



**EGLINTON STAGE 2A  
LOT 9008 MARMION AVENUE, EGLINTON  
SUBDIVISION**

**ROAD TRAFFIC (SPP 5.4)  
NOISE MANAGEMENT PLAN**

**MARCH 2023**

**OUR REFERENCE: 30851-3-12111-06**



DOCUMENT CONTROL PAGE

**SPP 5.4 NOISE MANAGEMENT PLAN  
EGLINTON STAGE 2A– SUBDIVISION**

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FOR

**SATTERLEY**

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## **EXECUTIVE SUMMARY**

Herring Storer Acoustics were commissioned to carry out an acoustical assessment of noise received within Stage 2A, being Lot 9020 Pipidiny Road, Eglinton.

Under the Western Australian Planning Commission (WAPC) Planning Policy 5.4 “Road and Rail Noise” (SPP 5.4), the appropriate criteria for assessment for this development are:

### **EXTERNAL**

$L_{Aeq(Day)}$  of 55 dB(A);

$L_{Aeq(Night)}$  of 50 dB(A).

### **INTERNAL**

$L_{Aeq(Day)}$  of 40 dB(A) in living and work areas; and

$L_{Aeq(Night)}$  of 35 dB(A) in bedrooms.

Additional to the above, noise received at an outdoor living area should also be reduced as far as practicable, with an aim of achieving an  $L_{Aeq}$  of 50 dB(A) during the night period.

Thus, to comply with the Policy, the following have been provided:

- Quiet House Design Packages and Notification on Titles for façade Lots 55 dB(A) or greater as noted below for single storey residences, as shown in Appendix C.

Any future lots exceeding the 55 dB(A) day target criteria require Notification on Titles.

Notes:

- 1 The summary of the Quiet House Design Packages constructions attached in Appendix D, are “Deemed to Satisfy” constructions. Alternative constructions would be acceptable, provided they are supported by an acoustic report prepared by a suitably qualified acoustic consultant.
- 2 Additionally, these residences designated as requiring Quiet House Design also require Notifications on Titles.

## 1. INTRODUCTION

Herring Storer Acoustics were commissioned to carry out an acoustical assessment of noise received within Eglinton Stage 2A, being Lot 9020 Pipidiny Road, Eglinton.

As part of the study, the following was carried out:

- Determine by noise modelling the noise that would be received at proposed residences within this development from vehicles travelling on Marmion Avenue in the future.
- Assess the predicted noise levels for compliance with the appropriate criteria.
- Provide detailed information as to noise control requirements such as quiet house design, noise walls and future notification on titles.

For information, the Subdivision Plan is attached in Appendix A.

## 2. CRITERIA

### 2.1 ROAD TRAFFIC NOISE

The Western Australian Planning Commission (WAPC) released on 6<sup>th</sup> September 2019 State Planning Policy 5.4 "Road and Rail Noise". The requirements of State Planning Policy 5.4 are outlined below.

#### POLICY APPLICATION (Section 4)

#### When and where it applies (Section 4.1)

*SPP 5.4 applies to the preparation and assessment of planning instruments, including region and local planning schemes; planning strategies, structure plans; subdivision and development proposals in Western Australia, where there is proposed:*

- a) noise-sensitive land-use within the policy's trigger distance of a transport corridor as specified in **Table 1**;*
- b) New or major upgrades of roads as specified in **Table 1** and maps (**Schedule 1, 2 and 3**); or*
- c) New railways or major upgrades of railways as specified in maps (**Schedule 1, 2 and 3**); or any other works that increase capacity for rail vehicle storage or movement and will result in an increased level of noise.*

Policy trigger distances (Section 4.1.2)

**Table 1** identifies the State’s transport corridors and the trigger distances to which the policy applies.

The designation of land within the trigger distances outlined in **Table 1** should not be interpreted to imply that land is affected by noise and/or that areas outside the trigger distances are un-affected by noise.

Where any part of the lot is within the specified trigger distance, an assessment against the policy is required to determine the likely level of transport noise and management/mitigation required. An initial screening assessment (**guidelines: Table 2: noise exposure forecast**) will determine if the lot is affected and to what extent.”

**TABLE 1: TRANSPORT CORRIDOR CLASSIFICATION AND TRIGGER DISTANCES**

<b>Transport corridor classification</b>	<b>Trigger distance</b>	<b>Distance measured from</b>
<b>Roads</b>		
<b>Strategic freight and major traffic routes</b> Roads as defined by Perth and Peel Planning Frameworks and/or roads with either 500 or more Class 7 to 12 Austroads vehicles per day, and/or 50,000 per day traffic volume	300 metres	Road carriageway edge
<b>Other significant freight/traffic routes</b> These are generally any State administered road and/or local government road identified as being a future State administered road (red road) and other roads that meet the criteria of either >=23,000 daily traffic count (averaged equivalent to 25,000 vehicles passenger car units under region schemes)	200 metres	Road carriageway edge
<b>Passenger railways</b>		
	100 metres	Centreline of the closest track
<b>Freight railways</b>		
	200 metres	Centreline of the closest track

Proponents are advised to consult with the decision making authority as site specific conditions (significant differences in ground levels, extreme noise levels) may influence the noise mitigation measures required, that may extend beyond the trigger distance.

POLICY MEASURES (Section 6)

The policy applies a performance-based approach to the management and mitigation of transport noise. The policy measures and resultant noise mitigation will be influenced by the function of the transport corridor and the type and intensity of the land-use proposed. Where there is risk of future land-use conflict in close proximity to strategic freight routes, a precautionary approach should be applied. Planning should also consider other broader planning policies. This is to ensure a balanced approach takes into consideration reasonable and practical considerations.

Noise Targets (Section 6.1)

**Table 2** sets out noise targets that are to be achieved by proposals under which the policy applies. Where exceeded, an assessment is required to determine the likely level of transport noise and management/mitigation required.

*In the application of the noise targets the objective is to achieve:*

- *indoor noise levels as specified in **Table 2** in noise sensitive areas (for example, bedrooms and living rooms of houses, and school classrooms); and*
- *a reasonable degree of acoustic amenity for outdoor living areas on each residential lot. For non-residential noise-sensitive developments, for example schools and child care centres the design of outdoor areas should take into consideration the noise target.*

*It is recognised that in some instances, it may not be reasonable and/or practicable to meet the outdoor noise targets. Where transport noise is above the noise targets, measures are expected to be implemented that balance reasonable and practicable considerations with the need to achieve acceptable noise protection outcomes.*

**TABLE 2: NOISE TARGETS**

Proposals	New/Upgrade	Noise Targets		
		Outdoor		Indoor
		Day ( $L_{Aeq}(\text{Day})$ dB) (6 am-10 pm)	Night ( $L_{Aeq}(\text{Night})$ dB) (10 pm-6 am)	( $L_{Aeq}$ dB)
Noise-sensitive land-use and/or development	New noise sensitive land use and/or development within the trigger distance of an existing/proposed transport corridor	55	50	$L_{Aeq}$ (Day) 40(Living and work areas)  $L_{Aeq}$ (Night) 35 (bedrooms)
Roads	New	55	50	N/A
	Upgrade	60	55	N/A
Railways	New	55	50	N/A
	Upgrade	60	55	N/A

Notes:

