>
<tr>
<th>Octave-band</th>
<th>An octave is the interval between one frequency and its double or its half. Octave-band analysis is implemented in sound level measurements and assessment to allow for division of the audible frequency range into smaller defined regions or ‘bands’. This provides for a more detailed and targeted analysis that is more effective in capturing the spectral characteristics of a sound source than the overall A-weighted level.</th>
</tr>
</thead>
</table>
I consider the above a better general explanation and expands on the previous description which was derived from the Noise Protocol.

18. The Guideline forms critical guidance and supplementary information for Clause 13.07-1L and is specifically referenced within that Clause.

6 Review of N&V Discussion Report

19. I note that the exhibited N&V Discussion Report is that from October 2019. This does not implement the recommended updates nominated by EPA that have been implemented in the Guideline Panel Version. As per the EPA recommendation and the Council Officer Report (3 August 2021, Resolution 1 (k)), I have updated the N&V Discussion Report and attach it to this Statement as Appendix C (20 September 2021 version). This version now incorporates the appropriate updates and changes associated with the new EPA legislation and general wording clarifications, as per the Guideline updates.

20. As previously discussed, this was the original basis document for the Guideline and it presents technical discussion and reasoning of the approach and noise criteria adopted for the Guidelines and Clause 13.07-1L.

7 Submissions Review

21. I have reviewed the list and summary of submissions as provided in my instructions. From review of those I note some general comments on noise and amenity from some submissions. Comments are typically general, but include:

- Traffic noise impacts (submitters 40, 206)
- General activity noise (submitter 13)
- General impact of development in terms of noise (submitters 181, 188, 221)
- Construction noise (submitter 369)

22. The above are not specific comments on the Guidelines and Clause 13.07-1L documents that I have prepared, but I note that the provisions in these documents will address some of these aspects in terms of improved amenity to new residential developments (eg requiring assessment and control of traffic noise and other commercial noise impacts to new developments).

23. I note submitter 323 provides a recommendation as follows:

“Noise policy – cross-reference to the new patron noise standards”

A similar comment is provided by submitter 18 as follows:

“The section on Noise would benefit, in particular, from cross referencing with the new patron noise standards in the Interfaces and Amenity policy above.”

The above comments relate to the 13.07-1L ‘Licenced Premises’ Clause. This is not specifically an issue raised in relation to the content of the noise provisions in the policy but in relation to the structure and referencing of the clauses. I do note however that the 13.07-1L ‘Interfaces and amenity’ policy would be triggered by any new application for a non-residential development so the patron noise considerations would be required to be considered; this would appear to likely address the submitter concerns.

I also note that 13.07-1L ‘Licenced Premises’ would require update to reference the new EPA noise legislation.
7.1 EPA Submission

24. The most relevant submission is that from EPA, entitled *Planning Scheme Amendment C269y Policy Transition* (Reference 5011052), dated 20 November 2020.

25. The EPA submission indicates general support of the objectives and intent of Clause 13.07-1L and the Guidelines but also provides some specific comments on several issues. The Panel Versions of the Guideline and Clause 13.07-1L have adopted EPA recommendations in most instances, and these are summarised below. My comment on other issues raised are also summarised below.
Table 1  EPA Submission and SLR Response Summary

<table>
<thead>
<tr>
<th>Item</th>
<th>EPA Comment</th>
<th>SLR Comment / Status</th>
</tr>
</thead>
</table>
| 1    | The Guideline: managing noise impacts of residential development (the Guideline) reflects the current environment protection legislation, including SEPP N-1 and SEPP N-2. As discussed above, with the changes expected in 2021 to the Environment Protection Act 1970, it is recommended that Council review and revise their guideline when the new legislation and related changes to the Victorian Planning Provisions (VPPs) take effect. | Panel Versions of both the Guideline and Clause 13.07-1L incorporate changes to reflect new legislation, including:  
- Specific reference to the Noise Protocol and deletion of past references to SEPP’s.  
- Changes to ‘indoor adjustment’ from 15 dB to 20 dB as per the Noise Protocol  
EPA recommendation adopted                                                                                                                                       |
| 2    | EPA have some concerns with the wording ‘design targets’, which may be understood as levels to design up to, while the intent should be to minimise impacts as far as reasonably practicable. Wording such as “highest [guideline] levels” may be more appropriate. | Wording in the Panel Version of the Guidelines has been amended. ‘Design targets’ generally replaced with “recommended maximum noise levels’ throughout.  
EPA recommendation adopted                                                                                                                                        |
| 3    | Where referring to new residential development near existing noise sources, the guidelines could be more explicit in promoting building siting and internal lay-out as the primary considerations to minimise or otherwise reduce noise exposure. The provision of enhanced acoustic insulation of the façade, which do not protect private outdoor spaces and can limit the opportunities for natural ventilation, should then be considered to address residual impacts after building orientation and internal lay-out have been optimised. | The Panel Version of the Guidelines has been amended and includes a specific Section 2 Building siting and internal layout which states:  
*Noise sensitive rooms (in particular bedrooms) and private open spaces are to be located away from existing and potential noise sources wherever practical. Siting and orientation to minimise noise exposure of these spaces will reduce requirements for onerous façade upgrade treatments and will result in an improved level of acoustic amenity generally.*  
EPA recommendation adopted                                                                                                                                  |
| 4    | Section 2.2 refers to the NSW Development Near Rail Corridors and Busy Roads – Interim Guideline for guidance for measuring and reporting road and rail noise. Instead, the guideline should refer to the planning practice note PPN83 Assessing external noise impacts for apartments for measuring and reporting of road and rail noise when applying clause 58 of the VPP. | The Guideline does not exclude the use of PPN83, the reference to the NSW literature was for additional guidance.  
SLR recommend maintaining reference due to the useful guidance provided in the NSW literature and potential for Clause 58 of the VPP and PPN83 to not capture or allow assessment of all sources intended to be assessed in the Guideline.  
Refer to further discussion below in Section 7.1.1                                                                                                               |
<table>
<thead>
<tr>
<th>Item</th>
<th>EPA Comment</th>
<th>SLR Comment / Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Section 5.4 the Guideline also refers to the use of a masking system. It is not clear that a masking system based on L_{eq} will mask low frequency bass music noise. Further, while noise masking can provide suitable outcomes, it is not appropriate in all situations.</td>
<td>SLR recommend sound masking is maintained as a potential means of noise management. The Panel version Guideline Section 5.4 provides some further comment and clarification on implementation of the masking systems. Refer to further discussion below in Section 7.1.2</td>
</tr>
<tr>
<td>6</td>
<td>In Section 6.1.4 the Guideline for patron noise from new outdoor areas of 55 dBA L_{max} in bedrooms with windows open is high and is unlikely to support sleep with the windows open. While this could be considered equivalent to the guidelines for new residential development near existing outdoor patron areas (Section 6.2.4), existing residences may not have adequate ventilation when windows are closed. Adopting this guideline would mean that new outdoor patron areas could cause online sleep disruption for existing residences living nearby.</td>
<td>The L_{max} assessment is supplementary to the L_{eq} assessment and considered a reasonable target for City of Yarra given the context of the area. The expected internal level is 45 dBA with windows closed which aligns with commonly used sleep disturbance criteria. Refer to further discussion below in Section 7.1.3</td>
</tr>
<tr>
<td>7</td>
<td>Section 7.1.2 applies to noise from apartment developments to existing dwellings from car park equipment. This section should specify where this noise is to be assessed. Further, the guideline design level of 65 dBA from the operation of car park equipment is considered too high and like patron noise described above, it is equivalent to a level of 55 dBA L_{max} inside bedrooms with the window open and is likely to cause sleep disturbance. Such equipment should be designed to be quiet as possible.</td>
<td>The L_{max} assessment is supplementary to the mandatory Noise Protocol based assessment and considered a reasonable target for City of Yarra given the context of the area. The expected internal level is 45 dBA with windows closed which aligns with typical sleep disturbance targets. Refer to further discussion below in Section 7.1.4</td>
</tr>
<tr>
<td>8</td>
<td>It is recommended that the bibliography include the relevant VCAT cases and references for terms acoustic rating curves (NR, RC, NC).</td>
<td>Terminology with reference terms has been included in the Panel Version of the Guidelines. Documenting specific past VCAT decisions has not been undertaken. Refer to further discussion below in Section 7.1.5</td>
</tr>
</tbody>
</table>
7.1.1 EPA Item 4 response – Referencing PPN83 instead of NSW Interim Guideline

26. The reference to the NSW Interim Guidelines was provided as a general comment under Section 2.2 of the Guideline. It does not form part of the Guideline recommendations or directly translate to Clause 13.07-1L, and was intended for additional guidance only. The reason for this is because Appendix D of the NSW Interim Guideline document provides direct practical guidance on the measurement and reporting of noise. Although PPN83 also provides guidance in the section ‘Technical requirements for measuring noise’ (page 3 of PPN83) it also refers the reader to 5 Australian Standards for guidance on specific issues and as such, is not a complete or self-contained reference. The Guideline reference to the NSW Interim Guidelines does not exclude the use of PPN83.

7.1.2 EPA Item 5 response – Noise Masking

27. I acknowledge that there are challenges around the use of noise masking to achieve compliance with music noise limits indoors. However, I am of the opinion that noise masking should be included as a possible tool for achieving compliance with music noise limits indoors in the City of Yarra for the following reasons:

- Masking is listed as a tool for managing music noise at residences in Planning Practice Noise 81 (PPN 81).
- The construction requirements for achieving the base noise limits under the music noise legislation can be impractical and have negative amenity impacts in other, non-acoustic areas. Where high levels of music are present options are typically limited to -
  - Designing apartments so that there are no windows or lightweight walls or roof exposed to high levels of music noise. This can represent significant architectural constraints on a site.
  - Including winter-gardens (enclosed glazed spaces) to all balconies and windows – this is effectively very large cavity double glazing (e.g. 10 mm glass, 1.2 m airgap, 12 mm glass).
  - Large parts of City of Yarra include busy commercial strips with entertainment venues. However, the internal limits for music noise (the base noise limits) are the same for new dwellings in these areas as they would be for any dwelling anywhere in Victoria, including quiet urban and rural areas.

28. I note the Panel Version of the Guideline includes some further updates to item 5.4, in particular:

   Note: Noise masking must not be relied on as the sole measure to address music noise exceedances. It can, however, be implemented on a project in conjunction with other reasonable and practical façade upgrades.

   This may provide some improved clarity on the reliance and approach to be taken.

29. In summary, in the context of City of Yarra where the developments in question are typically mid to high density and in close proximity to commercial and entertainment areas, it is considered appropriate to utilise all options for managing music noise. Including noise masking as an option for achieving compliance with internal music noise limits also has the potential to drive improvements in domestic noise masking technology.

7.1.3 EPA Item 6 response – Lmax design levels for patron noise

30. The design level of 55 dBA in bedrooms at night is for an open window situation and translates to an external level of 65 dBA (assuming 10 dBA difference inside to outside).
31. This design level has been used in the vast majority of assessments typically used by most consultants in Melbourne when an Lmax assessment is undertaken.

