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Traffic Noise Impact Assessment Everleigh, Greenbank

RoL 5 Application

Mirvac

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Executive Summary

ATP Consulting Engineers (ATP) was engaged by Mirvac to prepare a traffic noise impact assessment in support of the RoL 5 application for the Everleigh development in Greenbank.

This is Issue 5 of the report which has been prepared with consideration of the proposed new alignment and design surface levels for the Teviot Road upgrade. Teviot Road will be upgraded in the future and a new intersection will be constructed at Leanne Court and Anderson Drive, at the entry of RoL 5.

Previously, Issue 4 of the report was prepared with consideration of the revised bulk earthworks model by Premise. Premise was required to update the bulk earthworks for RoL 5 due to change in the retaining wall height criteria from EDQ. The Issue 4 report did not consider the design surface levels for the Teviot Road upgrade.

This is Issue 3 of the report considering the latest development layout and revised 2051 traffic volume estimates from Premise.

Previously, Issue 2 of the report was prepared considering the following information: Updated WOS traffic modelling data sketch and year 2051 traffic volume data; Precinct 9 3D surface file; and Civil CAD base file.

Potential noise impacts from commercial activities associated with the proposed Neighbourhood Centre, as well as activities at the school and recreation areas, are not part of this assessment and will require detailed assessment at a later stage.

Traffic noise propagation modelling was carried out considering the future traffic flows for a planning horizon of 2051. The results of the noise propagation modelling indicate that, without noise mitigation measures, the proposed dwellings at RoL 5 will be impacted by traffic noise from Teviot Road and Anderson Drive.

To mitigate traffic noise the following noise control measures must be implemented:

- Noise barriers must be constructed along Teviot Road and portion of Anderson Drive as presented in Figures 6.1 to 6.3 of this report.
- The noise barriers will ensure compliance with the traffic noise criteria at the ground floors of Lots 3001 to 3014, however the upper floors of these allotments will be impacted by traffic noise. The upper floors of Lots 3001 to 3014 must be designed and constructed as per AS 3671-1989 (floor-plan specific acoustic design) or acceptable forms of construction from QDC MP4.4.
- Noise barriers cannot be built at the front-loaded lots adjacent to Anderson Drive (Lots 3347 to 3418). The ground and upper floors of Lots 3347 to 3418 must be designed and constructed as per AS 3671-1989 (floor-plan specific acoustic design) or acceptable forms of construction from QDC MP4.4.

Provided the recommended planning and design noise control measures are implemented in the construction of Everleigh RoL 5, road traffic noise will not impose any further constraints on the establishment of the development.

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1. Introduction

1.1 Project background

ATP Consulting Engineers (ATP) was engaged by Mirvac to prepare a traffic noise impact assessment in support of the RoL 5 application for the Everleigh development in Greenbank.

This is Issue 5 of the report which has been prepared with consideration of the proposed new alignment and design surface levels for the Teviot Road upgrade. Teviot Road will be upgraded in the future and a new intersection will be constructed at Leanne Court and Anderson Drive, at the entry of RoL 5.

Previously, Issue 4 of the report was prepared with consideration of the revised bulk earthworks model by Premise. Premise was required to update the bulk earthworks for RoL 5 due to change in the retaining wall height criteria from EDQ. The Issue 4 report did not consider the design surface levels for the Teviot Road upgrade.

Previously, Issue 3 of the report was prepared considering the development layout dated 12 April 2021 and revised 2051 traffic volume estimates from Premise.

Previously, Issue 2 of the report was prepared considering the following information: Updated WOS traffic modelling data sketch and year 2051 traffic volume data; Precinct 9 3D surface file; and Civil CAD base file.

Potential noise impacts from commercial activities associated with the proposed Neighbourhood Centre, as well as activities at the school and recreation areas, are not part of this assessment and will require detailed assessment at a later stage.

1.2 Study objectives

Study objectives are as follows:

- Site specific noise measurements near Teviot Road to obtain information about the existing noise levels. The measured traffic noise levels will be used for validation of the SoundPLAN noise propagation model.
- Development of a 3D traffic noise propagation model using SoundPLAN software considering the development layout and civil engineering design of RoL 5. The traffic flows along Teviot Road and higher order internal road, to the year 2051 (ultimate planning horizon), will be considered in the SoundPLAN model.
- Calculation of the traffic noise levels at the facades and private open spaces of the future dwellings to be constructed at RoL 5.
- Based on the calculated traffic noise levels ATP Consulting will provide recommendations for noise control measures (i.e. acoustic barriers and advice on the architectural treatments to the building facades) to ensure compliance with the relevant external and internal noise criteria.

- Provision of a detailed acoustic report (traffic noise impact assessment) in a format required by EDQ and Logan City Council (LCC). The report will present the traffic noise assessment methodology, tabulated measured noise levels, calculated traffic noise levels, and recommendations for noise control measures.

1.3 Development plan

The approved Everleigh development is a master-planned community in Greenbank with frontage to Teviot Road to the west and Greenbank Road to the south. The subject site has a total area of 482.1 Ha. The site is located within the Greater Flagstone priority development area (PDA).

The development layout for RoL 5 is presented in Appendix A.

2. Existing Noise Amenity

2.1 Site-specific noise measurements

Noise monitoring was carried out at the western boundary of RoL 5, adjacent to Teviot Road, to obtain information about the existing traffic and background noise levels.

The noise measurement methodology is summarised in Table 2.1.

Table 2.1 Noise measurements

Relevant legislation, standards and guidelines	The noise measurements were carried out in accordance with: - Australian Standard AS 1055:2018 (<i>Acoustics – Description and measurement of environmental noise</i>); and - Australian Standard AS 2702-1984 (<i>Acoustics – Methods for measurement of road traffic noise</i>).
Measurement location	The noise monitoring was carried out at the south-western boundary of the existing Lot 3 on SP297192, which is located with the proposed RoL 5. The measurement location was approximately 20m setback from Teviot Road. The noise measurement location is presented in Figure 2.1, as well as the photos presented in Appendix B.
Measurement period	Continuous noise monitoring was carried out 24 hours a day from 5 to 18 March 2020.
Measurement equipment	The following noise measurement equipment was used: - Environmental noise logger – ARL EL-315 (serial no. 15-203-537); and - Calibration – RION NC-74 Sound Level Calibrator (serial no. 34615224). The noise measurement instruments conform to Australian Standard AS IEC61672.1-2004. Calibration was performed during set up and download of the data from the noise logger. The calibration drift was <0.1 dB(A).
Meteorological conditions	Rainfall occurred during on 6, 9, 10 and 12 March 2020. Noise data affected by periods of rainfall has been excluded from the results. Full meteorological data for the monitoring period is presented in Appendix C.
Analysis of data	The noise measurement data was analysed to determine the following noise descriptor: L_{10,18hr}: L₁₀ is the level of noise exceeded for 10% of any time period; L_{10,18hr} is the typical traffic noise descriptor, and is the arithmetic average of 18 hourly L_{10,1hr} levels over consecutive hours between 6am and 12am.



Figure 2.1 Noise measurement location

2.2 Measurement results

The results of the noise measurements undertaken from 5 to 18 March 2020 are presented in Table 2.2 and Appendix D.

Table 2.2 Noise measurement results

Date	Traffic Noise Levels		Background Noise Levels	
	L ₁₀ ,18hr (6am-12am)	L ₁₀ ,1hr max (6am-12am)	L ₉₀ ,18hr (6am-12am)	L ₉₀ ,8hr (10pm-6am)
5 Mar 2020 (Thu)	—	—	—	39
6 Mar 2020 (Fri)	64	67	52	36
7 Mar 2020 (Sat)	64	65	51	37
8 Mar 2020 (Sun)	62	65	49	38
9 Mar 2020 (Mon)	66	68	54	39
10 Mar 2020 (Tue)	64	68	53	39
11 Mar 2020 (Wed)	64	68	54	40
12 Mar 2020 (Thu)	65	68	55	41
13 Mar 2020 (Fri)	65	68	55	38
14 Mar 2020 (Sat)	64	66	52	39
15 Mar 2020 (Sun)	64	67	51	38
16 Mar 2020 (Mon)	64	68	52	39
17 Mar 2020 (Tue)	64	70	53	38
18 Mar 2020 (Wed)	63	67	52	39
Arithmetic Mean	64	67	52	39
Weekdays Only	64	68	53	39

Noise data disregarded due to rainfall.

3. Traffic Noise Criteria

3.1 External noise criteria

The development site is located within the Greater Flagstone PDA, a priority development area designated by Economic Development Queensland (EDQ).

There are no traffic noise criteria specific to the Greater Flagstone PDA. Traffic noise impact assessment for the Everleigh development should be carried out in accordance with the Department of Transport and Main Roads (TMR) *Road Traffic Noise Management: Code of Practice*.

The relevant traffic noise criteria are provided in the following documents:

- Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP), *State Development Assessment Provisions (SDAP) version 2.6 (February 2020), State code 1: Development in state-controlled road environment*; and
- Department of Transport and Main Roads (TMR), *Policy for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure Version 4 (October 2017)*.

The applicable criteria from the TMR Policy and the SDAP are presented in Table 3.1.

Table 3.1 External noise criteria for new residential development

Transport infrastructure	Development type	Location within development	Environmental criteria
State-controlled Road	Accommodation activities ¹	All facades	≤60dB(A) L _{10,18hr} facade corrected (measured L _{90,8hr} free field between 10pm and 6am ≤ 40dB(A))
			≤63dB(A) L _{10,18hr} facade corrected (measured L _{90,8hr} free field between 10pm and 6am > 40dB(A))
		Outdoor spaces for passive recreation	≤57dB(A) L _{10,18hr} free field (measured L _{90,18hr} free field between 6am and 10pm ≤ 45dB(A))
			≤60dB(A) L _{10,18hr} free field (measured L _{90,18hr} free field between 6am and 10pm > 45dB(A))

The relevant façade adjusted² road traffic noise criterion for the building facades is 63dB(A)L_{10,18hr}³.

The designated private open spaces (outdoor living areas) have to comply with the free-field traffic noise criterion of 60dB(A)L_{10,18hr}.

¹ Includes caretaker's accommodation, community residence, dual occupancy, dwelling house, dwelling unit, multiple dwelling, relocatable home park, residential care facility, resort complex, retirement facility, rooming accommodation, short-term accommodation and tourist park.

² The façade adjusted noise criteria contains +2.5dB(A) adjustment factor for the sound energy that is result of the reflection of the sound wave from the hard surface of typical buildings. This adjustment is applicable for areas within 3m from a hard reflective vertical surface.

³ Within a 10 year planning horizon, as the development is established, background noise levels in the vicinity of Teviot Road and Greenbank Road are expected to be greater than 40dB(A) L_{90,8hr} between 10pm and 6am.

In case of exceedance of the external traffic noise criteria, architectural treatment has to be applied to the external facade of the building to protect the internal noise amenity of the residential dwellings

3.2 Internal noise criteria

Where the external noise criteria cannot be met, the residential dwellings must be designed to mitigate intrusion of traffic noise into habitable rooms. At the building approval stage the dwellings at the affected allotments should be designed and constructed as per AS3671-1989 (floor-plan specific acoustic design) or acceptable forms of construction from QDC MP4.4.

When carrying out acoustic design as per AS3671, it is recommended to adopt the internal noise criteria specified in AS/NZS 2107:2016 as presented in Table 3.2.

Table 3.2 Internal noise criteria (dwellings)

Type of occupancy	Maximum L_{Aeq}
Living areas	45 dB(A)
Sleeping areas	40 dB(A)

4. Traffic Noise Calculation Methodology

The traffic noise from Teviot Road and the Anderson Drive was calculated using SoundPLAN noise propagation modelling software as per the procedure specified in the UK Department of Transport Welsh Office *Method of Calculation of Road Traffic Noise* (CoRTN'88). This is an accepted traffic noise calculation procedure applied widely in Australia⁴.

Traffic noise levels have been calculated for the ultimate planning horizon of 2051. Detailed results are calculated for the allotments located within RoL 5.

4.1 Traffic noise model – Validation (Year 2020)

The noise data collected during the monitoring period (as presented in Table 2.2) was used to validate the accuracy of the SoundPLAN model prior to calculating future road traffic noise levels.

Traffic flow data, as considered in the SoundPLAN validation model, is presented in Table 4.1.

Table 4.1 Traffic flow data for validation

Road	2006 Traffic Flow AADT ⁵	2020 Traffic Flow AADT ⁶	Heavy Vehicles (%)
Teviot Road	4,155	9,394	5.0

The additional factors and assumptions considered in the model are presented in Table 4.2.

Table 4.2 Data and assumptions – Model validation

Parameter	Data/Assumptions
Mean vehicle speed	• Teviot Road: 70 km/h north of Pub Lane and 80 km/h south of Pub Lane
Calculation procedure	• CoRTN (Calculation of Road Traffic Noise) • SoundPLAN grid spacing is 1m while the increment for angle of view is 1°
Road traffic volume for CoRTN procedure	• The CoRTN procedure requires 18 hours traffic volume data. Traffic volume for 18-hours (6:00am to midnight) was considered as 94% of the 24 hour AADT.
Road surface	• Teviot Road: Bituminous seal, requiring an adjustment of +3dB in the model
Noise logger	Each noise logger was situated at a free field location with a microphone height of 1.2m above ground level.

The results of the SoundPLAN model validation are presented in Table 4.3 and in Appendix F.

⁴ CoRTN (Calculation of Road Traffic Noise) is a widely accepted procedure in Australia for calculation of traffic noise and it is specifically recommended in QLD TMR's Code of Practice Volume 1, Section 4.3.2, Page 29.

⁵ Most recent traffic data available for Teviot Road and Greenbank Road was from a 2006/2007 study by the Department for Transport and Main Roads (TMR, 2010).

⁶ Traffic flow growth rates of 6.0% per annum from 2006 to 2020, based on population data published by the Queensland Government Statisticians Office which indicates a growth rate of approximately 6% within the Greenbank Statistical Area 2.

Table 4.3 SoundPLAN validation results

Receiver	Measured* L ₁₀ (18-hour) dB(A)	Calculated* L ₁₀ (18-hour) dB(A)	Difference dB(A)	Validation Factor
Noise Logger – Location 1	64	64	0	N/A

*Free-field

The calculated traffic noise levels are within ± 2 dBA tolerance limit, hence no correction factor is required.

4.2 Traffic noise model – Planning horizon (Year 2051)

Traffic noise calculations were carried out for an ultimate planning horizon of 2051. Traffic volumes for Teviot Road were sourced from the approved “Movement Network Infrastructure Master Plan” (3 March 2017) for the Everleigh development, prepared by MWH. Traffic volumes for Anderson Drive and Everleigh Drive were sourced from the Precinct 9 Traffic Statement by Premise – Drawing WOS600 revision B dated 11 May 2021.

The daily traffic volumes for 2051 are presented in Table 4.4 and in Appendix E.

Table 4.4 Traffic flow data – 2051 planning horizon

Road	Road Segment	2051 Traffic Flow AADT	Heavy Vehicles (%)
Teviot Road	North of Leanne Court	38,063	5
Teviot Road	Leanne Court to Shopping centre northern access road	34,304	5
Teviot Road	Shopping centre northern access road to Pub Lane	34,978	5
Teviot Road	Pub Lane to Greenbank Road	24,681	5
Teviot Road	South of Greenbank Road	19,423	5
Anderson Drive	Teviot Road to Kessels Boulevard	15,274	3
Anderson Drive	Kessels Boulevard to "Park" Road	7,382	3
Anderson Drive	"Park" Road to Ivory Parkway	3,190	3
Everleigh Drive	Teviot Road to Kessels Boulevard	12,364	3
Everleigh Drive	Kessels Boulevard to Ivory Parkway	4,912	3

The various additional factors considered in the model are presented in Table 4.5.

Table 4.5 Data and assumptions – Planning horizon model

Parameter	Data/Assumptions
Mean vehicle speed	• Teviot Road: 70 km/h north of Pub Lane and 80 km/h south of Pub Lane • Internal roads: 50 km/h
Calculation procedure	• CoRTN (Calculation of Road Traffic Noise) • SoundPLAN grid spacing is 1m while the increment for angle of view is 1°
Road traffic volume for CoRTN procedure	• The CoRTN procedure requires 18 hours traffic volume data. Traffic volume for 18-hours (6:00am to midnight) was considered as 94% of the 24 hour AADT.
Road type and alignment	• Teviot Road: After road upgrade: Two lanes in each direction. Centreline of new road is same as existing road (Note: as explained in Section 1.1 of this report, the new alignment of Teviot Road will be different and this noise assessment must be updated to consider the new road alignment once the finished surface levels for the new road design are made available). • Anderson Drive: Two lanes in each direction to the first roundabout, then one lane in each direction. • Everleigh Drive: One lane in each direction. • Source: - Civil CAD Base File "X-MIRSGB BASE" - CAD Base – Leanne_Anderson 250521
Road surface	• Teviot Road: Dense graded asphalt (after road upgrade) • Anderson Drive and Everleigh Drive: Dense graded asphalt. Dense graded asphalt requires no adjustment factor.
Development layout	• Source: - Civil CAD Base File "X-MIRSGB BASE"
Buildings	• Residential buildings on all lots were considered as one storey high with total height of 3.5m. • Front setbacks are 6.0m.
Receivers	Façade noise levels • Although buildings were considered as single-storey, receivers were allocated to ground (1.8m AGL) as well as upper floor (4.6m AGL) to calculate noise levels at potential two-storey houses. Note: <i>AGL: above ground level</i> • SoundPLAN adds +2.5dB(A) to the calculated noise levels when the receivers are attached to the buildings, thus the tabulated traffic noise levels are façade adjusted. Private open spaces • Receivers were placed at the outdoor living areas which are located at the ground floor at the rear of each dwelling (i.e. backyards). • Receivers were placed at a free-field location 4m from the building façades. • Receivers were placed at 1.5m AGL.
CoRTN correction factor	• Application of CoRTN correction factor of –1.7dB for receivers located 1m from building façades is considered in Australia, and –0.7dB for free-field receivers, as recommended by <i>TMR Code of Practice</i>.
Terrain	• Sourced from earthworks drawings by Premise: - 2021-07-22 MIR003 ROL5 Design Surface Tin 3d Triangles - Precinct 9 Design Surface 3D Triangles "2020-10-28 PRECINCT 9 DESIGN TIN 3D TRIANGLES.dwg" - Whole of Site Bulk Earthworks Finished Surface Levels "WOS BEW FINISHED SURFACE SUPER 3D TRIANGLES.dwg" - Teviot Rd- design tins east side 20210729

Parameter	Data/Assumptions
Noise control measures	Traffic noise levels were calculated with the noise control measures recommended in Section 6 of this report.

Overview of the SoundPLAN traffic noise model for RoL 5 is presented in Figure 4.1.



Figure 4.1 SoundPLAN traffic noise model – RoL 5

5. Calculated Traffic Noise Levels

The road traffic noise levels were calculated at the facades (ground and upper floors) and private open space (ground floor outdoor living area) of each dwelling, considering the noise barriers as per Section 6 of this report.

The calculated noise levels were then assessed against the traffic noise criteria ($\leq 63\text{dB(A)}$ $L_{10,18\text{hr}}$ facade adjusted for building facades; and $\leq 60\text{dB(A)}$ $L_{10,18\text{hr}}$ free-field for private open spaces).

5.1 Allotments within RoL 5

The calculated traffic noise levels at the allotments located within RoL 5 are presented in Table 5.1.