- *The noise target is to be measured at one metre from the most exposed, habitable façade of the proposed building, which has the greatest exposure to the noise-source. A habitable room has the same meaning as defined in State Planning Policy 3.1 Residential Design Codes.*
- *For all noise-sensitive land-use and/or development, indoor noise targets for other room usages may be reasonably drawn from Table 1 of Australian Standard/New Zealand Standard AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors (as amended) for each relevant time period.*
- *The 5dB difference in the criteria between new and upgrade infrastructure proposals acknowledges the challenges in achieving noise level reduction where existing infrastructure is surrounded by existing noise-sensitive development.*
- *Outdoor targets are to be met at all outdoor areas as far as is reasonable and practical to do so using the various noise mitigation measures outlined in the guidelines. For example, it is likely unreasonable for a transport infrastructure provider to achieve the outdoor targets at more than 1 or 2 floors of an adjacent development with direct line of sight to the traffic.*

Noise Exposure Forecast (Section 6.2)

When it is determined that SPP 5.4 applies to a planning proposal as outlined in Section 4, proponents and/or decision makers are required to undertake a preliminary assessment using **Table 2**: noise exposure forecast in the guidelines. This will provide an estimate of the potential noise impacts on noise-sensitive land-use and/ or development within the trigger distance of a specified transport corridor. The outcomes of the initial assessment will determine whether:

- no further measures is required;
- noise-sensitive land-use and/or development is acceptable subject to deemed-to-comply mitigation measures; or
- noise-sensitive land-use and/or development is not recommended. Any noise-sensitive land-use and/ or development is subject to mitigation measures outlined in a noise management plan.”

**3. MONITORING**

Noise monitoring was undertaken as part of the study with the results used to calibrate the noise model.

In summary, the monitoring was undertaken over seven-day period commencing Friday 9<sup>th</sup> to Wednesday 14<sup>th</sup> December 2022. Monitoring was conducted at boundary of the development, facing Marmion Ave. The monitor was placed 17m from the nearest running edge of respective road of interest.

The results of this monitoring are summarised in Table 3.1.

**TABLE 3.1: SUMMARY OF MEASURED ROAD TRAFFIC NOISE LEVELS (dB(A))**

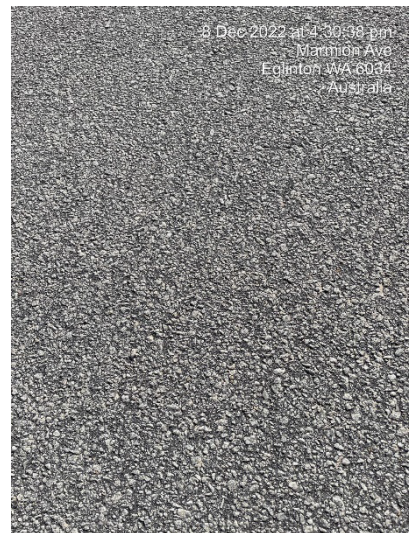
Date	Marmion Avenue Monitor		
	L <sub>A10</sub> (18hour)	L <sub>Aeq,day</sub> (6am to 10pm)	L <sub>Aeq,night</sub> (10pm to 6am)
Average	66.3	64.3	57.9

Note: Based on the results of the noise monitoring the difference between the L<sub>Aeq</sub> (Day) and L<sub>Aeq</sub> (Night) is greater than 5 dB(A) (ie; 6.4 dB(A)). Hence, achieving compliance with the day period criteria would also result in compliance with the night period criteria and the day period has been used for the assessment.

For information, the results of the monitoring are shown graphically in Appendix E with Figure 3.1 showing the location map, and Figure 3.2 showing the monitor in situ and the Marmion Ave Road surface.



**FIGURE 3.1 - NOISE MONITOR LOCATION PLAN**



**FIGURE 3.2 - NOISE MONITOR IN SITU AND ROAD SURFACE**

#### 4. MODELLING

To determine the requirements of any noise amelioration, acoustic modelling was carried out using the computer program 'SoundPlan'. Acoustic modelling was carried out for road traffic flows 20 years in the future.

**TABLE 4.1 - NOISE MODELLING INPUT DATA**

Parameter	Current (2022)	Future (2043)
Traffic flows VPD Marmion Ave South Bound	6713	28,200
Traffic flows VPD Marmion Ave North Bound	7021	25,900
Heavy Vehicles (%)	10.7%	6%
Traffic Speed km/hr	80	80
Road Surface	10mm Chipseal	Dense Graded Asphalt
Façade Correction	-	+2.5

The future road traffic volumes were based on information provided by the MRWA ROM department (Job # 42546) and as shown in Appendix E, with the traffic maps. The traffic flows provided by MRWA ROM department were for the year 2041. The ROM department does not undertake ROM modelling for 2043, thus, the traffic flows have been increase by 7% per year, being the average increase from 2022 to 2041, to obtain the 2043 traffic flows.

Other input data for the model included:

- Traffic data from MRWA ( <https://mrapps.mainroads.wa.gov.au/TrafficMap/> )
- Noise source heights for the three road source strings (Passenger Vehicles, Heavy Vehicles Engine and Heavy Vehicle Exhausts) are +0.5, +1.5 and +3.6m, with a noise correction of -0.8 and -8.0 applied to the heavy vehicle's engine and exhaust noise sources.
- Topographical data, with the ground level within the development based on natural ground levels as per surveys conducted.
- A +2.5 dB adjustment to allow for façade reflection.
- Development receiver heights at 1.4m above ground level.
- Future buildings located on the boundary Lots of the development (assumed to be present for future road traffic volumes).
- Calculations based on CoRTN algorithms.
- Other parameter listed in SPP 5.4 as to guidance for modelling road traffic noise / assessment.

To determine the noise that would be received within the development from the proposed Marmion Ave, acoustic modelling was carried out using the computer program 'SoundPlan'.

We note that for Marmion Ave, the difference between the  $L_{Aeq,8hr}$  and the  $L_{Aeq,16hr}$  would be greater than 5 dB(A), hence the day period is the critical period for compliance and achieving compliance with the day period criteria will also result in compliance with the night period criteria.

Therefore, noise modelling was only undertaken for the day period and the results for noise received at both the ground and first floors in the future, are shown as Figures in Appendix B and discussed further in the next section.

## 5. TRAFFIC NOISE ASSESSMENT

Under the WAPC State Planning Policy 5.4, for this development, the Noise Targets as listed in Table 2 are the appropriate noise levels to be achieved. Based on the noise monitoring, the difference between the  $L_{Aeq(16hr)}$  and the  $L_{Aeq(8hr)}$  would be greater than 5 dB(A). Therefore, the day period would be the critical period for compliance and if compliance with the day period noise limit is achieved, then compliance with the night period noise limits would also be achieved. The policy states that the outdoor criteria applies to the ground floor level only, however, it also states that noise mitigation measures should be implemented with a view to achieving the target levels in least one outdoor living area.

For residential premises, the Policy states that residence should be designed to meet the following acceptable internal noise levels:

Living and Work Areas	$L_{Aeq(Day)}$ of 40 dB(A)
Bedrooms	$L_{Aeq(Night)}$ of 35 dB(A)

For lots where noise level would be above the 55 dB(A) limit, notifications on titles are required.

To comply with the Policy, the following have been provided:

- Quiet House Design Packages as identified in Appendix C.

Any future lots exceeding the 55 dB(A) day target criteria would require Notification on Titles.