32. It should be noted that:
   - Partially open windows provide in the order of 15 dB noise reduction from outside to inside. This would mean internal levels would be more like 50 dBA with a window open, while allowing for some ventilation.
   - With windows closed, noise can be expected to be further reduced to internal Lmax levels of 40 to 45 dBA.

33. The above internal Lmax levels are considered acceptable in an inner city environment, where there are typically other sources of instantaneous Lmax noise, including vehicle passbys, pedestrians on the street and the like. The ‘closed window’ Lmax target levels fall within the more stringent sleep disturbance criteria nominated by the WHO and historic sleep disturbance studies.

34. It is also of consideration that the Lmax assessment is a secondary assessment, with patron noise also being assessed to an Leq target. The Leq target is in most instances the more difficult to meet, and compliance with the Leq target typically results in Lmax levels lower than 65 dBA externally.

7.1.4 Item 7 response – Lmax design levels for carpark equipment

35. In terms of the appropriateness of the Lmax targets, refer to discussion above in Section 7.1.3 for patron noise.

36. I also note that carpark equipment is still assessable to the Noise Protocols and the Lmax is a supplementary assessment. The assessment location is stated to be outside an openable window, which would be a bedroom used for sleep.

7.1.5 Item 8 response – Reference VCAT cases and references for terms acoustic rating curves (NR, RC, NC)


38. Specific VCAT findings / decisions have not been included. Findings can and have varied and do not take into consideration further new guidance and direction provided in more recent planning guidelines (eg. PPN83).

8 Clause 13.07-1L interaction with existing planning provisions

39. My instructions request I consider how Clause 13.07-1L will interact with existing planning provisions 13.05-1S (Noise Abatement), 13.07-3S (Live Music) and Clause 53.06 (Live Music Entertainment Venues) and Planning Practice Notes 81 and 83. These are considered below.

8.1 Clause 13.05-1S (Noise Abatement)

40. This Clause is reproduced below:
41. Clause 13.07-1L provides direct guidance on appropriate amenity design levels to sensitive land uses (residential developments). The clause supports the Objective, seeking to reduce and control noise impacts on sensitive land uses in noisy environments.

42. Clause 13.07-1L provides specific guidance that allows for development of building design to address various existing environmental noise sources, including plant and equipment noise, transportation noise, music and patron noise. This supports the Strategy of 13.05-1S.

8.2 13.07-3S (Live Music) and Clause 53.06 (Live Music Entertainment Venues) and Planning Practice Note 81

43. Clause 13.07-3S is reproduced below.
44. Clause 13.07-1L supports the Objectives of 13.07-3S given it is intended and designed to identify and address interface conflicts from development of residential uses near venues.

45. The Purpose and Application sections of Clause 53.06 are reproduced below. This Clause also includes further detailed guidance on noise assessment for Live Music Venues and is also reflected and adopted in the new noise legislation and Noise Protocol (Publication 1826.4). I further note that Planning Practice Note 81 is a guidance document that supports Clause 53.06.
46. In relation to Clause 53.06, Clause 13.07-1L does not replicate or provide an alternative approach. Clause 13.07-1L, through its reference to the Guideline, provides further details on protecting amenity impacts from all music venues (not just live music). This is an important aspect of 13.07-1L and the Guideline that are seeking to address a critical issue over the last 10 years in City of Yarra. The Guideline also provides further guidance and more prescriptive approaches on the issue of sound masking in particular, which is mentioned but not described in any detail in PPN81. I see Clause 13.07-1L and the Guideline as supplementary to Clause 53.06 and PPN81, and provides more protection of all music generating venues, not just live venues.

8.3 Planning Practice Note 83

47. Planning Practice Note 83 (PPN83) is the guidance document supporting Clause 55.07-6 and Clause 58.04-3 (Noise impacts) for apartment developments. Prescriptive internal design targets for apartment developments are presented in Standard D16 of these Clauses that consider noise from road, rail and industrial/commercial noise sources.

48. Both the Guidelines and our N&V Discussion Report provide significant discussion on these Clauses and PPN83. While these Clauses and PPN83 seek to provide protection from road, rail and industrial noise, there are a number of factors that are not accounted for with the critical aspects being:

- Triggering of road traffic noise assessments. Under Clauses 55.07-6 and 58.04-3 / PPN83, an assessment is only triggered for roads with more than 40,000 vehicles per day. This is a significant constraint and would result in many busy roads in Yarra not being considered. Clause 13.07-1L and the Guideline trigger traffic noise assessments for all roads that have the potential to cause noise impacts.

- The assessment periods in Clauses 55.07-6 and 58.04-3 / PPN83 do not address the 6 am to 7 am period as a ‘night period’. This does not align with Victorian EPA definitions of day and night periods. Clause 13.07-1L and the Guideline include further assessment criteria for this period for traffic noise.

- Clauses 55.07-6 and 58.04-3 / PPN83 provide internal noise assessment targets for industrial noise that are not aligned with Victorian EPA assessment approaches (both in terms of assessment intervals and setting of targets). Clause 13.07-1L and the Guideline provide more stringent amenity targets that are better aligned with EPA noise regulations, and would minimise the risk of nuisance to occupants in noise sensitive buildings near commercial and industrial operations.

In summary, the Clause 13.07-1L and the Guidelines provide additional and generally higher amenity targets to protect exiting businesses and commercial uses from encroaching residential development.

9 Conclusion and Summary of Opinions

49. I have summarised and clarified above particular aspects of the proposed Amendment C269yara (Amendment) to the Yarra Planning Scheme (Scheme). This Statement is not a full representation of all technical aspects and basis of the Amendment — that information is presented in both the Guidelines — Managing noise impacts in urban development, October 2019 and the Noise and Vibration Considerations Discussion Report, SLR Consulting Pty Ltd (October 2019).

50. The proposed Amendment and supporting documents are a response and reflection of the vast range of acoustic issues that have been the subject of consideration by City of Yarra over the last 10+ years in numerous development applications. The guidance provided will allow for greater consistency and clarification of expected minimum acoustic amenity for buildings, and will allow for design responses to more directly achieve the required amenity outcomes.
51. The Amendment will supplement existing planning scheme provisions and EPA noise legislation, and will reduce the risk of noise amenity impacts to sensitive uses within City of Yarra.

52. I am in full support of the Amendment and it represents and reflects my advice to City of Yarra.
APPENDIX A

Short CV’s – Jim Antonopoulos and Dianne Williams
JIM ANTONOPOULOS
PRINCIPAL PROJECT CONSULTANT
Acoustics, Asia Pacific

QUALIFICATIONS

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Year</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAppSc (Physics)</td>
<td>1996</td>
<td>Royal Melbourne Institute of Technology (RMIT)</td>
</tr>
</tbody>
</table>

EXPERTISE

- Architectural and Building Acoustics
- Mechanical Services Noise Control Design
- Environmental Noise Assessment
- Sound Power Measurement, Sound and Impact Insulation Testing FFT Analysis
- Expert Testimony at VCAT
- Noise Modelling (SoundPLAN)
- Vibration Measurement and Assessment

Jim Antonopoulos has over 20 years’ experience in acoustical consulting and has specialist expertise in building and architectural acoustics, and in environmental noise prediction and assessment. He has managed major residential, educational and commercial development projects and also undertaken environmental assessments for large industrial, transportation, mining and infrastructure projects.

Jim regularly provides expert evidence at VCAT and Panel Hearings on a range of acoustical matters, including major rezoning and planning applications, and also provides regular advice to councils.

Jim has also provided acoustic training to council planners and engineering students at Victoria University of Technology.

PROJECTS

Transportation

- Deer Park Bypass Noise Barrier Design
- Calder Highway, Eastern Freeway Extension and South Eastern Freeway Noise Monitoring
- Mitcham Frankston Motorway Tender Design
- Brisbane North-South Bypass Tunnel EIS
- Craigieburn Station noise and vibration assessment
- Beenleigh Gold Coast Rail Corridor upgrade
# CURRICULUM VITAE

## JIM ANTONOPOULOS

### Building
- St Kilda Station Redevelopment (Residential and Commercial Development)
- Highpoint Residential Development
- Central Equity residential development projects throughout Melbourne (20+ developments)
- Tarrawarra Museum of Art
- IBM office fitout (Southbank)
- Gordon Institute Recording Studio (Geelong)
- Suncorp residential development (Brisbane)

### Mechanical Services Design
- David Jones Foodstore (St Kilda Station Redevelopment)
- Central Equity Projects
- Myer Chadstone
- Draeger office and warehouse development

### Industrial
- SPI Powernet Terminal Stations (Richmond, Geelong, Redcliffs)
- Cranbourne Terminal Station
- Peerless Laverton and Braybrook Plants
- South Pacific Tyres (Campbellfield)
- Yallourn Power Station
- Stramit facility relocation study (Dandenong) Moorabool Water Treatment Plant

### Planning and Legal Representation
- Newport Village Blackshaws Road - Rezoning, Master Planning, Planning Panel and VCAT testimony
- Ballarat and Mortlake Saleyards – Environmental Noise Impact Assessment, Planning Panel presentation (Ballarat)
- City of Yarra – Expert Peer Review services and VCAT representation on various planning related matters (2012-current)
- Kensington K1 and K2 – Rezoning noise assessment
- Donald Mineral Sands Mining Project – Preparation of Noise Impact Assessment for EIS
- Black Rock Biosolids Treatment Facility – Environmental Noise Impact Assessment
- Mt Atkinson & Tarneit Planes PSP Planning Scheme Amendment C162 – Planning Panel Hearing Acoustic Evidence
- 56-74 Station St Nunawading, Whitehorse Planning Scheme Amendment C155 = Planning Panel Hearing Acoustic Evidence

### MEMBERSHIPS
- Member of Australian Acoustical Society MAAS
DIANNE WILLIAMS
PRINCIPAL
Acoustics, Melbourne

QUALIFICATIONS

<table>
<thead>
<tr>
<th>Degree</th>
<th>Year</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA(Hons)</td>
<td>1985</td>
<td>LaTrobe University</td>
</tr>
<tr>
<td>BAppSc</td>
<td>1998</td>
<td>RMIT</td>
</tr>
<tr>
<td>MEngSc(N&amp;V)</td>
<td>2007</td>
<td>UNSW</td>
</tr>
</tbody>
</table>

EXPERTISE

- Architectural and building acoustics
- Mechanical services noise control design
- Environmental noise assessment
- Testing, product development and industry advice
- Sound power measurement, sound and impact insulation testing FFT analysis
- Expert testimony
- Noise modelling (SoundPLAN)
- Review work

Dianne has worked as an acoustical consultant in Melbourne since 1999. Her areas of expertise include: mechanical services noise control; environmental noise and vibration measurement and assessments; architectural and building acoustics; 3-D computer environmental noise modelling and office fit-out design. Dianne has provided expert evidence at the Victorian Civil and Administrative Tribunal and before other statutory bodies, on planning, environmental and building acoustic matters. She also provides peer review services to a number of local government bodies.

