

# Traffic Noise Impact Assessment Everleigh, Greenbank

## Area 1 – Amendment to Lot Layout

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Mirvac

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# Executive Summary

ATP Consulting Engineers (ATP) was engaged by Mirvac to prepare a noise impact assessment in support of a Permissible Change application for the approved Area 1 of the Everleigh development in Greenbank. Minor change to the lot layout is proposed at the northern part of Area 1 (Precinct 1.6).

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 development site will be impacted by traffic noise from Teviot Road, Greenbank Road and the major internal collector roads.

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

- Noise barriers must be constructed along Teviot Road and Everleigh Drive.
- No noise control measures are required along Greenbank Road, provided that dwellings have minimum setback distance of 40m for low-set buildings and 60m for high-set buildings.
- The ground and upper floors of front-loaded lots adjacent to Everleigh Drive have to be designed as per AS3671-1989 to mitigate traffic noise ingress.
- The upper floors of the allotments located in close proximity to Teviot Road and Everleigh Drive have to be designed as per AS3671-1989 to mitigate traffic noise ingress.

Provided the recommended planning and design noise control measures are implemented in the construction of Everleigh Area 1, road traffic noise will not impose any further constraints on the establishment of the development.

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Appendix D – Noise measurement results
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## 1. Introduction

### 1.1 Project background

ATP Consulting Engineers (ATP) was engaged by Mirvac to prepare a noise impact assessment in support of a Permissible Change application for the approved Area 1 of the Everleigh development in Greenbank. Minor change to the lot layout is proposed at the northern part of Area 1 (Precinct 1.6).

This acoustic report is an amendment to the previous noise impact assessment<sup>1</sup> dated 5 March 2019.

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 and Greenbank 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 Area 1 and interface lots. The traffic flows along Teviot Road, Greenbank Road and higher order internal roads, 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 dwellings to be constructed at Area 1 and the interface lots along Greenbank Road.
- 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.

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<sup>1</sup> "Traffic Noise Impact Assessment – Everleigh, Greenbank: Precinct 2 – RoL Application; Area 1 – Review of Previous Noise Impact Assessment" by ATP Consulting Engineers, report ref. ATP170617-R-TNIA-01\_Precinct 2 RoL and Area 1 Review, Issue 1 report dated 5 March 2019

### 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 Area 1, including minor changes to the lot layout, is presented in Figure 1.1 and Appendix A.

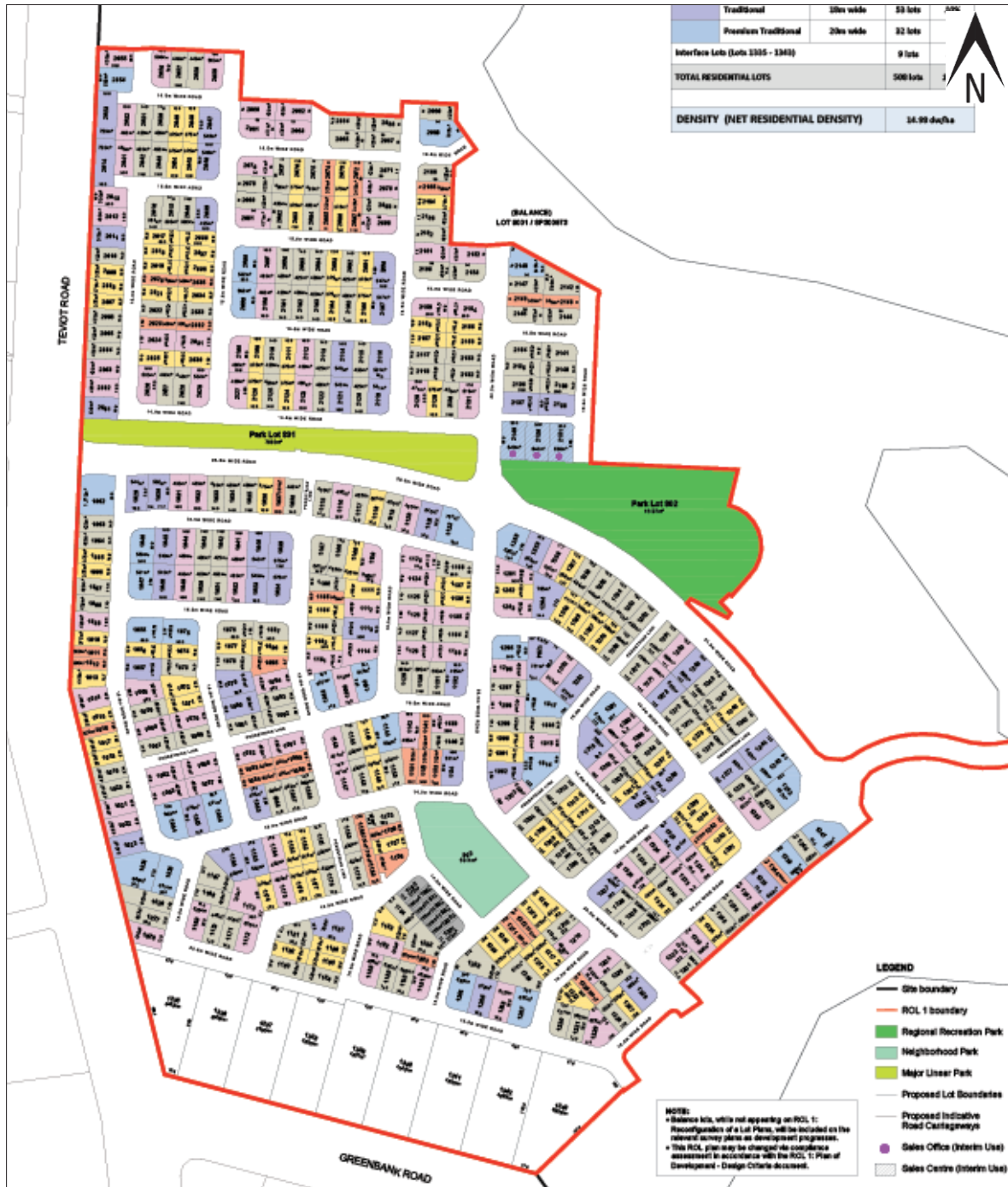


Figure 1.1 Area 1 lot layout

## 2. Existing Noise Amenity

### 2.1 Noise measurement location

Noise measurements were carried out at two locations within the site to obtain information about the traffic and background noise levels at the subject site.

