

THE SALVATION ARMY

GERALDTON WOMEN'S FDC REFUGE

DEVELOPMENT APPLICATION - ACOUSTICS

OCTOBER 2025

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DEVELOPMENT APPLICATION - ACOUSTICS

LOT 2852 AINSWORTH STREET
GERALDTON

Job No: 25390
Document Reference: 35524-1-25390

FOR

THE SALVATION ARMY

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CONTENTS

1.0	INTRODUCTION	1
2.0	CRITERIA	1
2.1	BCA Provisions	1
2.2	Environmental Protection (Noise) Regulations 1997	2
2.3	Noise Ingress	4
3.0	WALL CONSTRUCTIONS	4
3.1	Party Walls	4
3.2	Double Door System	5
4.0	PROPOSED FLOOR CONSTRUCTION	7
5.0	PROPOSED SOIL & WASTE PIPES CONSTRUCTION	7
6.0	GENERAL CONSTRUCTION COMMENTS	7
6.1	Electrical Outlets in Party Walls	7
7.0	NOISE FROM DEVELOPMENT	7
8.0	NOISE INGRESS	7

APPENDICIES

A	WALL SETOUT PLANS AND WALL TYPES
B	EXTRACT OF PART F7 OF NCC
C	MRWA TRAFFIC DATA

1.0 INTRODUCTION

Part F7 of the NCC details the requirements for sound transmission and insulation of residential type buildings.

2.0 CRITERIA

2.1 BCA PROVISIONS

For Class 1 buildings, the appropriate sections of Part F7 “Sound transmission and insulation” relating to the acoustic criteria are attached in Appendix B for information. Table 2.1 summarises the deemed to satisfy requirements of Part F7.

TABLE 2.1 – SUMMARY OF NCC REQUIREMENTS

Space of separation	Acoustic Rating	Discontinuous Construction Required
WALLS		
Wet to wet	$R_W + C_{tr}$ not less than 50 dB	NO
Living to living	$R_W + C_{tr}$ not less than 50 dB	NO
Wet to living	$R_W + C_{tr}$ not less than 50 dB	YES
Kitchens to living	$R_W + C_{tr}$ not less than 50 dB	YES
FLOORS		
Between Sole Occupancy Units	$R_W + C_{tr}$ not less than 50 dB.	N/A
	$L_{n,w}$ not more than 55 dB is recommended	N/A
SERVICE RISERS / STORM WATER DOWN PIPES		
to Habitable Rooms	$R_W + C_{tr}$ not less than 40 dB.	NO
to Non-Habitable Rooms	$R_W + C_{tr}$ not less than 25 dB	NO

Notes:

- 1 Where kitchens are part of an open living area, kitchens are considered to be part of the living area and in these cases discontinuous construction is required. This also includes cases where kitchens are back-to-back, however, discontinuous construction is only required on one side.
- 2 Wet area include bathrooms, ensuites, sanitary compartments/powder rooms, laundries and kitchens.
- 3 For the purposes of this Part, discontinuous construction means a wall having a minimum 20 mm cavity between 2 separate leaves, and—
 - (a) for masonry, where wall ties are required to connect leaves, the ties are of the resilient type; and
 - (b) for other than masonry, there is no mechanical linkage between leaves except at the periphery.

2.2 ENVIRONMENTAL PROTECTION (NOISE) REGULATIONS 1997

The *Environmental Protection (Noise) Regulations 1997* stipulate the allowable noise levels at any noise sensitive premises from other premises. The allowable or assigned noise levels for noise sensitive premises are determined by the calculation of an influencing factor, which is added to the baseline criteria set out in Table 1 of the Regulations. The baseline assigned noise levels are listed in Table 2.2. For commercial premises, the allowable or assigned noise levels are the same for all hours of the day. Table 2.2 also lists the assigned noise levels for commercial premises.