PROJECTS

Commercial buildings and fitouts

- MYOB, Glen Waverly
- Department of Planning, Level 5, 1 Spring Street Melbourne
- Mental Health Tribunal, Mental Health Complaints Commissioner and Health Services Commissioner fitout, Levels 26 and 30, 570 Bourke Street, Melbourne
- Taxi Services Commission, LG level, 1 Spring Street, Melbourne
- 4 National Circuit, Canberra
- United Energy and Multinet Gas, Pinewood
- Bacchus Marsh Council Offices and Community Hub

Industrial and Mining

- Eastern Treatment Plant Tertiary Upgrade
- Akzo Nobel, Sunshine North
- Mount Shamrock Quarry, Pakenham
- Rosebery Mine, Rosebery Tasmania
| **Transportation**                      | Ballarat Airport  
|                                        | Henty Grain Freight Facility  
|                                        | Tottenham Yard Upgrade  
|                                        | Regional Rail Link, West Werribee  
|                                        | Tottenham Yard Upgrade  
|                                        | Olympic Highway Diversion, Henty NSW |
| **Planning and VCAT**                  | Collingwood Arts Precinct  
|                                        | Lakeside Oval Upgrade  
|                                        | 601 Victoria Street Apartment Development  
|                                        | Richmond Club Hotel  
|                                        | 11-13 Narelle Drive, Aspendale Gardens |
| **Residential buildings**              | Zen Apartments, Melbourne  
|                                        | The Artist Apartments, Fitzroy |
| **Review work**                        | Yarra City Council  
|                                        | Banyule City Council  
|                                        | Maroondah City Council |
| **Testing, product development and industry advice** | Dunlop Flooring  
|                                        | Dulux Acratex  
|                                        | Multiboard  
|                                        | Pyropanel  
|                                        | EzyLite  
|                                        | James Hardie  
|                                        | Boral  
|                                        | Lee Brothers Fencing |
| **High performance acoustic spaces**   | CBMI Recording Studio, Box Hill  
|                                        | MadCat Sound, Oakleigh  
|                                        | Flagstaff Studios, Bank Street, South Melbourne |
| **MEMBERSHIPS**                        | Fellow of the Australian Acoustical Society (FAAS) |
| **AWARDS**                             | Vivian Taylor Award |
APPENDIX B

Instructions and supplied information
INTRODUCTION

1. We act for Yarra City Council (Council).

2. Council has prepared Amendment C269yara (Amendment) to the Yarra Planning Scheme (Scheme), which proposes to update Council’s local policies in the Scheme by replacing the Municipal Strategic Statement (MSS) at clause 21 and local planning policies at clause 22 of the Scheme with a Municipal Planning Strategy (MPS) and local policies within the Planning Policy Framework (PPF), consistent with the structure introduced by Amendment VC148.

3. More specifically, the Amendment:

   3.1 introduces a new MPS at clause 02.00 of the Scheme;
   3.2 introduces new and revised local policy content into the PPF at clauses 11-19;
   3.3 replaces the schedule to clause 52.06 (Gaming) with a new schedule that includes content previously contained in clause 22.15 (Gaming) of the LPPF;
   3.4 replaces the schedule to clause 72.04 (Documents Incorporated in this Planning Scheme) with a new schedule that:
      3.4.1 includes an updated version of the City of Yarra Heritage Review Appendix 8 (the name of which will be changed through Amendment C245yara to Database of Heritage Significant Areas); and
      3.4.2 includes a new document called ‘Guidelines – Managing noise impacts in urban development, October 2019’ that supports clause 13.07-1L (Interfaces and amenity);
   3.5 introduces a new schedule to clause 72.08 (Background Documents) comprising a list of background documents that informed the revised content in the MPS and PPF; and
   3.6 introduces a new Schedule to clause 74.01 (Application of Zones, Overlays and Provisions) to provide an explanation of the relationship between the municipal objectives and strategies, and the Scheme controls on the use and development of land.
The Amendment was informed by the following key documents which will be included in the new schedule to clause 72.08 (Background Documents):

4.1 *Activity Centres – Roles and Boundaries, City of Yarra* (October 2019);

4.2 *Landmarks and Views Assessment, Ethos Urban* (October 2019);

4.3 *Noise and Vibration Considerations Report, SLR Consulting Pty Ltd* (October 2019);

4.4 *Residential Heritage Policy Review, Context* (31 October 2019); and

4.5 *Yarra Industrial Heritage Policy, GJM Heritage* (15 October 2019).

The following strategies which have been previously adopted by Council will also be included in the new Schedule to clause 72.08 (Background Documents):

5.1 *Yarra Housing Strategy, City of Yarra* (September 2018);

5.2 *Yarra Spatial Economic and Employment Strategy, SGS Economics* (2018); and

5.3 *Building for Diversity – Yarra’s Social and Affordable Housing Strategy, Yarra City Council* (November 2019); and

On 26 November 2019, Council resolved to request authorisation from the Minister for Planning to prepare and exhibit the Amendment.

The Amendment was exhibited between 20 August 2020 and 4 December 2020. In response to exhibition, Council received 429 submissions (including late submissions), including a submission from the Environment Protection Authority Victoria (EPA) (Submitter #15).

The EPA’s submission makes a number of comments about clause 13.07-1L (Interfaces and amenity) and the operation of the proposed Incorporated Document, ‘Guidelines – Managing noise impacts in urban development, October 2019’ that supports clause 13.07-1L.

Council considered the submissions and resolved to refer all submissions to a Planning Panel on 3 August 2021. Further to this, your brief contains copies of:

9.1 the Council Meeting Agenda, Minutes and all attachments;

9.2 a report to the CEO referring further late submissions to the Panel; and

9.3 the ‘Panel version’ of the Amendment material, which will form the basis of Council’s position to the Panel (Panel version).

Please note that the Panel version includes marked up copies of the relevant exhibited policies (including clause 13.07-1L), consistent with Council’s resolution of 3 August 2021 (ie. as recommended by Council officers in Attachment 5 to the Council Meeting Agenda with further changes, consistent with Council’s resolution of 4 August 2021).
A detailed explanation of the proposed Clause 13.07-1L (Interfaces and Amenity) including:

(a) strategic justification, response to the issues raised in submissions including from the Environment Protection Authority, and the rationale for any proposed changes to the policy and proposed incorporated document

(b) assessment against the relevant requirements of PPN81 Live music and entertainment noise and PPN83 Assessing external noise impacts for apartments

(c) an explanation of how it interacts with existing planning provisions regarding noise, including Clause 13.05-1S (Noise abatement), 13.07-3S (Live Music) and Clause 53.06 (Live Music Entertainment Venues)

12. Having regard to the above, you are kindly instructed to:

12.1 review the exhibited Amendment documentation, as well as the ‘Panel version’ documentation, and particularly the marked up clause 13.07-1L;

12.2 prepare a statement of evidence and appear as an expert witness at the Panel Hearing, listed to commence on 5 October 2021. Your expert witness report should:

12.2.1 be prepared in accordance with the Guide to Expert Evidence;

12.2.2 not refer to any submitter, other than the EPA, by name (please use submission numbers);

12.2.3 express your opinion on the Amendment insofar as it relates to your area of expertise. In particular, we ask that you consider:

- the Noise and Vibration Considerations Discussion Report, SLR Consulting Pty Ltd (October 2019) and Guidelines – Managing noise impacts in urban development, October 2019;

- the issues raised in the EPA’s submission and any other submissions relevant to your expertise;

- the exhibited policy documentation in the Amendment, as well as the ‘Panel version’ documentation, on noise and vibration considerations within the City of Yarra;

- the relevant requirements of Planning Practice Note 81 (Live music and entertainment noise) and Planning Practice Note 83 (Assessing external noise impacts for apartments);

- how proposed clause 13.07-1L interacts with existing planning provisions regarding noise, including clause 13.05-1S (Noise Abatement), 13.07-3S (Live Music) and Clause 53.06 (Live Music Entertainment Venues).

12.2.4 otherwise express your opinion on the noise and vibrations question raised by the Panel’s direction, as relevant to your expertise.

---

1 Please note that changes are proposed to exhibited Clause 13.07-1L (Interfaces and Amenity) in Attachment 5 to the Council Meeting Report of 3 August 2021, and to the Guidelines – Managing noise impacts in urban development, June 2021 in Attachment 6 to the Council Meeting Report of 3 August 2021.
AMENDMENT C269yara

Summary

13. The purpose of the Amendment is two-fold in that it:

13.1 revises and updates local planning policies in the Scheme by implementing the findings of the Yarra Planning Scheme Review undertaken in 2014 (2014 Planning Scheme Review) and other key pieces of strategic work undertaken since that time; and

13.2 facilitates the integration of Council’s local policy into the PPF as required by Amendment VC148 and the Victorian Government’s Smart Planning Program which seeks to simplify and modernise Victoria’s planning policy, and to make planning schemes more efficient, accessible and transparent.

14. These elements of the Amendment are considered in further detail in the Officer’s Report of 26 November 2019 seeking authorisation from the Minister to prepare the Amendment and in the Explanatory Report for the Amendment, included in your brief at tabs 10 and 2 respectively.

15. For the purposes of this brief, we have only detailed those parts of the Amendment relevant to the noise and acoustic issues, and to your instructions.

Noise and acoustic issues

16. Most relevantly, proposed clause 13.01-7L has been prepared to address shortcomings identified in the 2014 Planning Scheme Review.

17. Clause 13.01-7L translates the existing clause 22.01 (Discretionary uses in the Residential 1 Zone) and clause 22.05 (Interface uses policy) of the Scheme into one document, and provides additional policy based on the strategic work undertaken in regards to this issue. A copy of clause 13.01-7L as exhibited is included in your brief.

18. As noted above, the Amendment also introduces a new incorporated document entitled ‘Guidelines – Managing noise impacts in urban development, October 2019’ (Noise Guidelines) as:

18.1 a reference document at clause 13.01-7L; and

18.2 an Incorporated Document in the Schedule to clause 72.04.

19. The Noise Guidelines seek to provide additional guidance for making planning decisions when considering noise impacts from urban development.

20. In particular, under clause 13.01-7L it is policy that the Noise Guidelines be considered as relevant when assessing applications for non-residential use and development and certain types of accommodation.

21. The Noise Guidelines deal with noise (and in some cases vibration) impacts from:

21.1 road traffic;

21.2 rail and trams;

21.3 commercial and industrial plant and equipment;

21.4 music;
21.5 patrons; and

21.6 apartments.

22. The Noise Guidelines were prepared based on the strategic work undertaken in the report prepared by your office, *Noise and Vibration Considerations Discussion Report, SLR Consulting Pty Ltd* (October 2019) which is proposed to be introduced as a Background Document in the schedule to clause 72.08 (Background Documents).

23. A copy of the Noise Guidelines and the *Noise and Vibration Considerations Discussion Report* as exhibited are included in your brief at tabs 7 and 8 respectively.