Table 5.1 Calculated traffic noise levels – RoL 5

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		$L_{10,18\text{hr}}$ dB(A) free-field	Compliance $\leq 60\text{dB(A)}$ $L_{10,18\text{hr}}$
	$L_{10,18\text{hr}}$ dB(A) facade-adjusted	Compliance $\leq 63\text{dB(A)}$ $L_{10,18\text{hr}}$	$L_{10,18\text{hr}}$ dB(A) facade-adjusted	Compliance $\leq 63\text{dB(A)}$ $L_{10,18\text{hr}}$		
RoL 5 Lot 3001	60	Yes	67	No	57	Yes
RoL 5 Lot 3002	60	Yes	67	No	58	Yes
RoL 5 Lot 3003	61	Yes	68	No	59	Yes
RoL 5 Lot 3004	61	Yes	69	No	59	Yes
RoL 5 Lot 3005	61	Yes	69	No	59	Yes
RoL 5 Lot 3006	62	Yes	69	No	60	Yes
RoL 5 Lot 3007	62	Yes	69	No	60	Yes
RoL 5 Lot 3008	62	Yes	69	No	60	Yes
RoL 5 Lot 3009	61	Yes	69	No	60	Yes
RoL 5 Lot 3010	61	Yes	70	No	60	Yes
RoL 5 Lot 3011	60	Yes	65	No	58	Yes
RoL 5 Lot 3012	60	Yes	64	No	58	Yes
RoL 5 Lot 3013	60	Yes	64	No	57	Yes
RoL 5 Lot 3014	60	Yes	64	No	58	Yes
RoL 5 Lot 3015	48	Yes	51	Yes	47	Yes
RoL 5 Lot 3016	58	Yes	61	Yes	55	Yes
RoL 5 Lot 3017	56	Yes	61	Yes	54	Yes
RoL 5 Lot 3018	56	Yes	60	Yes	54	Yes
RoL 5 Lot 3019	56	Yes	60	Yes	53	Yes
RoL 5 Lot 3020	57	Yes	60	Yes	53	Yes
RoL 5 Lot 3021	57	Yes	60	Yes	53	Yes
RoL 5 Lot 3022	57	Yes	60	Yes	53	Yes
RoL 5 Lot 3023	57	Yes	60	Yes	53	Yes
RoL 5 Lot 3024	57	Yes	60	Yes	54	Yes
RoL 5 Lot 3025	56	Yes	59	Yes	55	Yes
RoL 5 Lot 3026	56	Yes	59	Yes	55	Yes
RoL 5 Lot 3027	56	Yes	59	Yes	55	Yes
RoL 5 Lot 3028	56	Yes	59	Yes	55	Yes
RoL 5 Lot 3029	56	Yes	60	Yes	55	Yes
RoL 5 Lot 3030	61	Yes	63	Yes	54	Yes
RoL 5 Lot 3031	61	Yes	63	Yes	53	Yes
RoL 5 Lot 3032	61	Yes	63	Yes	53	Yes
RoL 5 Lot 3033	61	Yes	63	Yes	53	Yes
RoL 5 Lot 3034	55	Yes	59	Yes	52	Yes
RoL 5 Lot 3035	55	Yes	59	Yes	52	Yes
RoL 5 Lot 3036	55	Yes	58	Yes	52	Yes
RoL 5 Lot 3037	55	Yes	58	Yes	52	Yes
RoL 5 Lot 3038	55	Yes	58	Yes	52	Yes
RoL 5 Lot 3039	55	Yes	57	Yes	51	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L _{10,18hr} dB(A) free-field	Compliance ≤60dB(A) L _{10,18hr}
	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}		
RoL 5 Lot 3040	55	Yes	57	Yes	51	Yes
RoL 5 Lot 3041	55	Yes	57	Yes	51	Yes
RoL 5 Lot 3042	55	Yes	57	Yes	51	Yes
RoL 5 Lot 3043	55	Yes	56	Yes	52	Yes
RoL 5 Lot 3044	53	Yes	55	Yes	50	Yes
RoL 5 Lot 3045	53	Yes	55	Yes	50	Yes
RoL 5 Lot 3046	52	Yes	55	Yes	50	Yes
RoL 5 Lot 3047	52	Yes	55	Yes	50	Yes
RoL 5 Lot 3048	52	Yes	55	Yes	50	Yes
RoL 5 Lot 3049	52	Yes	56	Yes	51	Yes
RoL 5 Lot 3050	53	Yes	56	Yes	51	Yes
RoL 5 Lot 3051	53	Yes	57	Yes	51	Yes
RoL 5 Lot 3052	53	Yes	57	Yes	52	Yes
RoL 5 Lot 3053	54	Yes	58	Yes	52	Yes
RoL 5 Lot 3054	60	Yes	62	Yes	54	Yes
RoL 5 Lot 3055	60	Yes	63	Yes	53	Yes
RoL 5 Lot 3056	60	Yes	63	Yes	53	Yes
RoL 5 Lot 3057	60	Yes	62	Yes	53	Yes
RoL 5 Lot 3058	54	Yes	57	Yes	51	Yes
RoL 5 Lot 3059	53	Yes	56	Yes	51	Yes
RoL 5 Lot 3060	53	Yes	55	Yes	50	Yes
RoL 5 Lot 3061	53	Yes	55	Yes	50	Yes
RoL 5 Lot 3062	53	Yes	55	Yes	50	Yes
RoL 5 Lot 3063	53	Yes	55	Yes	50	Yes
RoL 5 Lot 3064	53	Yes	54	Yes	50	Yes
RoL 5 Lot 3065	53	Yes	54	Yes	50	Yes
RoL 5 Lot 3066	53	Yes	54	Yes	51	Yes
RoL 5 Lot 3067	52	Yes	54	Yes	51	Yes
RoL 5 Lot 3068	52	Yes	54	Yes	50	Yes
RoL 5 Lot 3069	52	Yes	54	Yes	51	Yes
RoL 5 Lot 3070	53	Yes	54	Yes	51	Yes
RoL 5 Lot 3071	53	Yes	55	Yes	51	Yes
RoL 5 Lot 3072	53	Yes	55	Yes	52	Yes
RoL 5 Lot 3073	53	Yes	56	Yes	52	Yes
RoL 5 Lot 3074	53	Yes	56	Yes	52	Yes
RoL 5 Lot 3075	54	Yes	57	Yes	53	Yes
RoL 5 Lot 3076	60	Yes	62	Yes	54	Yes
RoL 5 Lot 3077	60	Yes	62	Yes	53	Yes
RoL 5 Lot 3078	60	Yes	62	Yes	52	Yes
RoL 5 Lot 3079	59	Yes	62	Yes	52	Yes
RoL 5 Lot 3080	53	Yes	56	Yes	50	Yes
RoL 5 Lot 3081	53	Yes	56	Yes	50	Yes
RoL 5 Lot 3082	53	Yes	55	Yes	50	Yes
RoL 5 Lot 3083	53	Yes	55	Yes	50	Yes
RoL 5 Lot 3084	53	Yes	54	Yes	50	Yes
RoL 5 Lot 3085	52	Yes	54	Yes	50	Yes
RoL 5 Lot 3086	52	Yes	54	Yes	49	Yes
RoL 5 Lot 3087	52	Yes	53	Yes	50	Yes
RoL 5 Lot 3088	52	Yes	53	Yes	51	Yes
RoL 5 Lot 3089	51	Yes	53	Yes	50	Yes
RoL 5 Lot 3090	51	Yes	54	Yes	50	Yes
RoL 5 Lot 3091	51	Yes	54	Yes	49	Yes
RoL 5 Lot 3092	51	Yes	54	Yes	49	Yes
RoL 5 Lot 3093	51	Yes	55	Yes	49	Yes
RoL 5 Lot 3094	51	Yes	55	Yes	50	Yes
RoL 5 Lot 3095	52	Yes	56	Yes	50	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L _{10,18hr} dB(A) free-field	Compliance ≤60dB(A) L _{10,18hr}
	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}		
RoL 5 Lot 3096	60	Yes	62	Yes	52	Yes
RoL 5 Lot 3097	59	Yes	61	Yes	51	Yes
RoL 5 Lot 3098	58	Yes	61	Yes	50	Yes
RoL 5 Lot 3099	58	Yes	60	Yes	51	Yes
RoL 5 Lot 3100	53	Yes	56	Yes	50	Yes
RoL 5 Lot 3101	52	Yes	55	Yes	50	Yes
RoL 5 Lot 3102	52	Yes	54	Yes	49	Yes
RoL 5 Lot 3103	51	Yes	54	Yes	49	Yes
RoL 5 Lot 3104	51	Yes	53	Yes	49	Yes
RoL 5 Lot 3105	51	Yes	53	Yes	49	Yes
RoL 5 Lot 3106	51	Yes	53	Yes	48	Yes
RoL 5 Lot 3107	50	Yes	52	Yes	48	Yes
RoL 5 Lot 3108	50	Yes	52	Yes	47	Yes
RoL 5 Lot 3109	50	Yes	52	Yes	48	Yes
RoL 5 Lot 3110	49	Yes	52	Yes	48	Yes
RoL 5 Lot 3111	49	Yes	52	Yes	47	Yes
RoL 5 Lot 3112	49	Yes	52	Yes	48	Yes
RoL 5 Lot 3113	49	Yes	52	Yes	48	Yes
RoL 5 Lot 3114	48	Yes	52	Yes	47	Yes
RoL 5 Lot 3115	49	Yes	53	Yes	47	Yes
RoL 5 Lot 3116	49	Yes	53	Yes	48	Yes
RoL 5 Lot 3117	50	Yes	54	Yes	48	Yes
RoL 5 Lot 3118	50	Yes	55	Yes	49	Yes
RoL 5 Lot 3119	50	Yes	53	Yes	50	Yes
RoL 5 Lot 3120	50	Yes	53	Yes	50	Yes
RoL 5 Lot 3121	51	Yes	53	Yes	50	Yes
RoL 5 Lot 3122	52	Yes	53	Yes	50	Yes
RoL 5 Lot 3123	51	Yes	53	Yes	50	Yes
RoL 5 Lot 3124	51	Yes	53	Yes	50	Yes
RoL 5 Lot 3125	50	Yes	52	Yes	49	Yes
RoL 5 Lot 3126	50	Yes	52	Yes	49	Yes
RoL 5 Lot 3127	50	Yes	52	Yes	49	Yes
RoL 5 Lot 3128	51	Yes	52	Yes	50	Yes
RoL 5 Lot 3129	50	Yes	52	Yes	49	Yes
RoL 5 Lot 3130	50	Yes	52	Yes	49	Yes
RoL 5 Lot 3131	50	Yes	52	Yes	49	Yes
RoL 5 Lot 3132	50	Yes	52	Yes	49	Yes
RoL 5 Lot 3133	50	Yes	52	Yes	48	Yes
RoL 5 Lot 3134	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3135	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3136	48	Yes	51	Yes	47	Yes
RoL 5 Lot 3137	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3138	48	Yes	51	Yes	47	Yes
RoL 5 Lot 3139	49	Yes	51	Yes	48	Yes
RoL 5 Lot 3140	49	Yes	51	Yes	48	Yes
RoL 5 Lot 3141	49	Yes	52	Yes	48	Yes
RoL 5 Lot 3142	50	Yes	51	Yes	48	Yes
RoL 5 Lot 3143	49	Yes	51	Yes	46	Yes
RoL 5 Lot 3144	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3145	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3146	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3147	49	Yes	51	Yes	48	Yes
RoL 5 Lot 3148	49	Yes	51	Yes	48	Yes
RoL 5 Lot 3149	49	Yes	51	Yes	48	Yes
RoL 5 Lot 3150	50	Yes	51	Yes	49	Yes
RoL 5 Lot 3151	50	Yes	51	Yes	46	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L _{10,18hr} dB(A) free-field	Compliance ≤60dB(A) L _{10,18hr}
	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}		
RoL 5 Lot 3152	50	Yes	51	Yes	46	Yes
RoL 5 Lot 3153	50	Yes	51	Yes	46	Yes
RoL 5 Lot 3154	50	Yes	51	Yes	46	Yes
RoL 5 Lot 3155	50	Yes	51	Yes	46	Yes
RoL 5 Lot 3156	50	Yes	51	Yes	46	Yes
RoL 5 Lot 3157	49	Yes	50	Yes	47	Yes
RoL 5 Lot 3158	47	Yes	50	Yes	47	Yes
RoL 5 Lot 3159	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3160	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3161	47	Yes	51	Yes	46	Yes
RoL 5 Lot 3162	47	Yes	50	Yes	45	Yes
RoL 5 Lot 3163	47	Yes	50	Yes	45	Yes
RoL 5 Lot 3164	47	Yes	50	Yes	45	Yes
RoL 5 Lot 3165	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3166	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3167	49	Yes	51	Yes	47	Yes
RoL 5 Lot 3168	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3169	48	Yes	50	Yes	47	Yes
RoL 5 Lot 3170	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3171	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3172	48	Yes	50	Yes	47	Yes
RoL 5 Lot 3173	48	Yes	50	Yes	47	Yes
RoL 5 Lot 3174	48	Yes	50	Yes	47	Yes
RoL 5 Lot 3175	49	Yes	50	Yes	48	Yes
RoL 5 Lot 3176	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3177	48	Yes	50	Yes	45	Yes
RoL 5 Lot 3178	48	Yes	50	Yes	45	Yes
RoL 5 Lot 3179	48	Yes	49	Yes	46	Yes
RoL 5 Lot 3180	47	Yes	49	Yes	46	Yes
RoL 5 Lot 3181	47	Yes	49	Yes	46	Yes
RoL 5 Lot 3182	47	Yes	49	Yes	46	Yes
RoL 5 Lot 3183	48	Yes	49	Yes	46	Yes
RoL 5 Lot 3184	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3185	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3186	48	Yes	50	Yes	47	Yes
RoL 5 Lot 3187	48	Yes	50	Yes	47	Yes
RoL 5 Lot 3188	48	Yes	50	Yes	47	Yes
RoL 5 Lot 3189	46	Yes	50	Yes	46	Yes
RoL 5 Lot 3190	48	Yes	49	Yes	46	Yes
RoL 5 Lot 3191	47	Yes	49	Yes	46	Yes
RoL 5 Lot 3192	47	Yes	49	Yes	46	Yes
RoL 5 Lot 3193	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3194	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3195	47	Yes	49	Yes	46	Yes
RoL 5 Lot 3196	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3197	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3198	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3199	47	Yes	49	Yes	45	Yes
RoL 5 Lot 3200	47	Yes	49	Yes	45	Yes
RoL 5 Lot 3201	48	Yes	49	Yes	45	Yes
RoL 5 Lot 3202	48	Yes	50	Yes	45	Yes
RoL 5 Lot 3203	48	Yes	50	Yes	45	Yes
RoL 5 Lot 3204	48	Yes	50	Yes	45	Yes
RoL 5 Lot 3205	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3206	48	Yes	50	Yes	45	Yes
RoL 5 Lot 3207	48	Yes	50	Yes	45	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L _{10,18hr} dB(A) free-field	Compliance ≤60dB(A) L _{10,18hr}
	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}		
RoL 5 Lot 3208	48	Yes	50	Yes	45	Yes
RoL 5 Lot 3209	48	Yes	50	Yes	45	Yes
RoL 5 Lot 3210	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3211	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3212	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3213	48	Yes	50	Yes	45	Yes
RoL 5 Lot 3214	48	Yes	50	Yes	45	Yes
RoL 5 Lot 3215	49	Yes	52	Yes	45	Yes
RoL 5 Lot 3216	49	Yes	51	Yes	46	Yes
RoL 5 Lot 3217	50	Yes	52	Yes	47	Yes
RoL 5 Lot 3218	51	Yes	53	Yes	50	Yes
RoL 5 Lot 3219	51	Yes	54	Yes	50	Yes
RoL 5 Lot 3220	49	Yes	54	Yes	49	Yes
RoL 5 Lot 3221	50	Yes	53	Yes	49	Yes
RoL 5 Lot 3222	49	Yes	52	Yes	47	Yes
RoL 5 Lot 3223	49	Yes	51	Yes	48	Yes
RoL 5 Lot 3224	48	Yes	51	Yes	47	Yes
RoL 5 Lot 3225	48	Yes	51	Yes	47	Yes
RoL 5 Lot 3226	49	Yes	51	Yes	48	Yes
RoL 5 Lot 3227	48	Yes	50	Yes	47	Yes
RoL 5 Lot 3228	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3229	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3230	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3231	47	Yes	50	Yes	45	Yes
RoL 5 Lot 3232	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3233	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3234	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3235	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3236	46	Yes	49	Yes	44	Yes
RoL 5 Lot 3237	45	Yes	49	Yes	44	Yes
RoL 5 Lot 3238	45	Yes	49	Yes	44	Yes
RoL 5 Lot 3239	45	Yes	49	Yes	44	Yes
RoL 5 Lot 3240	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3241	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3242	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3243	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3244	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3245	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3246	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3247	47	Yes	49	Yes	45	Yes
RoL 5 Lot 3248	47	Yes	49	Yes	45	Yes
RoL 5 Lot 3249	47	Yes	49	Yes	45	Yes
RoL 5 Lot 3250	47	Yes	49	Yes	45	Yes
RoL 5 Lot 3251	47	Yes	49	Yes	46	Yes
RoL 5 Lot 3252	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3253	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3254	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3255	48	Yes	50	Yes	46	Yes
RoL 5 Lot 3256	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3257	48	Yes	51	Yes	47	Yes
RoL 5 Lot 3258	49	Yes	52	Yes	48	Yes
RoL 5 Lot 3259	48	Yes	52	Yes	48	Yes
RoL 5 Lot 3260	48	Yes	52	Yes	47	Yes
RoL 5 Lot 3261	48	Yes	51	Yes	47	Yes
RoL 5 Lot 3262	47	Yes	51	Yes	45	Yes
RoL 5 Lot 3263	47	Yes	50	Yes	46	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L _{10,18hr} dB(A) free-field	Compliance ≤60dB(A) L _{10,18hr}
	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}		
RoL 5 Lot 3264	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3265	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3266	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3267	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3268	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3269	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3270	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3271	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3272	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3273	45	Yes	49	Yes	45	Yes
RoL 5 Lot 3274	45	Yes	49	Yes	44	Yes
RoL 5 Lot 3275	46	Yes	49	Yes	44	Yes
RoL 5 Lot 3276	46	Yes	49	Yes	44	Yes
RoL 5 Lot 3277	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3278	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3279	47	Yes	51	Yes	46	Yes
RoL 5 Lot 3280	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3281	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3282	46	Yes	49	Yes	46	Yes
RoL 5 Lot 3283	46	Yes	49	Yes	46	Yes
RoL 5 Lot 3284	46	Yes	50	Yes	46	Yes
RoL 5 Lot 3285	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3286	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3287	47	Yes	50	Yes	46	Yes
RoL 5 Lot 3288	47	Yes	50	Yes	47	Yes
RoL 5 Lot 3289	47	Yes	51	Yes	47	Yes
RoL 5 Lot 3290	47	Yes	51	Yes	47	Yes
RoL 5 Lot 3291	47	Yes	51	Yes	47	Yes
RoL 5 Lot 3292	48	Yes	51	Yes	47	Yes
RoL 5 Lot 3293	48	Yes	51	Yes	47	Yes
RoL 5 Lot 3294	46	Yes	50	Yes	45	Yes
RoL 5 Lot 3295	46	Yes	50	Yes	46	Yes
RoL 5 Lot 3296	46	Yes	50	Yes	45	Yes
RoL 5 Lot 3297	46	Yes	50	Yes	45	Yes
RoL 5 Lot 3298	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3299	46	Yes	49	Yes	45	Yes
RoL 5 Lot 3300	47	Yes	51	Yes	46	Yes
RoL 5 Lot 3301	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3302	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3303	49	Yes	52	Yes	47	Yes
RoL 5 Lot 3304	46	Yes	50	Yes	46	Yes
RoL 5 Lot 3305	46	Yes	50	Yes	46	Yes
RoL 5 Lot 3306	47	Yes	51	Yes	47	Yes
RoL 5 Lot 3307	48	Yes	51	Yes	47	Yes
RoL 5 Lot 3308	48	Yes	52	Yes	47	Yes
RoL 5 Lot 3309	48	Yes	52	Yes	47	Yes
RoL 5 Lot 3310	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3311	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3312	48	Yes	51	Yes	46	Yes
RoL 5 Lot 3313	54	Yes	56	Yes	53	Yes
RoL 5 Lot 3314	53	Yes	55	Yes	51	Yes
RoL 5 Lot 3315	52	Yes	55	Yes	50	Yes
RoL 5 Lot 3316	51	Yes	54	Yes	50	Yes
RoL 5 Lot 3317	51	Yes	54	Yes	49	Yes
RoL 5 Lot 3318	50	Yes	54	Yes	49	Yes
RoL 5 Lot 3319	51	Yes	54	Yes	49	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L _{10,18hr} dB(A) free-field	Compliance ≤60dB(A) L _{10,18hr}
	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}		
RoL 5 Lot 3320	51	Yes	54	Yes	50	Yes
RoL 5 Lot 3321	49	Yes	53	Yes	48	Yes
RoL 5 Lot 3322	49	Yes	53	Yes	48	Yes
RoL 5 Lot 3323	50	Yes	53	Yes	48	Yes
RoL 5 Lot 3324	49	Yes	53	Yes	48	Yes
RoL 5 Lot 3325	49	Yes	53	Yes	47	Yes
RoL 5 Lot 3326	49	Yes	52	Yes	47	Yes
RoL 5 Lot 3327	48	Yes	52	Yes	47	Yes
RoL 5 Lot 3328	48	Yes	52	Yes	47	Yes
RoL 5 Lot 3329	49	Yes	52	Yes	47	Yes
RoL 5 Lot 3330	49	Yes	52	Yes	48	Yes
RoL 5 Lot 3331	50	Yes	53	Yes	48	Yes
RoL 5 Lot 3332	49	Yes	53	Yes	48	Yes
RoL 5 Lot 3333	49	Yes	53	Yes	48	Yes
RoL 5 Lot 3334	49	Yes	53	Yes	48	Yes
RoL 5 Lot 3335	49	Yes	53	Yes	48	Yes
RoL 5 Lot 3336	49	Yes	53	Yes	48	Yes
RoL 5 Lot 3337	49	Yes	53	Yes	48	Yes
RoL 5 Lot 3338	50	Yes	53	Yes	48	Yes
RoL 5 Lot 3339	51	Yes	54	Yes	50	Yes
RoL 5 Lot 3340	50	Yes	54	Yes	48	Yes
RoL 5 Lot 3341	49	Yes	54	Yes	48	Yes
RoL 5 Lot 3342	49	Yes	54	Yes	48	Yes
RoL 5 Lot 3343	51	Yes	55	Yes	49	Yes
RoL 5 Lot 3344	52	Yes	56	Yes	49	Yes
RoL 5 Lot 3345	53	Yes	57	Yes	50	Yes
RoL 5 Lot 3346	55	Yes	58	Yes	52	Yes
RoL 5 Lot 3347	65	No	66	No	55	Yes
RoL 5 Lot 3348	65	No	66	No	51	Yes
RoL 5 Lot 3349	65	No	66	No	50	Yes
RoL 5 Lot 3350	65	No	66	No	50	Yes
RoL 5 Lot 3351	64	No	66	No	50	Yes
RoL 5 Lot 3352	65	No	66	No	50	Yes
RoL 5 Lot 3353	64	No	66	No	51	Yes
RoL 5 Lot 3354	64	No	66	No	50	Yes
RoL 5 Lot 3355	64	No	66	No	50	Yes
RoL 5 Lot 3356	64	No	66	No	50	Yes
RoL 5 Lot 3357	64	No	66	No	50	Yes
RoL 5 Lot 3358	64	No	66	No	50	Yes
RoL 5 Lot 3359	64	No	66	No	50	Yes
RoL 5 Lot 3360	64	No	66	No	50	Yes
RoL 5 Lot 3361	64	No	66	No	50	Yes
RoL 5 Lot 3362	64	No	66	No	49	Yes
RoL 5 Lot 3363	64	No	66	No	49	Yes
RoL 5 Lot 3364	64	No	66	No	49	Yes
RoL 5 Lot 3365	64	No	66	No	49	Yes
RoL 5 Lot 3366	64	No	66	No	49	Yes
RoL 5 Lot 3367	64	No	66	No	49	Yes
RoL 5 Lot 3368	64	No	66	No	49	Yes
RoL 5 Lot 3369	64	No	66	No	50	Yes
RoL 5 Lot 3370	64	No	66	No	49	Yes
RoL 5 Lot 3371	64	No	66	No	50	Yes
RoL 5 Lot 3372	64	No	66	No	50	Yes
RoL 5 Lot 3373	64	No	66	No	50	Yes
RoL 5 Lot 3374	64	No	66	No	51	Yes
RoL 5 Lot 3375	64	No	66	No	50	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L _{10,18hr} dB(A) free-field	Compliance ≤60dB(A) L _{10,18hr}
	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}	L _{10,18hr} dB(A) facade-adjusted	Compliance ≤63dB(A) L _{10,18hr}		
RoL 5 Lot 3376	64	No	66	No	49	Yes
RoL 5 Lot 3377	64	No	66	No	49	Yes
RoL 5 Lot 3378	64	No	66	No	49	Yes
RoL 5 Lot 3379	64	No	66	No	49	Yes
RoL 5 Lot 3380	64	No	66	No	49	Yes
RoL 5 Lot 3381	64	No	66	No	49	Yes
RoL 5 Lot 3382	64	No	66	No	52	Yes
RoL 5 Lot 3383	65	No	66	No	52	Yes
RoL 5 Lot 3384	64	No	66	No	49	Yes
RoL 5 Lot 3385	64	No	66	No	50	Yes
RoL 5 Lot 3386	65	No	66	No	49	Yes
RoL 5 Lot 3387	65	No	66	No	48	Yes
RoL 5 Lot 3388	65	No	66	No	48	Yes
RoL 5 Lot 3389	64	No	66	No	48	Yes
RoL 5 Lot 3390	65	No	66	No	48	Yes
RoL 5 Lot 3391	65	No	66	No	48	Yes
RoL 5 Lot 3392	65	No	66	No	48	Yes
RoL 5 Lot 3393	64	No	66	No	47	Yes
RoL 5 Lot 3394	65	No	66	No	48	Yes
RoL 5 Lot 3395	65	No	66	No	48	Yes
RoL 5 Lot 3396	65	No	66	No	50	Yes
RoL 5 Lot 3397	64	No	66	No	49	Yes
RoL 5 Lot 3398	65	No	66	No	48	Yes
RoL 5 Lot 3399	65	No	66	No	49	Yes
RoL 5 Lot 3400	65	No	66	No	48	Yes
RoL 5 Lot 3401	65	No	66	No	49	Yes
RoL 5 Lot 3402	65	No	66	No	49	Yes
RoL 5 Lot 3403	65	No	66	No	49	Yes
RoL 5 Lot 3404	65	No	66	No	49	Yes
RoL 5 Lot 3405	65	No	66	No	49	Yes
RoL 5 Lot 3406	65	No	66	No	49	Yes
RoL 5 Lot 3407	65	No	66	No	49	Yes
RoL 5 Lot 3408	65	No	66	No	49	Yes
RoL 5 Lot 3409	65	No	66	No	49	Yes
RoL 5 Lot 3410	65	No	66	No	49	Yes
RoL 5 Lot 3411	65	No	66	No	50	Yes
RoL 5 Lot 3412	64	No	66	No	50	Yes
RoL 5 Lot 3413	64	No	66	No	49	Yes
RoL 5 Lot 3414	65	No	66	No	50	Yes
RoL 5 Lot 3415	64	No	66	No	50	Yes
RoL 5 Lot 3416	65	No	66	No	51	Yes
RoL 5 Lot 3417	64	No	66	No	51	Yes
RoL 5 Lot 3418	65	No	66	No	54	Yes
RoL 5 Lot 3419	49	Yes	51	Yes	46	Yes
RoL 5 Lot 3420	49	Yes	51	Yes	46	Yes
RoL 5 Lot 3421	49	Yes	52	Yes	46	Yes

Noise contour maps showing the traffic noise levels across RoL 5 are presented in Appendix G.