TABLE 2.2 – ASSIGNED NOISE LEVELS

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _A 10	L _A 1	L _A max
Noise sensitive premises within 15 metres of a dwelling	0700 - 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	35 + IF	45 + IF	55 + IF

Note: The L_{A10} noise level is the noise that is exceeded for 10% of the time.
The L_{A1} noise level is the noise that is exceeded for 1% of the time.
The L_{Amax} noise level is the maximum noise level recorded.

It is a requirement that noise from the site be free of annoying characteristics (tonality, modulation and impulsiveness) at other premises, defined below as per Regulation 9.

“impulsiveness” means a variation in the emission of a noise where the difference between L_{Apeak} and L_{Amax Slow} is more than 15dB when determined for a single representative event;

“modulation” means a variation in the emission of noise that –

- (a) is more than 3dB L_{A Fast} or is more than 3dB L_{A Fast} in any one-third octave band;
- (b) is present for more at least 10% of the representative assessment period; and
- (c) is regular, cyclic and audible;

“tonality” means the presence in the noise emission of tonal characteristics where the difference between –

- (a) the A-weighted sound pressure level in any one-third octave band; and
- (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as L_{Aeq,T} levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as L_{A Slow} levels.

Where the above characteristics are present and cannot be practicably removed, the following adjustments are made to the measured or predicted level at other premises.

TABLE 2.3 – ADJUSTMENTS FOR ANNOYING CHARACTERISTICS

Where tonality is present	Where modulation is present	Where impulsiveness is present
+ 5 dB	+ 5 dB	+ 10 dB

Figure 2,2,1 shows the development location and surrounds.



FIGURE 2.2.1 – AERIAL OF DEVELOPMENT LOCATION AND SURROUNDS

From a review of the development, the influencing factor for the premises identified in proximity to the development would be 4 dB, based on the following:

Major Roads within outer circle;	
Hannan Street	+ 2 dB
Industrial Premises within outer circle	+ 2 dB
Total IF	+ 4 dB

Hence the influencing factor would be + 4 dB and the assigned noise levels would be as listed in Table 2.4.

TABLE 2.4 - ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises within 15 metres of a dwelling	0700 - 1900 hours Monday to Saturday	49	59	69
	0900 - 1900 hours Sunday and Public Holidays	44	54	69
	1900 - 2200 hours all days	44	54	59
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	39	49	59

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.

We note that noise emissions from the premises need to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997*. This includes noise associated with mechanical services (ie air conditioning and ventilation systems).

2.3 NOISE INGRESS

The development is approximately 250m from North Western Coastal Highway as shown in Figure 2.3.1 and thus must be assessed in accordance with WAPC State Planning Policy 5.4.