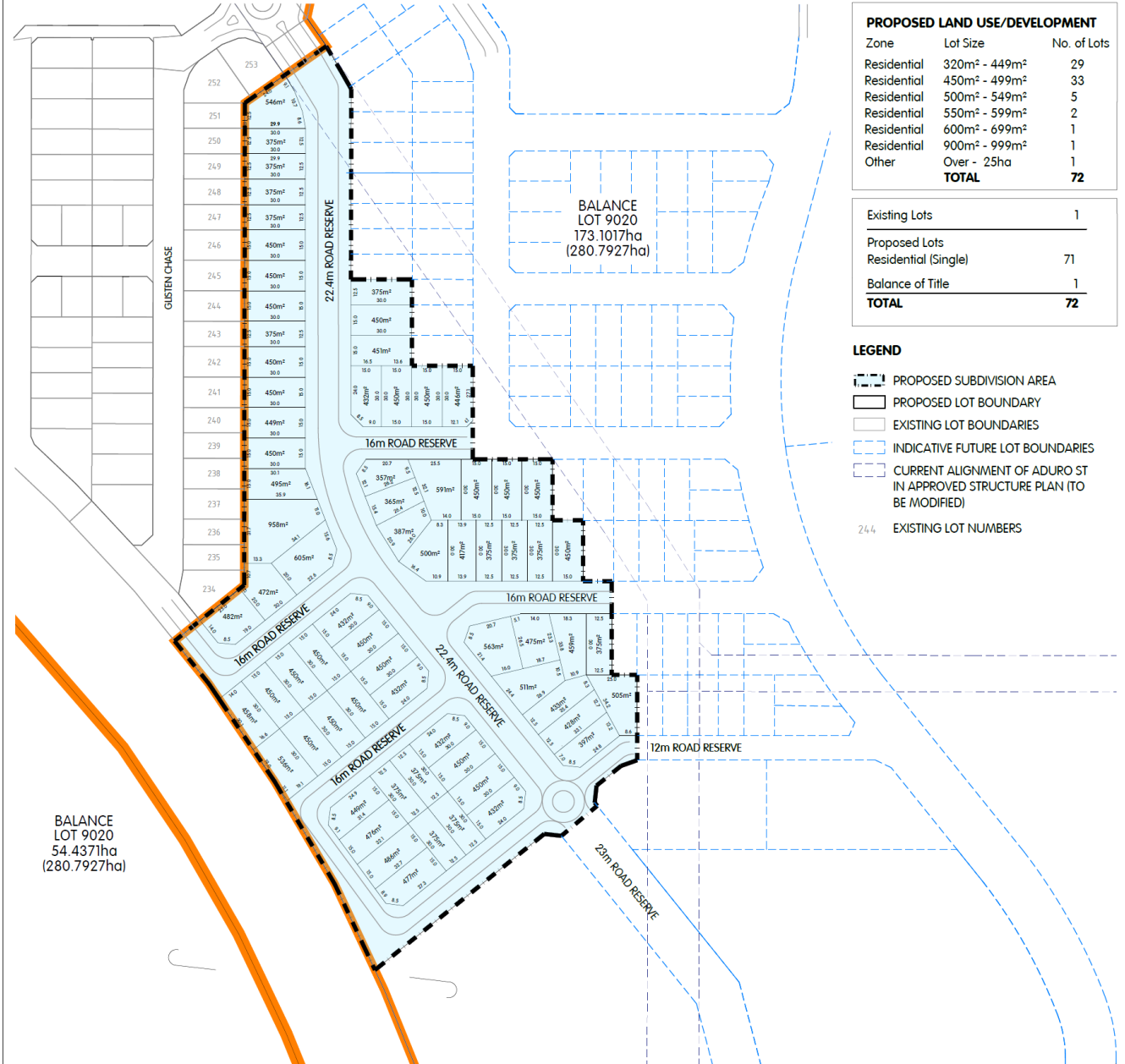
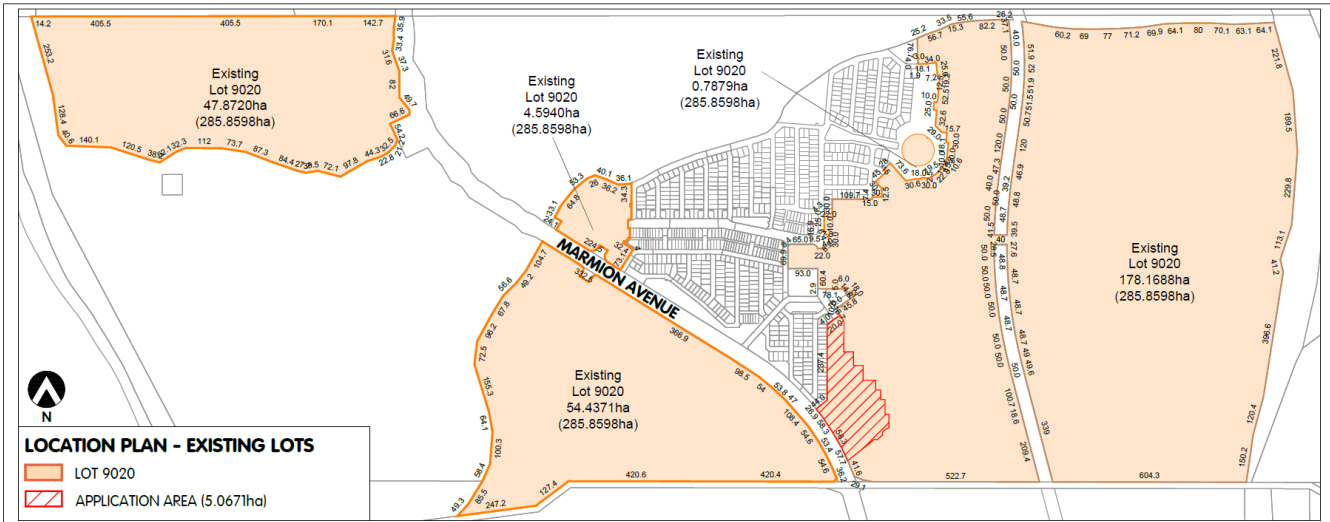
Information on the deemed to satisfy constructions for the various "Quiet House Design" packages are contained in Appendix D.

Notes:

- 1 The summary of the Quiet House Design Packages constructions attached in Appendix D, are "Deemed to Satisfy" constructions. Alternative constructions would be acceptable, provided they are supported by an acoustic report prepared by a suitably qualified acoustic consultant.
- 2 Additionally, these residences designated as requiring Quiet House Design also require Notifications on Titles.