6. Discussion and Recommendations

Traffic noise propagation modelling was carried out considering the future traffic flows for a planning horizon of 2051. The results of the noise propagation modelling indicate that, without noise mitigation measures, the proposed dwellings at RoL 5 will be impacted by traffic noise from Teviot Road and the major internal collector road (Anderson Drive).

A noise control strategy has been adopted in the planning of the Everleigh development. The general objectives of the noise control strategy are as follows:

1. Ensure that at all allotments, there is at least one private open space (outdoor living area) which complies with the traffic noise criterion of 60dB(A) $L_{10,18hr}$ (free-field).
2. Ensure compliance with the façade traffic noise criterion of 63dB(A) $L_{10,18hr}$ at all allotments where it is practical to do so (i.e. where noise barrier or acoustic setback is feasible). Typically, for traffic noise levels of 63dB(A) or lesser, standard construction of the building envelope is acceptable.
3. At allotments where noise barrier or acoustic setback is not feasible and traffic noise criterion of 63dB(A) $L_{10,18hr}$ is exceeded, the building envelope should be constructed in accordance with QDC MP4.4 or AS 3671-1989 to ensure compliance with the internal noise criteria from AS/NZS 2107:2016.

The proposed noise mitigation measures for RoL 5 are as follows:

- Noise barrier along Teviot Road;
- Noise barrier along Anderson Drive, at rear-loaded allotments where the outdoor living areas face the road;
- For front-loaded allotments on Anderson Drive, ensure that outdoor living areas are located on the protected façade;
- Acoustic setback along Anderson Drive (allotments separated from road by linear parks); and
- Acoustic design to be carried out at the building approval stage for any dwellings where the traffic noise criterion is exceeded. This may include upper floors of two storey houses and houses on front loaded allotments facing the internal collector road.

Summary of the recommended noise control measures is presented in Figures 6.1 and 6.2.

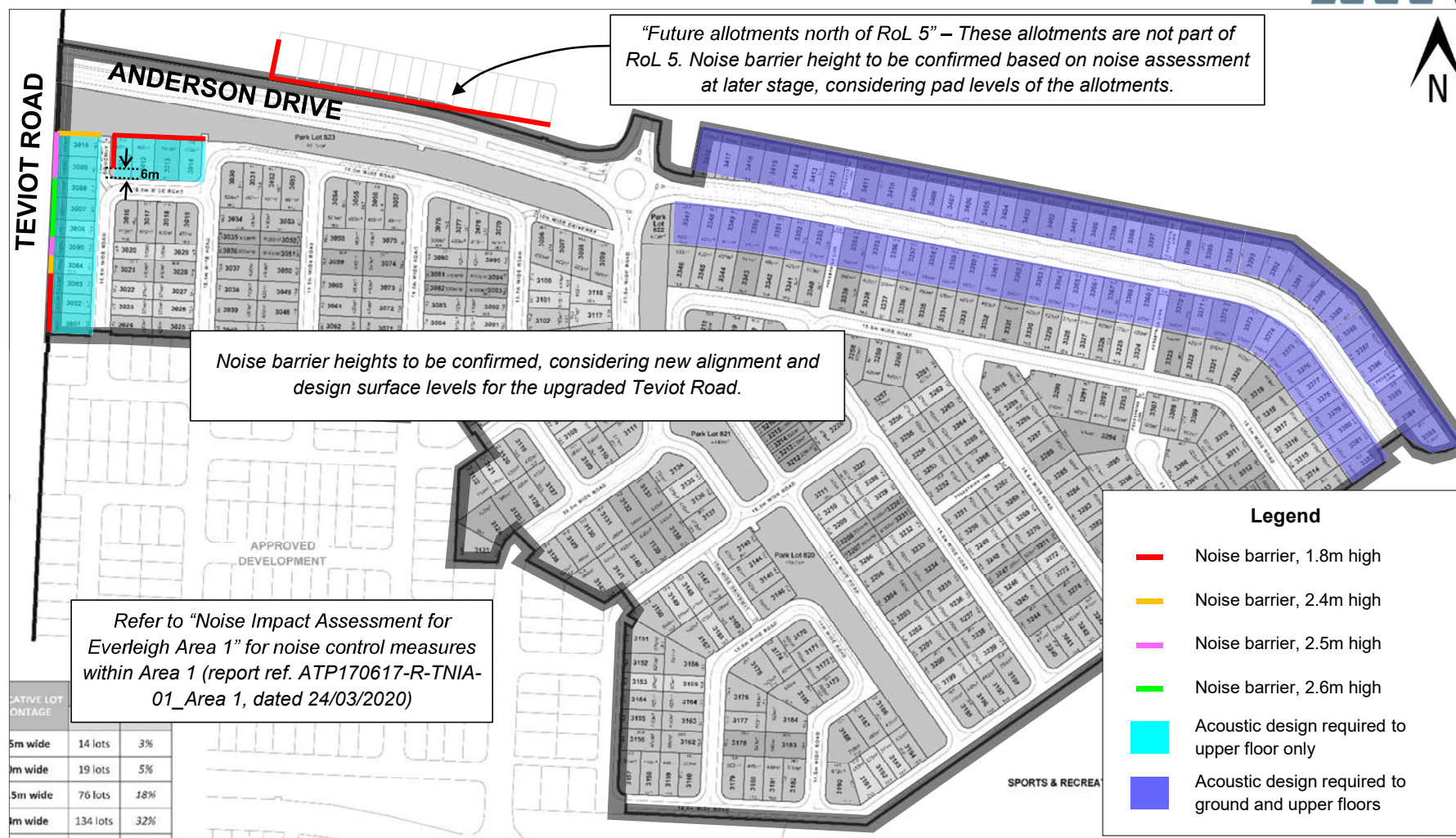


Figure 6.1 Noise control measures – RoL 5



6.1 Noise barriers

6.1.1 Noise barrier along Teviot Road

The noise barrier generally follows the western site boundary along Teviot Road, with a return along Anderson Drive at Lot 3010. The alignment and height of the noise barrier is described in Table 6.1.

Table 6.1 Noise barrier along Teviot Road

Location <i>Refer to Figure 6.2</i>	Description	Height of noise barrier
Western site boundary adjacent to Teviot Road	Lot 3001 to 3003	1.8m
	Lot 3004	2.4m
	Lot 3005	2.5m
	Lot 3006 to 3008	2.6m
	Lot 3009 to 3010	2.5m
Anderson Drive	Return along northern boundary of Lot 3010	2.4m

Retaining walls will be constructed along the western site boundary with Teviot Road and the return along Anderson Drive. The noise barrier must be constructed on top of the retaining walls.

The recommended levels of the noise barrier and retaining walls are presented in Table 6.2.

Table 6.2 Noise barrier along Teviot Road – Levels

Lot No.	Position (moving from south to north)	Pad level	Top of retaining wall, RL m	Retaining wall height, m	Noise barrier height, m	Top of noise barrier, RL m
3001	start	69.80	71.85	2.05	1.80	73.65
	end	69.80	71.65	1.85	1.80	73.45
3002	start	69.90	71.65	1.75	1.80	73.45
	end	69.90	71.40	1.50	1.80	73.20
3003	start	70.00	71.40	1.40	1.80	73.20
	end	70.00	71.05	1.05	1.80	72.85
3004	start	70.10	71.05	0.95	2.40	73.45
	end	70.10	70.70	0.60	2.40	73.10
3005	start	70.15	70.70	0.55	2.50	73.20
	end	70.15	70.35	0.20	2.50	72.85
3006	start	70.25	70.35	0.10	2.60	72.95
	end	70.25	70.25	0.20	2.60	72.85
3007	start	70.30	70.30	0.25	2.60	72.90
	end	70.30	70.30	0.65	2.60	72.90
3008	start	70.45	70.45	0.80	2.60	73.05
	end	70.45	70.45	1.15	2.60	73.05
3009	start	70.20	70.20	0.90	2.50	72.70
	end	70.20	70.20	1.40	2.50	72.70
3010	start	70.20	70.20	1.40	2.50	72.70
	corner	70.20	70.20	1.95	2.50	72.70
	end	70.20	70.25	0.05	2.40	72.65

The minimum RLs at the top of the noise barriers are presented in Figure 6.3.

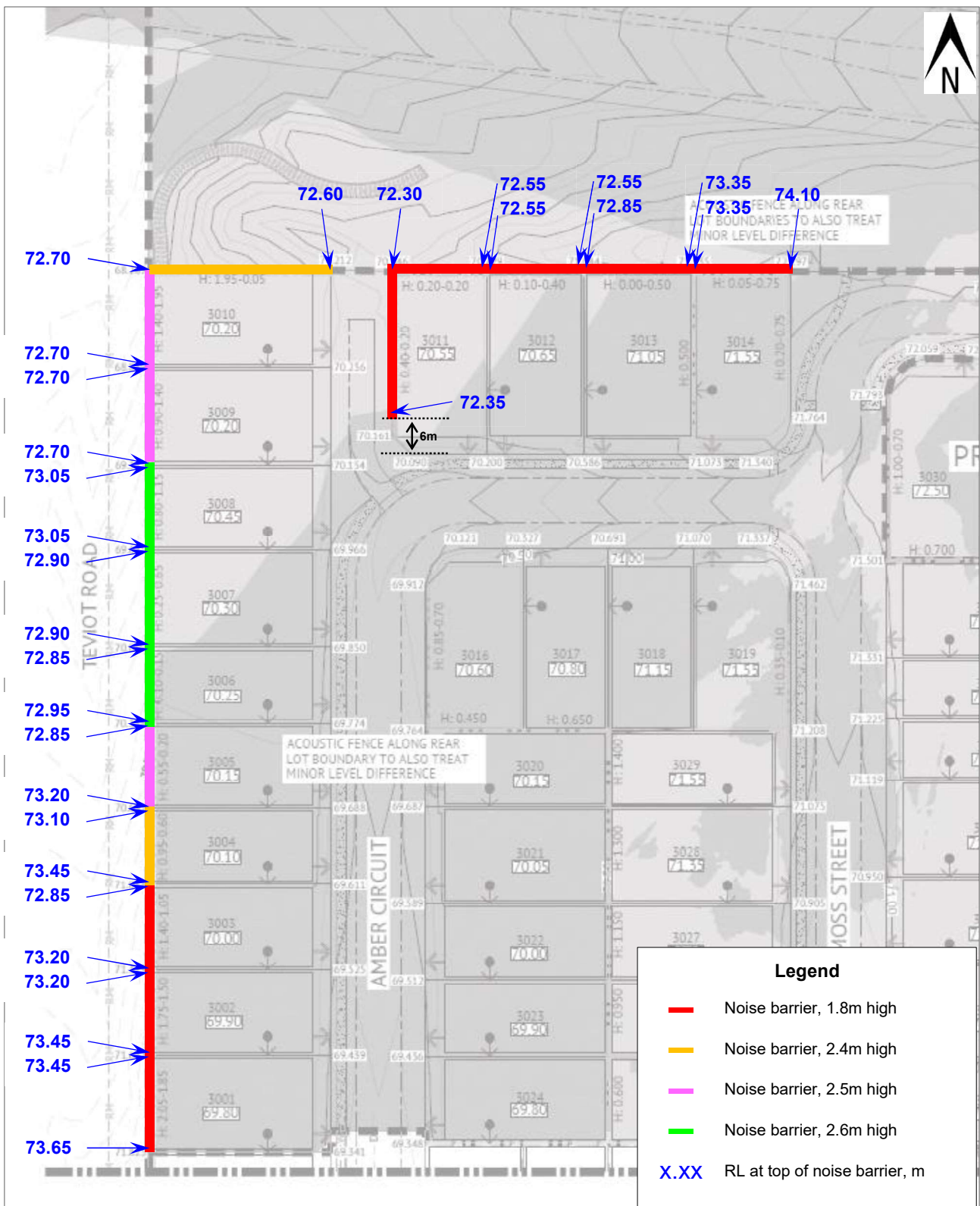


Figure 6.3 Noise barriers – Minimum RLs

At the southern end of the noise barrier (Lot 3001), the allotments sit below the height of Teviot Road and the road verge. As such, retaining walls will be constructed along Teviot Road. The noise barrier must be positioned on top of the retaining wall. Positioning the noise barrier on top of the retaining wall will maximise screening of road traffic noise. Locating the noise barrier on the site boundary, in close proximity to the noise sensitive outdoor living areas, will also maximise the “acoustic shadow”.

At the middle and northern end of the noise barrier, the height of the allotments is equal to or higher than Teviot Road and the road verge. As a result, the future dwellings will be less shielded from Teviot Road. The recommended height of the noise barrier ranges from 2.4m to 2.6m at this location.

6.1.2 Noise barriers along Anderson Drive

There are two noise barriers proposed along Anderson Drive:

- “Lot 3011 to 3014”

Northern boundary of RoL 5 allotments Lot 3011 to 3014, with return along the western boundary of Lot 3011

- “Unnamed future allotments north of RoL 5”

Southern boundary of unnamed future allotments, with return along the western boundary. The future allotments are located on northern side of Anderson Drive (outside the boundaries of RoL 5). Noise barrier height to be confirmed based on noise assessment at later stage, considering pad levels of the allotments.

The alignment and height of the noise barriers is described in Table 6.3.

Table 6.3 Noise barriers along Anderson Drive

Location <i>Refer to Figure 6.2</i>	Description	Height of noise barrier
Anderson Drive – Lot 3011 to 3014	Return along western boundary of Lot 3011	1.8m
	Lot 3011 to 3014	1.8m
Anderson Drive – Future allotments north of RoL 5	Return along western boundary of unnamed future allotment (refer to Figure 6.2)	1.8m
	Unnamed future allotments (refer to Figure 6.2)	1.8m

Retaining walls will be constructed along the lot boundaries. The noise barriers must be constructed on top of the retaining walls.

The recommended levels of the noise barrier and retaining walls along Lot 3011 to 3014 are presented in Table 6.4.

Table 6.4 Noise barrier along Anderson Drive – Levels

Lot No.	Position (moving from south to north, west to east)	Pad level	Top of retaining wall, RL m	Retaining wall height, m	Noise barrier height, m	Top of noise barrier, RL m
3011	start	70.55	70.55	0.40	1.80	72.35
	corner	70.55	70.50	0.20	1.80	72.30

Lot No.	Position (moving from south to north, west to east)	Pad level	Top of retaining wall, RL m	Retaining wall height, m	Noise barrier height, m	Top of noise barrier, RL m
	end	70.55	70.75	0.20	1.80	72.55
3012	start	70.65	70.75	0.10	1.80	72.55
	end	70.65	71.05	0.40	1.80	72.85
3013	start	71.05	71.05	0.00	1.80	72.85
	end	71.05	71.55	0.50	1.80	73.35
3014	start	71.55	71.55	0.05	1.80	73.35
	end	71.55	72.30	0.75	1.80	74.10

The minimum RLs at the top of the noise barrier are presented in Figure 6.3.

Pad levels are not currently available for the unnamed future allotments located on the northern side of Anderson Drive (outside the boundaries of RoL 5). The noise barrier RLs at these future allotments must be confirmed based on noise assessment at later stage, considering pad levels of the allotments once they are available.

The noise barrier alignment, and the height of the noise barriers relative to the allotments, is presented in Figures 6.4 to 6.7.