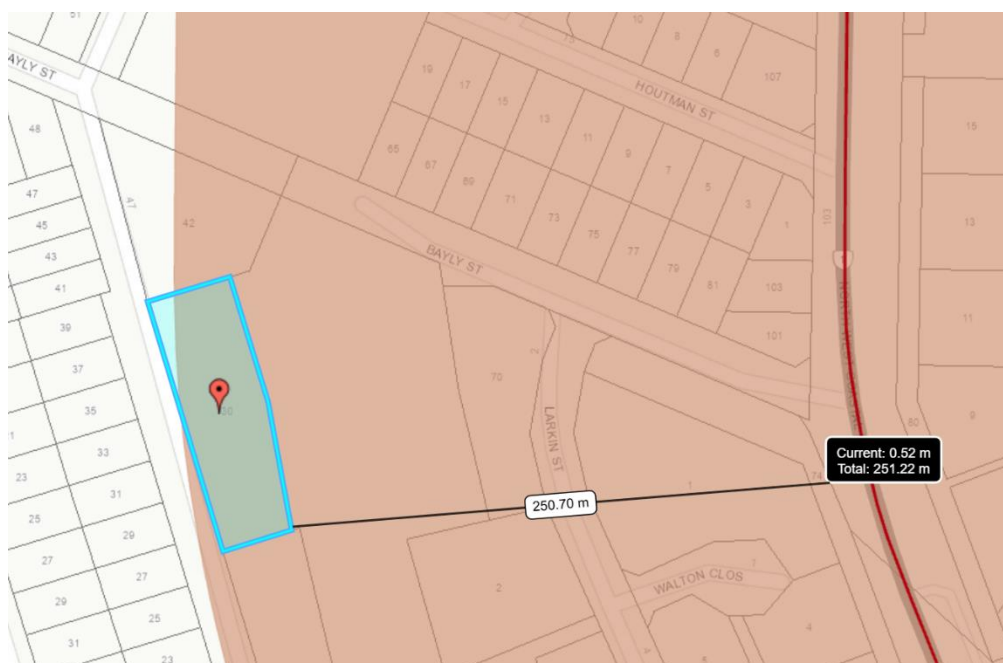


FIGURE 2.3.1 – EXCERPT FROM PLANWA

The aim of the planning policy is to design the residential building façade to achieve the following internal sound levels:

- L_{eq} 35 dB(A) in sleeping areas (bedrooms); and
- L_{eq} 40 dB(A) in living/work areas and other habitable rooms.

3.0 WALL CONSTRUCTIONS

3.1 PARTY WALLS

Walls separating sole-occupancy units are required to provide an $R_w + C_{tr}$ rating of not less than 50 dB. In some areas, a discontinuous construction is required.

These walls are marked up on plans in Appendix A.

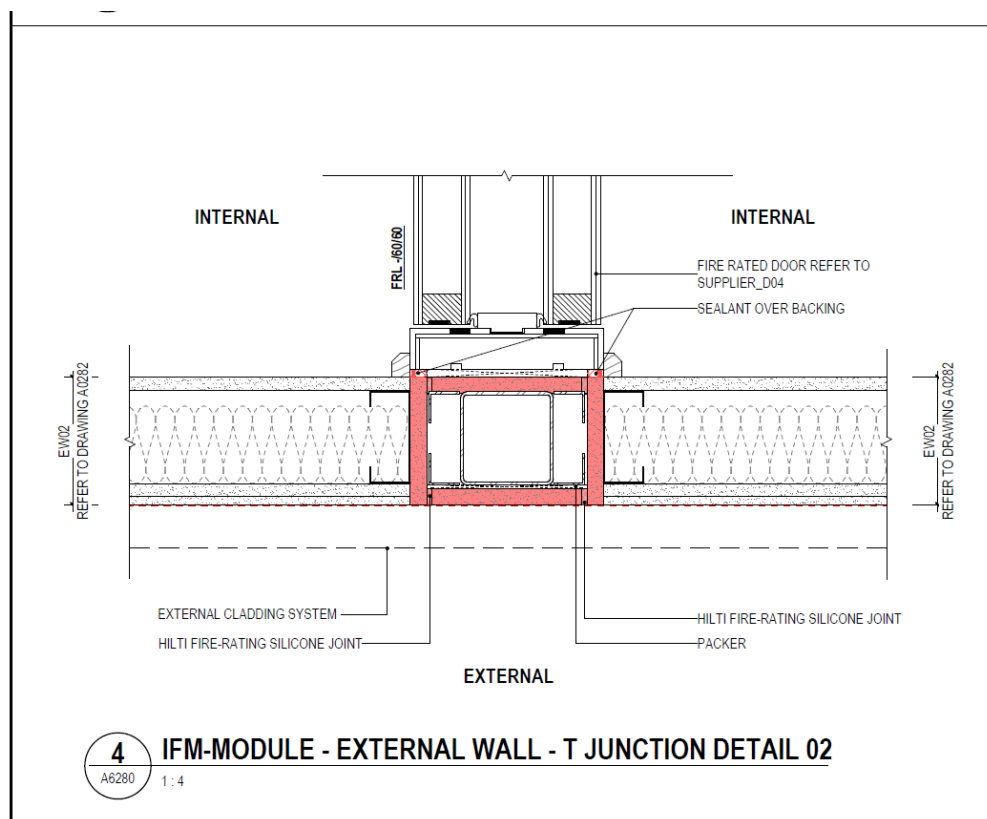
The walls are understood to be proposed to be constructed of two modular walls with an air gap in between and will need to be reviewed during Schematic Design to ensure compliance.