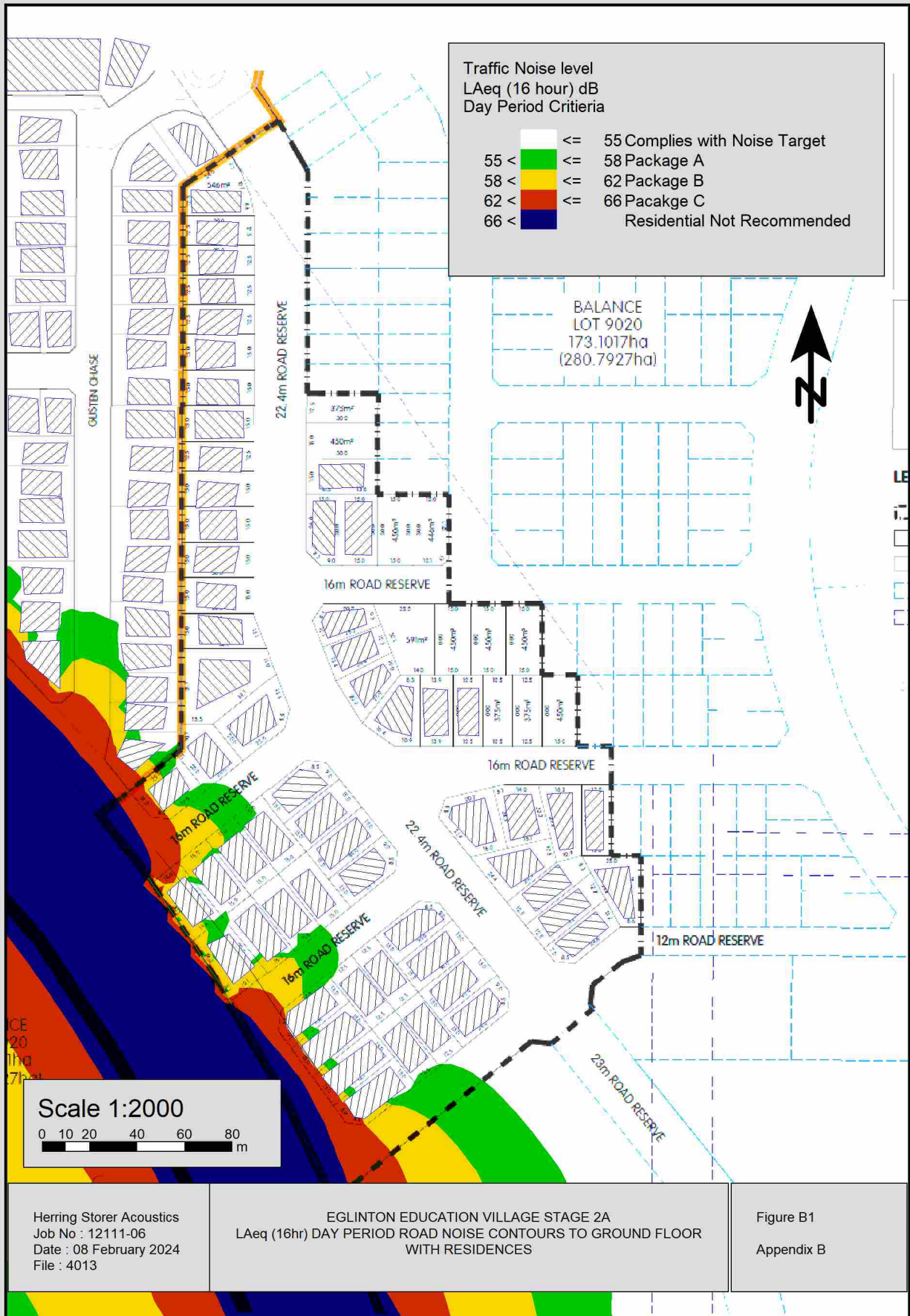
# **APPENDIX A**

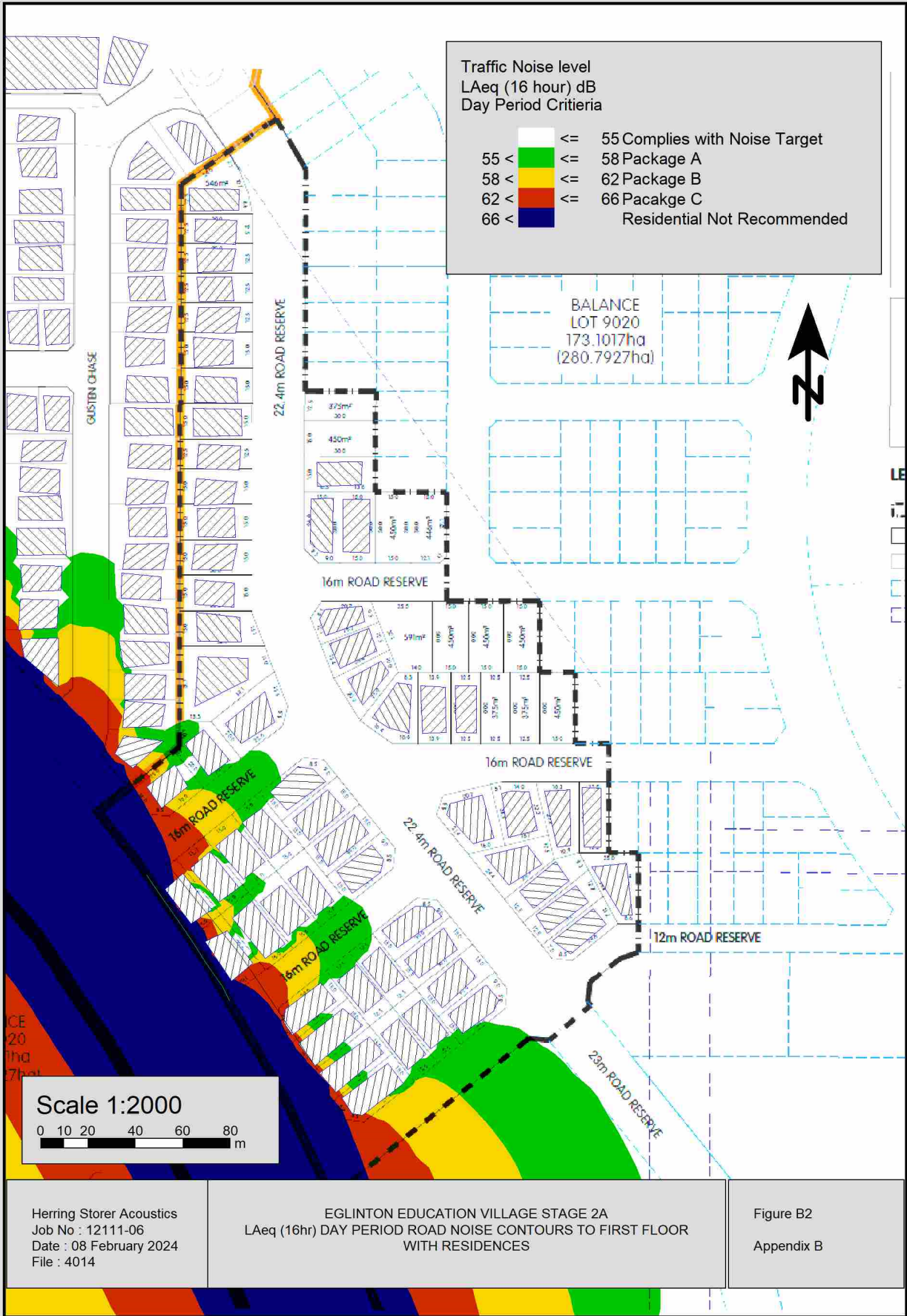
## **SUBDIVISION PLAN**



## **APPENDIX B**

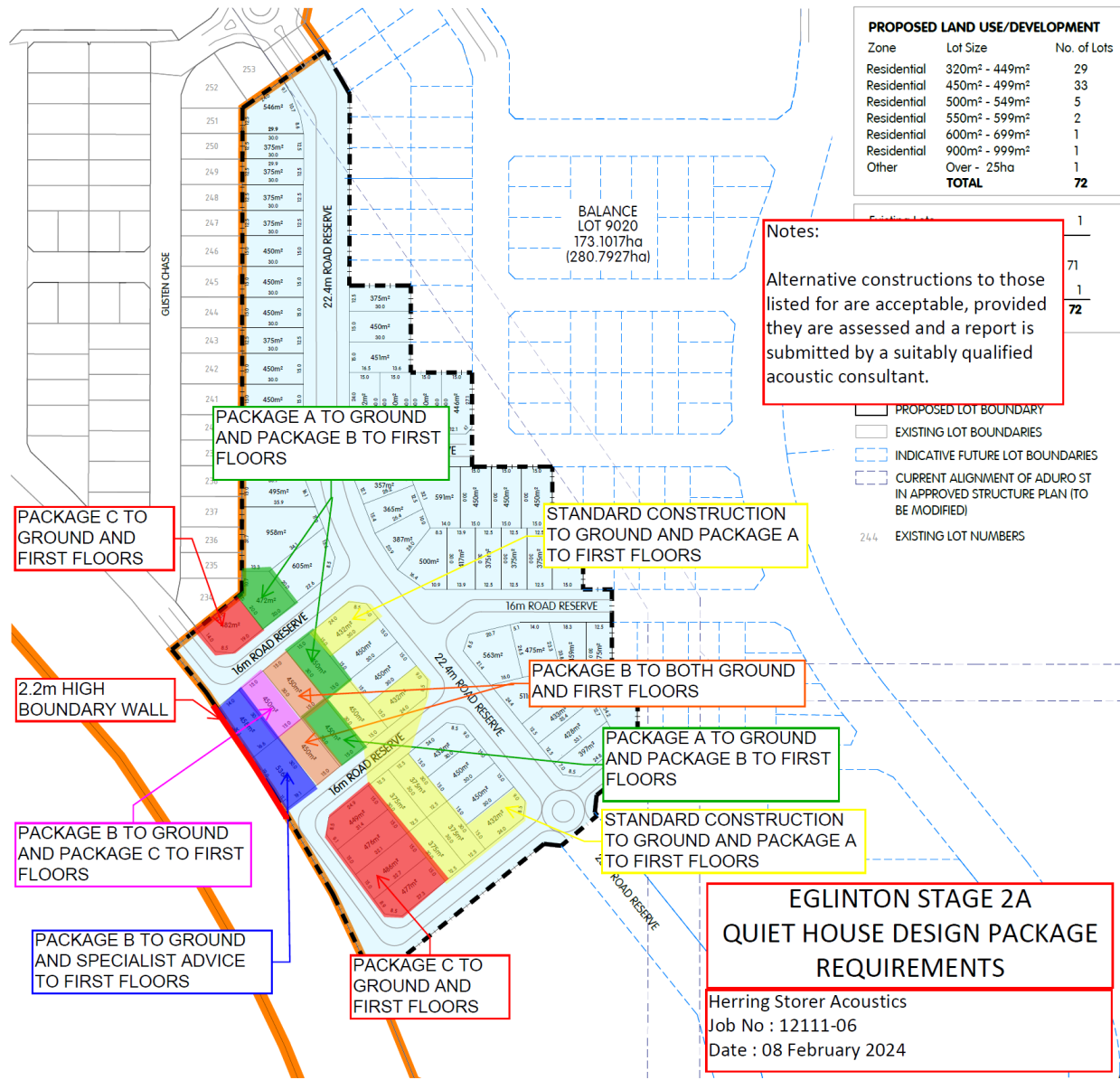
### NOISE CONTOUR PLOTS





## **APPENDIX C**

“QUIET HOUSE” DESIGN REQUIREMENTS



**CADASTRAL INFORMATION**  
 SOURCE: LANDGATE  
 YYWDD: 230912  
 DWG REF: LGATE-001  
 PROJECTION: PCG94



SIZE A3 1:2000  
 0 metres 10 20 30 40 50 60 70 80 90 100

C CALCULATIONS 240116 TG DP  
 B ROAD RESERVE/LOTS MOD 231205 TG DRAFT  
 A FIRST ISSUE 231201 TG DRAFT  
 REV DESCRIPTION YYWDD DRAWN APPROV  
 JOB CODE SERVICE DOC.TYPE DRAW NO. REV.  
**SAT EGL DES DWG RD1446 C**

SUBDIVISION PLAN STAGE 2A  
**Lot 9020 Pipidiny Road, Eglinton**  
 City of Wanneroo

**EGLINTON STAGE 2A  
 QUIET HOUSE DESIGN PACKAGE  
 REQUIREMENTS**

Herring Storer Acoustics  
 Job No : 12111-06  
 Date : 08 February 2024

## **APPENDIX D**

“QUIET HOUSE” DESIGN PACKAGES

**Road Traffic and Passenger Rail  
Quiet House Requirements  
(Based on Table 3 of State Planning Policy 5.4 2019)**

Exposure Category	Orientation to corridor	Acoustic rating and example constructions					Mechanical ventilation/air conditioning considerations
		Walls	External doors	Windows	Roofs and ceilings of highest floors	Outdoor Living areas	
<b>A</b> Quiet House A	Facing	<p><b>Bedroom and Indoor Living and work areas to <math>R_w + C_{tr}</math> 45dB</b></p> <p><b>Stud Frame Walls</b></p> <ul style="list-style-type: none"> <li>➤ One row of 92mm studs at 60mm centres with:</li> <li>➤ Resilient steel channels fixed to the outside of the studs; and</li> <li>➤ 9.5mm hardboard or 9mm fibre cement weatherboards or one layer of 19mm board cladding fixed to the outside of the channels; and</li> <li>➤ 75mm glass wool (11kg/m<sup>3</sup>) or 75mm polyester (14kg/m<sup>3</sup>) insulation, positioned between the studs; and</li> <li>➤ -Two layers of 16mm fire-protective grade plasterboard fixed to the inside face of the studs.</li> </ul> <p><b>Brick Walls</b></p>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Fully glazed hinged door with certified <math>R_w+C_{tr}</math> <b>28dB</b> rated door and frame including seals and 6mm glass</li> </ul> <p><b>Indoor Living and work areas:</b></p> <ul style="list-style-type: none"> <li>➤ 35mm solid core timber hinged door and frame system certified to <math>R_w</math> <b>28dB</b> including seals: <b>OR</b></li> <li>➤ Glazed sliding door with 10 mm glass and weather seals</li> </ul>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Total