**Exhibition and submissions**

24. In response to exhibition, Council received 429 submissions.

25. Relevantly, a submission was lodged by the EPA.

26. The EPA’s submission makes a number of comments about the operation of the proposed Noise Guidelines, including that:

26.1 regard should be had to the *Environment Protection Act 2017* (as amended by the *Environment Protection (Amendment) Act* 2018) which will replace the *Environment Protection Act 1970* on 1 July 2021. Changes will also be made to guidelines and State Environment Protection Policies (*SEPPs*) including SEPP-N1 (*Control of Noise from Commerce, Industry and Trade*) and SEPP-N2 (*State Environment Protection Policy (Control of Music Noise from Public Premises)*);

26.2 the EPA has concern with the wording ‘design targets’ and suggests that proposed wording such as ‘highest [guideline] level’ may be more appropriate; and

26.3 the Noise Guidelines could be more explicit in promoting building siting and internal lay-out as the primary considerations to minimise or otherwise reduce noise exposure.

27. The EPA submission also makes the following comments in relation to the Noise Guidelines:

27.1 section 2.2 should refer to the Planning Practice Note PPN83 *Assessing external noise impacts for apartments*, rather than the *NSW Development Near Rail Corridors and Busy Roads – Interim Guideline* for guidance for measuring and reporting road and rail noise;

27.2 it is not clear that a masking system based on L90 (as referenced at Section 5.4) will mask low frequency bass music noise;

27.3 in Section 6.1.4 the guideline for patron noise from new outdoor areas of 55 dBA Lmax in bedrooms with windows open is high and is unlikely to support sleep with the windows open. Adopting this guideline would mean that new outdoor patron areas could cause sleep disruption for existing residences living nearby;

27.4 Section 7.1.2 should specify where the noise is to be assessed and the guideline design level of 65 dBA from the operation of car park equipment is considered too high; and

27.1 the bibliography should include the relevant VCAT cases and references for terms acoustic rating curves (NR, RC, NC).

28. A copy of the EPA’s submission is included in the briefing materials.
29. The Council officer response to submissions (including the EPA’s submission (Submission #15) can be found in Attachment 3 to the Council Meeting Agenda of 3 August 2021.

30. You will note having regard to the Council Meeting Agenda of 3 August 2021, that a number of revisions to the exhibited Amendment and background material are proposed to be taken to the Panel for the purposes of Council’s position at the hearing in October (relevantly including those relating to noise). This includes the changes shown in Attachment 5 to the Council Meeting Agenda, in response to submissions, as well the further changes identified in paragraph 1(e) as resolved by Council on 3 August 2021 (collectively shown in the “Panel version” of the material).

Planning Panel

31. As noted above, the Directions Hearing was held on 27 August 2021 and the Panel Hearing confirmed as commencing on 5 October 2021. Council’s case is schedule to occur from 4 - 12 October. We are likely to require you towards the end of the week of 5 October 2021. We will confirm that as soon as possible.

YOUR INSTRUCTIONS

32. You are kindly instructed to:

32.1 review the exhibited Amendment documentation, as well as the ‘Panel version’ documentation, and particularly the marked up clause 13.07-1L;

32.2 prepare a statement of evidence and appear as an expert witness at the Panel Hearing, listed to commence on 5 October 2021. Your expert witness report should:

32.2.1 be prepared in accordance with the Guide to Expert Evidence;

32.2.2 not refer to any submitter, other than the EPA, by name (please use submission numbers);

32.2.3 express your opinion on the Amendment insofar as it relates to your area of expertise. In particular, we ask that you consider:

- the Noise and Vibration Considerations Discussion Report, SLR Consulting Pty Ltd (October 2019) and Guidelines – Managing noise impacts in urban development, October 2019;
- the issues raised in the EPA’s submission and any other submissions relevant to your expertise;
- the exhibited policy documentation in the Amendment, as well as the ‘Panel version’ documentation², on noise and vibration considerations within the City of Yarra;
- the relevant requirements of Planning Practice Note 81 (Live music and entertainment noise) and Planning Practice Note 83 (Assessing external noise impacts for apartments);
- how proposed clause 13.07-1L interacts with existing planning provisions regarding noise, including clause 13.05-1S (Noise Abatement), 13.07-3S (Live Music) and Clause 53.06 (Live Music Entertainment Venues).

² Please note that changes are proposed to exhibited Clause 13.07-1L (Interfaces and Amenity) in Attachment 5 to the Council Meeting Report of 3 August 2021, and to the Guidelines – Managing noise impacts in urban development, June 2021 in Attachment 6 to the Council Meeting Report of 3 August 2021.
32.2.4 otherwise express your opinion on the noise and vibrations question raised by the Panel’s direction, as relevant to your expertise.

Fee proposal

33. Before starting any work, we kindly request you provide us with an electronic copy of your fee proposal for the above scope of works, for Council’s consideration.

34. Please also provide a schedule of fees and rates in the event that you are required to perform additional tasks in the future relating to this matter.

35. If your fee proposal is approved, all accounts for this matter should be referred directly to Maddocks (marked to the attention of Briana Eastaugh/Kristin Richardson).

Maintaining client legal privilege and confidentiality

36. The advice you are being asked to provide may be relied upon for any future hearing or litigation and for the purposes of providing legal advice to our client. You must as far as legally possible treat all communications relating to the scope of works as confidential and subject to client legal privilege.

Other matters

37. Please find enclosed an indexed brief of documents. Kindly let us know if you require any further information or documentation.

38. Please contact Briana Eastaugh on 9258 3372 or Kristin Richardson on 9258 3558 should you have any queries.

Dated: 1 September 2021

----------------------------------------
Maddocks
# Index

<table>
<thead>
<tr>
<th>TAB NO</th>
<th>DESCRIPTION OF DOCUMENT</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RELEVANT AMENDMENT C269yara DOCUMENTATION (as exhibited)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Notice of Preparation of an Amendment</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Explanatory Report</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Instruction Sheet</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Clause 13.07-1L – Interfaces and amenity</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Schedule to clause 72.04 – Documents incorporated in this Planning Scheme</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Schedule to clause 72.08 – Background Documents</td>
<td></td>
</tr>
<tr>
<td><strong>STRATEGIC DOCUMENTS &amp; BACKGROUND REPORTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td><em>Noise and Vibration Considerations Discussion Report, SLR Consulting Pty Ltd</em> (31 October 2019)</td>
<td>31 October 2019</td>
</tr>
<tr>
<td><strong>SUBMISSIONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>EPA’s submission to Amendment C269yara</td>
<td>20 November 2020</td>
</tr>
<tr>
<td>10.</td>
<td>Other relevant Submissions</td>
<td></td>
</tr>
<tr>
<td><strong>COUNCIL REPORTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Ordinary Meeting of Council – Minutes and Agenda (containing Officer Report)</td>
<td>26 November 2019</td>
</tr>
<tr>
<td>12.</td>
<td>Ordinary Meeting of Council – Minutes and Agenda (containing Officer Report)</td>
<td>3 August 2021</td>
</tr>
<tr>
<td>13.</td>
<td>Report to the CEO referring further late submissions to the Panel</td>
<td></td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>‘Panel preferred’ version of relevant Amendment documentation, including changes proposed by Council Officers in response to submissions and having regard to Council resolution of 3 August 2021</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td><em>Planning Practice Note 81 (Live music and entertainment noise)</em></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td><em>Planning Practice Note 83 (Assessing external noise impacts for apartments)</em></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td><em>Planning Panels Guide to Expert Evidence</em></td>
<td></td>
</tr>
</tbody>
</table>
NOISE AND VIBRATION CONSIDERATIONS
DISCUSSION REPORT

City of Yarra

Prepared for:
City of Yarra
PO BOX 168
Richmond VIC 3121
PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
Level 11, 176 Wellington Parade
East Melbourne VIC 3002 Australia

T: +61 3 9249 9400
E: melbourne@slrconsulting.com  www.slrconsulting.com

BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with City of Yarra (the Client). 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 the Client. 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 SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

<table>
<thead>
<tr>
<th>Reference</th>
<th>Date</th>
<th>Prepared</th>
<th>Checked</th>
<th>Authorised</th>
</tr>
</thead>
<tbody>
<tr>
<td>640.10090.99990 Planning Review -R01-v0.5</td>
<td>20 September 2021</td>
<td>Dianne Williams</td>
<td>Jim Antonopoulos</td>
<td>Jim Antonopoulos</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CONTENTS

1 INTRODUCTION .................................................................................................................................. 6
1 ROAD TRAFFIC NOISE .................................................................................................................... 1
1.1 Background Information.................................................................................................................. 1
1.2 Mandatory Requirements................................................................................................................ 1
1.3 Other Potentially Useful Standards and Guidelines ................................................................. 1
1.4 SLR Recommendations ................................................................................................................ 2
2 RAIL NOISE ...................................................................................................................................... 3
2.1 Background Information.................................................................................................................. 3
2.2 Mandatory Requirements................................................................................................................ 4
2.3 Other Potentially Useful Standards and Guidelines ................................................................. 4
2.4 SLR Recommendations ................................................................................................................ 4
3 RAIL VIBRATION – TRAINS AND TRAMS ....................................................................................... 5
3.1 Background Information.................................................................................................................. 5
3.2 Other Potentially Useful Standards and Guidelines ................................................................. 5
3.3 SLR Summary and Recommendations ....................................................................................... 6
4 COMMERCIAL AND INDUSTRIAL PLANT AND EQUIPMENT NOISE ........................................... 8
4.1 Background Information.................................................................................................................. 8
4.2 Mandatory Requirements................................................................................................................ 8
4.3 Other Potentially Useful Standards and Guidelines ................................................................. 9
4.4 SLR Recommendations ................................................................................................................ 9
5 MUSIC NOISE .................................................................................................................................... 10
5.1 Background Information................................................................................................................ 10
5.1.1 Music Noise Compliance Indoors ............................................................................................. 10
5.1.2 What Needs to be Done ............................................................................................................ 11
5.2 Mandatory Requirements.............................................................................................................. 11
5.3 Other Potentially Useful Standards and Guidelines ................................................................. 11
5.4 SLR Recommendations ................................................................................................................ 11
6 PATRON NOISE – NEW OUTDOOR PATRON AREAS ................................................................. 13
6.1 Background .................................................................................................................................. 13
6.1.1 Noise Targets........................................................................................................................... 13
6.1.2 Predicting Patron Noise Levels .............................................................................................. 14
6.2 Mandatory Requirements.............................................................................................................. 14
6.3 Other Potentially Useful Standards and Guidelines ................................................................. 14
CONTENTS

6.4 SLR Recommendations ...................................................................................................... 14

7 PATRON NOISE – NEW RESIDENTIAL DEVELOPMENT NEAR EXISTING OUTDOOR
PATRON AREAS .................................................................................................................. 15

7.1 Background ....................................................................................................................... 15

7.1.1 Noise Targets .................................................................................................................. 15

7.1.2 Predicting Patron Noise Levels ....................................................................................... 15

7.2 Mandatory Requirements ................................................................................................. 15

7.3 Other Potentially Useful Standards and Guidelines ............................................................. 16

7.4 SLR Recommendations .................................................................................................... 16

8 NOISE FROM APARTMENT DEVELOPMENTS TO EXISTING DWELLINGS .......... 17

8.1 Noise Protocol, Part I Assessable Noise ............................................................................. 17