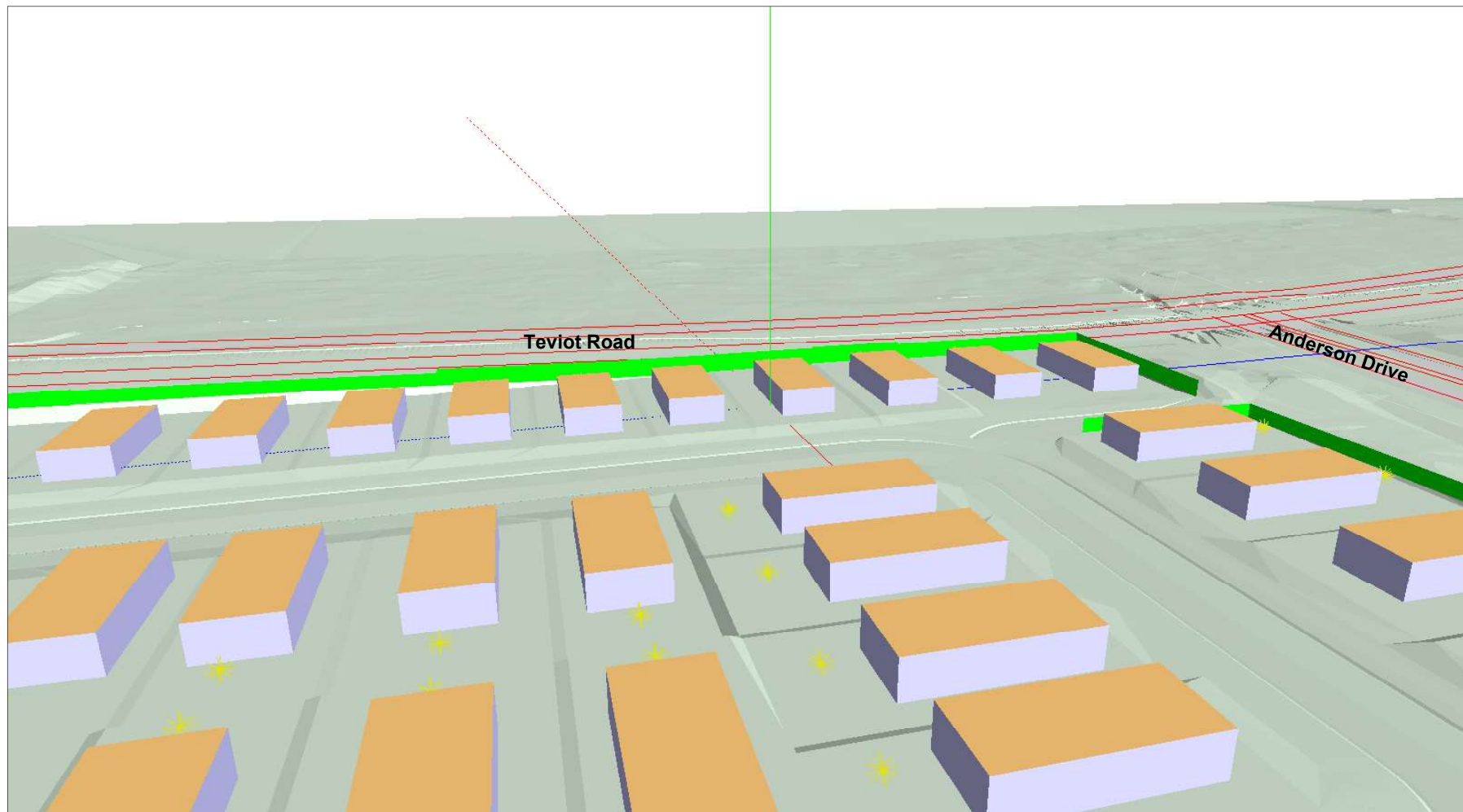


Figure 6.4 Noise barriers – 3d perspective 1

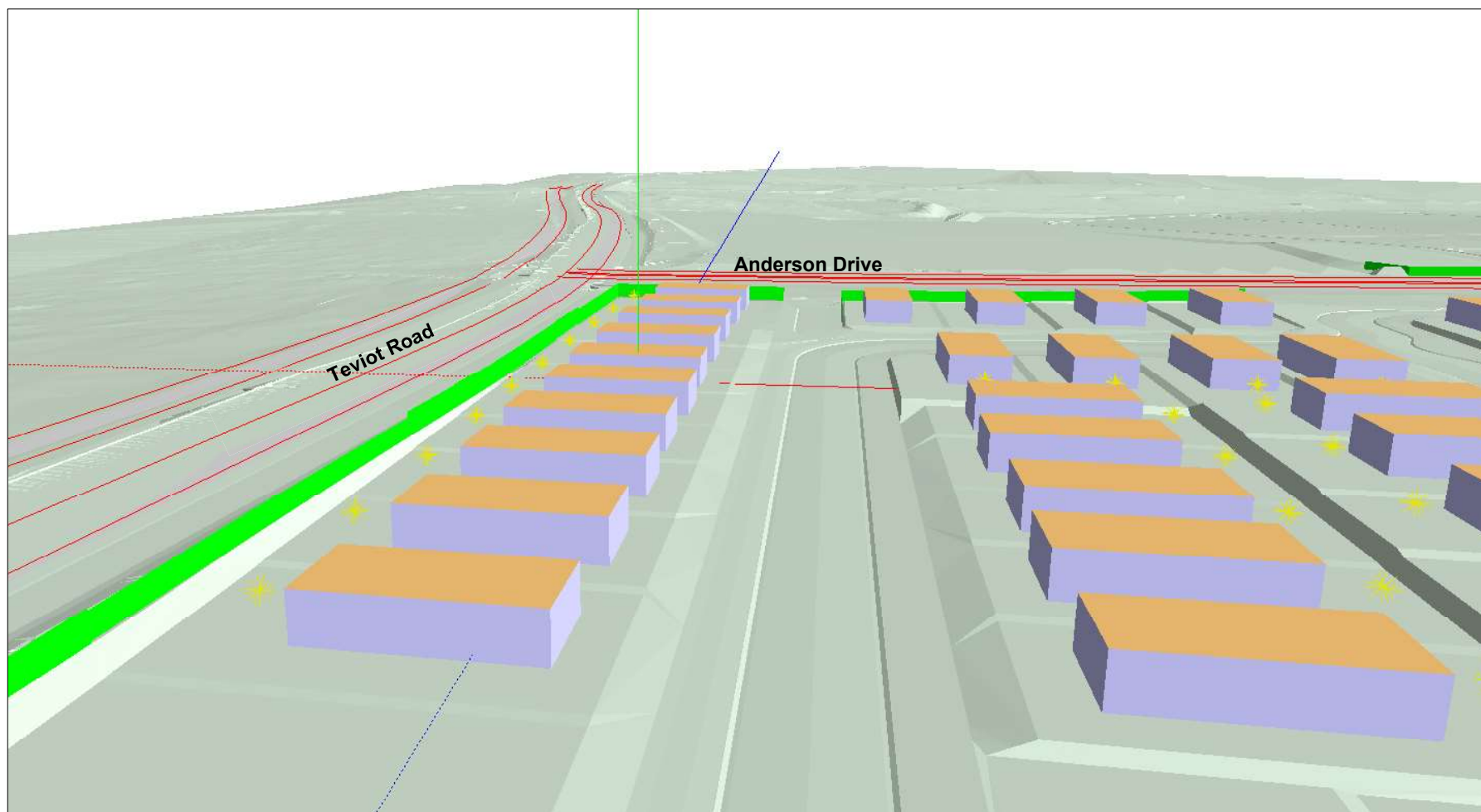


Figure 6.5 Noise barriers – 3d perspective 2

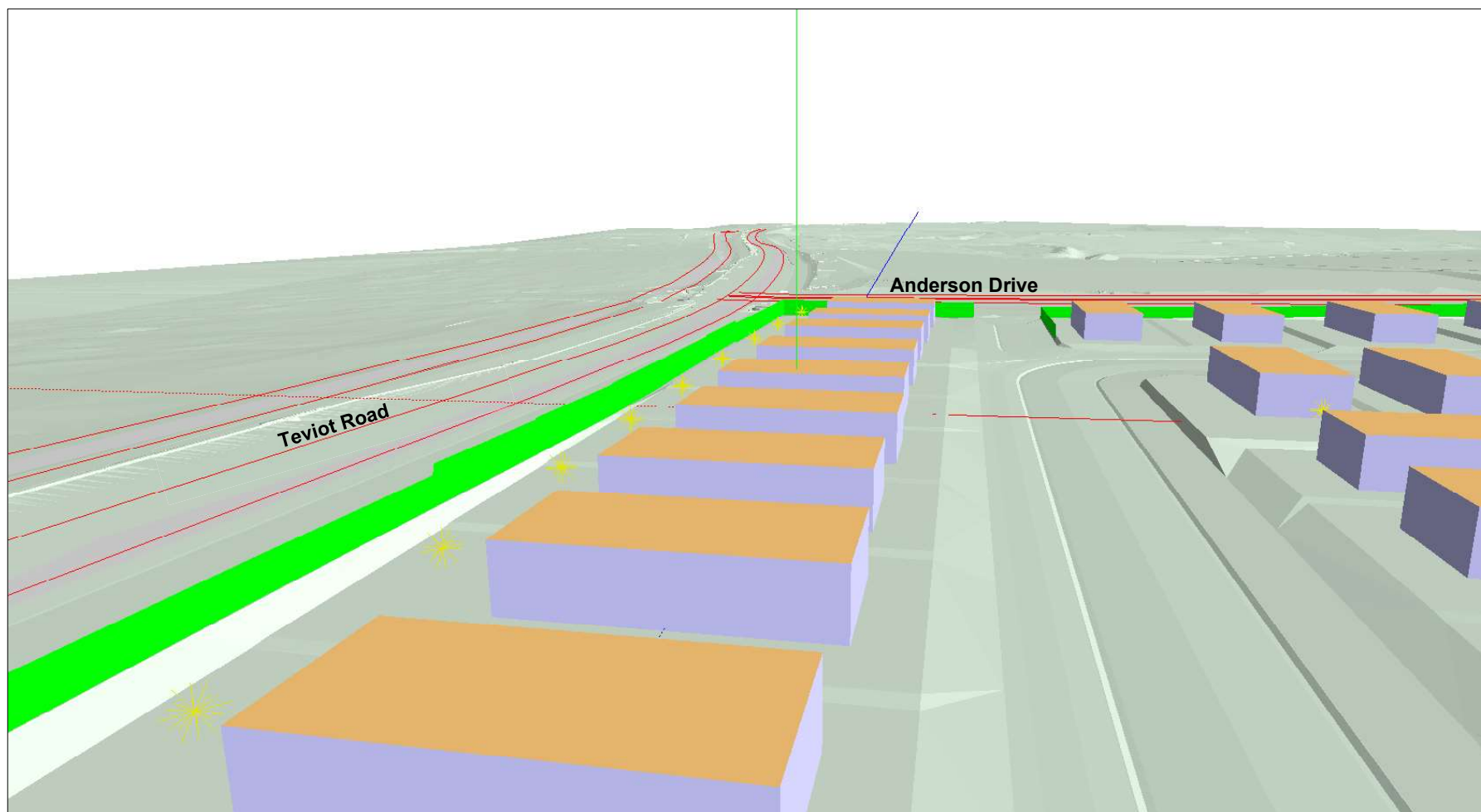


Figure 6.6 Noise barriers – 3d perspective 3



Figure 6.7 Noise barriers – 3d perspective 4

Acceptable form of construction for the noise barriers is as follows:

- Material with minimum surface density of 15kg/m^2 , e.g. timber palings with minimum thickness 20mm; fibre-cement sheeting with minimum thickness of 12mm; modular acoustic panels; masonry; and aerated concrete.
- The noise barrier should be free of any gaps. If the noise barrier is constructed of timber palings, planks should have minimum 35mm overlap.
- The noise barrier should be of durable construction.

A typical timber noise barrier fence construction is illustrated in Figure 6.8.

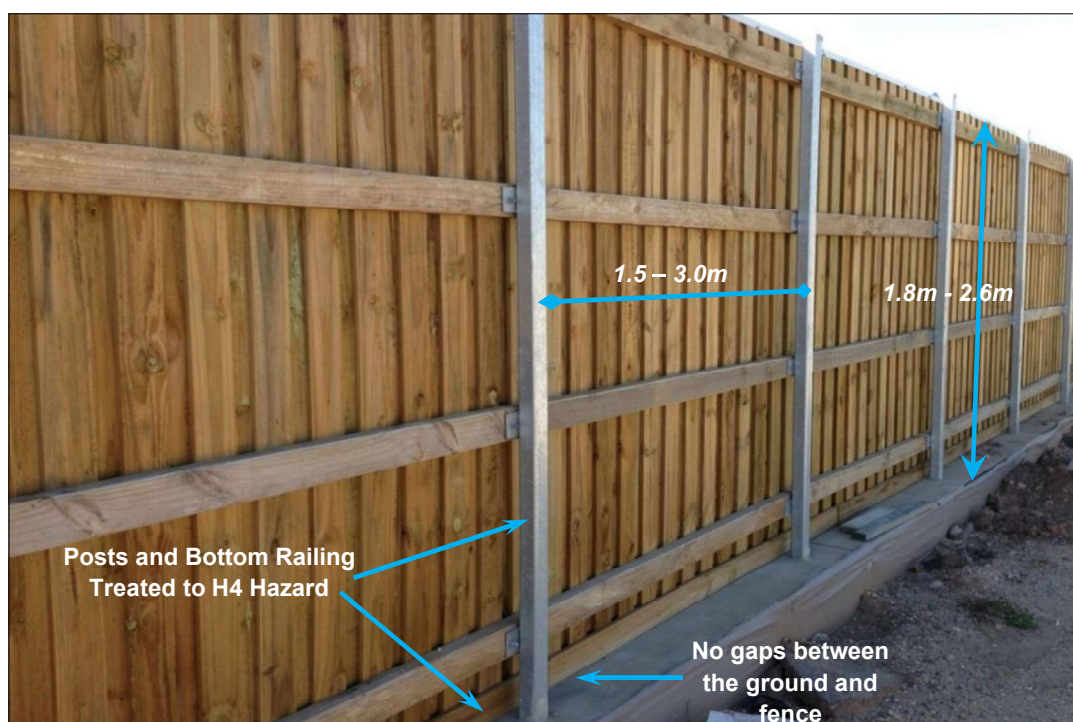


Figure 6.8 Typical timber noise barrier fence

6.2 Front loaded lots facing Anderson Drive

Front loaded lots facing Anderson Drive will have traffic noise impacts on the most exposed façade. The noise affected lots are identified in Figure 6.1.

At the building approval stage, future houses at the noise affected lots should be designed and constructed as per AS 3671-1989 (floor-plan specific acoustic design) or acceptable forms of construction from QDC MP4.4 to mitigate intrusion of traffic noise into habitable rooms.

At the front loaded lots facing Anderson Drive it is recommended to locate the private open spaces at the rear of the houses. Provided that the private open spaces are located along the protected rear façades (facing away from the road), or in a protected courtyard recessed into the side of the buildings, compliance with the traffic noise criterion will be achieved.

Typical layout showing outdoor living area located on the protected façade is presented in Figure 6.9.

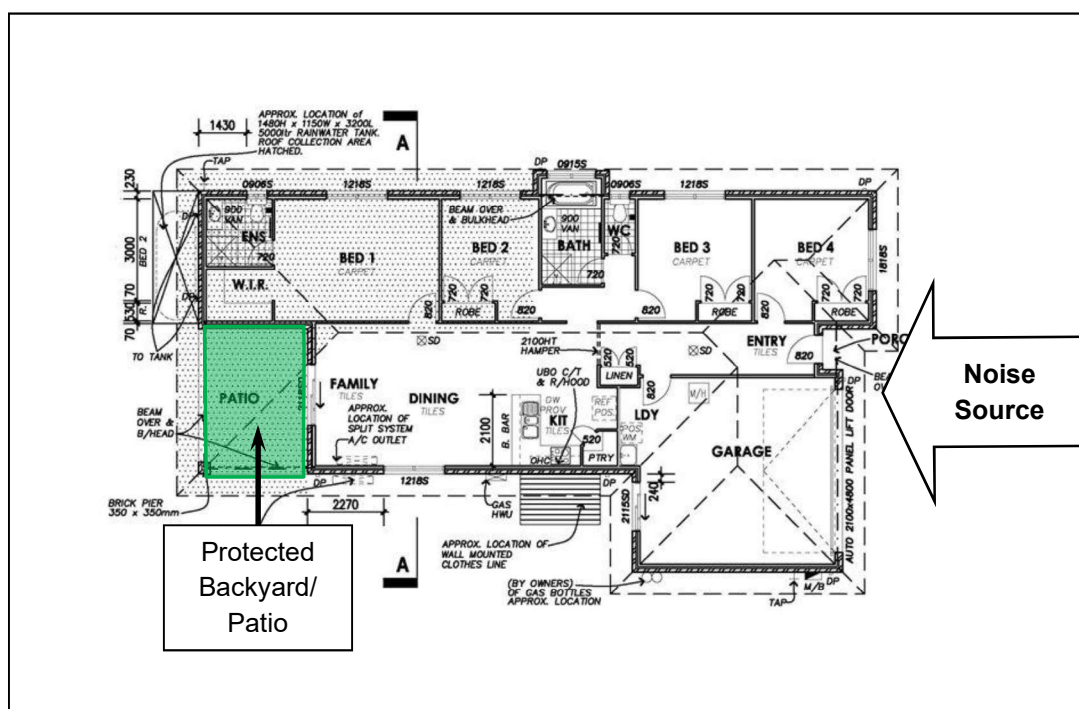


Figure 6.9 Outdoor living area on protected facade

6.3 Summary of lots requiring acoustic design

The results of the noise propagation modelling indicate that the proposed noise control strategy is effective at minimising the traffic noise impacts on the development.

Private Open Spaces – With the recommended noise mitigation measures in place, compliance with the traffic noise criterion for private open spaces can be achieved at all allotments.

Building Facades – Some allotments will require acoustic design to the building envelope to mitigate intrusion of traffic noise at the most exposed façade. Any allotments which are predicted to exceed the traffic noise criterion of 63dB(A) $L_{10,18hr}$ will require acoustic design as per AS 3671-1989 (floor-plan specific acoustic design) or acceptable forms of construction from QDC MP4.4. The following is concluded:

Ground floors

The traffic noise levels at the ground floors of the future dwellings will be compliant at all allotments, except the front-loaded lots facing Anderson Drive.

Upper floors

The noise control measures are primarily designed to protect the ground floors of the allotments. The traffic noise levels at the upper floors of future dwellings in close proximity to Teviot Road and Anderson Drive will exceed the traffic noise criterion.

The acoustic design requirements of the allotments located within RoL 5 are listed in Table 6.5.

Table 6.5 Acoustic design requirements

Lot No.	Ground Floor		First Floor	
	Acoustic requirements	Equivalent Noise Category QDC MP4.4	Acoustic requirements	Equivalent Noise Category QDC MP4.4
Lot 3001	None	None	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3002	None	None	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3003	None	None	Acoustic design; or QDC MP4.4	Noise Category 3
Lot 3004	None	None	Acoustic design; or QDC MP4.4	Noise Category 3
Lot 3005	None	None	Acoustic design; or QDC MP4.4	Noise Category 3
Lot 3006	None	None	Acoustic design; or QDC MP4.4	Noise Category 3
Lot 3007	None	None	Acoustic design; or QDC MP4.4	Noise Category 3
Lot 3008	None	None	Acoustic design; or QDC MP4.4	Noise Category 3
Lot 3009	None	None	Acoustic design; or QDC MP4.4	Noise Category 3
Lot 3010	None	None	Acoustic design; or QDC MP4.4	Noise Category 3
Lot 3011	None	None	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3012	None	None	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3013	None	None	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3014	None	None	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3015	None	None	None	None
Lot 3016	None	None	None	None
Lot 3017	None	None	None	None
Lot 3018	None	None	None	None
Lot 3019	None	None	None	None
Lot 3020	None	None	None	None
Lot 3021	None	None	None	None
Lot 3022	None	None	None	None
Lot 3023	None	None	None	None
Lot 3024	None	None	None	None
Lot 3025	None	None	None	None
Lot 3026	None	None	None	None
Lot 3027	None	None	None	None
Lot 3028	None	None	None	None
Lot 3029	None	None	None	None
Lot 3030	None	None	None	None
Lot 3031	None	None	None	None
Lot 3032	None	None	None	None
Lot 3033	None	None	None	None
Lot 3034	None	None	None	None
Lot 3035	None	None	None	None
Lot 3036	None	None	None	None
Lot 3037	None	None	None	None
Lot 3038	None	None	None	None
Lot 3039	None	None	None	None
Lot 3040	None	None	None	None

Lot No.	Ground Floor		First Floor	
	Acoustic requirements	Equivalent Noise Category QDC MP4.4	Acoustic requirements	Equivalent Noise Category QDC MP4.4
Lot 3041	None	None	None	None
Lot 3042	None	None	None	None
Lot 3043	None	None	None	None
Lot 3044	None	None	None	None
Lot 3045	None	None	None	None
Lot 3046	None	None	None	None
Lot 3047	None	None	None	None
Lot 3048	None	None	None	None
Lot 3049	None	None	None	None
Lot 3050	None	None	None	None
Lot 3051	None	None	None	None
Lot 3052	None	None	None	None
Lot 3053	None	None	None	None
Lot 3054	None	None	None	None
Lot 3055	None	None	None	None
Lot 3056	None	None	None	None
Lot 3057	None	None	None	None
Lot 3058	None	None	None	None
Lot 3059	None	None	None	None
Lot 3060	None	None	None	None
Lot 3061	None	None	None	None
Lot 3062	None	None	None	None
Lot 3063	None	None	None	None
Lot 3064	None	None	None	None
Lot 3065	None	None	None	None
Lot 3066	None	None	None	None
Lot 3067	None	None	None	None
Lot 3068	None	None	None	None
Lot 3069	None	None	None	None
Lot 3070	None	None	None	None
Lot 3071	None	None	None	None
Lot 3072	None	None	None	None
Lot 3073	None	None	None	None
Lot 3074	None	None	None	None
Lot 3075	None	None	None	None
Lot 3076	None	None	None	None
Lot 3077	None	None	None	None
Lot 3078	None	None	None	None
Lot 3079	None	None	None	None
Lot 3080	None	None	None	None
Lot 3081	None	None	None	None
Lot 3082	None	None	None	None
Lot 3083	None	None	None	None
Lot 3084	None	None	None	None
Lot 3085	None	None	None	None
Lot 3086	None	None	None	None
Lot 3087	None	None	None	None
Lot 3088	None	None	None	None
Lot 3089	None	None	None	None
Lot 3090	None	None	None	None
Lot 3091	None	None	None	None
Lot 3092	None	None	None	None
Lot 3093	None	None	None	None
Lot 3094	None	None	None	None
Lot 3095	None	None	None	None
Lot 3096	None	None	None	None
Lot 3097	None	None	None	None

Lot No.	Ground Floor		First Floor	
	Acoustic requirements	Equivalent Noise Category QDC MP4.4	Acoustic requirements	Equivalent Noise Category QDC MP4.4
Lot 3098	None	None	None	None
Lot 3099	None	None	None	None
Lot 3100	None	None	None	None
Lot 3101	None	None	None	None
Lot 3102	None	None	None	None
Lot 3103	None	None	None	None
Lot 3104	None	None	None	None
Lot 3105	None	None	None	None
Lot 3106	None	None	None	None
Lot 3107	None	None	None	None
Lot 3108	None	None	None	None
Lot 3109	None	None	None	None
Lot 3110	None	None	None	None
Lot 3111	None	None	None	None
Lot 3112	None	None	None	None
Lot 3113	None	None	None	None
Lot 3114	None	None	None	None
Lot 3115	None	None	None	None
Lot 3116	None	None	None	None
Lot 3117	None	None	None	None
Lot 3118	None	None	None	None
Lot 3119	None	None	None	None
Lot 3120	None	None	None	None
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Lot 3143	None	None	None	None
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Lot 3145	None	None	None	None
Lot 3146	None	None	None	None
Lot 3147	None	None	None	None
Lot 3148	None	None	None	None
Lot 3149	None	None	None	None
Lot 3150	None	None	None	None
Lot 3151	None	None	None	None
Lot 3152	None	None	None	None
Lot 3153	None	None	None	None
Lot 3154	None	None	None	None

Lot No.	Ground Floor		First Floor	
	Acoustic requirements	Equivalent Noise Category QDC MP4.4	Acoustic requirements	Equivalent Noise Category QDC MP4.4
Lot 3155	None	None	None	None
Lot 3156	None	None	None	None
Lot 3157	None	None	None	None
Lot 3158	None	None	None	None
Lot 3159	None	None	None	None
Lot 3160	None	None	None	None
Lot 3161	None	None	None	None
Lot 3162	None	None	None	None
Lot 3163	None	None	None	None
Lot 3164	None	None	None	None
Lot 3165	None	None	None	None
Lot 3166	None	None	None	None
Lot 3167	None	None	None	None
Lot 3168	None	None	None	None
Lot 3169	None	None	None	None
Lot 3170	None	None	None	None
Lot 3171	None	None	None	None
Lot 3172	None	None	None	None
Lot 3173	None	None	None	None
Lot 3174	None	None	None	None
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Lot 3176	None	None	None	None
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Lot 3205	None	None	None	None
Lot 3206	None	None	None	None
Lot 3207	None	None	None	None
Lot 3208	None	None	None	None
Lot 3209	None	None	None	None
Lot 3210	None	None	None	None
Lot 3211	None	None	None	None

Lot No.	Ground Floor		First Floor	
	Acoustic requirements	Equivalent Noise Category QDC MP4.4	Acoustic requirements	Equivalent Noise Category QDC MP4.4
Lot 3212	None	None	None	None
Lot 3213	None	None	None	None
Lot 3214	None	None	None	None
Lot 3215	None	None	None	None
Lot 3216	None	None	None	None
Lot 3217	None	None	None	None
Lot 3218	None	None	None	None
Lot 3219	None	None	None	None
Lot 3220	None	None	None	None
Lot 3221	None	None	None	None
Lot 3222	None	None	None	None
Lot 3223	None	None	None	None
Lot 3224	None	None	None	None
Lot 3225	None	None	None	None
Lot 3226	None	None	None	None
Lot 3227	None	None	None	None
Lot 3228	None	None	None	None
Lot 3229	None	None	None	None
Lot 3230	None	None	None	None
Lot 3231	None	None	None	None
Lot 3232	None	None	None	None
Lot 3233	None	None	None	None
Lot 3234	None	None	None	None
Lot 3235	None	None	None	None
Lot 3236	None	None	None	None
Lot 3237	None	None	None	None
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Lot 3247	None	None	None	None
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Lot 3249	None	None	None	None
Lot 3250	None	None	None	None
Lot 3251	None	None	None	None
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Lot 3257	None	None	None	None
Lot 3258	None	None	None	None
Lot 3259	None	None	None	None
Lot 3260	None	None	None	None
Lot 3261	None	None	None	None
Lot 3262	None	None	None	None
Lot 3263	None	None	None	None
Lot 3264	None	None	None	None
Lot 3265	None	None	None	None
Lot 3266	None	None	None	None
Lot 3267	None	None	None	None
Lot 3268	None	None	None	None