3.2 DOUBLE DOOR SYSTEM

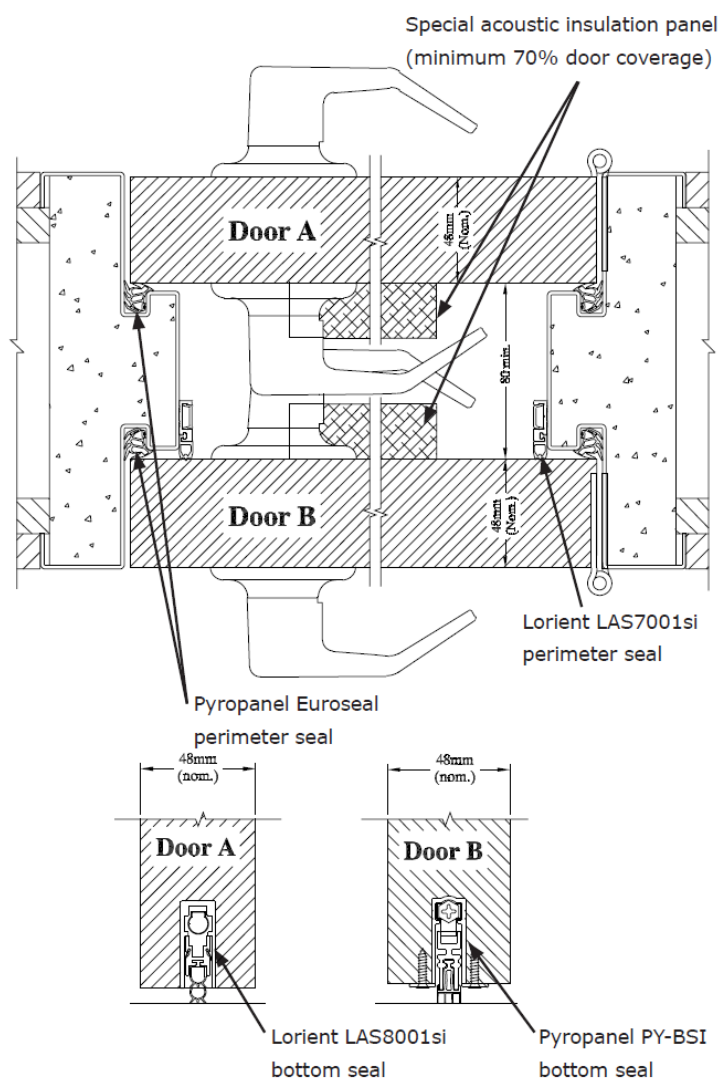
Double doors are noted in the walls separating sole-occupancy units in Units 5, 7 and 9.

The separating structure at these locations is required to provide an $R_w + C_{tr}$ not less than 50 dB to be deemed to satisfy the NCC/BCA requirements.

For double door systems, achieving the acoustic criteria is difficult to meet with the proposed (details below) providing typically the highest level of separation possible for a double door system – assuming perimeter and drop seals for both doors.



However, it is understood that the Pyropanel AS-INTERCOM-A2 door set is a 50 dB $R_w + C_{tr}$ interconnecting door leaf arrangement, the details of which are shown below :



Finally, it is noted that considering the overall acoustic performance of the party wall between rooms, the number of double rooms and the overall R_w rating, we believe that the party wall as a whole would be deemed to comply with the objective of Part F7 of the NCC, that is:

“to safeguard occupants from illness or loss of amenity as a result of undue sound being transmitted:

(a) between adjoining sole-occupancy units;”

Thus, being a refuge, that the amenity of the occupant can be maintained by management regardless of the building construction. Hence, given this and the above, we believe that the party walls containing the double set of doors would be deemed to comply with the requirements of the NCC.

4.0 PROPOSED FLOOR CONSTRUCTION

Due to the design of the development, there are no floor separating sole occupancy units.