8.2 Sleep Disturbance .............................................................................................................. 17

8.3 Apartment Common Areas ............................................................................................... 17

9 NOISE FROM APARTMENT COMMON AREAS TO APARTMENTS WITHIN THE
DEVELOPMENT ...................................................................................................................... 18

9.1 Communal outdoor areas, including decks, outdoor pools, gardens, carpark entrance etc. ......................................................................................................................... 18

9.2 Communal enclosed areas, including cinemas, gyms, indoor pools etc. ....................... 18

9.3 Noise transfer between apartments via lightwells .............................................................. 18

9.4 Carpark entrance gates and car stackers ........................................................................... 19

10 AAAC Guideline for Acoustical Star Ratings for Apartments and Townhouses........... 20

10.1 External noise intrusion .................................................................................................... 20

10.2 Internal Noise Intrusion .................................................................................................... 20

10 BIBLIOGRAPHY .................................................................................................................. 22

DOCUMENT REFERENCES

TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>External Noise Intrusion Design Levels (AAAC Star Rating Guide), Lmax levels</td>
<td>20</td>
</tr>
<tr>
<td>Table 2</td>
<td>External Noise Intrusion Design Levels (AAAC Star Rating Guide), Leq day and night levels</td>
<td>20</td>
</tr>
<tr>
<td>Table 3</td>
<td>Internal Noise Intrusion Design Targets (AAAC Star Rating Guide), Lmax day and night levels</td>
<td>20</td>
</tr>
<tr>
<td>Table 4</td>
<td>Internal Noise Intrusion Design Targets (AAAC Star Rating Guide), Leq day and night levels</td>
<td>21</td>
</tr>
</tbody>
</table>
CONTENTS

FIGURES

Figure 1    NSW Interim Guideline Rail Vibration Assessment Zones .............................................. 5
1 Introduction

This report provides a technical discussion and summary of previously provided advice to City of Yarra on planning related noise and vibration issues and forms the basis of the *Guidelines – managing noise impacts in urban development*, *Guidance for planning permit and related decisions under the Yarra Planning Scheme 2021*. 
1 Road Traffic Noise

1.1 Background Information

Road traffic is a significant and major source of noise impact to dwellings on main roads. The issue has been acknowledged and addressed in new Better Apartments Design Standards, 2016. The document provides decibel targets for day and night average road traffic noise levels, and applies to apartment developments on roads carrying more than 40,000 vehicles, or within 300 m from a freeway. The design targets are 40 dBA Leq,16h for all habitable rooms and 35 dBA Leq,8h for bedrooms.

It is of note that the time classifications used in Better Apartments document place the 6 am to 7 am period in the 'day' rather than the 'night' category. This classification is not consistent with those we have been applying to City of Yarra projects, and is not consistent with the classifications usually used in Victoria (e.g. the Vic EPA 'Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues’ (Publication 1826) and the Vic EPA ‘Noise control guidelines’ (Publication 1254)).

In our opinion the Better Apartments document should be modified as follows:

- the 6 am to 7 am period should be included in the 'night' period rather than the 'day' period;
- application of the targets should be extended to all developments affected by road traffic noise (not just those near freeways or on roads carrying more than 40,000 vehicles), and
- the targets should be applied to all residential developments, not just apartments.

1.2 Mandatory Requirements

The Victorian Planning Provisions were amended in March 2017 with Clause 58, Apartment Developments, objectives and Standard D16 which adopted the Better Apartments Design Standards. This introduced the design targets of 40 dBA Leq,16h for living rooms and 35 dBA Leq,8h for bedrooms in developments within 300 m of a freeway on roads carrying more than 40,000 vehicles.

1.3 Other Potentially Useful Standards and Guidelines

AS/NZS2107:2016 Acoustics – Recommended design sound levels and reverberations times for building interiors, provides recommended noise level ranges for dwellings near major and minor roads. This Standard has traditionally been called up in planning permits to address road traffic noise impacts. However the provision in the Standard of a decibel range instead of a specific design target has led to uncertainty with regard to actual design targets (most consultants design to the upper end of the range). Furthermore the assessment methodology is not defined (it is unclear whether traffic noise should be quantified as an average or worst case level, e.g. the loudest hour of traffic noise). In our reviews of acoustic reports for the City of Yarra, and in our own planning noise assessments, we have interpreted the AS/NZS2107 design levels to be as follows: the day and night average noise levels are assessed to the lower end of the AS/NZS2107 range (35 dBA bedrooms and 40 dBA living rooms), and the loudest hour of road traffic noise during the day and night periods are assessed to the upper end of the AS/NZS2107 range (40 dBA bedrooms and 45 dBA living rooms).
The NSW Road Noise Policy, 2011 provides internal targets for road traffic noise of 35 dBA in bedrooms at night and 40 dBA in all habitable rooms during the day period (NSW Road Noise Policy, 2011, C10). These targets are elaborated in the NSW guideline document Development Near Rail Corridors and Busy Roads - Interim Guideline, 2008. The NSW targets are generally consistent with the Better Apartments Design Standards (with the exception that the 6 am to 7 am period is classified as 'night' in the NSW Road Noise Policy – as per our preference and consistent with the time intervals used in the assessment of commercial noise).

Development Near Rail Corridors and Busy Roads - Interim Guideline also provides clear and practical guidance for measuring and reporting. This information is missing from the Victorian policy and guidelines documents for road and rail noise.

1.4 SLR Recommendations

Our office recommends designing to the following levels for road traffic noise:

- 40 dBA Leq,16h to all habitable rooms and 35 dBA Leq,8h in bedrooms, and
- Loudest hour of road traffic noise is not to exceed 45 dBA Leq,1h in habitable rooms from 7 am to 10 pm, and 40 dBA Leq,1h in bedrooms from 10 pm to 7 am the following morning. The basis for the loudest hour targets is AS/NZS2107:2016, with the day and night periods defined in accordance with Victorian EPA legislation and guidelines rather than in accordance with the Better Apartment Design Standards.
- These recommended maximum design noise levels should apply to all residential development where there is a reasonable expectation that traffic noise may impact the land (i.e. not just those formally triggered by Clause 58 of the planning scheme).

Reporting should generally be in accordance with NSW guideline document Development Near Rail Corridors and Busy Roads - Interim Guideline Appendix D – Acoustic Consultant Reports, Methodology for Testing and Compliance Reporting.
2 Rail Noise

2.1 Background Information

The Victorian Government Passenger Rail Infrastructure Noise Policy, 2013 provides screening levels for rail noise. The Policy is a high level document and it is designed for transport bodies and planning authorities. Where existing rail noise exceeds the threshold levels specific consideration of rail noise is required before the project proceeds. However if the threshold levels are not exceeded, rail noise impacts may still need to be considered as a 'secondary matter’. In the context of a proposed residential development, we understand this to mean that the issue of rail noise should be dealt with by the individual developer and local government.

Until recently there was no government guidance about how to assess rail noise impacts on apartment developments. The Clause 58, Apartment Developments, objectives and Standard D16 address both rail and road traffic noise. Standard D16 requires that all apartment developments within 80 m of a passenger line or 135 m of a freight rail line, are designed to internal targets. The design targets to be met are the same as those for road traffic noise: 40 dBA Leq,16h and 35 dBA Leq,8h.

Prior to the release of the Apartment Developments, Standard D16, a common approach has been to assess rail noise to Lmax targets of 60 dBA in living rooms and either 50 or 55 dBA Lmax in bedrooms. These design levels broadly align with:

- The minimum acoustic standard (2-3 star) for external noise intrusion provided in the Association of Australasian Acoustical Consultants (AAAC) Guideline for Apartment and Townhouse Acoustic Ratings (2017)
- Aircraft noise design levels provided in Australian Standard AS 2021:2015 Acoustics – Aircraft noise intrusion – Building siting and construction
- General sleep disturbance criteria provided in the NSW Road Traffic Policy and sleep disturbance studies.

The levels of 60 dBA (living rooms) and 55 dBA (bedrooms) have been accepted at VCAT on some projects, and are cited by acoustical consultants on those grounds.

The use of long term day and night average targets for rail noise, in the Apartment Developments Standard D16 provides a clear standard. There is, however, benefit in also incorporating Lmax criteria for rail noise for the following reasons:

- Leq is primarily a noise descriptor used to quantify steady or quasi-steady state noise. So this is appropriate for sources such as mechanical plant noise, and reasonably applied to traffic noise which has a fairly regular and consistent noise level. Train noise is not as constant / regular as traffic noise. While there are no trains passing by, the occupant experiences little or no noise, yet while the train passes, there is a short term high noise event which can only be quantified via an Lmax descriptor; to clarify, the Lmax is the actual highest level that someone experiences as the train goes past. In contrast, the long term Leq’s are not easily related to the actual objective experience of an occupant when the train passes by.
- Lmax levels are often used to address sleep disturbance.
- On suburban rail corridors where there may only be one line in each direction, relatively infrequent trains and no trains during some of the night period, the Lmax criteria become more important and are likely to drive the assessment. If these targets are not in place it is possible for the Leq targets to be met, and rail noise to exceed sleep disturbance Lmax targets by appreciable amounts.
- Very short term noise events, such as train horns, are not well quantified using long term $L_{eq}$ criteria. It may be of consideration that in the City of Yarra, where all rail lines carry significant numbers of trains, it is less likely that the assessment will be driven by the $L_{\text{max}}$ criteria.

### 2.2 Mandatory Requirements

Clause 58, Apartment Developments, objectives and Standard D16 has been incorporated into the planning scheme.

### 2.3 Other Potentially Useful Standards and Guidelines

The NSW guideline document *Development Near Rail Corridors and Busy Roads - Interim Guideline*, 2008 provides average day and night targets for road and rail noise that are similar to the levels included in Apartment Developments, Standard D16.

### 2.4 SLR Recommendations

Our office recommends designing to the following levels for road traffic noise:

- Clause 58, Apartment Developments, Standard D16 - 40 dBA $L_{\text{eq,16h}}$, and 35 dBA $L_{\text{eq,8h}}$, and
- Train generated $L_{\text{max}}$ levels, including horn noise, should not exceed 60 dBA $L_{\text{max}}$ in living rooms or 55 dBA $L_{\text{max}}$ in bedrooms. $L_{\text{max}}$ levels to be achieved for 95% of train pass-by events (a minimum of 20 trains to be measured).

Reporting should generally be in accordance with NSW guideline document *Development Near Rail Corridors and Busy Roads - Interim Guideline* Appendix D – Acoustic consultant Reports, Methodology for Testing and Compliance Reporting.
3 Rail Vibration – Trains and Trams

3.1 Background Information

In Victoria, there are no guidelines, standards or policies that address transportation vibration impacts.

The only time that vibration assessments are typically undertaken is when a local council perceives there may be a vibration issue and calls up a vibration assessment in a permit condition, or larger scale projects where a Planning Panel or VCAT may require consideration of the issue.

The lack of guidelines and policy leads to enormous variability and inconsistency in addressing vibration in Victoria.