The noise measurement methodology is summarised in Table 2.1.

**Table 2.1 Noise measurements**

<b>Relevant legislation, standards and guidelines</b>	<p>The noise measurements were carried out in accordance with:</p> <ul style="list-style-type: none"> <li>• Australian Standard AS 1055:2018 (<i>Acoustics – Description and measurement of environmental noise</i>); and</li> <li>• Australian Standard AS 2702-1984 (<i>Acoustics – Methods for measurement of road traffic noise</i>).</li> </ul>
<b>Measurement location</b>	<p>The noise monitoring was carried out at two locations:</p> <ul style="list-style-type: none"> <li>• Location 1 – South-western boundary of the existing Lot 3 on SP297192, approximately 20m setback distance from Teviot Road</li> <li>• Location 2 – Approximately 30m setback distance from Greenbank Road</li> </ul> <p>The noise measurement locations are presented in Figure 2.1, as well as the photos presented in Appendix B.</p>
<b>Measurement period</b>	<ul style="list-style-type: none"> <li>• Location 1 – Continuous noise monitoring was carried out 24 hours a day from 5 to 18 March 2020. This recent noise monitoring has been carried out by ATP in support of noise assessment for the Everleigh RoL 5 application.</li> <li>• Location 2 – Continuous noise monitoring was carried out 24 hours a day from 25 September to 2 October 2015. This noise monitoring was carried out as part of the original noise assessment in support of the Area 1 development application. The proposed lot layout changes are at the northern part of Area 1, closer to monitoring Location 1, therefore there was no need to carry out new noise monitoring at Location 2.</li> </ul>
<b>Measurement equipment</b>	<p>The following noise measurement equipment was used:</p> <ul style="list-style-type: none"> <li>• Environmental noise logger – ARL EL-315 (serial no. 15-203-537);</li> <li>• Environmental noise logger – ARL Ngara (serial no. 8780d4); and</li> <li>• Calibration – RION NC-74 Sound Level Calibrator (serial no. 34615224).</li> </ul> <p>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 &lt;0.1 dB(A).</p>
<b>Meteorological conditions</b>	<ul style="list-style-type: none"> <li>• Location 1 – 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.</li> <li>• Location 2 – Rainfall occurred on 28 and 29 September 2015. 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.</li> </ul>
<b>Analysis of data</b>	<p>The noise measurement data was analysed to determine the following noise descriptor:</p>



	<ul style="list-style-type: none"> <li> <b>L<sub>10,18hr</sub></b>: L<sub>10</sub> is the level of noise exceeded for 10% of any time period; L<sub>10,18hr</sub> is the typical traffic noise descriptor, and is the arithmetic average of 18 hourly L<sub>10,1hr</sub> levels over consecutive hours between 6am and 12am.         </li> </ul>
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The noise measurement locations are presented in Figure 2.1 and site photos are presented in Appendix B.