Lot No.	Ground Floor		First Floor	
	Acoustic requirements	Equivalent Noise Category QDC MP4.4	Acoustic requirements	Equivalent Noise Category QDC MP4.4
Lot 3269	None	None	None	None
Lot 3270	None	None	None	None
Lot 3271	None	None	None	None
Lot 3272	None	None	None	None
Lot 3273	None	None	None	None
Lot 3274	None	None	None	None
Lot 3275	None	None	None	None
Lot 3276	None	None	None	None
Lot 3277	None	None	None	None
Lot 3278	None	None	None	None
Lot 3279	None	None	None	None
Lot 3280	None	None	None	None
Lot 3281	None	None	None	None
Lot 3282	None	None	None	None
Lot 3283	None	None	None	None
Lot 3284	None	None	None	None
Lot 3285	None	None	None	None
Lot 3286	None	None	None	None
Lot 3287	None	None	None	None
Lot 3288	None	None	None	None
Lot 3289	None	None	None	None
Lot 3290	None	None	None	None
Lot 3291	None	None	None	None
Lot 3292	None	None	None	None
Lot 3293	None	None	None	None
Lot 3294	None	None	None	None
Lot 3295	None	None	None	None
Lot 3296	None	None	None	None
Lot 3297	None	None	None	None
Lot 3298	None	None	None	None
Lot 3299	None	None	None	None
Lot 3300	None	None	None	None
Lot 3301	None	None	None	None
Lot 3302	None	None	None	None
Lot 3303	None	None	None	None
Lot 3304	None	None	None	None
Lot 3305	None	None	None	None
Lot 3306	None	None	None	None
Lot 3307	None	None	None	None
Lot 3308	None	None	None	None
Lot 3309	None	None	None	None
Lot 3310	None	None	None	None
Lot 3311	None	None	None	None
Lot 3312	None	None	None	None
Lot 3313	None	None	None	None
Lot 3314	None	None	None	None
Lot 3315	None	None	None	None
Lot 3316	None	None	None	None
Lot 3317	None	None	None	None
Lot 3318	None	None	None	None
Lot 3319	None	None	None	None
Lot 3320	None	None	None	None
Lot 3321	None	None	None	None
Lot 3322	None	None	None	None
Lot 3323	None	None	None	None
Lot 3324	None	None	None	None
Lot 3325	None	None	None	None

Lot No.	Ground Floor		First Floor	
	Acoustic requirements	Equivalent Noise Category QDC MP4.4	Acoustic requirements	Equivalent Noise Category QDC MP4.4
Lot 3326	None	None	None	None
Lot 3327	None	None	None	None
Lot 3328	None	None	None	None
Lot 3329	None	None	None	None
Lot 3330	None	None	None	None
Lot 3331	None	None	None	None
Lot 3332	None	None	None	None
Lot 3333	None	None	None	None
Lot 3334	None	None	None	None
Lot 3335	None	None	None	None
Lot 3336	None	None	None	None
Lot 3337	None	None	None	None
Lot 3338	None	None	None	None
Lot 3339	None	None	None	None
Lot 3340	None	None	None	None
Lot 3341	None	None	None	None
Lot 3342	None	None	None	None
Lot 3343	None	None	None	None
Lot 3344	None	None	None	None
Lot 3345	None	None	None	None
Lot 3346	None	None	None	None
Lot 3347	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3348	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3349	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3350	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3351	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3352	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3353	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3354	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3355	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3356	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3357	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3358	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3359	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3360	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3361	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3362	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3363	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3364	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2

Lot No.	Ground Floor		First Floor	
	Acoustic requirements	Equivalent Noise Category QDC MP4.4	Acoustic requirements	Equivalent Noise Category QDC MP4.4
Lot 3394	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3395	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3396	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3397	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3398	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3399	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3400	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3401	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3402	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3403	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3404	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3405	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3406	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3407	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3408	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3409	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3410	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3411	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3412	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3413	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3414	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3415	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3416	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3417	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3418	Acoustic design; or QDC MP4.4	Noise Category 2	Acoustic design; or QDC MP4.4	Noise Category 2
Lot 3419	None	None	None	None
Lot 3420	None	None	None	None
Lot 3421	None	None	None	None

For any dwellings where the traffic noise criterion is exceeded, the most practical approach is acoustic treatment to the building envelope (external walls, windows and roof/ceiling). At the building approval stage, the houses on the affected allotments should be designed and constructed as per AS 3671-1989 (floor-plan specific acoustic design) or acceptable forms of construction from QDC MP4.4 to mitigate intrusion of traffic noise into habitable rooms.

Provided the recommended planning and design noise control measures are implemented in the construction of Everleigh RoL 5, road traffic noise will not impose any further constraints on the establishment of the development.

7. Conclusions

Based on the results of the traffic noise impact assessment for the RoL 5 of the Everleigh development, the following is concluded:

- Noise barriers must be constructed along Teviot Road and portion of Anderson Drive as presented in Figures 6.1 to 6.3 of this report.
- The noise barriers will ensure compliance with the traffic noise criteria at the ground floors of Lots 3001 to 3014, however the upper floors of these allotments will be impacted by traffic noise. The upper floors of Lots 3001 to 3014 must be designed and constructed as per AS 3671-1989 (floor-plan specific acoustic design) or acceptable forms of construction from QDC MP4.4.
- Noise barriers cannot be built at the front-loaded lots adjacent to Anderson Drive (Lots 3347 to 3418). The ground and upper floors of Lots 3347 to 3418 must be designed and constructed as per AS 3671-1989 (floor-plan specific acoustic design) or acceptable forms of construction from QDC MP4.4.

Provided the recommended planning and design noise control measures are implemented in the construction of Everleigh RoL 5, road traffic noise will not impose any further constraints on the establishment of the development.

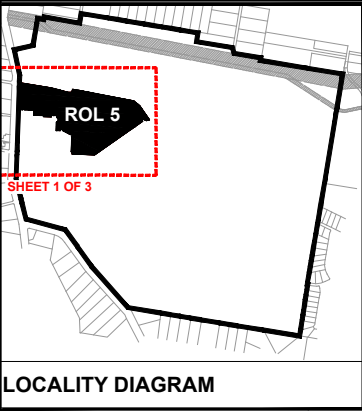
8. References

- Australian Standard AS 1055.1:2018 (*Acoustics - Description and Measurement of Environmental Noise Part 1: General Procedures*)
- Australian Standard AS 1055.2:2018 (*Acoustics - Description and Measurement of Environmental Noise Part 2: Application to Specific Situations*)
- Australian Standard AS/NZS 2107:2016 (*Acoustics – Recommended design sound levels and reverberation times for building interiors*)
- Australian Standard ASIEC61672.1-2004 (*Electroacoustics - Sound level meters – Specifications*)
- Australian Standard AS 3671-1989 (*Acoustics – Road Traffic Noise Intrusion – Building siting and construction*)
- Department of State Development Infrastructure and Planning, *State Development Assessment Provisions* (Version 2.6), February 2020
- Department of Transport and Main Roads, 2013, *Transport Noise Management: Code of Practice, Volume 1 – Road Traffic Noise*
- Department of Transport and Main Roads, *Development on land affected by environmental emissions*, Version 4, October 2017
- Logan City Council, 2015, *Logan Planning Scheme 2015*
- Queensland Government, 2010, 'Queensland Development Code (QDC) MP4.4 (Buildings in a Transport Noise Corridor)'

Appendices

- Appendix A – RoL 5 lot layout
- Appendix B – Site photos
- Appendix C – Meteorological data
- Appendix D – Noise measurement results
- Appendix E – Traffic volumes, 2051
- Appendix F – Validation of traffic noise model
- Appendix G – Traffic noise levels

Appendix A – RoL 5 lot layout



LOCALITY DIAGRAM

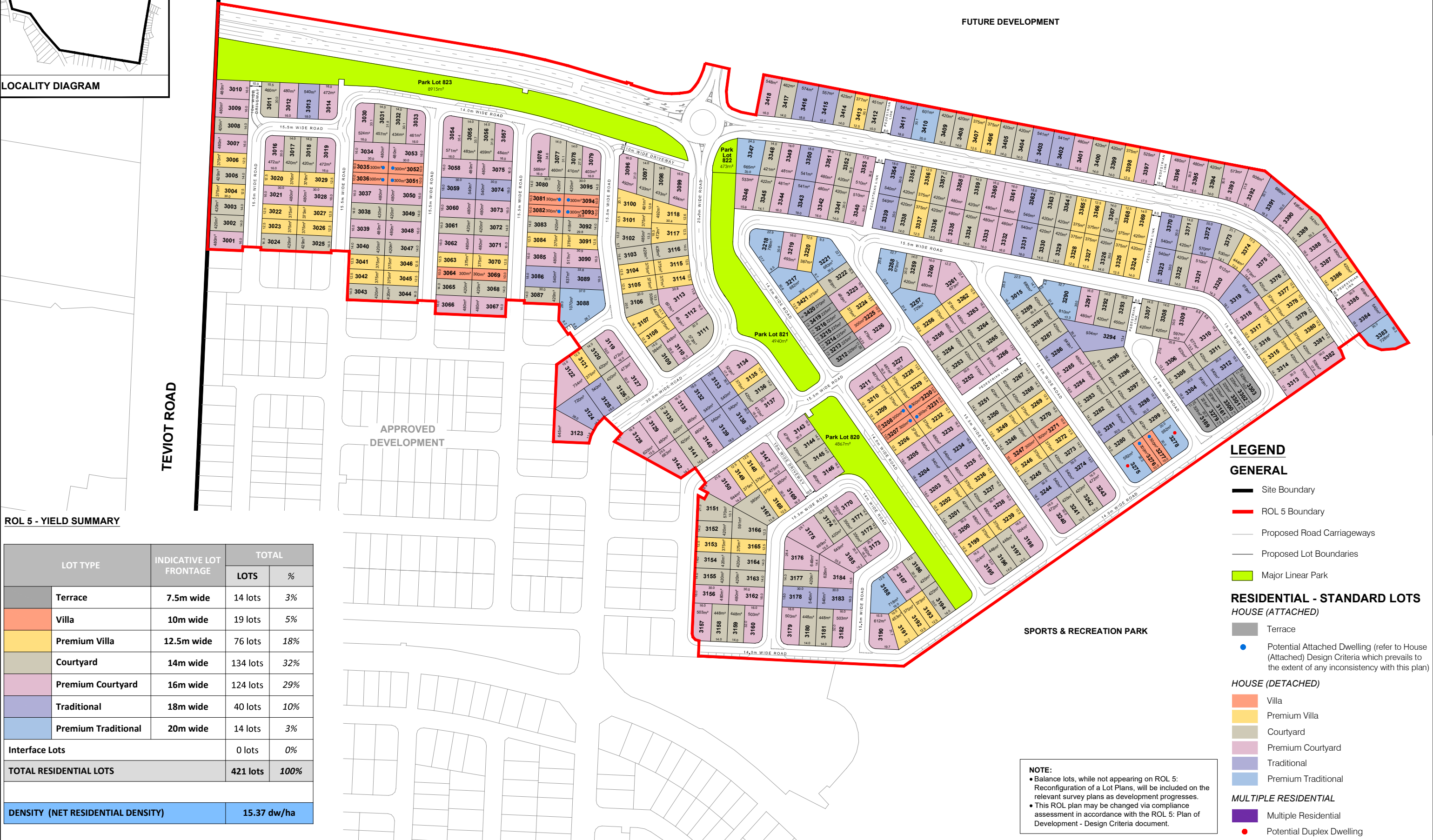
ROL 5 - YIELD SUMMARY

LOT TYPE		INDICATIVE LOT FRONTAGE	TOTAL	
			LOTS	%
	Terrace	7.5m wide	14 lots	3%
	Villa	10m wide	19 lots	5%
	Premium Villa	12.5m wide	76 lots	18%
	Courtyard	14m wide	134 lots	32%
	Premium Courtyard	16m wide	124 lots	29%
	Traditional	18m wide	40 lots	10%
	Premium Traditional	20m wide	14 lots	3%
Interface Lots			0 lots	0%
TOTAL RESIDENTIAL LOTS			421 lots	100%
DENSITY (NET RESIDENTIAL DENSITY)			15.37 dw/ha	



EVERLEIGH

RECONFIGURATION OF A LOT PLAN - ROL 5 - SHEET 1 OF 3



LEGEND

GENERAL

- Site Boundary
- ROL 5 Boundary
- Proposed Road Carriageways
- Proposed Lot Boundaries
- Major Linear Park

RESIDENTIAL - STANDARD LOTS
HOUSE (ATTACHED)

- Terrace
- Potential Attached Dwelling (refer to House (Attached) Design Criteria which prevails to the extent of any inconsistency with this plan)

HOUSE (DETACHED)

- Villa
- Premium Villa
- Courtyard
- Premium Courtyard
- Traditional
- Premium Traditional

MULTIPLE RESIDENTIAL

- Multiple Residential
- Potential Duplex Dwelling

NOTE:
• Balance lots, while not appearing on ROL 5: Reconfiguration of a Lot Plans, will be included on the relevant survey plans as development progresses.
• This ROL plan may be changed via compliance assessment in accordance with the ROL 5: Plan of Development - Design Criteria document.

Scale: 1:3,000 @ A3

0 25 50 75

PROJECT NO: P0018054
DATE: 12.04.2021
DRAWING NO: ROL05-1
REV: 08

Appendix B – Site photos



Photo 1 – Noise monitoring location, looking south



Photo 2 – Noise monitoring location, looking west



Photo 3 – Noise monitoring location, looking north-west



Photo 4 – Noise monitoring location, looking north-east

Appendix C – Meteorological data

Greenbank (Defence), Queensland

March 2020 Daily Weather Observations



Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C					km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Su	17.6	32.5	0			NE	19	15:08	26.6	62		SW	7		32.4	45		NNE	4	
2	Mo	18.2	35.8	0			NNE	22	16:50	27.1	67		W	6		34.9	30		SSE	6	
3	Tu	18.7	33.5	0			NE	28	16:24	27.7	68		NE	2		32.3	46		ENE	11	
4	We	22.0	29.6	23.2			SE	28	12:05	22.8	99			Calm		28.5	61		E	11	
5	Th	20.0	31.0	1.2			NE	33	12:20	26.8	72		NE	4		29.8	51		NNE	15	
6	Fr	23.5	32.1	0.6			NNE	20	16:00	27.4	79		N	6		30.0	65		NNE	7	
7	Sa	23.2	30.6	4.0			SSE	24	17:34	27.9	76		S	6		28.1	66		SSE	9	
8	Su	19.9	29.4	0			SSE	31	11:09	25.3	57		S	7		27.8	49		SE	11	
9	Mo	19.9	21.5	5.2			ESE	26	14:29	20.3	98		S	2		20.3	97		SSE	4	
10	Tu	18.1	23.9	39.6			SE	26	17:07	21.1	87		S	7		22.5	78		SE	9	
11	We	17.3	27.3	2.8			SE	35	11:58	23.0	70		S	9		25.6	53		SE	7	
12	Th	17.5	24.7	0.2			SSE	30	11:48	23.4	64		S	11		23.3	69		SSE	7	
13	Fr	17.0	27.1	4.4			ESE	33	16:53	23.2	67		S	9		26.2	53		ESE	11	
14	Sa	14.7	28.8	0			SE	22	15:17	23.7	59		S	6		26.8	49		ESE	7	
15	Su	16.6	27.4	0			SSW	35	12:57	23.3	65		SSW	11		26.4	52		S	17	
16	Mo	16.1	27.7	0			SSE	33	09:49	22.8	53		SSW	9		27.0	41		SSW	9	
17	Tu	16.3	26.6	0			SE	33	14:04	22.6	61		S	9		26.1	45		SSE	9	
18	We	13.4	28.6	0			ESE	28	16:15	22.7	56		S	7		28.2	38		E	7	
19	Th	12.4	30.0	0			N	20	11:32	23.1	57		SW	6		28.5	39		E	2	
20	Fr	13.2	31.0	0			NNE	26	17:14	23.5	67		W	4		30.1	37		N	7	
21	Sa	14.7	33.4	0			E	28	15:28	24.5	65		WNW	9		32.2	38		ENE	11	
22	Su	17.8		0						26.4	66		ESE	4							
Statistics for the first 22 days of March 2020																					
Mean		17.6	29.2							24.3	68			6		28.0	52			8	
Lowest		12.4	21.5							20.3	53			Calm		20.3	30		E	2	
Highest		23.5	35.8	39.6			#	35		27.9	99		#	11		34.9	97		S	17	
Total				81.2																	

Appendix D – Noise measurement results

Unattended Noise Measurements
Everleigh, Greenbank - Location 1
 Noise Levels - 18hr Day (Traffic Noise)

Logger Location - Southern-western boundary of existing Lot 3 on SP297192, approx. 20m setback from Teviot Road

ARL Environmental Noise Logger
 Logger Serial Number 15-203-537
 Measurement Title Everleigh - RoL 5
 Measurement started at 05/03/2020 11:09 AM
 Measurement stopped at 19/03/2020 06:34 AM
 Frequency Weighting A
 Time Averaging Fast
 Statistical Interval 15 min
 Pre-measurement Ref. 94.0
 Post-measurement Ref. 94.0
 Engineering Units dB SPL

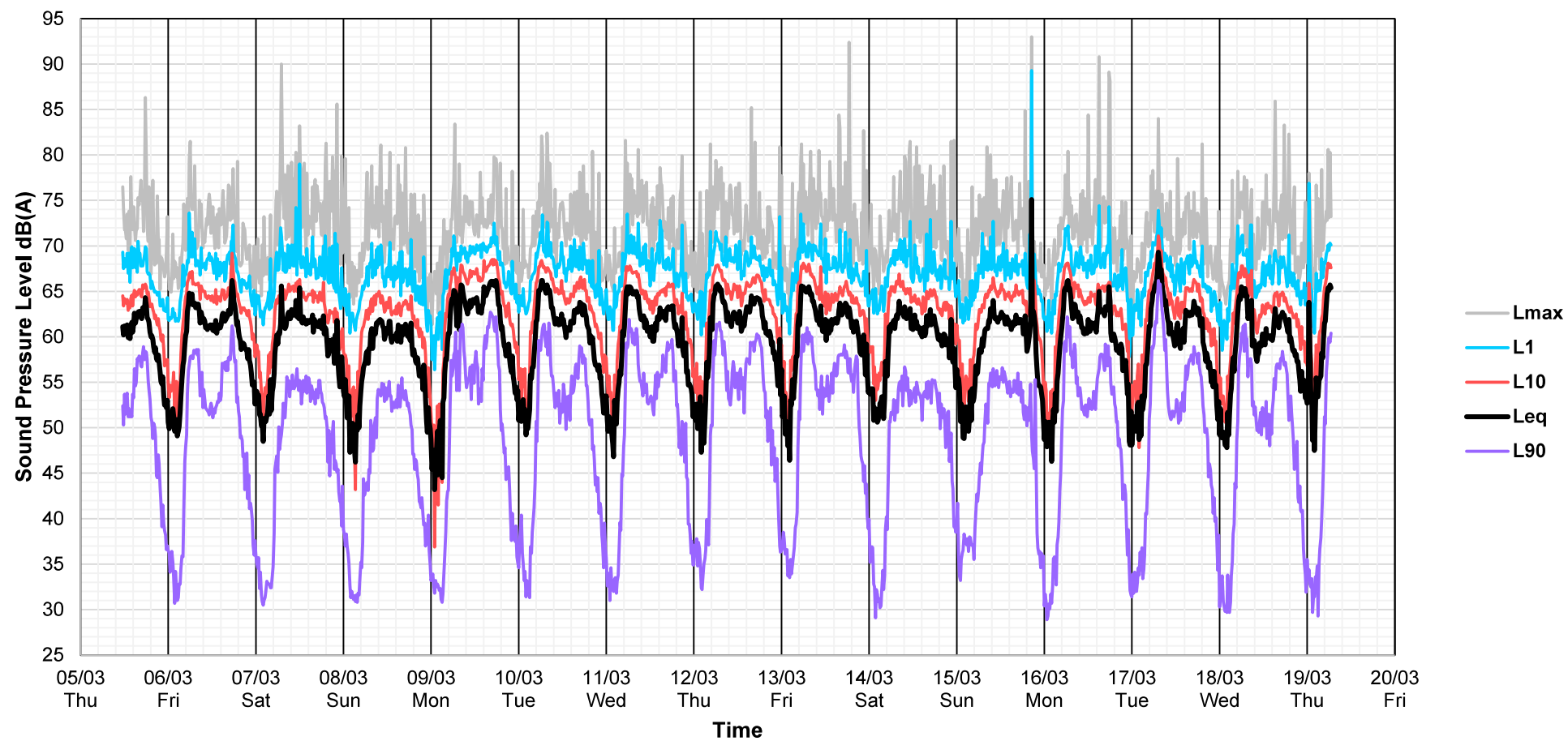
Note

— No noise data available

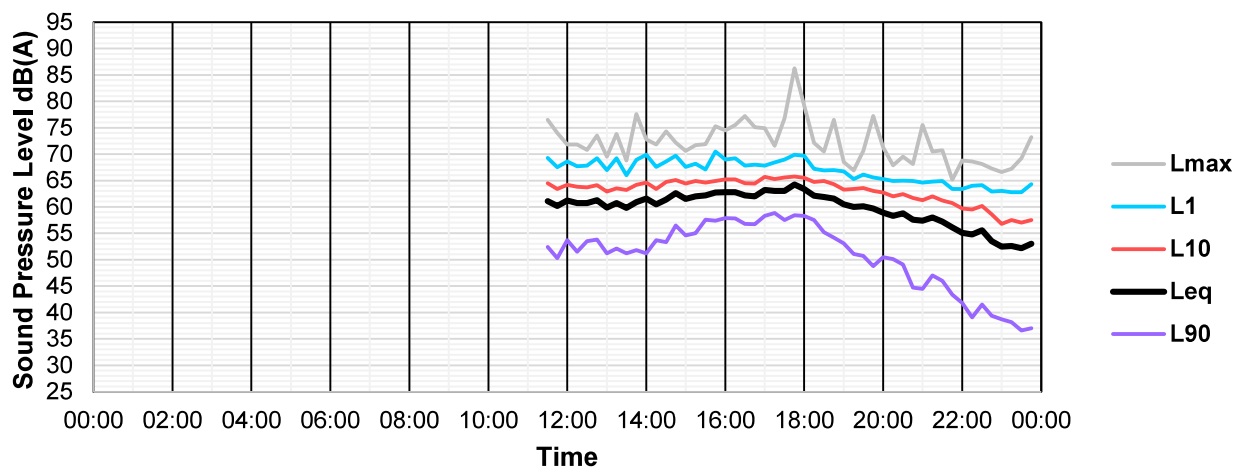
■ Rainfall recorded on this day

Date	Day	L _{A10,T}			L _{Aeq,T}		L _{A90,T}	
		18hr day 6am-12am	1hr max 6am-12am	Time for 1hr max	18hr day 6am-12am	8hr night 10pm-6am	18hr day 6am-12am	8hr night 10pm-6am
5/03/2020	Thursday	—	—	—	—	54	—	39
6/03/2020	Friday	64	67	17:00	61	54	52	36
7/03/2020	Saturday	64	65	11:00	61	53	51	37
8/03/2020	Sunday	62	65	09:00	59	53	49	38
9/03/2020	Monday	66	68	16:00	62	55	54	39
10/03/2020	Tuesday	64	68	06:00	61	55	53	39
11/03/2020	Wednesday	64	68	06:00	61	55	54	40
12/03/2020	Thursday	65	68	06:00	62	56	55	41
13/03/2020	Friday	65	68	06:00	62	55	55	38
14/03/2020	Saturday	64	66	08:00	61	54	52	39
15/03/2020	Sunday	64	67	20:00	61	54	51	38
16/03/2020	Monday	64	68	06:00	61	54	52	39
17/03/2020	Tuesday	64	70	07:00	61	54	53	38
18/03/2020	Wednesday	63	67	06:00	60	56	52	39
Average		64	67		61	54	52	39
Average (weekdays only)		64	68		61	55	53	39