3.2 Other Potentially Useful Standards and Guidelines

NSW has significantly more noise and vibration related planning guidance documents than Victoria does.

Their main planning guideline document relating to new developments is the Development Near Rail Corridors and Busy Roads – Interim Guideline (Department of Planning, State Government of NSW, 2008) and provides some guidance on vibration assessment methodology, including a basic preliminary screening process.

Section 3.5.1 of the NSW Interim Guideline provides a basic buffer distance within which a rail vibration assessment should be undertaken, and is reproduced below:

Figure 1  NSW Interim Guideline Rail Vibration Assessment Zones

So from the above any multi-level development within 60 m of a railway line will require a vibration assessment. This is a particularly large assessment zone. It should be noted that this relates to railway lines, not trams (which we discuss further below).

The NSW Interim Guideline does not provide the technical requirements of the assessment; it instead refers to another NSW Technical Guideline; Assessing Vibration: a technical guideline (DECC 2006).
The Technical Guideline includes all necessary details of the testing / or prediction of vibration and also provides the assessment targets. The assessment methodology and targets are based on British Standard BS6472 which uses the ‘Vibration Dose Value’ measurement (VDV) for intermittent vibration assessment.

The VDV is a long term averaged ‘dose’ based parameter (a little like a long term Leq), and is a relatively new measurement parameter. The equipment used to measure VDV is more advanced than traditional vibration measuring equipment, however, is readily available and most of the larger acoustical consulting firms have the necessary equipment.

The VDV is assessed for the day (16 h) and night (9 hour) with different criteria applicable for each period and for different uses. The following excerpt from the NSW Technical Guideline shows the criteria:

<table>
<thead>
<tr>
<th>Location</th>
<th>Daytime$^1$ Preferred value</th>
<th>Maximum value</th>
<th>Night-time$^1$ Preferred value</th>
<th>Maximum value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical areas$^2$</td>
<td>0.10</td>
<td>0.20</td>
<td>0.10</td>
<td>0.20</td>
</tr>
<tr>
<td>Residences</td>
<td>0.20</td>
<td>0.40</td>
<td>0.13</td>
<td>0.26</td>
</tr>
<tr>
<td>Offices, schools, educational institutions and places of worship</td>
<td>0.40</td>
<td>0.80</td>
<td>0.40</td>
<td>0.80</td>
</tr>
<tr>
<td>Workshops</td>
<td>0.80</td>
<td>1.60</td>
<td>0.80</td>
<td>1.60</td>
</tr>
</tbody>
</table>

1. Daytime is 7:00 am to 10:00 pm and night-time is 10:00 pm to 7:00 am.
2. Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas.

It is normally necessary to monitor for at least a 24 hour period to obtain the VDV value (although it is possible to estimate using shorter measurements). There are also some further complicated calculations necessary when the vibration transmits to the upper floors of a building.

One of the most significant issues relating to the assessment is what to do if the criteria are exceeded. There are really only two options – do not build the building in that location, or design in complicated building vibration isolation into the footings. Both are of major concern to any application / developer.

**Trams**

There is a large gap in knowledge and information on tram vibration impacts, primarily because it has not been considered historically in any assessments.

We have minimal reference data upon which to draw indicative buffer distance triggers, however, from our experience in CoY, it is clear that trams operate in very close proximity to existing and proposed residential / office buildings. In addition, there are many additional variables such as track condition, joint locations in the track, and the speed of pass-bys, that would affect the vibration level in the building.

### 3.3 SLR Summary and Recommendations

Rail and tram vibration presents one of the most difficult challenges in relation to planning assessments.

There are no Victorian policy or guideline documents, and no precedent for assessing vibration (with many historical and new developments constructed in close proximity to rail with no formal assessment undertaken).
The further complicating issue is that if vibration impacts are found to exceed the British Standard BS 6472 criteria at a particular building, it has drastic implications; either further setback is required, or the building is required to be designed with vibration isolation within the footings – potentially making the development financially not-viable.

Overall, due to the lack of formal guidance in any Victorian policy or guideline and the large extent of variables that can affect a vibration assessment, it is not considered appropriate for these issues to be addressed in the Yarra Planning Scheme at this time.
4 Commercial and Industrial Plant and Equipment Noise

Commercial and industrial noise assessable to the Victorian EPA Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues, Part I: Commercial, industrial and trade premises (Noise Protocol, Part I) is considered in the following section.

4.1 Background Information

This is a critical ‘tier one’ planning issue from our perspective. Noise from existing commercial and industrial premises to residential developments needs to be addressed to ensure that:

- The compliance status of the business with the Noise Protocol is not changed by the residential development. If the business is forced into non-compliance by introduction of new noise receptors, it may be required to undertake significant and costly noise control works.

- The amenity of future occupants is addressed.

The main issue with commercial and industrial noise pertains to whether or not the noise should be assessed at the façade of the proposed residential development, or within the residence with windows and doors closed. The latter approach is not strictly in accordance with the Noise Protocol, which requires noise to be assessed externally unless noise enters the dwelling via a non-openable section of the façade (solid wall, fixed window etc.).

Whereas the Noise Protocol requires commercial noise to be assessed externally, the City of Yarra (and other Councils) has often allowed for an internal assessment location. This is seen as a reasonable amenity compromise in an inner city environment, where insisting on an external assessment location would effectively make many sites impossible to develop.

Our approach has been largely consistent with the City of Yarra’s, however we have encouraged the following exceptions / modifications:

- Where commercial noise is to be assessed internally, we recommend that the targets are equal to the lower of:
  - The effective Noise Protocol internal noise limit, taking into consideration any relevant corrections for noise character (corrections for character are required under the Noise Protocol), and
  - The lower end of the original AS/NZS2107:2000 ranges, which was 35 dBA in living rooms and 30 dBA in bedrooms. However, in the 2016 release of AS/NZS2107, the lower end of the allowable ranges for apartments near major roads has increased to 35 dBA in all rooms.

4.2 Mandatory Requirements

Compliance with the Noise Protocol is required; however strictly speaking the onus of compliance is on the business, rather than the developer.

The Better Apartments Design Standards / Clause 58, Apartment Developments, Standard D16 also potentially also applies to commercial noise however the targets provided in this document are generally likely to be less stringent than the Noise Protocol indoor limits.
4.3 Other Potentially Useful Standards and Guidelines

The Association of Australian Acoustical Consultants (AAAC) Guideline for Acoustical Star Ratings for Apartments and Townhouses provides indoor design targets for commercial noise. Assuming ‘three star’ (i.e. average) apartments the targets would be:

- Bedrooms: 35 dBA Leq and 50 dBA Lmax
- Living rooms: 40 dBA Leq and 55 dBA Lmax

4.4 SLR Recommendations

All residential developments should be designed to ensure that existing commercial uses formally comply with the EPA Noise Protocol, Part I external to the development wherever possible. Where it is demonstrated that external compliance cannot practically be achieved, including treatment of the source of noise in consultation with the commercial operator, an internal assessment may be considered. The following internal targets for commercial / industrial noise (windows closed) are to be met if noise is assessed internally:

- Noise Protocol, Part I indoor limits, being the outdoor limits less 20 dB, and
- Not more than 30 dBA Leq in bedrooms and 35 dBA Leq in living rooms, and
- Not more than 45 dBA Lmax in bedrooms and 50 dBA Lmax in living rooms.

In addition to the above, commercial plant and equipment noise levels should not exceed the following levels externally:

- Not more than 10 dBA above any Noise Protocol, Part I period noise limits, outside any openable windows or doors,
  AND
- For balconies and other private open spaces:
  - Not more than 65 dBA during the day
  - Not more than 55 dBA during the evening and night

All assessment methodologies should apply corrections for character in accordance with the Noise Protocol, Part I procedure.

The above is aimed at providing a reduced risk of complaint from new sensitive receivers in the City of Yarra. The above does not represent a formal compliance outcome to the requirements of the Noise Protocol.
5 Music Noise

The following considers the issue of music noise impacts from existing venues to new dwellings only. The issue of music from proposed new venues to existing dwellings is straightforward one, and need not revisited here. Consistent with the Noise Protocol, Part II, all new venues need to comply with external noise limits at existing dwellings.

5.1 Background Information

This is a critical ‘tier one’ planning issue for acoustics, with existing music venues being at risk of non-compliance with the Noise Protocol, Part II due to residential encroachment. Yarra City Council has, in recent times, adopted an ‘Agent of Change’ approach to new dwellings in the vicinity of existing music venues. This approach is both supported and complicated by the planning scheme amendment VC183 28/09/2020 Clause 53.06 Live Music and Entertainment Venues (previously VC120 4 September 2014 Clause 52.43).

The amendment provides support for the assessment of music to indoor locations. Prior to the amendment, there was no formal recognition that building upgrades to control music noise would protect existing venues from residential encroachment (i.e. upgrades could be adopted, but the assessment location was still formally outdoors).

The issue of music noise impacts to new residential development is complicated by the following

- Clause 53.06 applies to live music venues only. Many existing music venues are not live music venues, and these are explicitly excluded from consideration under Clause 53.06.

- Clause 53.06 only applies to venues within 50 m from a proposed residential development.

The amendment requires new dwellings at which a music noise excess is established, and which cannot be managed in any other way, to be constructed such that noise limits are met indoors. However the means by which compliance is to be achieved in doors has not, in our opinion, been thought through. A brief outline of the issues is provided below.

5.1.1 Music Noise Compliance Indoors

Compliance with the Noise Protocol, Part II is achieved by either designing for a ‘background + margin’ target (as defined in the Policy), or the ‘base noise limits’. The issues are that the ‘background + margin’ target can rarely be reached when a dwelling’s façade is upgraded – the same upgrades that control music noise ingress also work to reduce the ambient noise and effectively lower the noise targets.

By contrast, the ‘base noise limits’ are fixed targets. However they are very low, and can in practice be extremely difficult to achieve. Most high performance acoustic glazing, for example, performs poorly in the region of the acoustic spectrum where music noise generally exceeds the base noise limits the most (i.e. in the 63 Hz and 125 Hz octave bands).

The planning practice note provides options for upgrading a noise sensitive dwelling on page 3 of the May 2016 revision, however the options are inadequate in the context of controlling significant levels of bass music noise.

In practice, to achieve compliance indoors when music levels are 10 dB or more above the external limit, the following methods or combinations of them can be required:

- Design the dwelling so that there are no windows or lightweight walls or roof exposed to high levels of music noise. This can represent significant architectural constraints on a site.
• Include wintergardens to all balconies and windows – this is effectively very large cavity double glazing (e.g. 10 mm glass, 1.2 m airgap, 12 mm glass).

• Incorporate controlled noise masking into the design (relying on air conditioning systems to provide masking is not sufficient as the masking noise provided in this way will vary with the weather). The masking should preferably not be controlled or varied by the user.

5.1.2 What Needs to be Done

In our opinion there is still a lot of work to do before Clause 53.06 is workable.

Review of indoor limits

• Are the base noise limits appropriate for all environments? It may be reasonable to apply higher limits in an inner urban environment and particularly in one that is acknowledged as an entertainment district or on a very busy road.