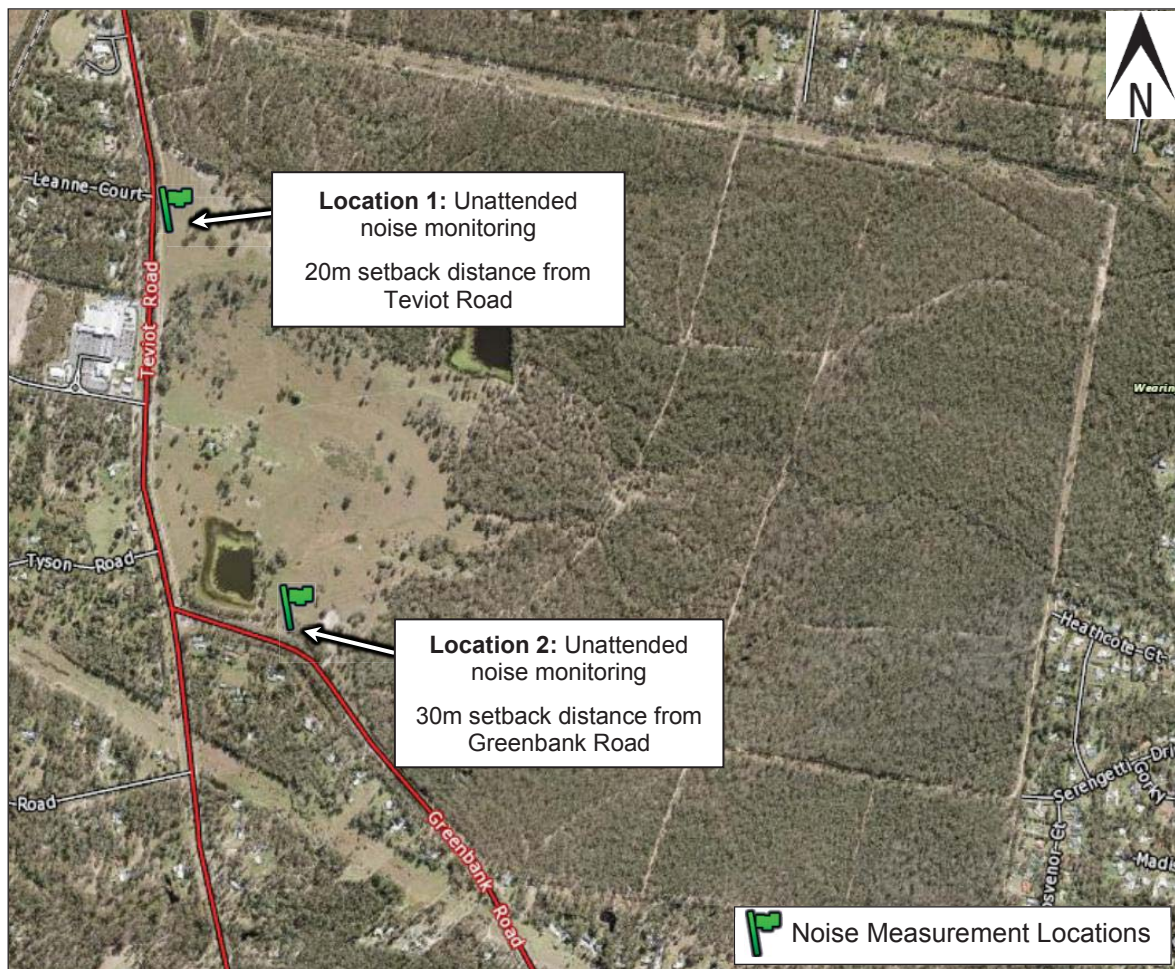


Figure 2.1 Noise measurement locations

## 2.2 Measurement Results

### 2.2.1 Location 1

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 – Location 1**

Date	Traffic Noise Levels		Background Noise Levels	
	L <sub>10,18hr</sub> (6am-12am)	L <sub>10,1hr max</sub> (6am-12am)	L <sub>90,18hr</sub> (6am-12am)	L <sub>90,8hr</sub> (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
<b>Arithmetic Mean</b>	64	67	52	39
<b>Weekdays Only</b>	64	68	53	39

Noise data disregarded due to rainfall.

## 2.2.2 Location 2

The results of the noise measurements undertaken from 25 September to 2 October 2015 are presented in Table 2.3 and Appendix D.

**Table 2.3 Noise measurement results – Location 2**

Date	Traffic Noise Levels	Background Noise Levels	
	L <sub>10,18hr</sub> (6am-12am)	L <sub>90,18hr</sub> (6am-12am)	L <sub>90,8hr</sub> (10pm-6am)
25 Sep 2015 (Fri)	57	46	38
26 Sep 2015 (Sat)	57	45	31
27 Sep 2015 (Sun)	55	42	31
28 Sep 2015 (Mon)	55	44	35
29 Sep 2015 (Tue)	56	46	34
30 Sep 2015 (Wed)	56	45	37
1 Oct 2015 (Thu)	56	45	35
2 Oct 2015 (Fri)	56	44	33
<b>Arithmetic Mean Weekdays Only</b>	55	44	34

  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 TMR's policy for *Development Affected by Environmental Emissions from Transport* and *SDAP State Code 1 Development in a state-controlled road environment*.

The relevant traffic noise criteria are presented in Table 3.1.

**Table 3.1 External noise criteria**

Development type	Location within development	Environmental criteria
Accommodation activities <sup>2</sup>	All facades	≤60dB(A) L <sub>10(18hr)</sub> façade corrected (measured L <sub>90(8hr)</sub> free field between 10pm and 6am ≤ 40dB(A))
		≤63dB(A) L <sub>10(18hr)</sub> façade corrected (measured L <sub>90(8hr)</sub> free field between 10pm and 6am > 40dB(A))
	Private open spaces	≤57dB(A) L <sub>10(18hr)</sub> free field (measured L <sub>90(18hr)</sub> free field between 6am and midnight ≤ 45dB(A))
		≤60dB(A) L <sub>10(18hr)</sub> free field (measured L <sub>90(18hr)</sub> free field between 6am and midnight > 45dB(A))

The relevant façade adjusted<sup>3</sup> road traffic noise criterion for the building facades is 63dB(A)L<sub>10,18hr</sub><sup>4</sup>.

The designated private open spaces (outdoor living areas) have to comply with the free-field traffic noise criterion of 60dB(A)L<sub>10,18hr</sub>.

<sup>2</sup> Definition of accommodation activity from SDAP includes residential dwellings, relocatable home park, residential care/retirement facility, tourist park and short-term accommodation, among others.

<sup>3</sup> 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.

<sup>4</sup> 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<sub>90,8hr</sub> between 10pm and 6am.



### 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 <sub>Aeq</sub>
Living areas	45 dB(A)
Sleeping areas	40 dB(A)

## 4. Traffic Noise Calculation Methodology

The traffic noise from Teviot Road, Greenbank Road and major internal roads 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 Australia<sup>5</sup>.

Traffic noise levels have been calculated for the ultimate planning horizon of 2051. Detailed results are calculated for Area 1 (early release area).

### 4.1 Traffic noise model – Validation (Year 2015 and 2020)

The noise data collected during the monitoring period (as presented in Tables 2.2 and 2.3) 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 <sup>6</sup>	2015 Traffic Flow AADT <sup>7</sup>	2020 Traffic Flow AADT	Heavy Vehicles (%)
Teviot Road	4,155	7,020	9,394	5.0
Greenbank Road	2,065	3,489	4,669	8.0

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	<ul style="list-style-type: none"> <li>• <b>Teviot Road:</b> 70 km/h north of Pub Lane and 80 km/h south of Pub Lane</li> <li>• <b>Greenbank Road:</b> 80 km/h</li> </ul>
Calculation procedure	<ul style="list-style-type: none"> <li>• CoRTN (Calculation of Road Traffic Noise)</li> <li>• SoundPLAN grid spacing is 1m while the increment for angle of view is 1°</li> </ul>
Road traffic volume for CoRTN procedure	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Road surface	<ul style="list-style-type: none"> <li>• <b>Teviot Road:</b> Bituminous seal, requiring an adjustment of +3dB in the model</li> <li>• <b>Greenbank Road:</b> Bituminous seal, requiring an adjustment of +3dB in the model</li> </ul>
Noise logger	Each noise logger was situated at a free field location with a microphone height of 1.2m above ground level.

<sup>5</sup> 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.

<sup>6</sup> 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).

<sup>7</sup> 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.

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

**Table 4.3 SoundPLAN validation results**

Receiver	Measured* L <sub>10(18-hour)</sub> dB(A)	Calculated* L <sub>10(18-hour)</sub> dB(A)	Difference dB(A)	Validation Factor
Noise Logger – Location 1	64	64	0	N/A
Noise Logger – Location 2	55	57	+2	N/A

\*Free-field

The calculated traffic noise levels are within  $\pm 2$  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, as per the approved “Movement Network Infrastructure Master Plan” (3 March 2017) for the Everleigh development, prepared by MWH.