external door and window system area up to 40% of room floor area: Sliding or double hung with minimum 10 mm single or 6mm-12mm-10mm double insulated glazing (<math>R_w+C_{tr}</math> <b>28 dB</b>). Sealed awning or casement windows may use 6 mm glazing instead: <b>OR</b></li> <li>➤ Up to 60% floor area: as per above but must be sealed awning or casement type windows (<math>R_w+C_{tr}</math> <b>31dB</b>).</li> </ul> <p><b>Indoor Living and work areas</b></p> <ul style="list-style-type: none"> <li>➤ Up to 40% floor area: Sliding, awning, casement or double hung with minimum 6mm single pane or 6mm-12mm-6mm double insulated glazing (<math>R_w+C_{tr}</math> <b>25dB</b>): <b>OR</b></li> <li>➤ Up to 60% floor area: As per Bedrooms at up to 40% area (<math>R_w+C_{tr}</math> <b>28 dB</b> : <b>OR</b></li> <li>➤ Up to 80% floor area: As per Bedrooms at up to 60% area (<math>R_w+C_{tr}</math> <b>31 dB</b>).</li> </ul>	<p><b>To <math>R_w+C_{tr}</math> 35dB</b></p> <ul style="list-style-type: none"> <li>➤ Concrete or terracotta tile or metal sheet roof with sarking and at least 10mm plasterboard ceiling</li> </ul>	<ul style="list-style-type: none"> <li>➤ At least one outdoor living area located on the opposite side of the building from the transport corridor and/or at least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum <b>2 metres</b> height above ground level</li> </ul>	<ul style="list-style-type: none"> <li>➤ Acoustically rated openings and ductwork to provide a minimum sound reduction performance of <b>R<sub>w</sub> 40dB</b> into sensitive spaces</li> <li>➤ Evaporative systems require attenuated ceiling air vents to allow closed windows</li> <li>➤ Refrigerant-based systems need to be designed to achieve National Construction Code fresh air ventilation requirements</li> <li>➤ Openings such as eaves, vents and air inlets must be acoustically treated, closed or relocated to building sides facing away from the corridor where practicable</li> </ul>
	Side On	<ul style="list-style-type: none"> <li>➤ Single leaf of 150mm brick masonry with 13mm cement render on each face: <b>OR</b></li> <li>➤ Double brick: two leaves of 90 mm clay brick masonry with a 20mm cavity between leaves.</li> </ul>	<p>As per "Facing" above, except <math>R_w+C_{tr}</math> values may be 3dB less, e.g. glazed sliding door with 10 mm glass and weather seals for bedrooms</p>	<p>As above, except <math>R_w+C_{tr}</math> values may be 3dB less, or max % area increased by 20%</p>			
	Opposite		No specific requirements	No specific requirements			