5.0 PROPOSED SOIL & WASTE PIPES CONSTRUCTION

Due to the design of the building, there is understood to be no soil and waste pipes located in shafts or ceiling spaces, associated with a different SOU to that SOU.

6.0 GENERAL CONSTRUCTION COMMENTS

The following general construction comments are provided:

6.1 ELECTRICAL OUTLETS IN PARTY WALLS

The wall types proposed to be used are modular and therefore where electrical outlets are located in party walls, they are not to be located back-to-back, but rather offset accordingly once finalised materials are determined.

7.0 NOISE FROM DEVELOPMENT

The main source of noise from the proposed development will be from mechanical services consisting of air-conditioning plant. Noise received at neighbouring premises, and premises within the development, from these items need to comply with the assigned noise levels as determined under the *Environmental Protection (Noise) Regulations 1997*.

As the mechanical services could operate during the night, noise emissions from the development needs to comply with the assigned L_{A10} night period noise level of 39 dB(A) at residential premises. Potentially, noise emissions from mechanical services could be tonal, in which case an +5 dB(A) penalty for a tonal component could be applied to the resultant noise levels. Therefore, the design level at the neighbouring residential premises would be 34 L_{A10} dB.

The air conditioning for the units is not yet known. Once the design of the system is finalised, an acoustic assessment will be carried out of noise emissions from the mechanical plant and any noise amelioration required will be incorporated into the design to ensure compliance with the *Environmental Protection (Noise) Regulations 1997*.

From experience, we believe that compliance with the above criteria for the night period would be achievable, however, some noise mitigation is likely to be required.

8.0 NOISE INGRESS

As North Western Coastal Highway as an approximate volume per day of 15,000, of which greater than 100 are Class 7 Austroad vehicles (source MRWA Traffic Map, attached in Appendix C), an assessment with regards to State Planning Policy 5.4 is required.

However due to the distance between the edge of the development and the road edge, a screening assessment has been undertaken, with Figure 8.1 showing the forecast noise exposure category based on Table 2 from State Planning Policy 5.4 Implementation Guidelines.

Table 2: Noise exposure forecast

Transport Corridor Classification	Number of lanes (both directions), including bus/priority lanes and entrance/exit ramps	Forecast noise exposure category based on lot distance(m) from edge of nearest main road carriageway (not entrance/exit ramps)																											
		adjacent	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	175	200	225	250	275	300						
Strategic freight/major traffic route • 500 or more Class 7-12 Austroads vehicles per day, or • 50,000+ vehicles per day	2 to 4 lanes	72	68	66	65	63	62	61	61	60	59	59	58	57	57	56	55	54	53	52	51	50							
	5 to 6 lanes	74	70	68	66	65	64	63	62	61	61	60	59	59	58	58	57	56	55	54	53	52							
	7 to 8 lanes	76	72	69	68	66	65	64	64	63	62	62	61	60	60	59	58	57	56	55	54	53							
	9 to 10 lanes	77	73	70	69	67	66	65	65	64	63	63	62	61	61	60	59	58	57	56	55	54							
	10 or more lanes	78	74	71	70	68	67	66	66	65	64	64	63	62	62	61	60	59	58	57	56	56							
Other significant freight / traffic routes • Any actual or planned future State Administered Road • Local Government Roads Carrying 100 or more Class 7 – 12 Austroads vehicles/day • 25,000+ vehicles per days vehicles/day	Urban Region Scheme areas 60-80 km/hr	1 to 2 lanes	67	64	62	61	60	59	58	57	56	56	55	54	54	53	53	52	51	50	49	48	47						
		3 to 6 lanes	69	66	64	63	62	61	60	59	58	58	57	56	56	55	55	54	53	52	51	50	49						
	Urban Region Scheme areas 100+ km/hr	1 to 2 lanes	70	67	65	64	63	62	61	60	59	59	58	57	57	56	56	55	54	53	52	51	50						
		3 to 6 lanes	74	70	68	66	65	64	63	62	61	61	60	60	59	59	58	57	56	55	54	53	52						
	Rural areas 60-80 km/hr	1 to 2 lanes	62	59	57	56	55	54	53	52	51	51	50	49	49	48	48	46	45	44	43	42	41						
		3 to 4 lanes	66	63	61	60	59	58	56	56	55	54	53	53	52	52	51	50	49	48	47	46	45						
	Rural areas 100+ km/hr	1 to 2 lanes	67	64	62	61	60	59	58	57	56	55	54	54	53	53	52	51	50	49	48	47	46						
		3 to 4 lanes	69	66	64	63	62	61	60	59	58	57	56	56	55	55	54	53	52	51	50	49	48						

