Paradigm 42

Brisbane
Canberra

Noise Management Plan for DA

Yarralumla Brickworks Precinct 3

On Behalf of

Doma

14 September 2023

ABN 39 169 211 312

T: 0437 405 365
E: asubkey@paradigm42.com.au

Rev No.	Author	Approved	Description	Date
A	Alan Subkey		Internal Draft	10/09/2023
0	Alan Subkey	Alan Subkey	Issued	14/09/2023
1				
2				
3				

Contents

1 Background

Paradigm 42 has been engaged by Doma to prepare a noise management plan for the site Precinct 3 of the Yarralumla Brickworks development. This site is located on the southern side of the Brickworks development, north of Dunrossil Drive.

For this report we have:

1 Established noise emissions from the proposed commercial premises to the north of this precinct;;

2 Established noise emissions for plant to adjacent neighbours;

3 Established the criteria for noise intrusion into the development;

4 Shown how the criteria will be met;

5 Made general recommendations to assist in compliance.

1.1 References

1. Multi Unit Housing Development Code, *Territory Plan*, ACT Government (*MUHDC*);
2. Yarralumla Precinct Map and Code, accessed 13 September 2023;
3. 'Noise Standards in the ACT', accessed 9 March 2021
4. Australian/New Zealand Standard AS 2107-2000 Acoustics – Recommended design sound levels and reverberation times for building interiors (AS 2107);
5. Environmental Protection Regulation 2005, version effective 24 February 2016, (EPR);
6. Guidelines for the preparation of Noise Management Plans for development applications, Environment Protection Authority, February 2014, (Guide for NMP);
7. *Noise Measurement Manual*, Environment Protection Authority, ACT, September 2009
8. Smith, Peters and Owen, *Acoustics and Noise Control*, Second Edition, Edinburgh, 1996;
9. Bies D.A., and Hanson C.H., *Engineering Noise Control, Theory and Practice*, Third Edition, 2003, Spon Press, NY, especially p. 342, formula (8.16);
10. Drawings from Cumulus Studio, Dated 07/08/23, as below.

Drawing Number	Revision	Title
J20776- DA02	DA04	Site Plan
J20776- DA03	DA04	Plan - Basement
J20776- DA04	DA04	Plan - Ground
J20776- DA05	DA04	Plan – Level 01
J20776- DA06	DA04	Plan – Level 02
J20776- DA07	DA04	Plan – Level 03
J20776- DA08	DA04	Plan – Roof
J20776- DA25	DA04	Nth + Sth Elevations
J20776- DA26	DA04	East + West Elevations

1.2 Personnel Qualifications

This report was prepared by Alan Subkey MAAS. Alan has been a full member of the Australian Acoustical Society since April 2005. He has practised acoustics in the ACT since January 2005. A fuller CV is available on request.

1.3 Disclaimer

This report has been prepared for Development Application only. It should not be used for Building Approval or Compliance/Certification. No responsibility will be accepted beyond DA. If this report is used past DA the information in this report should be reviewed by the consultant providing certification and the responsibility will lie with them.

Note also that once new drawings are issued, this report will be obsolete as it is based on the referenced drawings and only the referenced drawings. As the DA drawings will not be used 'For Construction' this report should not be used for construction.

The only part of this report that will not become obsolete are the criteria as established in Section 3, below.