The average weekday traffic volumes for 2051 are presented in Table 4.4, Figure 4.1 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	34,304	5.0
Teviot Road	Leanne Court to Pub Lane	34,978	5.0
Teviot Road	Pub Lane to Greenbank Road	24,681	5.0
Teviot Road	South of Greenbank Road	19,423	5.0
Greenbank Road	Teviot Road to High order road (South entry road, Everleigh)	6,795	8.0
Greenbank Road	High order road (South entry road, Everleigh) to Crowson Lane	9,883	8.0
Everleigh Drive (within development)	Pub Lane to High order road (South entry road, Everleigh)	8,082	3.0
High order road (South entry road, Everleigh)	Greenbank Road to “School” road	3,088	3.0
High order road (North entry road, Everleigh)	Teviot Road to “School” road	8,796	3.0

Source: Movement Network Infrastructure Master Plan by MWH, 3 March 2017

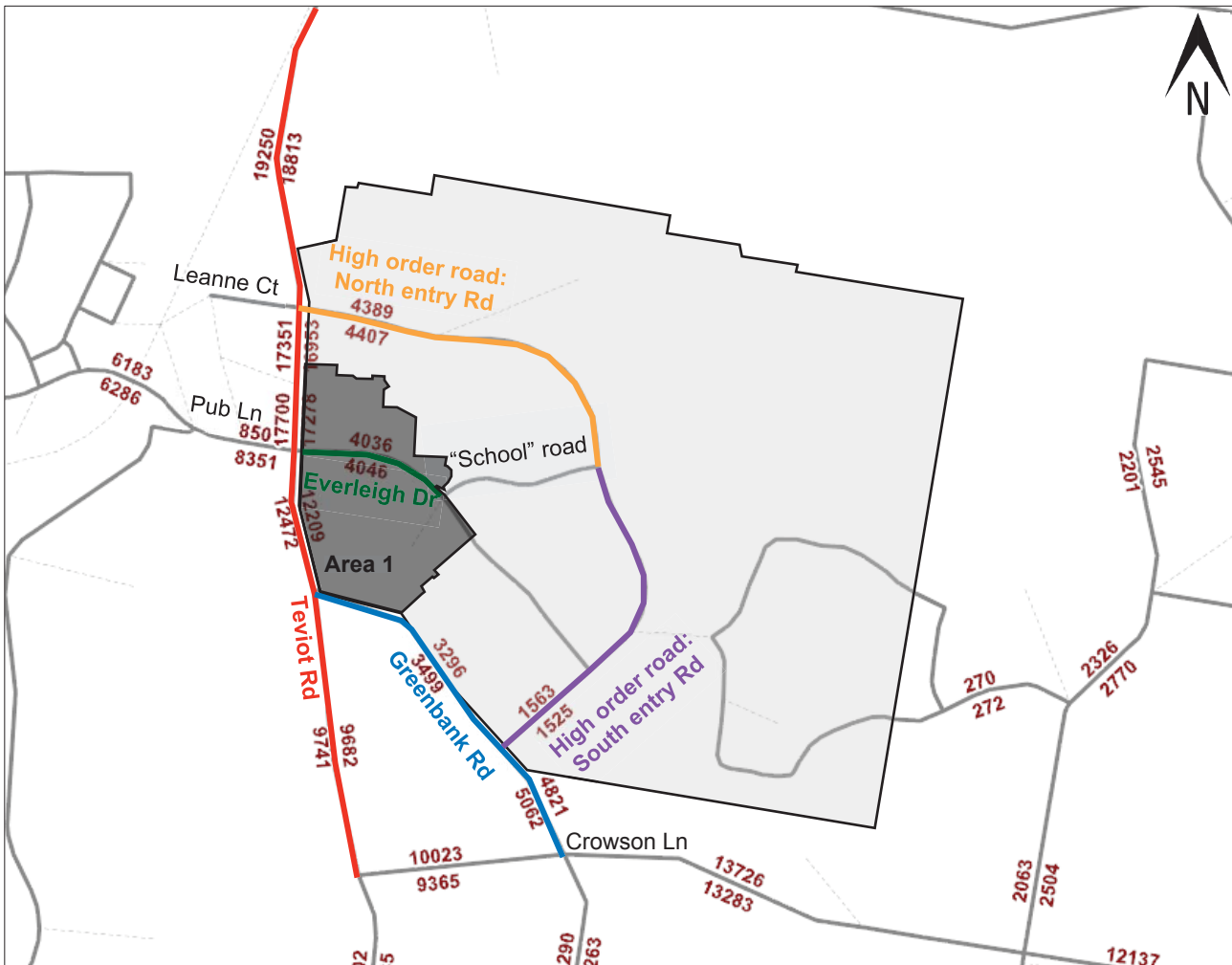


Figure 4.1 Average weekday traffic volumes, 2051

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	<ul style="list-style-type: none"> <li>• <b>Teviot Road:</b> 70 km/h north of Pub Lane and 80 km/h south of Pub Lane</li> <li>• <b>Greenbank Road:</b> 80 km/h</li> <li>• <b>Internal roads:</b> 50 km/h</li> </ul>
Calculation procedure	<ul style="list-style-type: none"> <li>• CoRTN (Calculation of Road Traffic Noise)</li> <li>• SoundPLAN grid spacing is 1m while the increment for angle of view is 1°</li> </ul>
Road traffic volume for CoRTN procedure	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Road type and alignment	<ul style="list-style-type: none"> <li>• <b>Teviot Road:</b> After road upgrade: Two lanes in each direction, three lanes in each direction (north of Pub Lane).</li> <li>• <b>Greenbank Road:</b> One lane in each direction.</li> <li>• <b>Internal roads:</b> Everleigh Drive and North entry road: Two lanes in each direction to the first roundabout, then one lane in each direction. South entry road: One lane in each direction.</li> </ul>