FIGURE 8.1 TABLE 2 FROM STATE PLANNING POLICY 5.4 IMPLEMENTATION GUIDELINES

Based on the above, a future forecast day time noise level of 49 dB $L_{Aeq}(\text{Day})$ has been utilised and as a result, no noise amelioration with regard to State Planning Policy 5.4 is required.

APPENDIX A

Drawings



PRELIMINARY

CLIENT
The Salvation Army Corps

PROJECT
GERALDTON CRISIS HOUSING
Lot 2852 (# 30) Ainsworth St.
Geraldton WA 6163

ISSUE DATE
08.10.2025 SK.02
15.10.2025 SK.03
28.10.2025 SK.04

REVISION / NOTES
PRELIMINARY FOR REVIEW

SITEPLAN

SK.04

1 SITEPLAN
SCALE 1:200 @A3



APPENDIX B

Extract of NCC

WALLS**F7D6 Sound insulation rating of walls**

- (1) A wall in a Class 2 or 3 building must—(a) have an $R_w + C_{tr}$ (airborne) not less than 50, if it separates *sole-occupancy units*; and
 - (b) have an R_w (airborne) not less than 50, if it separates a *sole-occupancy unit* from a plant room, lift *shaft*, stairway, *public corridor*, public lobby or the like, or parts of a different classification; and
 - (c) comply with F7D4(2) if it separates—
 - (i) a bathroom, *sanitary compartment*, laundry or kitchen in one *sole-occupancy unit* from a *habitable room* (other than a kitchen) in an adjoining unit; or
 - (ii) a *sole-occupancy unit* from a plant room or lift *shaft*.
- (2) A door may be incorporated in a wall in a Class 2 or 3 building that separates a *sole-occupancy unit* from a stairway, *public corridor*, public lobby or the like, provided the door assembly has an R_w not less than 30.
- (3) A wall in a Class 9c building must have an R_w not less than 45 if it separates—
 - (a) *sole-occupancy units*; or
 - (b) a *sole-occupancy unit* from a kitchen, bathroom, *sanitary compartment* (not being an associated ensuite), laundry, plant room or utilities room.
- (4) In addition to (3), a wall separating a *sole-occupancy unit* in a Class 9c building from a kitchen or laundry must comply with F7D4(2).
- (5) Where a wall *required* to have sound insulation has a floor above, the wall must continue to—
 - (a) the underside of the floor above; or
 - (b) a ceiling that provides the sound insulation *required* for the wall.
- (6) Where a wall *required* to have sound insulation has a roof above, the wall must continue to—
 - (a) the underside of the roof above; or
 - (b) a ceiling that provides the sound insulation *required* for the wall.

F7D4 Determination of impact sound insulation ratings

- (1) A floor in a building required to have an impact sound insulation rating must—
 - (a) have the required value for weighted normalised impact sound pressure level ($L_{n,w}$) determined in accordance with AS ISO 717.2 using results from laboratory measurements; or
 - (b) comply with Specification 28.
- (2) A wall in a building required to have an impact sound insulation rating must—
 - (a) for a Class 2 or 3 building be of discontinuous construction and
 - (b) for a Class 9c building, must—
 - (i) for other than masonry, be two or more separate leaves without rigid mechanical connection except at the periphery; or