And specifically with regard to noise making:

• What level of noise masking is acceptable? The masking should not cause occupants discomfort (ideally it should not even be noticed).

• What level of music is acceptable above the noise masking? i.e. should the masking be equal in level to the music, or should the masking be treated as the background noise level, and higher levels of music allowed in accordance with the ‘background +’ targets.

• Could ‘user controlled’ masking systems be used? Clause 53.06 allows user control of the acoustic environment by permitting noise limits to be met in dwellings with openable windows closed. It could be argued that the same use control could be extended to noise masking.

The above questions cannot be simply answered, and should ideally be explored in the context of a wider review.

5.2 Mandatory Requirements

Compliance with the Noise Protocol, Part II is mandatory, however strictly speaking the onus of compliance is on the venue rather than the developer.

Compliance with Clause 53.06 is also mandatory, but only for developments within 50 m of a live music venue.

5.3 Other Potentially Useful Standards and Guidelines

Acoustic rating curves (NR, RC or NC) are provided in acoustic literature for quantifying noise intrusion. The curves define acceptable levels of noise in octave measurement bands, not dissimilar to the Noise Protocol octave band night noise limits.

From recent experience on projects incorporating masking for music noise, use of ‘Noise Criteria’ or NC curves is considered the most appropriate for domestic use.

5.4 SLR Recommendations

We recommend that formal compliance with the Noise Protocol, Part II noise limits is demonstrated, using any of the methods described in Section 5.1.1 of this review. Effectively this means achieving:
- Base noise limits within apartment habitable rooms with doors and windows closed, OR
- The Noise Protocol ‘background + margin’ noise limits with continuous noise masking installed in habitable rooms of all apartments. The masking system should be set to no more than NC20 L₉₀ and the Leq of the masking to no greater than NC20 L₉₀ + 5 dB.
- Where noise masking is used to achieve compliance:
  - The masking system should be designed to enable masking levels in all rooms to be individually controlled.
  - Future occupants are to be informed that compliance with the relevant music noise limits relies on the masking system operating at the pre-determined level.
  - Commissioning testing should be conducted to demonstrate that the masking system meets the above requirements and is deemed acceptable for domestic use by the acoustical consultant.
- Note: Noise masking should not be relied on as the sole measure to address music noise exceedances. If implemented on a project, it should be used in conjunction with other reasonable and practical façade upgrades.
- These indoor targets for music noise should be applied to all existing sources of music, not just live music.
- The requirements should be met at dwellings where any significant music noise impacts are identified, not just due to venues within 50 m of the proposed residential use.
6 Patron Noise – New Outdoor Patron Areas

6.1 Background

The Noise Protocol Parts I and II specifically exclude patron noise, but with the significant increase in outdoor patron area applications, there have been major noise issues associated with this source.

While there are still no mandatory requirements for patron noise, there is general acknowledgement that this source of noise needs to be considered in the context of proposed dwellings near existing outdoor patron areas, and in the context of proposed new outdoor patron areas near existing dwellings. New outdoor patron areas are considered in this section.

6.1.1 Noise Targets

As part of any planning application for an outdoor patron area we expect an assessment of patron noise to ‘Leq’ and Lmax targets. The Leq descriptor quantifies the average level of patron noise over an interval, and is particularly important for outdoor areas that are proposed to accommodate appreciable numbers of people (say more than 10). The Lmax targets are useful for quantifying impacts from smaller outdoor areas, where the steady state noise emissions may be low, or variable, and the most intrusive impacts are due to isolated loud voices.

The following noise criteria are typically used in assessments:

- The Noise Protocol, Part I – while the Noise Protocol does not strictly apply to patron noise, it can nevertheless provide a useful assessment methodology and we find it valuable for quantifying patron noise impacts.
- Background + 5 dB – this is a standard basis for quantifying the intrusiveness of noise. It is a useful assessment tool for patron noise although we have found that the day and evening limits can be impractically low.
- Sleep disturbance targets of 55 dBA Lmax in bedrooms with windows open (usually assessed as 65 dBA Lmax externally, outside openable windows).
- Marshall Day in-house targets for patron noise. MDA have developed patron noise targets based on background noise levels plus a variable margin, being:
  - Background + 10 dB during the day and evening period (including weekends)
  - Background + 5 dB at night (after 10 pm)

The MDA approach is generally supported however the following is noted:

- The evening noise target of ‘background + 10 dB’ can be too high in some circumstances where there is little other ambient noise (for example for dwellings that back onto an outdoor patron area, but are not exposed to general street noise).
- MDA are careful to emphasise that these levels are not ‘noise limits’, and that modelling or predictions that show targets will be exceeded represent a risk of nuisance rather than grounds for stopping a project from going ahead.
- The MDA approach appears to allow for long term averaging of background levels. This can lead to a misrepresentation of the impact during, for example, the last hour of operation of a venue when background levels in an area are at their minimum.
6.1.2 Predicting Patron Noise Levels

Unless the application is for the expansion of an existing outdoor patron area, patron noise levels need to be predicted to the nearest receivers. The prediction involves two steps:

- Quantification of the amount of noise produced in the outdoor area. This should take into consideration both the level of noise in the outdoor area, the size of the outdoor area and the number of patrons. Ideally the overall noise level should be expressed as a sound power level.

- Prediction of acoustic attenuation or losses, between the outdoor patron area and the receiver location due to distance, shielding and the like. For complicated built environments it can be appropriate to use a 3D computer noise modelling program to predict noise to receiver locations.

There is enormous variability in how acoustical consultants predict patron noise and we have been particularly disturbed by the recent use of patron sound power data derived from restaurants and non-drinking venues to beer garden environments. Most patron noise assessment we review are delayed during the review process due to differences in opinion with regard to the amount of noise produced in outdoor patron areas.

6.2 Mandatory Requirements

There are no mandatory requirements for patron noise.

6.3 Other Potentially Useful Standards and Guidelines

None.

6.4 SLR Recommendations

Regarding noise limits, or targets for patron noise, we support the following:

- Noise Protocol, Part I

OR

- Background based assessment of:

  - ‘night’ targets (background + 5 dB)
  - ‘evening’ and ‘day’ targets (background + 10 dB) where they can be demonstrated to be reasonable, and where they align with the Noise Protocol definition of evening (that is including all day Sunday).

- Background levels to be based on the minimum 15 minute to 1 hour interval and conducted during a time that is representative of potential worst case noise impacts (long term averaging of background levels is not appropriate).

AND

- Sleep disturbance targets of 55 dBA Lmax in bedrooms with windows open (65 dBA Lmax externally, outside openable windows).
7 Patron Noise – New Residential Development Near Existing Outdoor Patron Areas

7.1 Background

The issue of existing noise from outdoor patrons areas to new developments should be assessed in any planning application to protect future residents from noise. Due to the fact that there are no mandatory requirements for patron noise, we are generally comfortable with the developer designing to meet appropriate patron noise targets indoors with windows closed. Some consideration should also be given to patron noise to balconies.

7.1.1 Noise Targets

Our approach to date has been to require patron noise to be designed to meet the ‘satisfactory’ levels provided in AS/NZS2107:2000. These were 35 dBA in living rooms and 30 dBA in bedrooms near major roads. The recently reissued version of the Standard proposes higher minimum noise levels in bedrooms (35 dBA). In our opinion these are not appropriate for voice noise and we recommend adoption of the 30 dBA target in bedrooms which also aligns with the WHO recommendations for sleep disturbance during the night (WHO 1996). Patron noise is a very distinctive, potentially annoying and variable noise source. Patron noise levels equal to 35 dBA Leq will include frequent levels of over 40 dBA Lmax, which we believe are unacceptable in sleeping areas.

With regard to acceptable patron noise levels to balconies, this is a complicated issue given that:

- By adopting indoor targets we are effectively accepting high levels of noise externally, and in many cases these will occur on balconies
- It can be difficult to avoid having balconies overlooking the noise source (many apartment developments only have one external façade).
- Unavoidably high levels of noise on balconies can occur in the context of road traffic noise.
- Patron noise levels on balconies above 60-65 dBA Leq would, in our opinion make the outdoor space unusable for most residents
- Options for controlling noise to balconies are limited to:
  - Wintergardens (high level of control but effectively an enclosed space), OR
  - Solid balcony balustrades in combination with sound absorption to the underside of the balcony ceiling (small reduction in noise level to seated position on balcony).

7.1.2 Predicting Patron Noise Levels

Patron noise from existing venues should ideally be measured at a location representative of the most exposed new dwelling. Where this is not practical, for example where a proposed multi-level residential development will overlook an existing outdoor area, it may be necessary to predict patron noise to the new façade. The predictions should, however, still take into consideration the actual patron noise levels at the venue during worst case operating conditions. This may involve monitoring noise over a busy weekend period, with a logger located above the outdoor patron area. In our opinion it is not appropriate to use theoretical patron noise data to predict patron levels from an existing outdoor area.

7.2 Mandatory Requirements

None.
7.3 Other Potentially Useful Standards and Guidelines

The Better Apartments Design Standards, 2016 provides indoor targets of 40 L\text{A}\text{eq},16h and 35 L\text{A}\text{eq},8h. As indicated above, we believe these are too high for patron noise. The long term averaging component (16h and 8h) is also not relevant. To provide for a reasonable level of amenity we would expect patron noise to meet the nominated targets at all times, not just over a long averaged period.

The Noise Protocol effective indoor limits (external noise limit less 20 dB) can be used as indoor targets for patron noise however there is a risk that the resultant limits will be unreasonably high in some instances.

7.4 SLR Recommendations

We recommend that new residential developments exposed to noise from outdoor patron areas be designed to achieve the following internal targets:

- 35 L\text{A}\text{eq},15mins in habitable rooms
- 30 L\text{A}\text{eq},15 mins in bedrooms at night
- 45 dBA, L\text{max} in bedrooms at night
- 65 L\text{A}\text{eq},15 mins to balconies, 1.2 m high

Noise from existing outdoor patron areas should be measured in order to quantify the worst case impacts to the subject site. Where measurements cannot be undertaken at a location representative of the proposed new receptors, they should be made closer to the venue. The measured levels should be adjusted for the size of the outdoor patron area, and for the distance to the development façade.
8 Noise from Apartment Developments to Existing Dwellings

8.1 Noise Protocol, Part I Assessable Noise

Communal mechanical plant, car stackers, carpark entrance gates and the like are required to comply with the Noise Protocol, Part I at existing and proposed dwellings.

In our opinion as much advice as practical should be provided by the consultant at the planning stage, particularly with regard to items that have structural implications for the project, such as carpark entrance doors and car stackers. Effective control of noise and vibration can for example, require full enclosure of the carpark and/or setdowns to accommodate vibration isolation mounts.

Noise from mechanical plant cannot usually be fully addressed during the planning stage because equipment is rarely specified at this time, and equipment location may not be finalised. On larger projects, where an acoustical consultant is retained during the detailed design, it is reasonable for the consultant to state that these issues will be addressed during the detailed design.