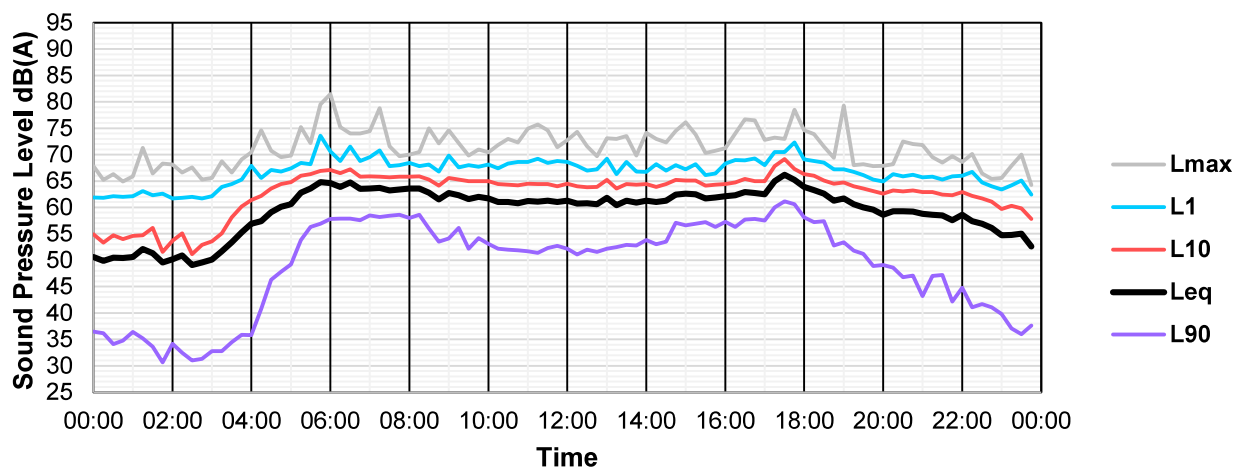
Unattended Noise Measurements 5 to 19 March 2020



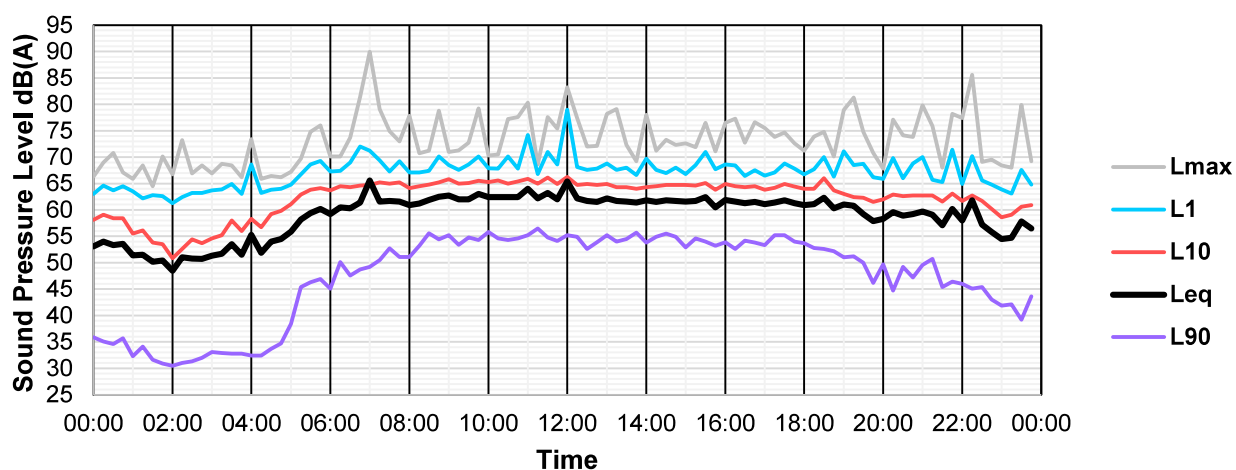
Unattended Noise Measurements Thursday 5 March 2020



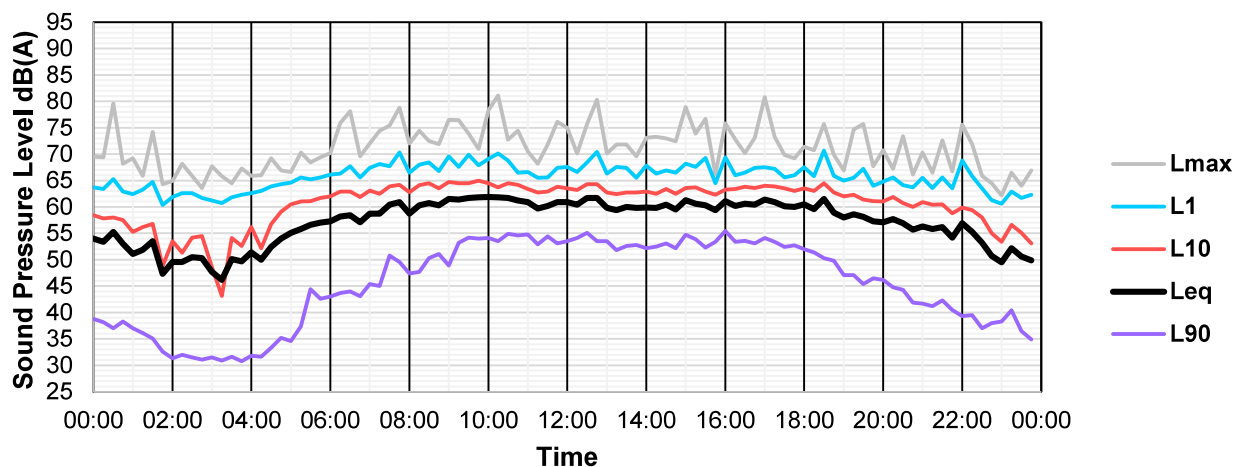
Unattended Noise Measurements Friday 6 March 2020



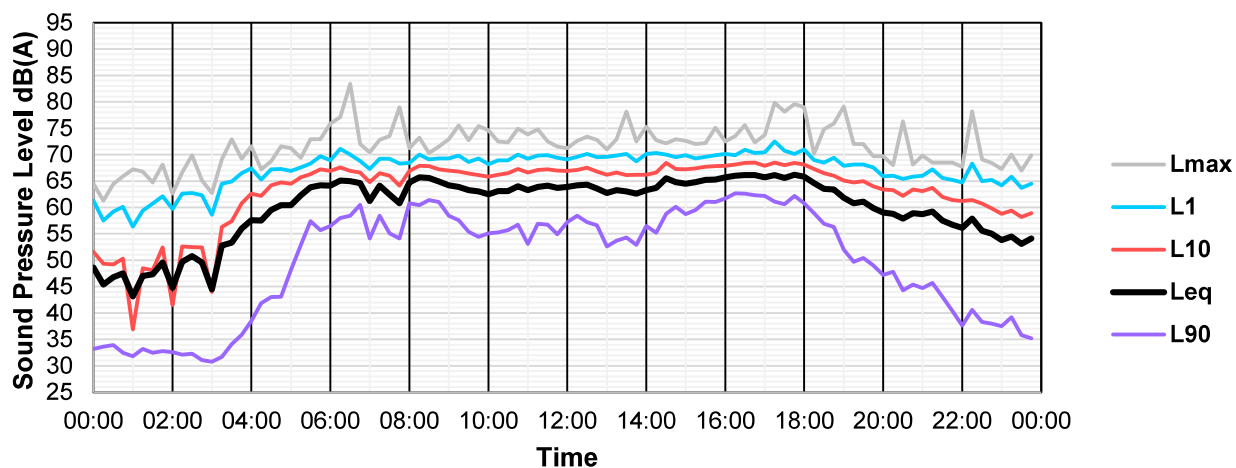
Unattended Noise Measurements Saturday 7 March 2020



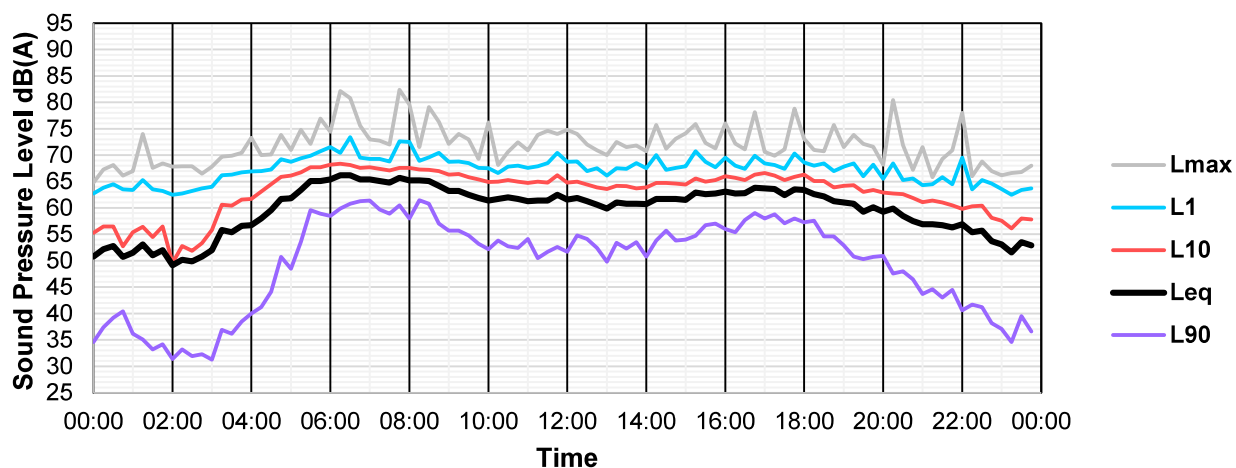
Unattended Noise Measurements Sunday 8 March 2020



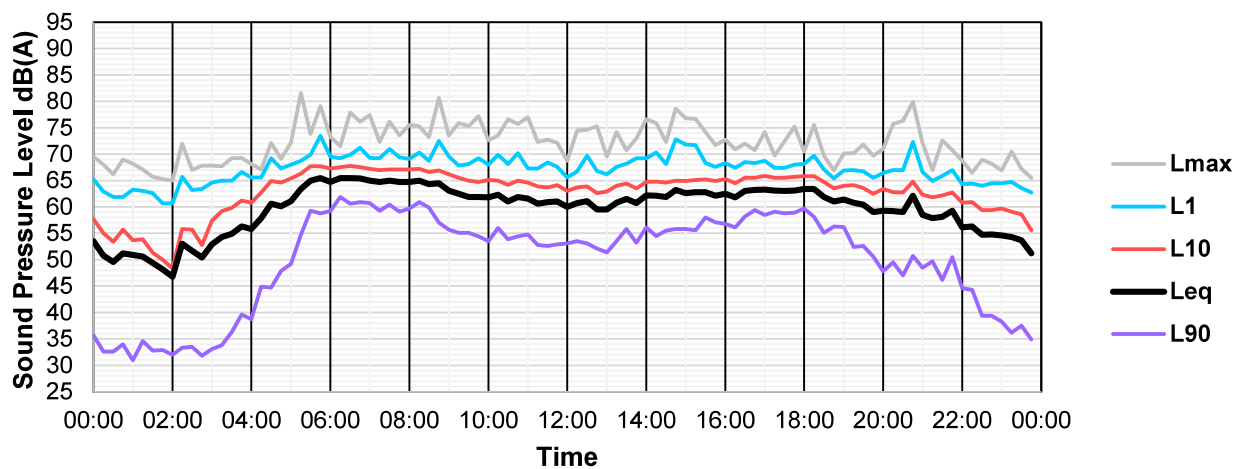
Unattended Noise Measurements Monday 9 March 2020



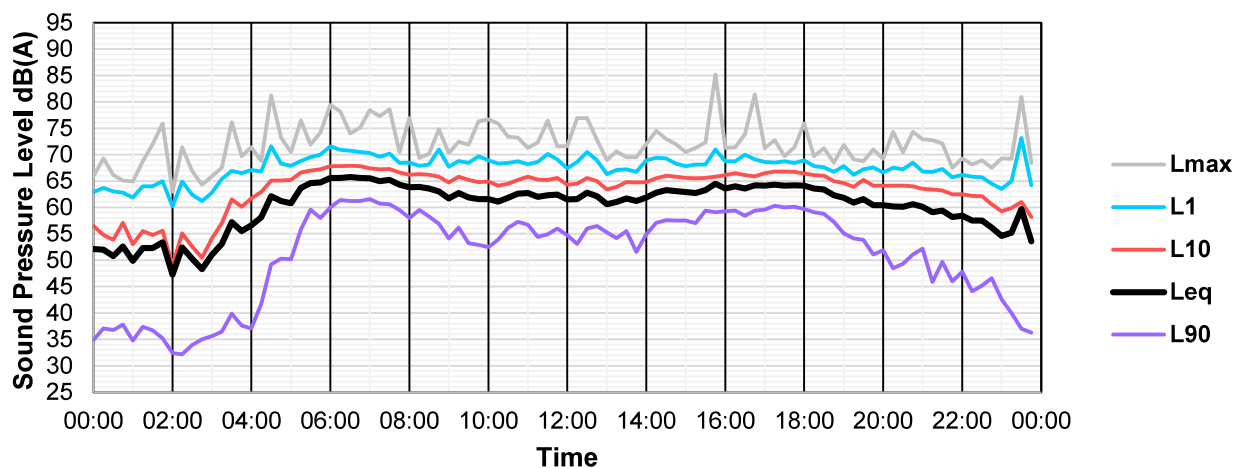
Unattended Noise Measurements Tuesday 10 March 2020



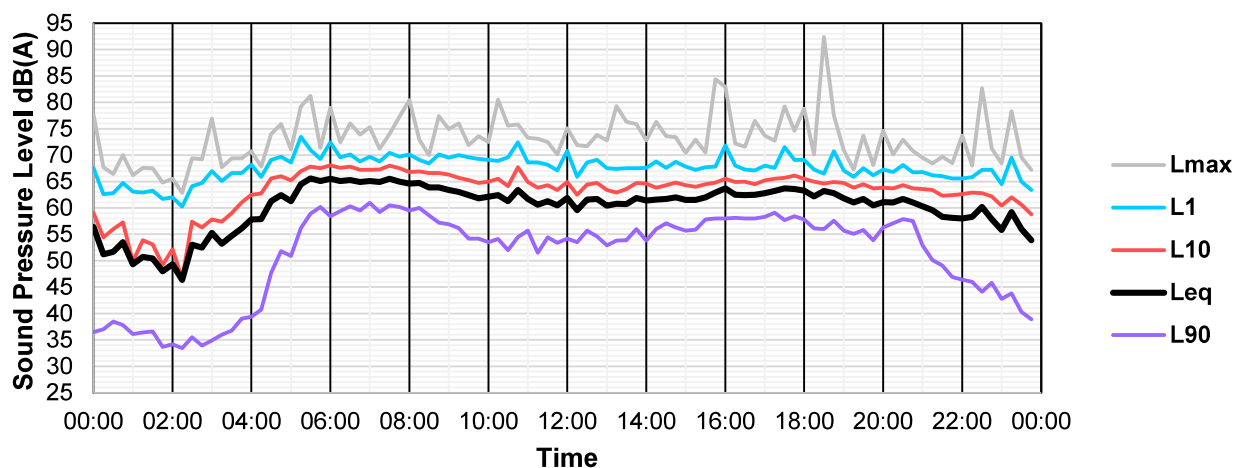
Unattended Noise Measurements Wednesday 11 March 2020



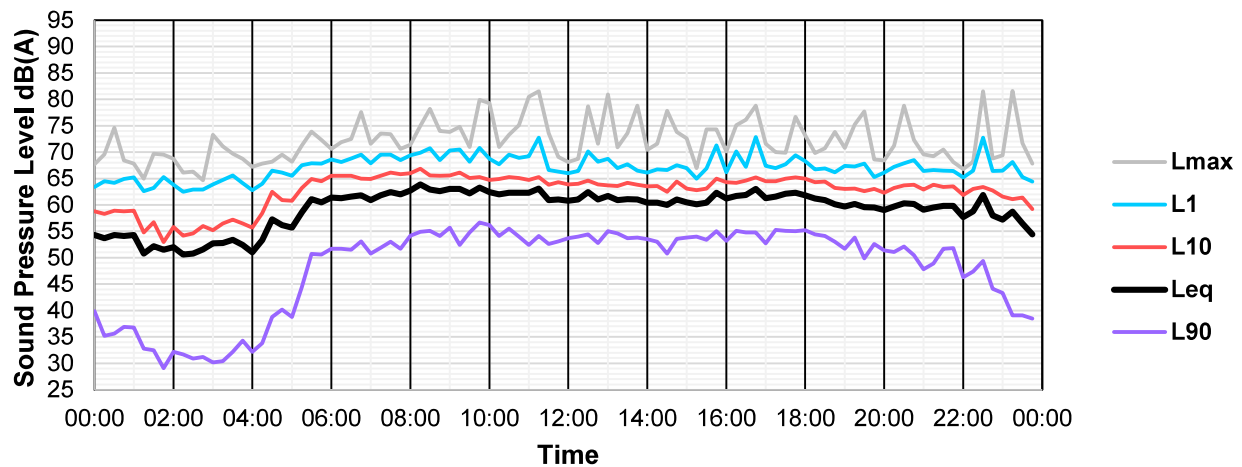
Unattended Noise Measurements Thursday 12 March 2020



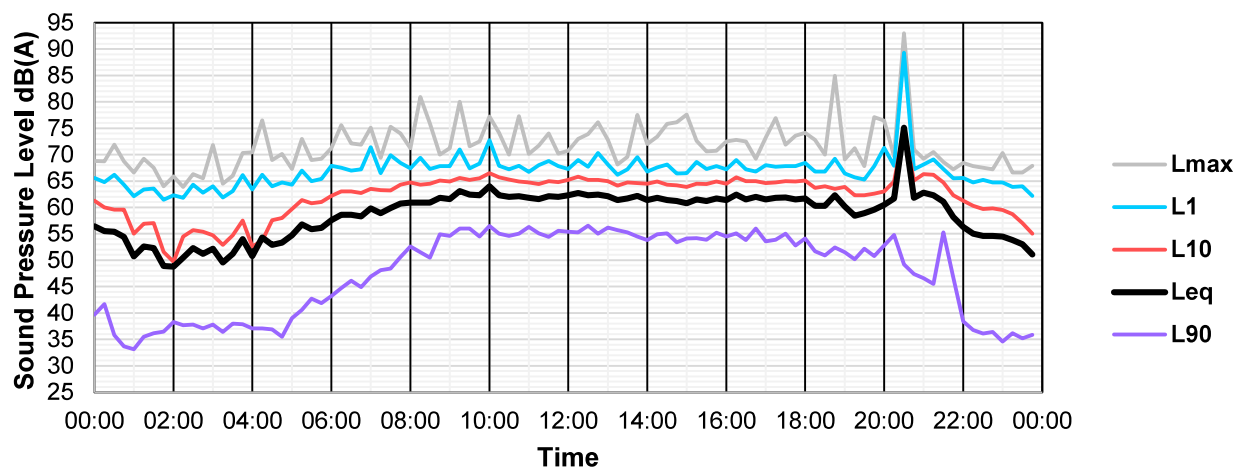
Unattended Noise Measurements Friday 13 March 2020



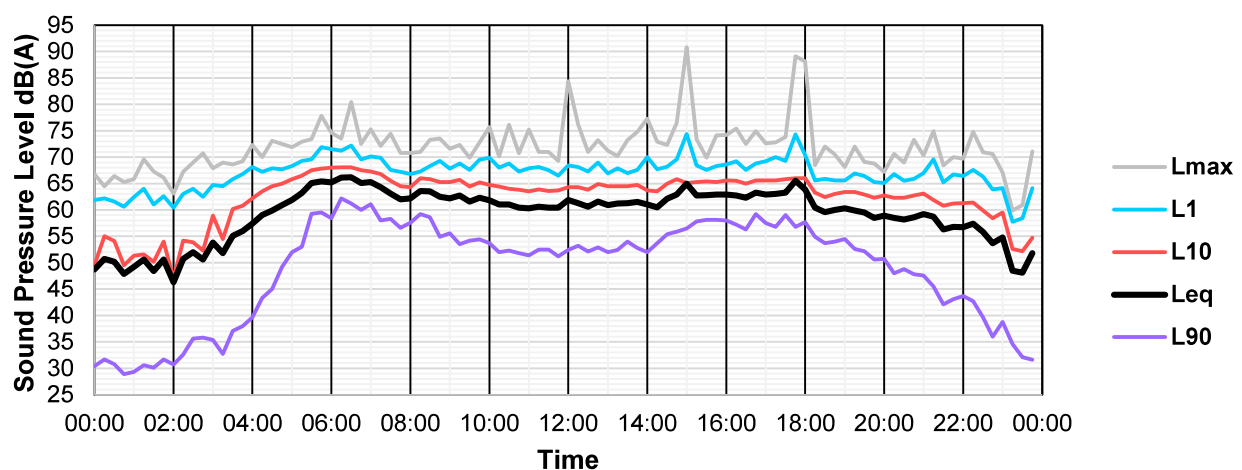
Unattended Noise Measurements Saturday 14 March 2020