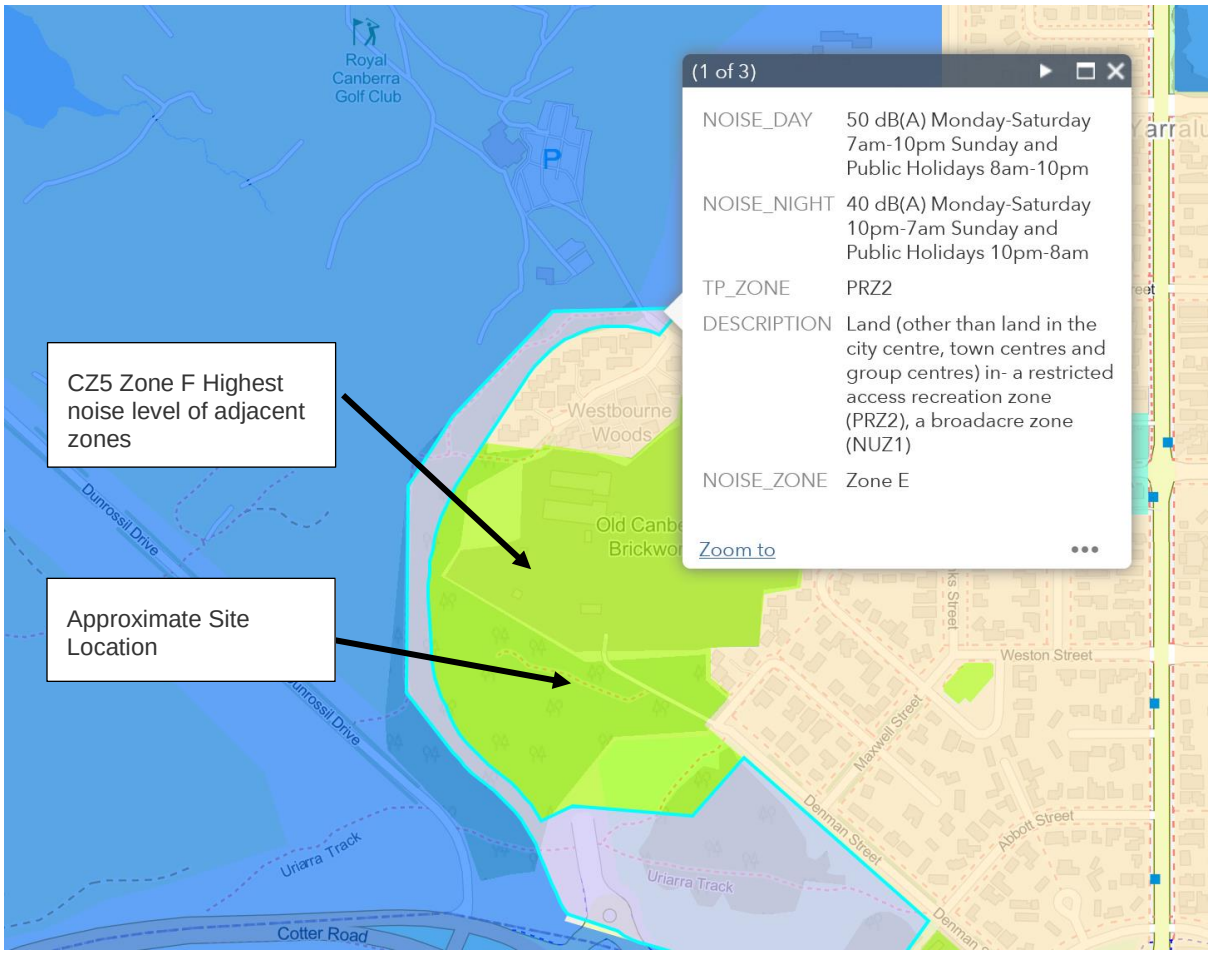
2 Site Description

This development is Shown below,

Figure 1.

Figure 1: Yarralumla Brickworks Development showing location of Precinct 3. Source Cumulus Studio

Figure 2: Site Location from 'Noise Standards in the ACT', inc noise zones accessed 13 September 2023



Note that this is not a precise location, but only shows the relative location of noise zones. If precise location is required, reference to the surveyors' report should be made.

2.1 Noise Sources

Noise sources to be addressed here are:

1. Plant noise from internal sources as well as adjacent buildings. This may include carpark exhausts, air-conditioning condensers, etc;
2. Noise from the commercial units from the adjacent Heritage Core which is being developed as a commercial enterprise.

2.2 Affected Receivers

The affected receivers are shown in Figure 2 with Zoning, Noise Zones and Noise Zone Levels.