On smaller projects, where it is unlikely that a consultant will be retained after the planning phase, we recommend that more guidance be provided for achieving compliance. This could entail providing a maximum overall sound power level for any mechanical plant proposed to be installed on a roof top plant deck, and/or maximum ratings for air conditioning condenser units.

8.2 Sleep Disturbance

Noise from operation of carpark equipment should also be designed to comply with sleep disturbance targets outside openable windows of nearby dwellings. Noise levels should not be in excess of 65 dBA $L_{max}$.

8.3 Apartment Common Areas

There are no mandatory limits for voice noise from apartment common areas such as communal decks, gardens, pools and spas. In our opinion these should be assessed similarly to any other patron noise (see Section 6 of this document).
9 Noise from Apartment Common Areas to Apartments within the Development

Noise to apartments from common areas within and outside the development buildings has the potential to cause nuisance. We consider this a ‘second tier’ planning issue because, theoretically, any issues due to noise within the development can be addressed in the future by the Body Corporate. However, it is preferable to address these items during the planning stage particularly as they can be costly and difficult to rectify post construction.

The following is a summary of the relevant potential impacts. City of Yarra should consider if their planning documents should require assessment of these ‘2nd tier’ issues.

9.1 Communal outdoor areas, including decks, outdoor pools, gardens, carpark entrance etc.

Facade upgrades should be provided to apartments within the development that are potentially impacted by noise from voice and vehicles in communal outdoor areas. From our perspective moderate glazing upgrades, as opposed to a full patron noise assessment, are appropriate in the context of outdoor communal areas. If, after reasonable upgrades, occupants are still annoyed by voice noise, the Body Corporate should manage impacts through restricted access to the communal facilities.

Appropriate moderate upgrades may include, for example, calling up double glazing comprising 10.38 mm thick laminated glass, 12 mm airgap, 6 mm glass to the most affected windows.

9.2 Communal enclosed areas, including cinemas, gyms, indoor pools etc.

The main issue with regard to gyms and pools is vibration and structure-borne noise due to running machines, free weights, and weight machines.

The degree of vibration control appropriate for a development will depend on the size of the gym, the proximity of the closest apartments, and the equipment proposed for use. For small gyms, it may be sufficient to install a 50 mm thick dense rubber matt throughout the gym and to restrict the use of free weights and running machines. For more elaborate gyms a full acoustic floating floor may be required.

9.3 Noise transfer between apartments via lightwells

Noise transfer between apartments that share a lightwell should be addressed in the acoustic report as this issue is not covered under the National Construction Code (NCC).

Noise transfer can be a particular problem in instances where the lightwell is enclosed on all sides, as the ambient noise within the lightwell is low, and sound attenuation within the lightwell is minimal. Sound emanating from one apartment (which may have their windows open) will reflect off the walls and windows of the lightwell, potentially causing nuisance to other occupants.

There are two basic scenarios:

a. Lightwells that contain non-openable windows to habitable rooms, and openable windows to bathrooms / toilets only
b. Lightwells that have openable window from habitable room.
Scenario A is not a major concern, because, provided reasonable well sealed glazing is fitted to all windows of habitable rooms, noise between apartments will typically travel through two widely spaced panes of glass. We recommend that glazing to habitable rooms in this situation be not less than $R_w = 30$ dB (eg. 6 mm thick glass to windows of all habitable rooms onto the lightwell).

Scenario B is the greater concern because the noise generating apartment may have their window open. In that instance, there is only one window separating affected apartments from the noise source. We recommend glazing to habitable rooms be rated not less than $R_w = 38$ dB in this situation (eg. double glazing comprising 10.38 mm thick laminated glass, 12 mm airgap, 6 mm glass).

The above advice will not be optimum for all situations – very large lightwells or light courts, for example, may be less critical because more sound attenuation will take place between apartments. A lesser upgrade would be reasonable in these areas.

9.4 Carpark entrance gates and car stackers

These items are potential sources of airborne noise, structure-borne noise and vibration.

Noise

Carpark entrance gates and carstackers need to comply with the Noise Protocol, Part I effective indoor limits within apartments and should also be designed to achieve appropriate $L_{\text{max}}$ levels indoors for sleep disturbance and general annoyance.

The Noise Protocol assessment should take into consideration typical frequency of use during various times of day and night; the duration of the event, and any relevant corrections for impulse, tonality and intermittency. In our measurements of car stackers we have found that a 5 dB impulsive correction always applies; a 2 dB correction for tonality is often appropriate and intermittency corrections apply to the day and evening periods.

Regarding sleep disturbance, as a minimum, we recommend that the AAAC internal targets for $L_{\text{max}}$ levels in three star apartments are met with windows closed (40 dBA $L_{\text{max}}$ in living rooms and 35 dBA $L_{\text{max}}$ in bedrooms). Lower noise levels should be targeted by the developer if they classify the apartment as moderately high to high quality.

Controls to apartments potentially affected by noise from the carpark typically include glazing upgrades and / or floor ceiling upgrades (particularly for lightweight/non-masonry floor construction).

Structure-borne Sound and Vibration

Carpark entrance gates and carstackers should be vibration isolated to ensure that the noise targets are met in potentially affected apartments.
10 AAAC Guideline for Acoustical Star Ratings for Apartments and Townhouses

SLR have often advised on the use of the AAAC Acoustic Star Rating design targets because these address many sources of noise in apartments that are not always captured or assessable under existing guidelines, standards and policies.

The AAAC recommended indoor targets for internal and external noise, and for discrete events (quantified using the ‘Lmax’ acoustical descriptor) and steady state noise are provided in the sections below. We have generally advised targeting for not less than 3 stars in City of Yarra reports. If a development is advertised as moderately high to high quality, a higher star rating should be targeted by the developer.

These targets are a useful fall-back for many sources of noise, however we do not recommend using them for:

- Noise from existing outdoor patron areas - the Guideline would result in targets of 35 dBA Leq in bedrooms and 40 dBA Leq in living rooms, which is too high for patron noise.

10.1 External noise intrusion

Examples of external Lmax sources of noise include: individual truck pass-bys, crashing and banging due to deliveries or rubbish collection.

Table 1  External Noise Intrusion Design Levels (AAAC Star Rating Guide), Lmax levels

<table>
<thead>
<tr>
<th>External noise intrusion</th>
<th>2 star</th>
<th>3 Star</th>
<th>4 Star</th>
<th>5 Star</th>
<th>6 Star</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrooms</td>
<td>50</td>
<td>50</td>
<td>45</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>Other habitable rooms</td>
<td>55</td>
<td>55</td>
<td>50</td>
<td>45</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 2  External Noise Intrusion Design Levels (AAAC Star Rating Guide), Leq day and night levels

<table>
<thead>
<tr>
<th>External noise intrusion</th>
<th>2 star</th>
<th>3 Star</th>
<th>4 Star</th>
<th>5 Star</th>
<th>6 Star</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrooms</td>
<td>36</td>
<td>35</td>
<td>32</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>Other habitable rooms</td>
<td>41</td>
<td>40</td>
<td>35</td>
<td>30</td>
<td>27</td>
</tr>
</tbody>
</table>

10.2 Internal Noise Intrusion

Examples of internal Lmax sources of noise include: mechanical plant and equipment serving the building or commercial tenancies and hydraulic noise.

Table 3  Internal Noise Intrusion Design Targets (AAAC Star Rating Guide), Lmax day and night levels

<table>
<thead>
<tr>
<th>Internal noise intrusion</th>
<th>2 star</th>
<th>3 Star</th>
<th>4 Star</th>
<th>5 Star</th>
<th>6 Star</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrooms</td>
<td>45</td>
<td>40</td>
<td>35</td>
<td>30</td>
<td>27</td>
</tr>
</tbody>
</table>
Examples of internal Leq sources of noise include: mechanical plant and equipment serving the building or commercial tenancies and hydraulic noise.

A decibel penalty should be added to the measured noise level where the source is deemed to include annoying characteristics. Penalties are typically equal to +2 dB for just audible characteristics, and +5 dB for clearly audible characteristics.

**Table 4  Internal Noise Intrusion Design Targets (AAAC Star Rating Guide), Leq day and night levels**

<table>
<thead>
<tr>
<th>Internal noise intrusion</th>
<th>2 star</th>
<th>3 Star</th>
<th>4 Star</th>
<th>5 Star</th>
<th>6 Star</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrooms</td>
<td>36</td>
<td>35</td>
<td>32</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td>Other habitable rooms</td>
<td>41</td>
<td>40</td>
<td>35</td>
<td>30</td>
<td>27</td>
</tr>
</tbody>
</table>
10 Bibliography


AS/NZS2107:2000 Acoustics – Recommended design sound levels and reverberations times for building interiors

AS/NZS2107:2016 Acoustics – Recommended design sound levels and reverberations times for building interiors

Guideline for Apartment and Townhouse Acoustic Rating, 2010, Prepared by the Association of Australian Acoustical Consultants (AAAC)

City of Yarra Planning Scheme: Clause 52.43 – Live Music and Entertainment Noise

Live Music and Entertainment Noise, Victorian Government, Department of Environment, Land, Water and Planning (DELWP), Planning Practice Note 81, May 2016

Live Music and Entertainment Noise, Victorian Government, Department of Environment, Land, Water and Planning (DELWP), Planning Practice Note 81, September 2015

EPA Victoria Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues, Publication 1826, (Noise Protocol)

EPA Victoria Environment Protection Regulations 2021

Yarra Planning Scheme, updated 14/05/2021
ASIA PACIFIC OFFICES

BRISBANE
Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

SYDNEY
2 Lincoln Street
Lane Cove NSW 2066
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

AUCKLAND
68 Beach Road
Auckland 1010
New Zealand
T: +64 27 441 7849

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

MELBOURNE
Suite 2, 2 Domville Avenue
Hawthorn VIC 3122
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

TOWNSVILLE
Level 1, 514 Sturt Street
Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

Nelson
6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628

DARWIN
Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

TOWNSVILLE SOUTH
12 Cannan Street
Townsville South QLD 4810
Australia
T: +61 7 4772 6500

GOLD COAST
Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

PERTH
Ground Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

WOLLONGONG
Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 404 939 922
ASIA PACIFIC OFFICES

ADELAIDE
60 Halifax Street
Adelaide SA 5000
Australia
T: +61 431 516 449

BRISBANE
Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

DARWIN
Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

GOLD COAST
Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

MELBOURNE
Level 11, 176 Wellington Parade
East Melbourne VIC 3002
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

NEWCASTLE CBD
Suite 2B, 125 Bull Street
Newcastle West NSW 2302
Australia
T: +61 2 4940 0442

PERTH
Grd Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

SYDNEY
Tenancy 202 Submarine School
Sub Base Platypus
120 High Street
North Sydney NSW 2060
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

WOLLONGONG
Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 2 4249 1000

TOWNSVILLE
12 Cannan Street
South Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

AUCKLAND
Level 4, 12 O’Connell Street
Auckland 1010
New Zealand
T: 0800 757 695

NELSON
6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628

WELLINGTON
12A Waterfool Quay
Wellington 6011
New Zealand
T: +64 2181 7186

SINGAPORE
39b Craig Road
Singapore 089677
T: +65 6822 2203