**Road Traffic and Passenger Rail  
Quiet House Requirements  
(Based on Table 3 of State Planning Policy 5.4 2019)**

Exposure Category	Orientation to corridor	Acoustic rating and example constructions					Mechanical ventilation/air conditioning considerations
		Walls	External doors	Windows	Roofs and ceilings of highest floors	Outdoor Living areas	
<b>B</b> Quiet House B	Facing	<p><b>Bedroom and indoor living and work areas to <math>R_w+C_{tr}</math> 50dB</b></p> <p><b>Single leaf of 90 mm clay brick masonry with:</b></p> <ul style="list-style-type: none"> <li>➤ A row of 70 mm x 35 mm timber studs or 64 mm steel studs at 600 mm centres;</li> <li>➤ A cavity of 25 mm between leaves;</li> <li>➤ 50 mm glass wool or polyester cavity insulation (R2.0+) insulation between studs; and</li> <li>➤ One layer of 10mm plasterboard fixed to the inside face</li> <li>➤ Single leaf of 220mm brick masonry with 13mm cement render on each face</li> <li>➤ 150mm thick unlined concrete panel or 200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face</li> </ul>	<p><b>Bedrooms</b></p> <ul style="list-style-type: none"> <li>➤ Fully glazed hinged door with certified <math>R_w+C_{tr}</math> <b>31dB</b> rated door and frame including seals and 10mm glass</li> </ul> <p><b>Indoor Living and work areas</b></p> <ul style="list-style-type: none"> <li>➤ 35mm solid core timber hinged door and frame system certified to <math>R_w</math> <b>28dB</b> including seals: <b>OR</b></li> <li>➤ Glazed sliding door with 10 mm glass and weather seals</li> </ul>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Total external door and window system area up to 40% of room floor areas: Fixed sash, awning or casement with minimum 6mm single or 6mm-12mm-6mm double insulated glazing (<math>R_w+C_{tr}</math> <b>31dB</b>).</li> <li>➤ Up to 60% floor area: as per above but must be minimum 10mm single or 6mm-12mm-10mm double insulated glazing (<math>R_w+C_{tr}</math> <b>34dB</b>)</li> </ul> <p><b>Indoor Living and work areas</b></p> <ul style="list-style-type: none"> <li>➤ Up to 40% floor area; Sliding or double hung with minimum 6mm single pane or 6mm-12mm-6mm double insulated glazing (<math>R_w+C_{tr}</math> 28dB). Sealed awning or casement windows may use 6mm glazing instead. : <b>OR</b></li> <li>➤ Up to 60% floor area: As per Bedrooms at up to 40% area (<math>R_w+C_{tr}</math> <b>31dB</b>). : <b>OR</b></li> <li>➤ Up to 80% floor area: As per Bedrooms at up to 60% area (<math>R_w+C_{tr}</math> <b>34dB</b>).</li> </ul>	<p><b>To <math>R_w+C_{tr}</math> 35dB</b></p> <ul style="list-style-type: none"> <li>➤ Concrete or terracotta tile sarking and at least 10mm plasterboard ceiling, R3.0+ insulation</li> <li><b>OR</b></li> <li>➤ Metal sheet roof, sarking and at least 10mm plasterboard ceiling, R3.0+ insulation</li> </ul>	<ul style="list-style-type: none"> <li>➤ At least one outdoor living area located on the opposite side of the building from the corridor and/or at least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum <b>2.4 metres</b> height above ground level</li> </ul>	<ul style="list-style-type: none"> <li>➤ Acoustically rated openings and ductwork to provide a minimum sound reduction performance of <math>R_w</math> <b>40dB</b> into sensitive spaces</li> <li>➤ Evaporative systems require attenuated ceiling air vents to allow closed windows</li> <li>➤ Refrigerant-based systems need to be designed to achieve National Construction Code fresh air ventilation requirements</li> <li>➤ Openings such as eaves, vents and air inlets must be acoustically treated, closed or relocated to building sides facing away from the corridor where practicable</li> </ul>
	Side-On	<p><b>Double brick: two leaves of 90mm clay brick masonry with:</b></p> <ul style="list-style-type: none"> <li>➤ A 50mm cavity between leaves</li> <li>➤ 50mm glass wool or polyester cavity insulation (R2.0+)</li> <li>➤ Resilient ties where required to connect leaves</li> </ul> <p><b>Double brick: two leaves of 110mm clay brick masonry with</b></p> <ul style="list-style-type: none"> <li>➤ 50mm cavity between leaves and R2.0+ cavity insulation</li> </ul>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Fully glazed hinged door with certified <math>R_w+C_{tr}</math> <b>28dB</b> rated door and frame including seals and 6mm glass</li> </ul> <p><b>Indoor Living and work areas:</b></p> <ul style="list-style-type: none"> <li>➤ 35mm solid core timber hinged door and frame system certified to <math>R_w</math> <b>28dB</b> including seals: <b>OR</b></li> <li>➤ Glazed sliding door with 10 mm glass and weather seals</li> </ul>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Total external door and window system area up to 40% of room floor area: Sliding or double hung with minimum 10 mm single or 6mm-12mm-10mm double insulated glazing (<math>R_w+C_{tr}</math> <b>28 dB</b>). Sealed awning or casement windows may use 6 mm glazing instead. : <b>OR</b></li> <li>➤ Up to 60% floor area: as per above but must be sealed awning or casement type windows (<math>R_w+C_{tr}</math> <b>31dB</b>).</li> </ul> <p><b>Indoor Living and work areas</b></p> <ul style="list-style-type: none"> <li>➤ Up to 40% floor area: Sliding, awning, casement or double hung with minimum 6mm single pane or 6mm-12mm-6mm double insulated glazing (<math>R_w+C_{tr}</math> <b>25dB</b>). : <b>OR</b></li> <li>➤ Up to 60% floor area: As per Bedrooms at up to 40% area (<math>R_w+C_{tr}</math> <b>28 dB</b>) : <b>OR</b></li> <li>➤ Up to 80% floor area: As per Bedrooms at up to 60% area (<math>R_w+C_{tr}</math> <b>31 dB</b>).</li> </ul>			
	Opposite	As above, except $R_w+C_{tr}$ values may be 3dB less, or max % area increased by 20%	As above, except $R_w+C_{tr}$ values may be 3dB less, or max % area increased by 20%				