3 NOISE ASSESSMENT CRITERIA

3.1 Multi Unit Housing Development Code (MUHDC)

The MUHDC states that if a block has one of the following:

1. identified in a precinct code as being potentially affected by noise from external sources;
2. adjacent to a road carrying or forecast to carry traffic volumes greater than 12,000 vehicles per day;
3. located in a commercial zone;
4. adjacent to a commercial or industrial zone;
   dwellings will be constructed to comply with relevant sections of:
   a. AS/NZS 2107:2000 - Acoustics –Recommended design sound levels and reverberation times for building interiors (the relevant satisfactory recommended interior design sound level). [This is now superseded by AS/NZS 2107:2016] and
   b. AS/NZS 3671 - Acoustics – Road Traffic *Noise Intrusion Building Siting and Design*.

   For other than road traffic noise, the noise level immediately adjacent to the dwelling is assumed to be the relevant noise zone standard specified in the ACT Environment Protection Regulation 2005.

MUHDC R 67 page 29.

This development is subject to item 4, above.

3.2 AS 2107

The internal noise limits are the recommended design sound levels from Australian/New Zealand Standard *AS 2107-2000 Acoustics – Recommended design sound levels and reverberation times for building interiors* (*AS 2107*) and the relevant noise levels for apartments are presented in Table 1.

As the site is subject to traffic noise 'Houses and apartments near major roads' noise levels are applicable. This standard (2107:2000) has been superseded, and the current one (2107:2016) classifies this site location as 'Houses and apartments in inner city areas or entertainment districts or near major roads'.

Table 1: Design Sound Levels From AS 2107:2000 Table 1

Type of occupancy/activity	**Recommended design sound level, L_{Aeq}, dB(A)**	
	Satisfactory	**Maximum**
7 RESIDENTIAL BUILDINGS (see Note 7 and Clause 5.2)		
Houses and apartments near major roads—		
Living areas	35	45
Sleeping areas	30	40
Work areas	35	45

AS 2107 recommends that assessment in a space should be conducted during the times of use. Therefore, living areas should be assessed in the day time (07:00 to 22:00 hours) and bedrooms at night time (22:00 to 07:00 hours).

We have set the criteria for noise as 35/30 dB(A) day/night respectively for internal spaces.

3.3 Noise Emissions Criteria

The *Environmental Protection Regulation 2005* provides acceptable noise emission levels at the boundary of the receiver of depending on zoning (zones shown above in Figure 3. If there are two different zones bounding each other, it is generally accepted that the average of the two zones during the same time period is used. Tables 2.1 and 2.2 from the *EPR* have been combined below in Table 2.

Table 2: From Environmental Protection Regulation 2005, version effective 24 February 2016, Schedule 2 Tables 2.1 and 2.2 combined

Table 2.1			**Table 2.2**	
Noise Zone	ACT Land	NSW Land	**noise standard (dB(A))** Mon-Sat 7am-10pm, Sun & public holiday 8am-10pm	**noise standard (dB(A))** Mon-Sat 10pm-7am, Sun & public holiday 10pm-8am
A	land in an industrial zone	land in the Queanbeyan city industrial zone	65	55
B	land in the city centre and town centres	land in the Queanbeyan city business zone	60	50
	land in the Central National Area (City Hill Precinct)			
C	land in group centres, corridor sites and office sites		55	45
	land in the Central National Area (Parliamentary Zone and Other Areas)			
D	land (other than land in the city centre, town centres and group centres) in a commercial CZ4 zone		50	35
E	land (other than land in the city centre, town centres and group centres) in— • restricted access recreation zone • broadacre zone		50	40
F	land (other than land in the city centre, town centres and group centres) in— • commercial CZ5 zone • TSZ2 services zone • Community facility zone leisure and accommodation zone	land in the Queanbeyan city special uses zone	same as the noise standard for the adjoining noise zone with the loudest noise standard for the time period	
G	all other land, other than land in the Central National Area (Fairbairn)	all other NSW land	45	35

This block is in CZ5 mixed use as per The Territory Plan. Therefore, the site is in Zone F "land (other than land in the city centre, town centres and group centres) in—commercial CZ5 zone" Therefore is subject to the same noise standard for the adjoining noise zone with the loudest noise standard for the time period (*EPR* 2005).