	<ul style="list-style-type: none"> <li>• Source: <ul style="list-style-type: none"> <li>- <i>Teviot Road ultimate design alignments from Premise, received 18 September 2018</i></li> <li>- <i>Development layout “2020-0221_Everleigh – Master Plan” from Mirvac, received 26 February 2019</i></li> </ul> </li> </ul>
Road surface	<ul style="list-style-type: none"> <li>• <b>Teviot Road &amp; Greenbank Road:</b> Dense graded asphalt (after road upgrade)</li> <li>• <b>Internal roads:</b> Dense graded asphalt.</li> </ul> <p>Dense graded asphalt requires no adjustment factor.</p>
Development layout	<ul style="list-style-type: none"> <li>• Source: <ul style="list-style-type: none"> <li>- <i>Development layout “2020-0221_Everleigh – Master Plan” from Mirvac, received 26 February 2019</i></li> </ul> </li> </ul>
Buildings	<ul style="list-style-type: none"> <li>• Residential buildings on all lots were considered as one storey high with total height of 3.5m.</li> <li>• Front setbacks are 6.0m and side setbacks are minimum 1.5m.</li> </ul>
Receivers	<p><b>Façade noise levels</b></p> <ul style="list-style-type: none"> <li>• 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></li> <li>• 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.</li> </ul> <p><b>Private open spaces</b></p> <ul style="list-style-type: none"> <li>• Receivers were placed at the outdoor living areas which are located at the ground floor at the rear of each dwelling (i.e. backyards).</li> <li>• Receivers were placed at a free-field location 4m from the building façades.</li> <li>• Receivers were placed at 1.5m AGL.</li> </ul>
CoRTN correction factor	<ul style="list-style-type: none"> <li>• 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>.</li> </ul>
Terrain	<ul style="list-style-type: none"> <li>• Sources: <ul style="list-style-type: none"> <li>- <i>“2020-03-17 MIR003 DESIGN 3D TRIANGLES” from Premise, received 16 March 2020</i></li> <li>- <i>Precinct 1.3 civil engineering drawings “2018-08-09 MIR001-03 Precinct 1.3 Civil Drawings” from Premise, received 7 February 2019</i></li> <li>- <i>Precinct 1.4 civil engineering drawings “2018-08-09 MIR001-04 Precinct 1.4 Civil Drawings” from Premise, received 7 February 2019</i></li> <li>- <i>Precinct 1.1 civil engineering drawings “2018-06-27 MIR001-01 Precinct 1.1 Civil Drawings” from Premise, received 5 September 2018</i></li> <li>- <i>“2019-02-11 MIRSGB Super Design TIN” and “Everleigh ASCON FSL” from Premise, received 15 February 2019</i></li> </ul> </li> </ul>
Noise control measures	<ul style="list-style-type: none"> <li>• Traffic noise levels were calculated with the noise control measures recommended in Section 6 of this report.</li> </ul>

Overview of the SoundPLAN traffic noise model for Area 1 is presented in Figure 4.2.

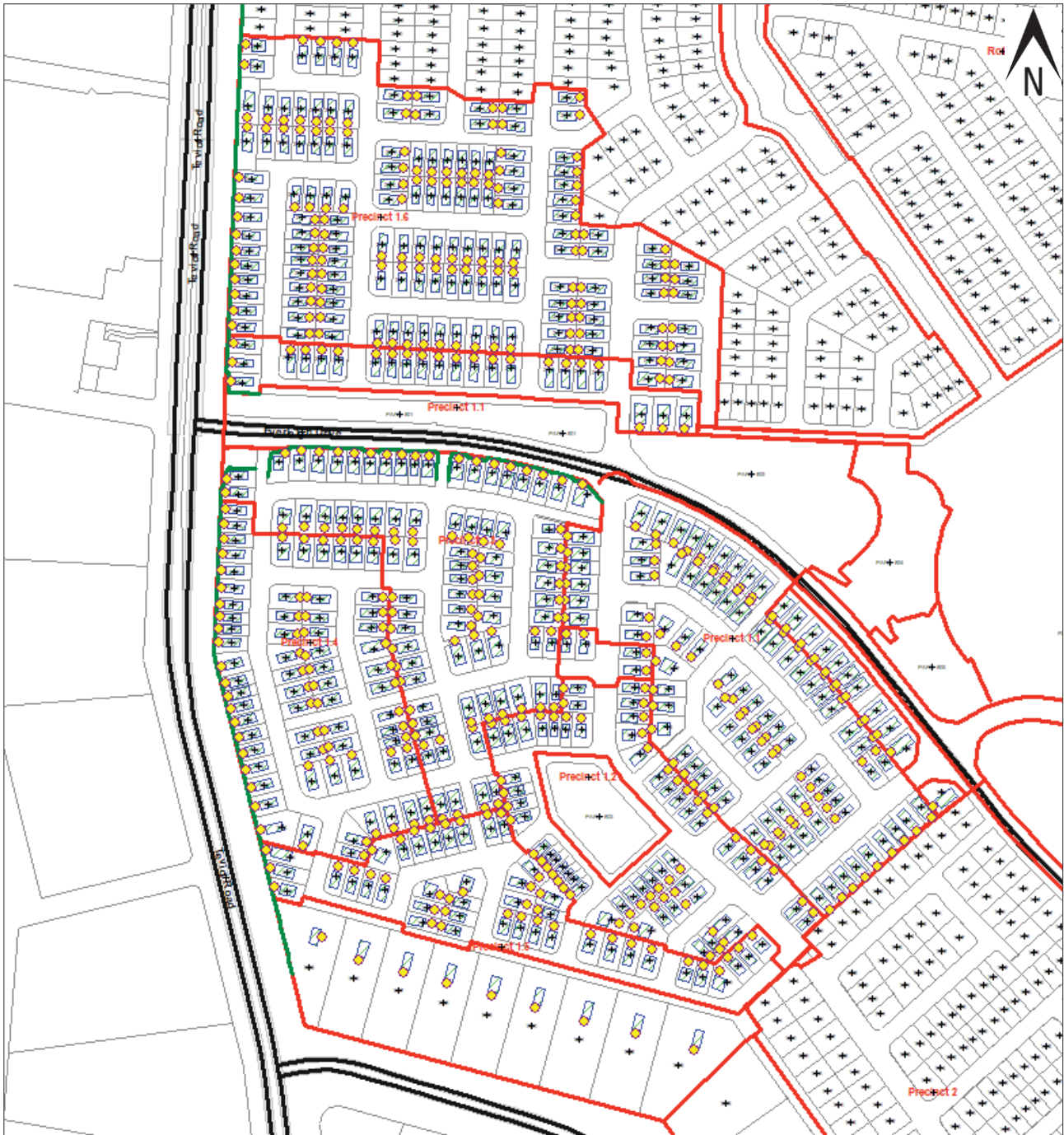


Figure 4.2 SoundPLAN traffic noise model – Area 1



## 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 Area 1

The calculated traffic noise levels at Area 1 and assessment of compliance are presented in Table 5.1.