**Road Traffic and Passenger Rail  
Quiet House Requirements  
(Based on Table 3 of State Planning Policy 5.4 2019)**

Exposure Category	Orientation to corridor	Acoustic rating and example constructions					Mechanical ventilation/air conditioning considerations
		Walls	External doors	Windows	Roofs and ceilings of highest floors	Outdoor Living areas	
<b>C</b> Quiet House C	Facing	<p><b>Bedroom and indoor living and work areas to <math>R_w+C_{tr}</math> 50dB</b></p> <p><b>Single leaf of 90 mm clay brick masonry with:</b></p> <ul style="list-style-type: none"> <li>➤ A row of 70 mm x 35 mm timber studs or 64 mm steel studs at 600 mm centres;</li> <li>➤ A cavity of 25 mm between leaves;</li> <li>➤ 50 mm glass wool or polyester cavity insulation (R2.0+) insulation between studs; and</li> </ul>	<p><b>Bedrooms</b></p> <ul style="list-style-type: none"> <li>➤ External doors to bedrooms facing the corridor are not recommended.</li> </ul> <p><b>Indoor Living and work areas</b></p> <ul style="list-style-type: none"> <li>➤ Fully glazed hinged door with certified <b><math>R_w+C_{tr}</math> 31dB</b> rated door and frame including seals and 10mm glass: <b>OR</b></li> </ul> <p>40mm solid core timber frame and door (without glass or with glass inserts not less than 6mm), side hinged with certified <b><math>R_w</math> 32dB</b> acoustically rated door and frame system including seals</p>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Total external door and window system area up to 20% of room floor area: Fixed sash, awning or casement with minimum 6mm single or 6mm-12mm-6mm double insulated glazing (<b><math>R_w+C_{tr}</math> 31dB</b>): <b>OR</b></li> <li>➤ Up to 40% floor area; as per above but must be minimum 10mm single or 6mm-12mm-10mm double insulated glazing (<b><math>R_w+C_{tr}</math> 34dB</b>).</li> </ul> <p><b>Indoor Living and work areas</b></p> <ul style="list-style-type: none"> <li>➤ Up to 40% floor area: Sliding or double hung with minimum 6mm single pane or 6mm-12mm-6mm double insulated glazing (<b><math>R_w+C_{tr}</math> 31dB</b>). Sealed awning or casement windows may use 6mm glazing instead: <b>OR</b></li> <li>➤ Up to 60% floor area: As per Bedrooms at up to 40% area (<b><math>R_w+C_{tr}</math> 34dB</b>)</li> </ul>	<p><b>To <math>R_w+C_{tr}</math> 40dB</b></p> <ul style="list-style-type: none"> <li>➤ To all bedrooms, 2 layers of 10mm plasterboard, or one layer 13mm high density sealed plasterboard (minimum surface density of 12.5 kg/m<sup>2</sup>), affixed using steel furring channels beneath ceiling rafters/supports: <b>and</b></li> <li>➤ R3.0+ insulation batts laid in cavity : <b>and</b></li> <li>➤ Concrete or terracotta tile roof with sarking, or metal sheet roof with foil backed R2.0+ fibre insulation between steel sheeting and roof battens</li> </ul>	<ul style="list-style-type: none"> <li>➤ At least one outdoor living area located on the opposite side of the building from the corridor and/or at least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum <b>2.4 metres</b> height above ground level</li> </ul>	<ul style="list-style-type: none"> <li>➤ Acoustically rated openings and ductwork to provide a minimum sound reduction performance of <math>R_w</math> 40dB into sensitive spaces.</li> <li>➤ Evaporative systems require attenuated ceiling air cents to allow closed windows.</li> <li>➤ Refrigerant-based systems need to be designed to achieve National Construction Code fresh air ventilation requirements</li> </ul>
	Side-on	<ul style="list-style-type: none"> <li>➤ One layer of 10mm plasterboard fixed to the inside face</li> <li>➤ Single leaf of 220mm brick masonry with 13mm cement render on each face</li> <li>➤ 150mm thick unlined concrete panel or 200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face</li> </ul> <p><b>Double brick: two leaves of 90mm clay brick masonry with:</b></p>	<p><b>Bedrooms</b></p> <ul style="list-style-type: none"> <li>➤ Fully glazed hinged door with certified <b><math>R_w+C_{tr}</math> 31dB</b> rated door and frame including seals and 10mm glass</li> </ul> <p><b>Indoor Living and work areas</b></p> <ul style="list-style-type: none"> <li>➤ 35mm solid core timber hinged door and frame system certified to <b><math>R_w</math> 28dB</b> including seals: <b>OR</b></li> <li>➤ Glazed sliding door with 10 mm glass and weather seals</li> </ul>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Fully glazed hinged door with certified <b><math>R_w+C_{tr}</math> 28dB</b> rated door and frame including seals and 6mm glass</li> </ul> <p><b>Indoor Living and work areas:</b></p> <ul style="list-style-type: none"> <li>➤ 35mm solid core timber hinged door and frame system certified to <b><math>R_w</math> 28dB</b> including seals: <b>OR</b></li> <li>➤ Glazed sliding door with 10 mm glass and weather seals</li> </ul>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Total external door and window system area up to 40% of room floor area: Sliding or double hung with minimum 10 mm single or 6mm-12mm-10mm double insulated glazing (<b><math>R_w+C_{tr}</math> 28 dB</b>). Sealed awning or casement windows may use 6 mm glazing instead: <b>OR</b></li> <li>➤ Up to 60% floor area: as per above but must be sealed awning or casement type windows (<b><math>R_w+C_{tr}</math> 31dB</b>).</li> </ul> <p><b>Indoor Living and work areas</b></p> <ul style="list-style-type: none"> <li>➤ Up to 40% floor area: Sliding, awning, casement or double hung with minimum 6mm single pane or 6mm-12mm-6mm double insulated glazing (<b><math>R_w+C_{tr}</math> 25dB</b>): <b>OR</b></li> <li>➤ Up to 60% floor area: As per Bedrooms at up to 40% area (<b><math>R_w+C_{tr}</math> 28 dB</b> : <b>OR</b></li> <li>➤ Up to 80% floor area: As per Bedrooms at up to 60% area (<b><math>R_w+C_{tr}</math> 31 dB</b>).</li> </ul>	<ul style="list-style-type: none"> <li>➤ At least one outdoor living area located on the opposite side of the building from the corridor and/or at least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum <b>2.4 metres</b> height above ground level</li> </ul>	<ul style="list-style-type: none"> <li>➤ Openings such as eaves, vents and air inlets must be acoustically treated, close or relocated to building sides facing away from the corridor where practicable.</li> </ul>
	Opposite	<ul style="list-style-type: none"> <li>➤ A 50mm cavity between leaves</li> <li>➤ 50mm glass wool or polyester cavity insulation (R2.0+)</li> <li>➤ Resilient ties where required to connect leaves</li> </ul> <p><b>Double brick: two leaves of 110mm clay brick masonry with</b></p> <ul style="list-style-type: none"> <li>➤ 50mm cavity between leaves and R2.0+ cavity insulation</li> </ul>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Fully glazed hinged door with certified <b><math>R_w+C_{tr}</math> 28dB</b> rated door and frame including seals and 6mm glass</li> </ul> <p><b>Indoor Living and work areas:</b></p> <ul style="list-style-type: none"> <li>➤ 35mm solid core timber hinged door and frame system certified to <b><math>R_w</math> 28dB</b> including seals: <b>OR</b></li> <li>➤ Glazed sliding door with 10 mm glass and weather seals</li> </ul>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Fully glazed hinged door with certified <b><math>R_w+C_{tr}</math> 28dB</b> rated door and frame including seals and 6mm glass</li> </ul> <p><b>Indoor Living and work areas:</b></p> <ul style="list-style-type: none"> <li>➤ 35mm solid core timber hinged door and frame system certified to <b><math>R_w</math> 28dB</b> including seals: <b>OR</b></li> <li>➤ Glazed sliding door with 10 mm glass and weather seals</li> </ul>	<p><b>Bedrooms:</b></p> <ul style="list-style-type: none"> <li>➤ Total external door and window system area up to 40% of room floor area: Sliding or double hung with minimum 10 mm single or 6mm-12mm-10mm double insulated glazing (<b><math>R_w+C_{tr}</math> 28 dB</b>). Sealed awning or casement windows may use 6 mm glazing instead: <b>OR</b></li> <li>➤ Up to 60% floor area: as per above but must be sealed awning or casement type windows (<b><math>R_w+C_{tr}</math> 31dB</b>).</li> </ul> <p><b>Indoor Living and work areas</b></p> <ul style="list-style-type: none"> <li>➤ Up to 40% floor area: Sliding, awning, casement or double hung with minimum 6mm single pane or 6mm-12mm-6mm double insulated glazing (<b><math>R_w+C_{tr}</math> 25dB</b>): <b>OR</b></li> <li>➤ Up to 60% floor area: As per Bedrooms at up to 40% area (<b><math>R_w+C_{tr}</math> 28 dB</b> : <b>OR</b></li> <li>➤ Up to 80% floor area: As per Bedrooms at up to 60% area (<b><math>R_w+C_{tr}</math> 31 dB</b>).</li> </ul>	<ul style="list-style-type: none"> <li>➤ At least one outdoor living area located on the opposite side of the building from the corridor and/or at least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum <b>2.4 metres</b> height above ground level</li> </ul>	<ul style="list-style-type: none"> <li>➤ Openings such as eaves, vents and air inlets must be acoustically treated, close or relocated to building sides facing away from the corridor where practicable.</li> </ul>