The land to the east is in PRZ2 and is zone with the loudest noise standard for the time period to 50/40 dB(A) noise zone limit.

3.4 Internal Criteria

For residential premises on the site the *Guide for NMP* states:

> Where a residential development is proposed in an area with a noise standard higher than zone G, the development must meet the 'satisfactory' recommended design sound levels for residential buildings of AS/NZS 2107. Commercial accommodation developments should meet AS/NZS 2107 for sleeping areas.

As this site is in Zone F, the residential components are subject to the internal criteria as 'satisfactory' in AS 2107.

3.5 Summary of Criteria

Below is a summary of the criteria discussed above:

Table 3: Summary of Criteria

Location where assessed	**Criteria**	**Time Applicable**	
		noise standard (dB(A)) Mon-Sat 7am-10pm, Sun & public holiday 8am-10pm	**noise standard (dB(A))** Mon-Sat 10pm-7am, Sun & public holiday 10pm-8am
External to development at the boundary	Noise Zone F and therefore same as Zone E.	50	40
Residential within the development	AS2107	35	30

4 ASSESSMENT

4.1 Noise Intrusion

Based on floor plans and elevations, glazing and building treatments were determined by using the calculation methods based on floor plans and elevations. Glazing and building treatments were determined using an inside to outside calculation method as published in Smith, Peters and Owen, *Acoustics and Noise Control*, Second Edition, Edinburgh, 1996, p. 155, and Bies D.A., and Hanson C.H., *Engineering Noise Control, Theory and Practice*, Third Edition, 2003, Spon Press, NY, p. 342, formula (8.16).

$SPL_{in} = SPL_{out} - R + 10 \log_{10} S - 10 \log_{10} A + K$.

This formula takes into account the Reduction, the area of absorbent material in the room based on RT time, volume of room, area of material under consideration, adjusts for angles of incidence and façade reflection.

Based on living room of apartment A03.A.01 (on drawing number DA-A-0114) we have determined a worst case scenario of 21.8 m2 of glazing that R_w30 glazing will result in an internal noise level of 21 dB(A).

R -= 30 dB (reduction of glazing)

S = 13.2 m^2 (area of glazing)

A= 0.16*Volume/RT

V = 234 m^3

RT = Reverberation Time = 1s

K = -3

The same calculation was performed based on the following for a bedroom:

R -= 30 dB (reduction of glazing)

S = 9.6 m^2 (area of glazing)

A= 0.16*Volume/RT

V = 58 m^3

RT = Reverberation Time = 0.5s

K = -3

The resultant internal noise level is 23dB(A).

In the calculations distance from the boundary was not considered, making the result somewhat conservative.

4.2 Onsite Activity Noise - Plant

At this stage because equipment has not been chosen we cannot say definitively what treatments will be required. The criteria in all directions has been provided in Table 3.

The noise levels should be checked and mitigation provided once plant is selected.

We have determined criteria of 40 dB(A) at night at the boundaries.

This should be checked and confirmed once plant is selected.

5 RECOMMENDATIONS

The recommended acoustic treatments are required to ensure compliance with the relevant criteria.

5.1 Mitigation of noise from commercial tenancies

The following mitigation measures are required for compliance with this NMP,

1. Minimum R_W 30 glazing to be fitted to the facades. Glass of 5 mm float will achieve this, however the frames may serve to de-rate the window. Therefore the glazier should verify the performance of the windows and doors;
2. External walls are to rate minimum RW 40 to the northern façades adjacent to the Heritage Core.

5.2 Provision of Alternative Ventilation

To achieve the required internal noise levels of habitable rooms, doors and windows should be closed, hence, all habitable rooms may require the provision of an alternative ventilation system. The design and installation of the plant should not reduce the overall acoustic performance of the building shell.

5.3 Onsite Activity Noise - Plant

Plant is to emit no more than the criteria established in Table 3 above which summarises the criteria. This is 50 dB(A) during the daytime period and 40 dB(A) during the nighttime period. This is to be checked during the design and construction stages. This includes any plant associated with the commercial units that may be installed after completion.