**Table 5.1 Calculated traffic noise levels – Area 1**

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 $\leq 63\text{dB(A)}$ $L_{10,18\text{hr}}$		
P1.1_Lot 1133	52	Yes	55	Yes	51	Yes
P1.1_Lot 1134	51	Yes	55	Yes	49	Yes
P1.1_Lot 1135	50	Yes	55	Yes	49	Yes
P1.1_Lot 1136	50	Yes	55	Yes	48	Yes
P1.1_Lot 1137	51	Yes	55	Yes	48	Yes
P1.1_Lot 1138	53	Yes	56	Yes	49	Yes
P1.1_Lot 1233	50	Yes	53	Yes	47	Yes
P1.1_Lot 1234	50	Yes	53	Yes	48	Yes
P1.1_Lot 1235	50	Yes	53	Yes	48	Yes
P1.1_Lot 1236	50	Yes	53	Yes	48	Yes
P1.1_Lot 1237	50	Yes	54	Yes	49	Yes
P1.1_Lot 1238	51	Yes	54	Yes	49	Yes
P1.1_Lot 1239	52	Yes	56	Yes	51	Yes
P1.1_Lot 1240	56	Yes	59	Yes	54	Yes
P1.1_Lot 1252	64	No	66	No	49	Yes
P1.1_Lot 1253	64	No	66	No	49	Yes
P1.1_Lot 1254	64	No	66	No	49	Yes
P1.1_Lot 1255	64	No	66	No	49	Yes
P1.1_Lot 1256	64	No	66	No	49	Yes
P1.1_Lot 1257	64	No	66	No	49	Yes
P1.1_Lot 1258	64	No	66	No	49	Yes
P1.1_Lot 1259	64	No	66	No	49	Yes
P1.1_Lot 1260	64	No	66	No	50	Yes
P1.1_Lot 1261	55	Yes	58	Yes	52	Yes
P1.1_Lot 1262	53	Yes	57	Yes	52	Yes
P1.1_Lot 1263	53	Yes	56	Yes	51	Yes
P1.1_Lot 1264	54	Yes	57	Yes	53	Yes
P1.1_Lot 1265	53	Yes	57	Yes	52	Yes
P1.1_Lot 1266	53	Yes	57	Yes	52	Yes
P1.1_Lot 1267	52	Yes	57	Yes	52	Yes
P1.1_Lot 1268	52	Yes	56	Yes	52	Yes
P1.1_Lot 1269	53	Yes	57	Yes	52	Yes
P1.1_Lot 1270	53	Yes	57	Yes	52	Yes
P1.1_Lot 1271	53	Yes	57	Yes	52	Yes
P1.1_Lot 1272	52	Yes	57	Yes	51	Yes
P1.1_Lot 1273	52	Yes	56	Yes	51	Yes
P1.1_Lot 1274	52	Yes	56	Yes	51	Yes
P1.1_Lot 1275	51	Yes	56	Yes	50	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L <sub>10,18hr</sub> dB(A) free-field	Compliance ≤60dB(A) L <sub>10,18hr</sub>
	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>		
P1.1_Lot 1276	52	Yes	56	Yes	51	Yes
P1.1_Lot 1277	52	Yes	57	Yes	51	Yes
P1.1_Lot 1278	52	Yes	57	Yes	51	Yes
P1.1_Lot 1279	54	Yes	57	Yes	51	Yes
P1.1_Lot 1280	51	Yes	56	Yes	49	Yes
P1.1_Lot 1281	50	Yes	54	Yes	48	Yes
P1.1_Lot 1282	49	Yes	54	Yes	48	Yes
P1.1_Lot 1283	49	Yes	53	Yes	48	Yes
P1.1_Lot 1284	49	Yes	53	Yes	48	Yes
P1.1_Lot 1285	50	Yes	53	Yes	49	Yes
P1.1_Lot 1286	49	Yes	53	Yes	48	Yes
P1.1_Lot 1287	49	Yes	53	Yes	49	Yes
P1.1_Lot 1288	50	Yes	53	Yes	49	Yes
P1.1_Lot 1289	50	Yes	53	Yes	49	Yes
P1.1_Lot 1290	50	Yes	54	Yes	49	Yes
P1.1_Lot 1291	50	Yes	54	Yes	50	Yes
P1.1_Lot 1292	51	Yes	54	Yes	50	Yes
P1.1_Lot 1293	51	Yes	54	Yes	50	Yes
P1.1_Lot 1294	51	Yes	54	Yes	50	Yes
P1.1_Lot 1295	53	Yes	55	Yes	51	Yes
P1.1_Lot 1296	53	Yes	55	Yes	50	Yes
P1.1_Lot 1309	49	Yes	53	Yes	48	Yes
P1.1_Lot 1310	49	Yes	53	Yes	48	Yes
P1.1_Lot 1311	49	Yes	53	Yes	48	Yes
P1.1_Lot 1312	50	Yes	53	Yes	49	Yes
P1.1_Lot 1313	50	Yes	53	Yes	49	Yes
P1.1_Lot 1314	50	Yes	54	Yes	49	Yes
P1.1_Lot 1315	49	Yes	53	Yes	48	Yes
P1.1_Lot 1316	49	Yes	54	Yes	48	Yes
P1.1_Lot 1317	49	Yes	53	Yes	48	Yes
P1.1_Lot 1318	50	Yes	53	Yes	48	Yes
P1.1_Lot 1319	50	Yes	53	Yes	48	Yes
P1.1_Lot 1320	50	Yes	53	Yes	48	Yes
P1.1_Lot 1321	49	Yes	53	Yes	48	Yes
P1.1_Lot 1322	49	Yes	53	Yes	48	Yes
P1.1_Lot 1323	50	Yes	53	Yes	48	Yes
P1.1_Lot 1324	50	Yes	53	Yes	48	Yes
P1.1_Lot 1325	50	Yes	53	Yes	48	Yes
P1.1_Lot 1326	50	Yes	53	Yes	48	Yes
P1.1_Lot 1331	49	Yes	53	Yes	48	Yes
P1.1_Lot 1332	49	Yes	53	Yes	47	Yes
P1.1_Lot 1333	49	Yes	53	Yes	47	Yes
P1.1_Lot 1334	49	Yes	53	Yes	48	Yes
P1.1_Lot 1344	51	Yes	55	Yes	50	Yes
P1.1_Lot 2001	60	Yes	68	No	57	Yes
P1.1_Lot 2002	61	Yes	68	No	58	Yes
P1.1_Lot 2003	61	Yes	68	No	58	Yes
P1.1_Lot 2026	60	Yes	64	No	57	Yes
P1.1_Lot 2027	59	Yes	63	Yes	55	Yes
P1.1_Lot 2028	59	Yes	62	Yes	54	Yes
P1.1_Lot 2029	59	Yes	62	Yes	54	Yes
P1.1_Lot 2119	58	Yes	60	Yes	51	Yes
P1.1_Lot 2120	58	Yes	60	Yes	51	Yes
P1.1_Lot 2121	58	Yes	60	Yes	51	Yes
P1.1_Lot 2122	58	Yes	60	Yes	51	Yes
P1.1_Lot 2123	58	Yes	60	Yes	51	Yes



Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L <sub>10,18hr</sub> dB(A) free-field	Compliance ≤60dB(A) L <sub>10,18hr</sub>
	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>		
P1.1 Lot 2124	58	Yes	61	Yes	51	Yes
P1.1 Lot 2125	58	Yes	61	Yes	52	Yes
P1.1 Lot 2126	59	Yes	61	Yes	53	Yes
P1.1 Lot 2127	59	Yes	61	Yes	51	Yes
P1.1 Lot 2128	57	Yes	60	Yes	52	Yes
P1.1 Lot 2129	57	Yes	59	Yes	50	Yes
P1.1 Lot 2130	57	Yes	59	Yes	50	Yes
P1.1 Lot 2131	57	Yes	59	Yes	50	Yes
P1.1 Lot 2149	59	Yes	61	Yes	58	Yes
P1.1 Lot 2150	58	Yes	60	Yes	56	Yes
P1.1 Lot 2151	57	Yes	59	Yes	56	Yes
P1.2 Lot 1131	51	Yes	54	Yes	49	Yes
P1.2 Lot 1132	51	Yes	54	Yes	49	Yes
P1.2 Lot 1139	51	Yes	55	Yes	48	Yes
P1.2 Lot 1140	51	Yes	55	Yes	49	Yes
P1.2 Lot 1148	54	Yes	57	Yes	49	Yes
P1.2 Lot 1149	52	Yes	56	Yes	48	Yes
P1.2 Lot 1150	52	Yes	56	Yes	48	Yes
P1.2 Lot 1151	51	Yes	55	Yes	48	Yes
P1.2 Lot 1152	51	Yes	55	Yes	48	Yes
P1.2 Lot 1153	51	Yes	55	Yes	47	Yes
P1.2 Lot 1154	51	Yes	54	Yes	47	Yes
P1.2 Lot 1155	52	Yes	56	Yes	49	Yes
P1.2 Lot 1156	52	Yes	56	Yes	49	Yes
P1.2 Lot 1157	53	Yes	56	Yes	51	Yes
P1.2 Lot 1158	53	Yes	56	Yes	49	Yes
P1.2 Lot 1195	53	Yes	56	Yes	51	Yes
P1.2 Lot 1196	52	Yes	56	Yes	50	Yes
P1.2 Lot 1197	52	Yes	56	Yes	50	Yes
P1.2 Lot 1198	52	Yes	56	Yes	50	Yes
P1.2 Lot 1199	52	Yes	55	Yes	50	Yes
P1.2 Lot 1200	52	Yes	55	Yes	51	Yes
P1.2 Lot 1201	52	Yes	55	Yes	51	Yes
P1.2 Lot 1208	52	Yes	55	Yes	51	Yes
P1.2 Lot 1209	51	Yes	55	Yes	51	Yes
P1.2 Lot 1210	51	Yes	54	Yes	51	Yes
P1.2 Lot 1211	51	Yes	54	Yes	50	Yes
P1.2 Lot 1212	51	Yes	54	Yes	50	Yes
P1.2 Lot 1213	51	Yes	54	Yes	50	Yes
P1.2 Lot 1214	51	Yes	53	Yes	50	Yes
P1.2 Lot 1215	50	Yes	53	Yes	49	Yes
P1.2 Lot 1216	50	Yes	53	Yes	49	Yes
P1.2 Lot 1217	50	Yes	54	Yes	49	Yes
P1.2 Lot 1218	51	Yes	54	Yes	49	Yes
P1.2 Lot 1219	51	Yes	54	Yes	50	Yes
P1.2 Lot 1222	51	Yes	54	Yes	48	Yes
P1.2 Lot 1223	51	Yes	53	Yes	48	Yes
P1.2 Lot 1224	50	Yes	53	Yes	48	Yes
P1.2 Lot 1225	49	Yes	53	Yes	48	Yes
P1.2 Lot 1231	50	Yes	53	Yes	49	Yes
P1.2 Lot 1232	50	Yes	53	Yes	49	Yes
P1.2 Lot 1297	53	Yes	55	Yes	50	Yes
P1.2 Lot 1298	52	Yes	54	Yes	49	Yes
P1.2 Lot 1299	52	Yes	54	Yes	49	Yes
P1.2 Lot 1300	52	Yes	54	Yes	49	Yes
P1.2 Lot 1301	52	Yes	54	Yes	48	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L <sub>10,18hr</sub> dB(A) free-field	Compliance ≤60dB(A) L <sub>10,18hr</sub>
	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>		
P1.2 Lot 1302	52	Yes	54	Yes	48	Yes
P1.2 Lot 1303	52	Yes	54	Yes	47	Yes
P1.2 Lot 1304	51	Yes	54	Yes	48	Yes
P1.2 Lot 1305	51	Yes	54	Yes	48	Yes
P1.2 Lot 1306	51	Yes	53	Yes	48	Yes
P1.2 Lot 1307	51	Yes	53	Yes	48	Yes
P1.2 Lot 1308	51	Yes	53	Yes	48	Yes
P1.2 Lot 1327	51	Yes	53	Yes	49	Yes
P1.2 Lot 1328	51	Yes	53	Yes	49	Yes
P1.2 Lot 1329	50	Yes	53	Yes	49	Yes
P1.2 Lot 1330	50	Yes	53	Yes	49	Yes
P1.3 Lot 1002	58	Yes	68	No	56	Yes
P1.3 Lot 1003	60	Yes	68	No	57	Yes
P1.3 Lot 1029	60	Yes	67	No	58	Yes
P1.3 Lot 1030	60	Yes	66	No	59	Yes