- (ii) *be identical with a prototype that is no less resistant to the transmission of impact sound when tested in accordance with Specification 29 than a wall listed in S28C4 to S28C7.*
- (3) *For the purposes of this Part, discontinuous construction means a wall having a minimum 20 mm cavity between 2 separate leaves, and—*
 - (a) *for masonry, where wall ties are required to connect leaves, the ties are of the resilient type; and*
 - (b) *for other than masonry, there is no mechanical linkage between leaves except at the periphery.*

FLOORS

F7D5 Sound insulation rating of floors

- (1) *A floor in a Class 2 or 3 building must have an $R_w + C_{tr}$ (airborne) not less than 50 and an $L_{n,w}$ (impact) not more than 62 if it separates—*
 - (a) *sole-occupancy units; or*
 - (b) *a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.*

As recommended by the Association of Australian Acoustical Consultants, the design objective of an $L_{n,w}$ of 55 is recommended to be utilised for impact isolation between floors of apartments.

SOIL & WASTE PIPES

F7D7 Sound insulation rating of internal services

- (1) *If a duct or soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an $R_w + C_{tr}$ (airborne) not less than—*
 - (a) *40 if the adjacent room is a habitable room (other than a kitchen); or*
 - (b) *25 if the adjacent room is a kitchen or non-habitable room.*
- (2) *If a stormwater pipe passes through a sole-occupancy unit, it must be separated in accordance with (1)(a) and (b).*

PUMPS

F7D8 Sound isolation of pumps

A flexible coupling must be used at the point of connection between the service pipes in a building and any circulating or other pump.

APPENDIX C

MRWA Traffic Data



Hourly Vehicle Type Volumes

North West Coastal Hwy (H007)

North of Second St (SLK 3.75)

SITE 18718

2021/22

Monday to Friday

	Northbound												
	Vehicle Type												
	1	2	3	4	5	6	7	8	9	10	11	12	All
00:00	20	1	2	0	0	0	0	0	1	2	4	0	30
01:00	12	0	1	0	0	0	0	0	1	0	3	0	17
02:00	9	1	1	0	0	0	0	0	0	0	2	0	13
03:00	14	1	1	1	0	0	0	0	0	0	1	0	18
04:00	30	1	2	1	0	0	0	0	1	0	3	0	38
05:00	67	2	13	1	0	0	0	0	1	0	4	0	88
06:00	173	11	27	2	1	1	4	1	1	0	3	0	224
07:00	279	16	51	3	1	1	5	1	2	0	4	0	363
08:00	453	21	77	5	2	3	8	2	4	1	4	1	581
09:00	439	31	73	6	2	2	7	2	4	1	7	1	575
10:00	519	38	79	7	2	3	11	2	4	1	5	0	671
11:00	543	38	76	5	3	4	9	1	4	0	4	1	688
12:00	531	32	76	5	2	3	10	1	3	0	5	0	668
13:00	503	33	68	4	1	3	8	2	3	1	6	0	632
14:00	517	32	74	4	1	3	8	1	3	0	4	0	647
15:00	676	28	75	4	2	3	9	1	5	0	5	1	809
16:00	580	24	62	2	2	3	7	1	2	1	8	1	693
17:00	473	15	40	2	1	1	5	1	2	1	9	0	550
18:00	265	8	21	1	0	0	3	0	1	0	3	0	302
19:00	163	5	12	0	0	0	1	0	1	0	4	0	186
20:00	145	3	11	0	0	0	1	0	1	1	4	0	166
21:00	107	3	8	0	0	0	1	0	0	1	3	0	123
22:00	65	2	3	1	0	0	0	0	1	1	5	0	78
23:00	43	2	2	1	0	0	0	0	1	0	5	0	54
TOTAL	6626	348	855	55	20	30	97	16	46	11	105	5	8214



Peak Statistics

AM TIME	11:15	10:15	10:30	08:45	10:45	10:15	09:45	08:45	08:00	00:00	09:00	08:30	11:15
VOL	548	40	81	7	4	4	11	3	4	2	7	2	692
PM TIME	15:00	12:30	12:00	12:30	16:45	13:45	14:45	15:30	15:15	20:45	16:45	16:45	15:00
VOL	676	34	76	5	2	4	10	2	5	2	11	1	809