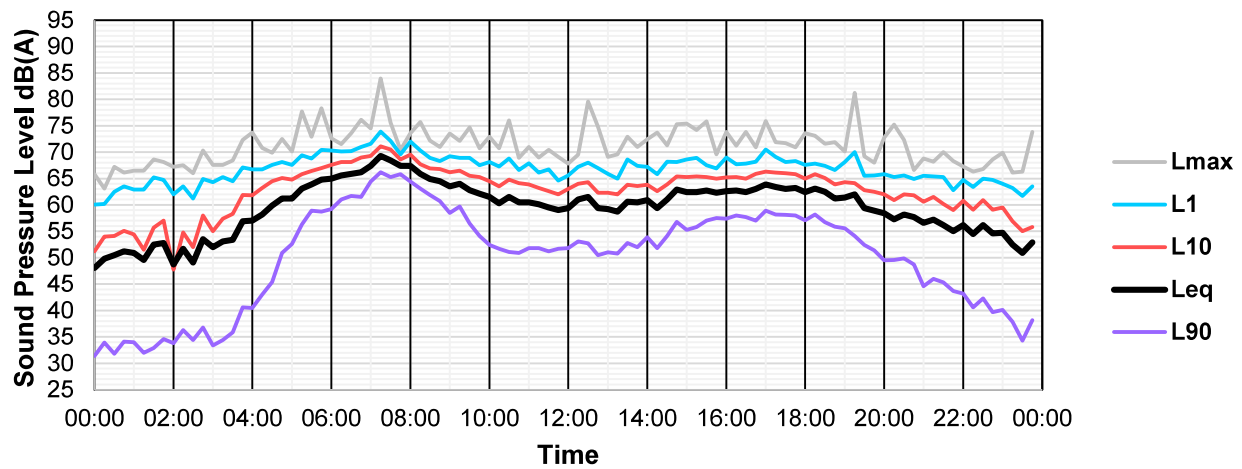
Unattended Noise Measurements Sunday 15 March 2020



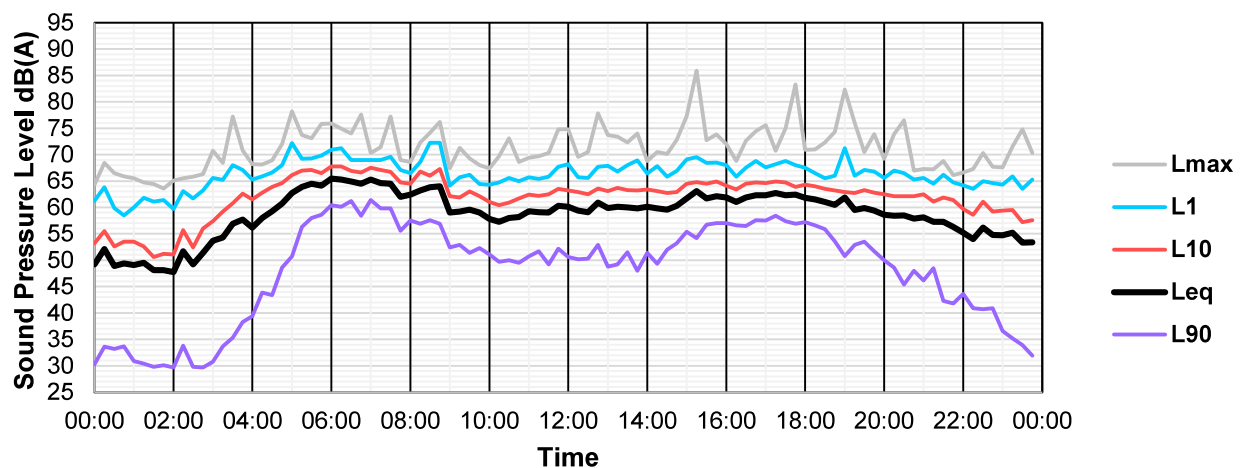
Unattended Noise Measurements Monday 16 March 2020



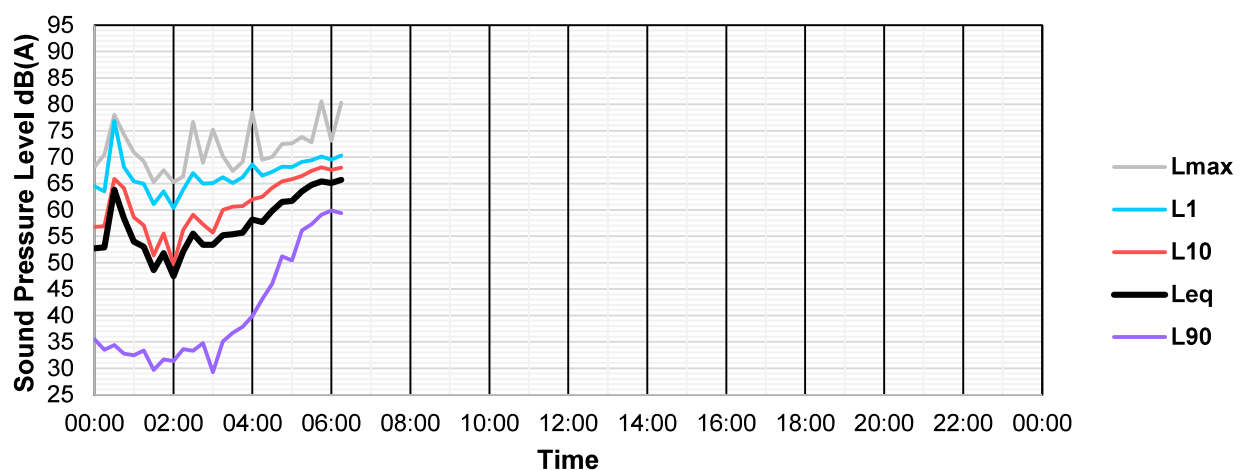
Unattended Noise Measurements Tuesday 17 March 2020



Unattended Noise Measurements Wednesday 18 March 2020



Unattended Noise Measurements Thursday 19 March 2020



Appendix E – Traffic volumes, 2051

TRAFFIC STATEMENT – EVERLEIGH PRECINCT 9

11/05/2021

Bradley Jones RPEQ

Precinct 9 Traffic Statement-revB

1. INTRODUCTION

Premise was engaged by Mirvac to prepare a Traffic Statement for Everleigh Precinct 9 based on:

- Urbis Drawing No. P0018054 ROL05-1 rev08 "Everleigh: Reconfiguration of a Lot Plan – ROL 5"; and
- Premise Drawing Number MIRSGB-TD000-revB "Proposed Subdivision: Greenbank Road, Greenbank – Site Layout and Lot Count" (21/10/2020).

Precinct 9 consists of approximately 421 residential lots to the southeast of the Teviot Road / Leanne Court intersection, Greenbank. It is the extension of Everleigh Precinct 12 north of Everleigh Drive and includes extension of Leanne Court east of Teviot Road as Anderson Drive.

This statement includes:

- Forecast ultimate (2051) Teviot Road / Leanne Court / Anderson Drive (new road) intersection arrangement;
- Proposed Anderson Drive cross sections to accommodate ultimate (2051) traffic;
- Recommendation of a lot trigger for construction of the Anderson Drive leg of the Teviot Road / Leanne Court intersection;
- Forecast ultimate (2051) daily traffic volumes on Everleigh's connector street network; and
- Responses to Economic Development Queensland (EDQ) concerns regarding:
 - Intersection spacing on Anderson Drive;
 - Access to Precinct 9.

1.1 Background

Revision A of this Traffic Statement, dated 21 November 2020, was submitted with the development application to Economic Development Queensland (EDQ) as the assessment manager. Traffic Statement-revA differed from the current (revB) traffic statement in that:

- Traffic Statement-revA included identification of possible Anderson Drive configurations to provide access to a future neighbourhood centre on the northeast corner of the Teviot Road / Anderson Drive intersection. As the neighbourhood centre does not form part of the current development application, consideration of the neighbourhood centre has been removed from the current (revB) traffic statement; and
- Traffic modelling referred to in Traffic Statement-revA allowed trips produced by residential zones within Everleigh to be attracted to non-residential zones within Everleigh. As requested by EDQ, traffic modelling has been revised to match the MWH model assumption that residential trip generation is discounted by 25% to represent self-containment with no modelling of trips within Everleigh.

2. TEVIOT RD / LEANNE CT / ANDERSON DR INTERSECTION (2051)

Figure 1 is an extract from the approved Movement Network Infrastructure Master Plan (MNIMP) depicting the forecast ultimate (2051) Teviot Road / Leanne Court / Anderson Drive intersection. This arrangement has been used to develop the Ultimate Intersection Functional Layout Plans included within the ROL05 Engineering Services Report.

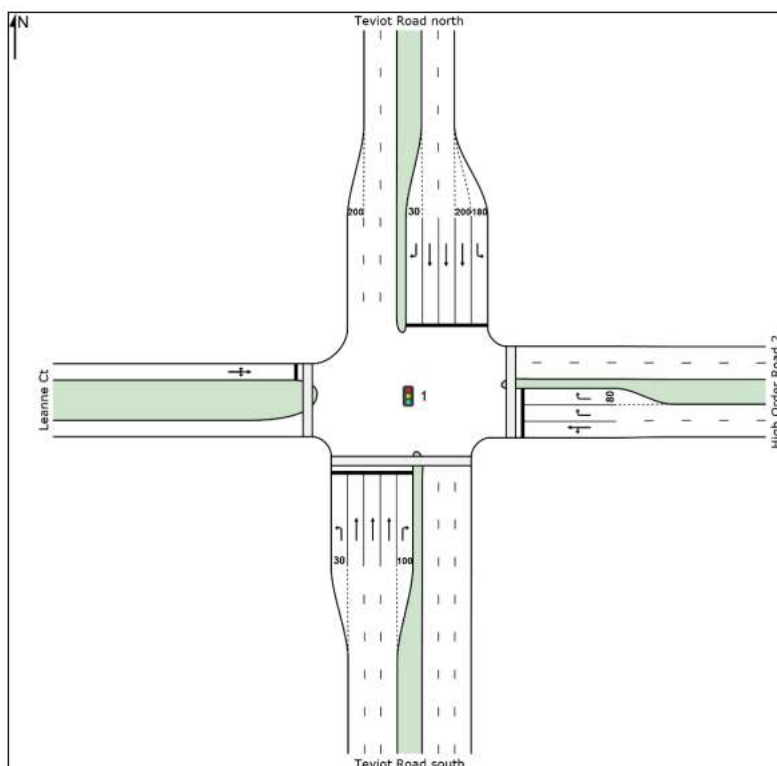


Figure 1: 2051 Teviot Road / Leanne Court / HOR2 (Anderson Drive) Intersection Layout

(Source – MWH Movement Network Infrastructure Master Plan)

3. ANDERSON DRIVE CROSS SECTION

Anderson Drive within Precinct 9 consists of two (2) sections being:

- Between Teviot Road and Kessels Boulevard; and
- East of Kessels Boulevard.
- Commentary on each of these sections is provided below.

Anderson Drive – Between Teviot Road and Kessels Boulevard

Figure 2 provides the MNIMP approved cross section of Anderson Drive between Teviot Road and Kessels Boulevard (described as Trunk Connector 1 in the MNIMP). The 28m wide road reserve has been provided for in the reconfiguration of a lot plans and the Internal Road Functional Plans included within the ROL05 Engineering Services Report.

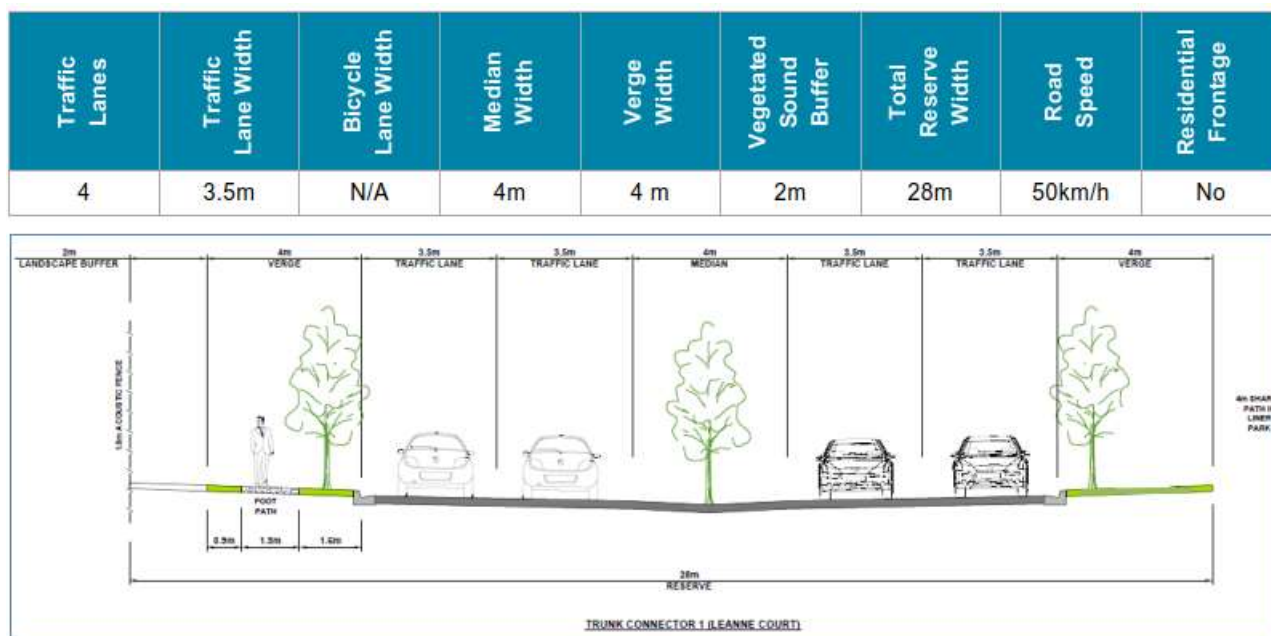


Figure 2: 2051 Trunk Connector 1 (Anderson Drive) Cross Section

(Source – MWH Movement Network Infrastructure Master Plan)

Figure 5 indicates a traffic volume of 15,274vpd for this section of Anderson Drive in the ultimate (2051) scenario. EDQ's "PDA Guideline No. 06: Street and Movement Network" (February 2019) suggests traffic volumes of 10,000vpd to 18,000vpd may be adequately serviced by a Trunk Connector with a 2-lane cross section (either divided or undivided) and no direct access. Accordingly, opportunity exists to reduce the Anderson Drive cross section from 4 to 2 lanes.

Conversely, we understand there is some uncertainty regarding:

- sub-regional traffic planning;
- traffic access, egress and intersection arrangements for the neighbourhood centre and State community health centre to be located north of Anderson Drive; and
- the ultimate design of the Teviot Road / Leanne Court / Anderson Drive Intersection (which requires design coordination with Council).

To provide maximum flexibility, it is recommended the approved 4-lane cross section be adopted as the base case, with opportunities to reduce traffic lanes to be confirmed in detail design and assessed by compliance assessment. Notes have been provided on the Road Functional Plans to this effect.

Anderson Drive – East of Kessels Boulevard

Figure 3 provides the MNIMP approved cross section of Anderson Drive east of Kessels Boulevard (described as Neighbourhood Connector 1 in the MNIMP). The 21m wide road reserve has been provided for in the reconfiguration of a lot plans and the Internal Road Functional Plans included within the ROL05 Engineering Services Report.

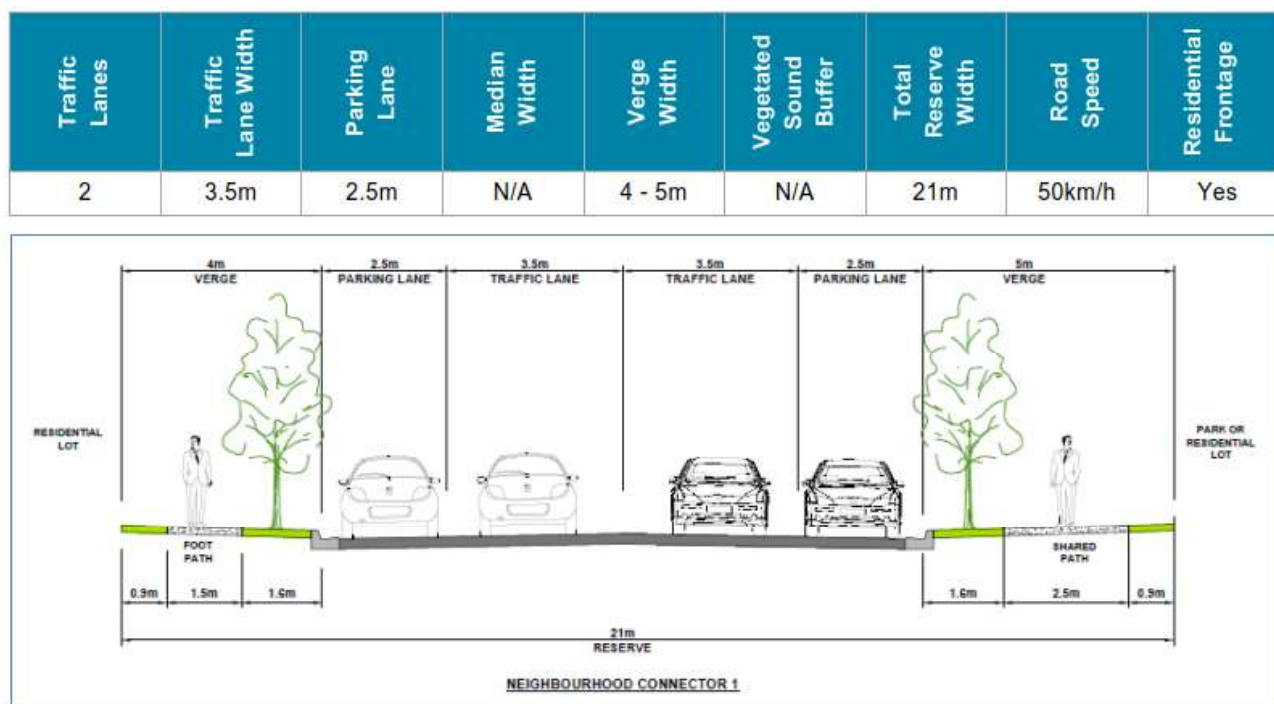


Figure 3: 2051 Neighbourhood Connector 1 (Anderson Drive) Cross Section

(Source – MWH Movement Network Infrastructure Master Plan)

Figure 5 indicates a traffic volume of 7,382vpd for this section of Anderson Drive in the ultimate (2051) scenario. EDQ's "PDA Guideline No. 06: Street and Movement Network" (February 2019) suggests traffic volumes 3,000vpd to 7,499vpd may be adequately serviced by a Neighbourhood Connector Street. Additionally, it is noted that traffic volumes of 7,500vpd to 10,000vpd may be adequately serviced by a Trunk Connector with an identical 2-lane cross section (either divided or undivided) and with direct access permitted. Accordingly, the proposed cross section for this part of Anderson Drive is considered appropriate and also capable of servicing up to a traffic volume of 10,000vpd.

4. LOT TRIGGER FOR ANDERSON DRIVE CONSTRUCTION

The trigger for construction of the Anderson Drive leg of the Teviot Road / Leanne Court intersection will be the Teviot Road / Everleigh Drive/ Pub Lane intersection, currently the only access to Everleigh, reaching capacity.

To assess the operation of the Teviot Road / Everleigh Drive / Pub Lane intersection, Premise has developed a spreadsheet traffic model of Everleigh and the surrounding road network. The model is generally based on the same assumptions as the AIMSUN model developed by MWH for the purpose of preparing "Movement Network Infrastructure Master Plan: Teviot Road, Greenbank" (MNIMP). The MNIMP was approved by EDQ on 9 August 2017 based on:

- 24-hour intersection traffic count data collected on Thursday 5 November 2015;
- Traffic generation rates and directional splits for land uses within Everleigh as agreed by MWH and Veitch Lister Consulting (VLC) on 25 January 2017;
- Growth rates of between 3% and 4%; and

- 25% discounting of trips produced by residential development within Everleigh to represent the communities self-containment.

Further to the above, the Premise traffic model is based on:

- Daily traffic generation rates for land uses within Everleigh which were not specified by MWH are based on the preferred hierarchy of data sources for traffic generation rates specified in the Department of Transport and Main Roads' (TMR's) "Guide to Traffic Impact Assessment" (GTIA); and
- An external trip distribution which was estimated based on the available information regarding the trip distribution in the MWH model.

While Premise has generally sort to keep its spreadsheet traffic model consistent with the MWH model, Premise has increased the number of trip generating zones within Everleigh from four (4) in the MWH model to 16 in the Premise model. EDQ acknowledges that this will provide a more refined traffic model and allow more realistic estimation of traffic on the network.

The Premise traffic model estimates traffic for each year from when traffic count data was collected (2015) until 2051 which was adopted as representative of ultimate traffic in MNIMP. As the model is calibrated to traffic counts conducted in November 2015, forecast traffic is representative of traffic in November of each year.

Advice from Mirvac is that Everleigh produced the first developed lots in 2019 with the current and forecast development rate being approximately 200 lots per annum. Forecast project milestones are:

- 365 sealed lots in December 2020;
- 509 sealed lots in December 2021; and
- 668 sealed lots in September 2022.

There is understood to be a six (6) to nine (9) month lag between the sealing of a lot and its occupation as a residential dwelling.

In light of the above, the Premise traffic model is based on:

- 300 sealed lots including 200 occupied lots in November 2020;
- 500 sealed lots including 400 occupied lots in November 2021; and
- 700 sealed lots including 600 occupied lots in November 2022.
- Only lots with occupied residential dwellings generate traffic in the Premise traffic model.

The Teviot Road / Everleigh Drive / Pub Lane intersection was analysed based on its existing lane and phase arrangement using SIDRA Intersection Version 9 (SIDRA). The pedestrian crossing of Teviot Road on the southern leg of the intersection was omitted from the analysis. It is expected that demand for this crossing movement will be low but, by including it in all signal cycles, the overall intersection capacity estimated by SIDRA was greatly reduced.