# **APPENDIX E**

TRAFFIC DATA

2041 ROM24 Scenario - Link Volume Plot for Marmion Ave, Alkimos Noise Assessment  
 All Day

Mitchell Fwy Extension land use and network assumption

**MODEL ASSUMPTIONS**

**NETWORK:** 2041 Mitchell Freeway Extension network assumptions  
**LAND USE:** 2041 Mitchell Freeway Extension land use assumptions

**ROM24 Multi-Modal Model V4.40**

**24-Hour Traffic Volumes (Factored by 100)**

Terms & Conditions:  
 MRWA Traffic Modelling Data is supplied to approved clients in confidence and is not to be made available to unauthorised persons or organisations. This data should not be used for any purpose other than the stated purpose for which it was requested from MRWA. The MRWA ROM24 is for estimating regional traffic volumes on regional and major local roads, and it should not be used for estimating local traffic on local roads. The MRWA ROM24 includes local roads but it is not intended to provide connectivity in the model. MRWA Traffic Modelling Data should be interpreted by an experienced qualified person. This data should not be used in making decisions relating to commercial or residential developments.



Transport Modelling Section  
 Enquiries: Thomas.Ly@mainroads.wa.gov.au  
 MRWA Reference Job #42519  
 Mar 25 Jul 2022  
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(Licensed to )



SITE 53583

# Hourly Volume

Marmion Av (H029)

2021/22  
 Monday to Friday

North of Pipindinny Rd (SLK 35.37)

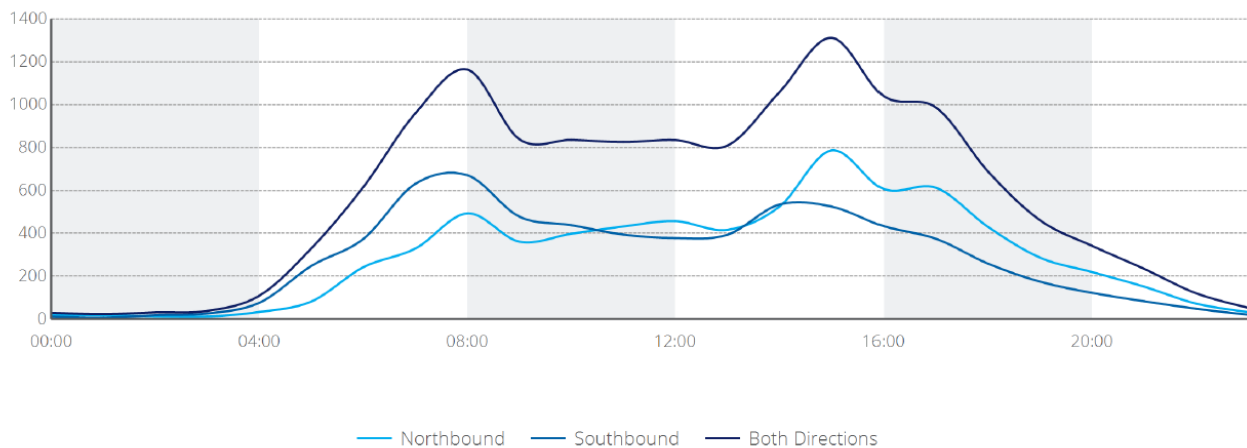
	All Vehicles				Heavy Vehicles								
	N	NB	S	SB	N/S	Both	N	NB	S	SB	N/S	Both	%
00:00		18		11		29		1		0		1	3.4
01:00		17		6		23		1		1		2	8.7
02:00		13		18		31		2		3		5	16.1
03:00		12		26		38		1		2		3	7.9
04:00		33		76		109		7		11		18	16.5
05:00		82		248		330		12		41		53	16.1
06:00		242		374		616		31		51		82	13.3
07:00		329		631		960		44		72		116	12.1
08:00		493		671		1164		47		95		142	12.2
09:00		361		478		839		49		71		120	14.3
10:00		398		438		836		45		64		109	13.0
11:00		432		394		826		54		68		122	14.8
12:00		457		378		835		41		51		92	11.0
13:00		416		393		809		50		60		110	13.6
14:00		524		534		1058		37		71		108	10.2
15:00		787		525		1312		48		67		115	8.8
16:00		606		433		1039		37		40		77	7.4
17:00		612		374		986		34		37		71	7.2
18:00		429		258		687		20		27		47	6.8
19:00		286		174		460		22		13		35	7.6
20:00		219		122		341		14		8		22	6.5
21:00		151		83		234		10		6		16	6.8
22:00		72		48		120		3		2		5	4.2
23:00		32		20		52		1		3		4	7.7
TOTAL		7021		6713		13734		611		864		1475	10.7



## Peak Statistics

AM	TIME	08:15	07:30	07:45	11:15	07:30	08:00
	VOL	497	781	1220	55	95	142
PM	TIME	14:45	14:15	14:45	13:00	14:45	14:45
	VOL	789	567	1346	50	78	125

Volume



**2041 ROM24 Scenario - Link Volume Plot for Marmion Ave, Eglinton Noise Assessment**  
**All Day**

**Mitchell Freeway Extension Modelling Project**

**MODEL ASSUMPTIONS**

NETWORK: 2041 Mitchell Freeway Extension network assumptions  
 LAND USE: 2041 Mitchell Freeway Extension land use assumptions

**ROM24 Multi-Modal Model V4.40**

**24-Hour Traffic Volumes (Factor X 100)**

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Transport Modelling Section  
 Enquiries Clare Yu 9323 4967  
 MRWA Reference Job #42546  
 Thu 30 Mar 2023  
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- 1 Lane Each Direction
- 2 Lanes Each Direction
- 3 Lanes Each Direction
- >=4 Lanes Each Direction
- - - Zone Connector

# **APPENDIX F**

## MONITORING DATA