SIDRA analysis indicated that the critical peak hour for the existing Teviot Road / Everleigh Drive / Pub Lane intersection is the evening peak hour and that the intersection will reach its practical capacity (degree of saturation (DoS) ≥ 0.90) between November 2022 and November 2023.

To provide a more precise estimate of when the existing intersection would reach capacity, SIDRA's Design Life tool was used with growth rates chosen such that one (1) "year" as modelled by SIDRA represented one (1) month of Everleigh development and background traffic growth. By this process it was estimated that the intersection DoS during the critical evening peak hour will be:

- 0.90 in February 2023 with approximately 750 sealed lots and approximately 650 occupied lots. The DoS during the morning peak hour would be less than 0.90;
- 0.95 in June 2023 with approximately 810 sealed lots and approximately 710 occupied lots. The DoS during the morning peak hour would still be less than 0.90; and
- 1.00 (theoretical capacity) in January 2024 with approximately 930 sealed lots and approximately 830 occupied lots. The DoS during the morning peak hour would still be less than 0.90.

Based on the SIDRA analysis referred to above it is recommended that:

- Design of the Teviot Road / Leanne Court / Anderson Drive intersection be approved prior to sealing of the 751st lot within Everleigh, i.e. prior to the Teviot Road / Everleigh Drive / Pub Lane intersection reaching its practical capacity; and
- Construction of the Anderson Drive leg of the Teviot Road / Leanne Court intersection be completed prior to sealing of the 931st lot within Everleigh, i.e. prior to the Teviot Road / Everleigh Drive / Pub Lane intersection reaching its theoretical capacity.

5. FORECAST ULTIMATE (2051) TRAFFIC

Ultimate traffic on Everleigh's connector street network was forecast using the Premise traffic model. The modelled residential lot yield and distribution is as shown by Figure 4 extracted from Premise Drawing Number MIRSG-B-TD000-revB. Based on advice from Mirvac:

- The school (P2.11) is expected to have an ultimate enrolment of 1,400 students; and
- The retail precinct (P13), also referred to as the Neighbourhood Centre, is expected to have an ultimate gross leasable area (GLA) of 7,600m².

Figure 5 shows estimated ultimate (2051) daily traffic volumes on Everleigh's connector street network

Figure 4 – Site layout and lot count (extracted from MIRSGB-TD000-revA)

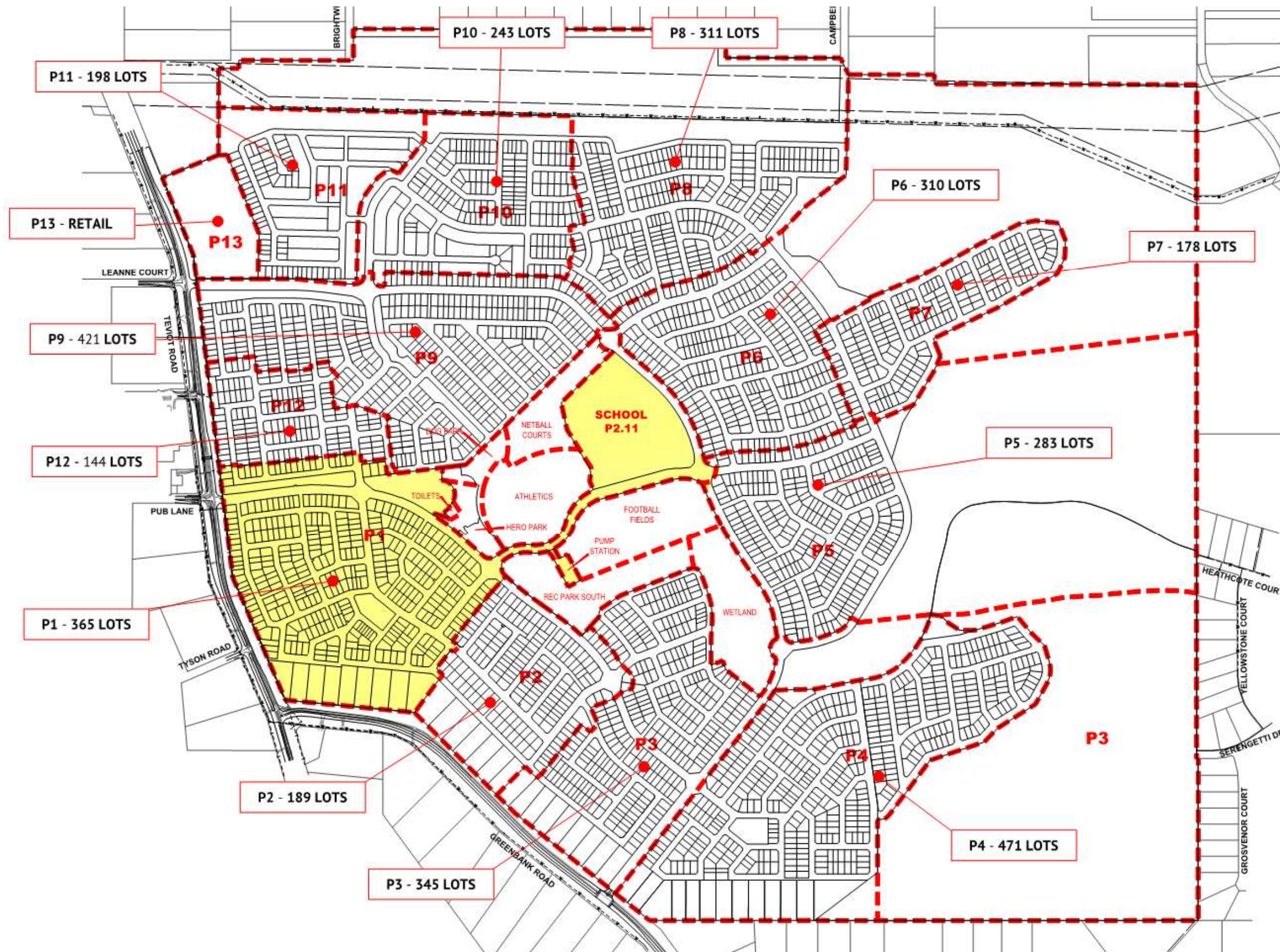


Figure 5 – Everleigh year 2051 traffic volumes



6. RESPONSE TO ECONOMIC DEVELOPMENT QUEENSLAND

6.1 Intersection Spacing

EDQ has queried the distance between the proposed roundabouts on Anderson Drive at Kessels Boulevard and the eastern end of Precinct 9 and have suggested an additional access point be provided for Precinct 9 between these two (2) roundabouts.

In response to EDQ's query, it should be noted that while vehicle connectivity between Anderson Drive and Precinct 9 is not provided to the east of Kessels Boulevard, connectivity for active transport modes is provided at three (3) points. In the context of the overall street and path network, the proposed active transport links provide direct access to local facilities and promote the use of active transport modes for access to local facilities such as parks and schools, and public transport. This type of network arrangement, sometimes referred to as a fused grid or filtered permeability, provides efficient external vehicle connectivity (to / from Teviot Road) with internal connectivity being more efficient for active transport than private vehicles. Research has found that this type of network increases walking, reduces travel by vehicles and results in better health outcomes than conventional urban street networks where private vehicles are given a similar level of access to active transport (<https://www.vtpi.org/tdm/tdm116.htm>).

6.2 Precinct 9 Access

EDQ have also queried traffic access / egress to / from Precinct 9 lots to the east of Kessels Boulevard. No guidance is provided in relation to these issues by PDA Guideline No. 06. Therefore, the following response has been prepared in accordance with Institute of Public Works Engineering Australasia, Queensland (IPWEAQ) guidelines including "Queensland Streets" and "Street Design Manual: Walkable Neighbourhoods".

Approximately 220 residential lots are proposed within Precinct 9 to the east of Kessels Boulevard. These lots will be accessed by two (2) intersections on Kessels Boulevard with one (1) approved for construction within Precinct 12 and the other proposed for construction within Precinct 9. Kessels Boulevard itself provides through connectivity between Everleigh Drive and Anderson Drive. Therefore, a single road closure or accident will not prohibit vehicle access to Precinct 9 lots.

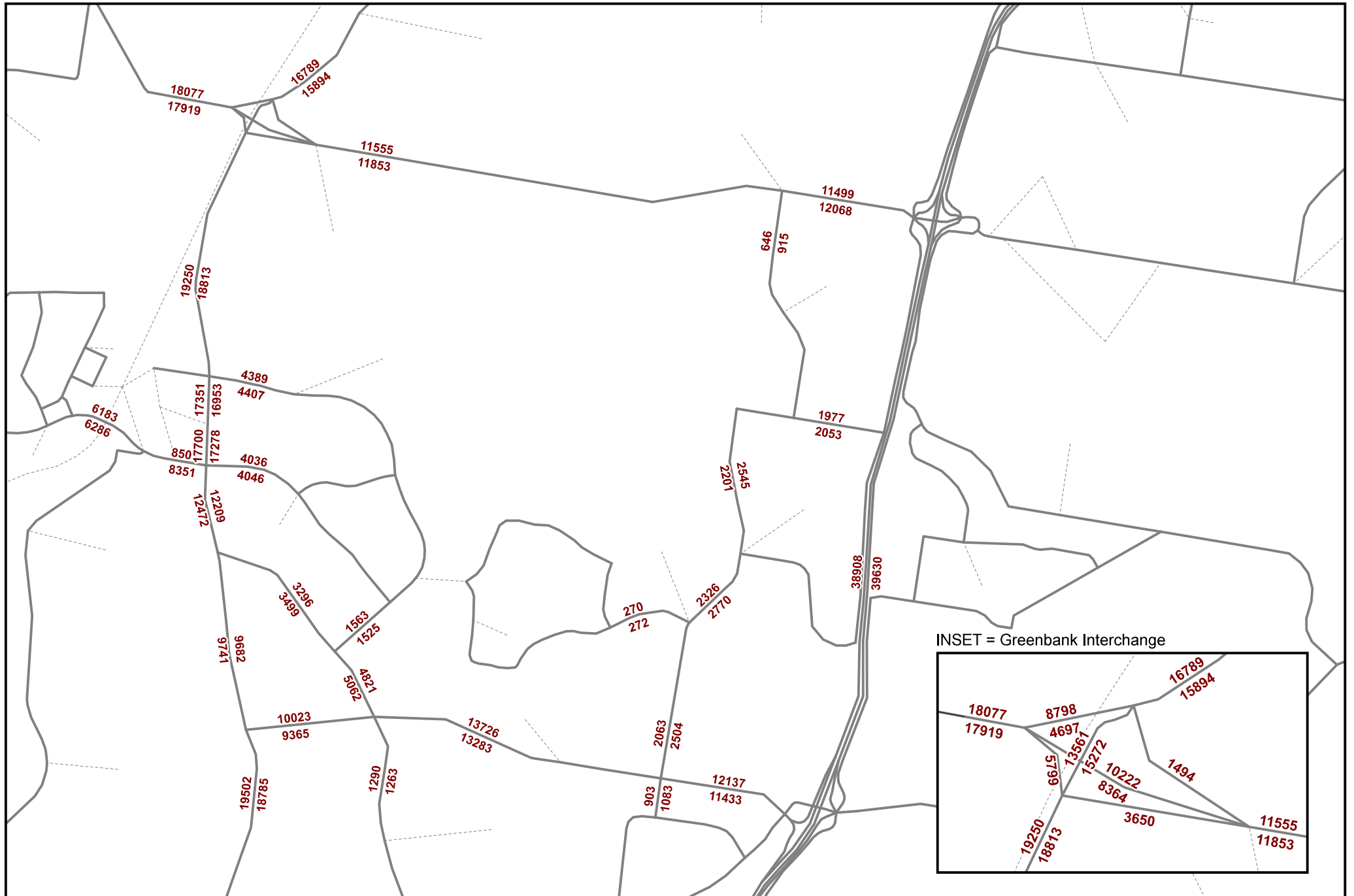
The proposed access street layout servicing Precinct 9 lots utilises straight street alignments which provide legibility and improve wayfinding for visitors to the area. Travel distances between residential lots and the Kessels Boulevard neighbourhood connector are short. In the worst case, the residential lot is less than 700m from Kessels Boulevard which corresponds to approximately 60sec of travel time at 40km/h.

The above strategies comply with the recommendations of IPWEAQ guidelines.



Premise

premise.com.au



Forecast Average Weekday Traffic, 2051 (with Full SRIP)

Appendix F – Validation of traffic noise model

Appendix G – Traffic noise levels

Everleigh, Greenbank - RoL 5

**Traffic Noise Modelling
Year 2051**

**Ground Floor Private Open Spaces
(1.5m AGL)**

With Noise Barriers

Traffic noise level
Free field
 $L_{10}(18hr)dB(A)$

	<=	56
56 <	<=	57
57 <	<=	58
58 <	<=	59
59 <	<=	60
60 <	<=	61
61 <	<=	62
62 <	<=	63
63 <	<=	64
64 <	<=	65
65 <	<=	66
66 <	<=	67
67 <	<=	68
68 <	<=	69

Legend

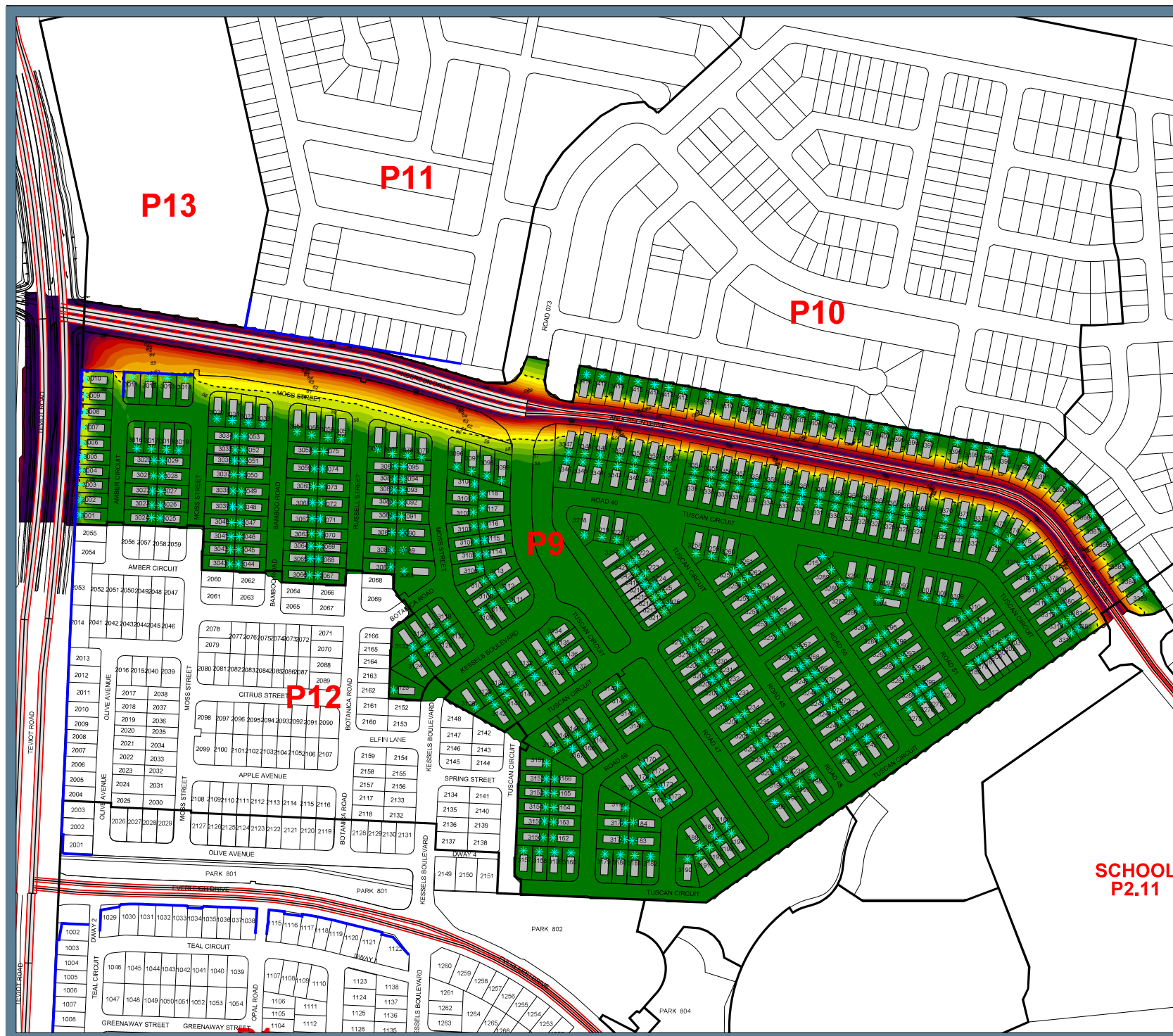
- Limit line - 60dB(A) criteria
- Road noise emission line
- Road surface
- Noise barrier
- Building
- * Private open space

SCALE @ A4 1:5000

0 15 30 60 90 120 150 180 m



Grid Spacing: 3m
Project Engineer: Sam Fraser
Created: 6/08/2021
Processed with SoundPLAN 8.2



Everleigh, Greenbank - RoL 5

**Traffic Noise Modelling
Year 2051**

**Ground Floor
(1.8m AGL)**

With Noise Barriers

Traffic noise level
Facade adjusted
 $L_{10(18hr)}dB(A)$

	<=	59
59 <	<=	60
60 <	<=	61
61 <	<=	62
62 <	<=	63
63 <	<=	64
64 <	<=	65
65 <	<=	66
66 <	<=	67
67 <	<=	68
68 <	<=	69
69 <	<=	70
70 <	<=	71
71 <	<=	72
72 <		

Legend

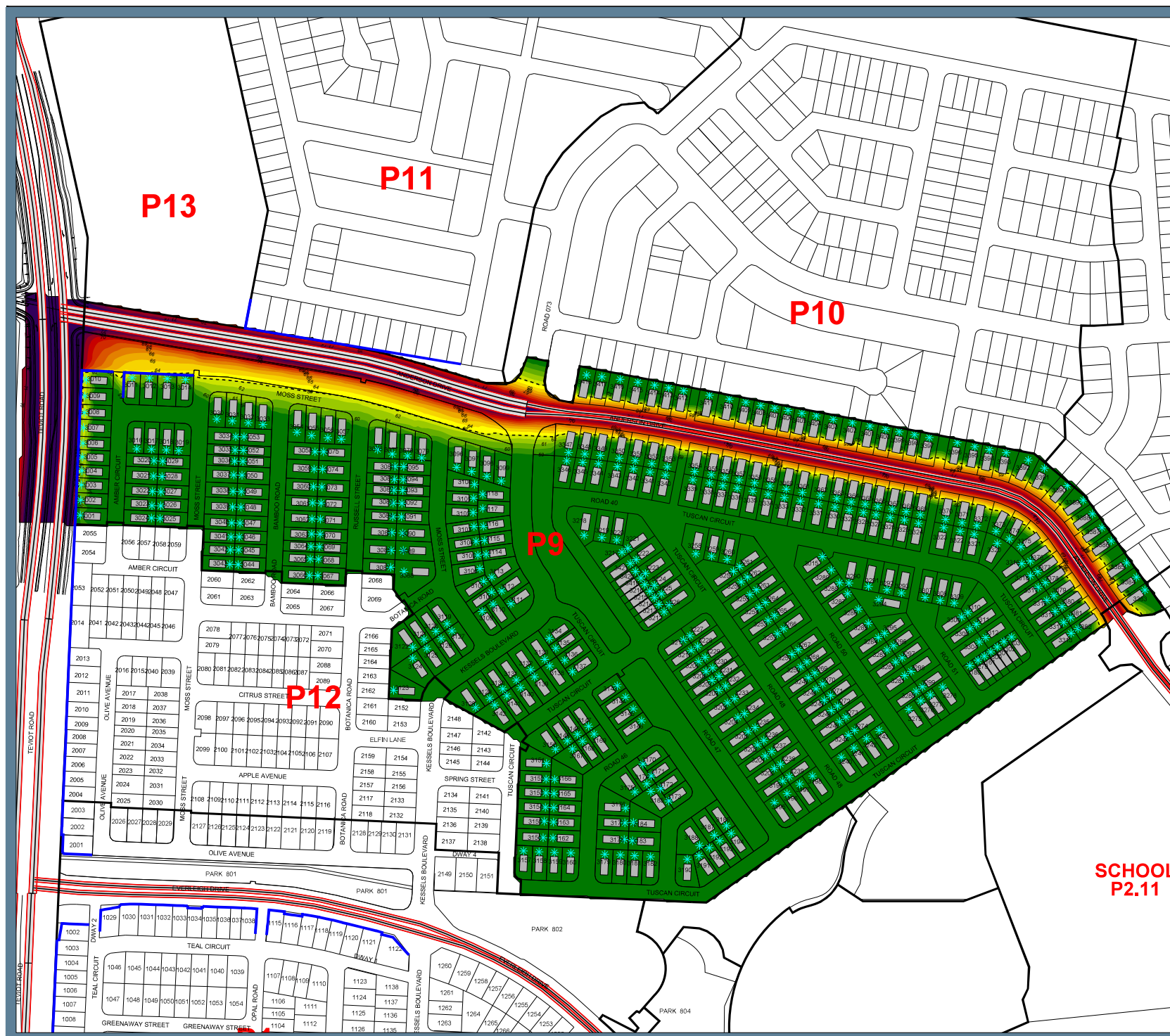
- Limit line - 63dB(A) criteria
- Road noise emission line
- Road surface
- Noise barrier
- Building
- * Private open space

SCALE @ A4 1:5000

0 15 30 60 90 120 150 180 m



Grid Spacing: 3m
Project Engineer: Sam Fraser
Created: 6/08/2021
Processed with SoundPLAN 8.2



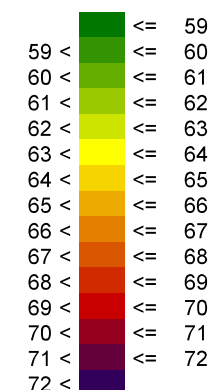
Everleigh, Greenbank - RoL 5

**Traffic Noise Modelling
Year 2051**

**First Floor
(4.6m AGL)**

With Noise Barriers

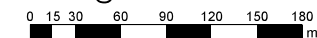
Traffic noise level
Facade adjusted
 $L_{10(18hr)}dB(A)$



Legend

- Limit line - 63dB(A) criteria
- Road noise emission line
- Road surface
- Noise barrier
- Building
- * Private open space

SCALE @ A4 1:5000



Grid Spacing: 10m
Project Engineer: Sam Fraser
Created: 6/08/2021
Processed with SoundPLAN 8.2