P1.3 Lot 1031	59	Yes	65	No	58	Yes
P1.3 Lot 1032	59	Yes	65	No	57	Yes
P1.3 Lot 1033	59	Yes	65	No	57	Yes
P1.3 Lot 1034	59	Yes	65	No	57	Yes
P1.3 Lot 1035	58	Yes	64	No	57	Yes
P1.3 Lot 1036	58	Yes	64	No	57	Yes
P1.3 Lot 1037	58	Yes	64	No	57	Yes
P1.3 Lot 1038	57	Yes	64	No	56	Yes
P1.3 Lot 1039	53	Yes	58	Yes	52	Yes
P1.3 Lot 1040	53	Yes	58	Yes	52	Yes
P1.3 Lot 1041	53	Yes	59	Yes	53	Yes
P1.3 Lot 1042	54	Yes	59	Yes	53	Yes
P1.3 Lot 1043	55	Yes	60	Yes	54	Yes
P1.3 Lot 1044	56	Yes	61	Yes	55	Yes
P1.3 Lot 1045	57	Yes	62	Yes	56	Yes
P1.3 Lot 1046	60	Yes	63	Yes	58	Yes
P1.3 Lot 1053	54	Yes	58	Yes	52	Yes
P1.3 Lot 1054	54	Yes	58	Yes	52	Yes
P1.3 Lot 1087	53	Yes	58	Yes	52	Yes
P1.3 Lot 1088	53	Yes	57	Yes	51	Yes
P1.3 Lot 1089	55	Yes	58	Yes	53	Yes
P1.3 Lot 1090	55	Yes	58	Yes	54	Yes
P1.3 Lot 1091	56	Yes	58	Yes	54	Yes
P1.3 Lot 1092	57	Yes	58	Yes	55	Yes
P1.3 Lot 1093	57	Yes	58	Yes	55	Yes
P1.3 Lot 1094	57	Yes	58	Yes	55	Yes
P1.3 Lot 1095	56	Yes	58	Yes	54	Yes
P1.3 Lot 1096	55	Yes	58	Yes	53	Yes
P1.3 Lot 1097	55	Yes	58	Yes	53	Yes
P1.3 Lot 1098	53	Yes	57	Yes	51	Yes
P1.3 Lot 1099	52	Yes	56	Yes	50	Yes
P1.3 Lot 1100	52	Yes	56	Yes	49	Yes
P1.3 Lot 1101	54	Yes	57	Yes	52	Yes
P1.3 Lot 1102	55	Yes	57	Yes	52	Yes
P1.3 Lot 1103	55	Yes	57	Yes	51	Yes
P1.3 Lot 1104	55	Yes	57	Yes	51	Yes
P1.3 Lot 1105	55	Yes	57	Yes	52	Yes
P1.3 Lot 1106	55	Yes	57	Yes	52	Yes
P1.3 Lot 1107	54	Yes	57	Yes	52	Yes
P1.3 Lot 1108	52	Yes	56	Yes	50	Yes
P1.3 Lot 1109	52	Yes	56	Yes	50	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L <sub>10,18hr</sub> dB(A) free-field	Compliance ≤60dB(A) L <sub>10,18hr</sub>
	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>		
P1.3_Lot 1110	52	Yes	56	Yes	50	Yes
P1.3_Lot 1111	51	Yes	55	Yes	49	Yes
P1.3_Lot 1112	51	Yes	56	Yes	49	Yes
P1.3_Lot 1113	51	Yes	56	Yes	49	Yes
P1.3_Lot 1114	53	Yes	56	Yes	51	Yes
P1.3_Lot 1115	58	Yes	64	No	57	Yes
P1.3_Lot 1116	57	Yes	64	No	56	Yes
P1.3_Lot 1117	57	Yes	63	Yes	56	Yes
P1.3_Lot 1118	57	Yes	63	Yes	56	Yes
P1.3_Lot 1119	57	Yes	63	Yes	56	Yes
P1.3_Lot 1120	57	Yes	63	Yes	56	Yes
P1.3_Lot 1121	56	Yes	63	Yes	56	Yes
P1.3_Lot 1122	57	Yes	64	No	56	Yes
P1.3_Lot 1123	53	Yes	56	Yes	52	Yes
P1.3_Lot 1124	52	Yes	56	Yes	51	Yes
P1.3_Lot 1125	53	Yes	56	Yes	50	Yes
P1.3_Lot 1126	53	Yes	56	Yes	50	Yes
P1.3_Lot 1127	53	Yes	56	Yes	50	Yes
P1.3_Lot 1128	53	Yes	55	Yes	50	Yes
P1.3_Lot 1129	52	Yes	55	Yes	50	Yes
P1.3_Lot 1130	51	Yes	55	Yes	49	Yes
P1.3_Lot 1141	51	Yes	55	Yes	51	Yes
P1.3_Lot 1142	52	Yes	55	Yes	51	Yes
P1.3_Lot 1143	52	Yes	56	Yes	52	Yes
P1.3_Lot 1144	53	Yes	56	Yes	52	Yes
P1.3_Lot 1145	53	Yes	57	Yes	53	Yes
P1.3_Lot 1146	55	Yes	57	Yes	54	Yes
P1.3_Lot 1147	53	Yes	56	Yes	51	Yes
P1.3_Lot 1159	53	Yes	57	Yes	53	Yes
P1.3_Lot 1160	54	Yes	57	Yes	53	Yes
P1.3_Lot 1161	54	Yes	58	Yes	53	Yes
P1.3_Lot 1162	54	Yes	58	Yes	54	Yes
P1.4_Lot 1004	61	Yes	68	No	58	Yes
P1.4_Lot 1005	61	Yes	68	No	58	Yes
P1.4_Lot 1006	61	Yes	68	No	58	Yes
P1.4_Lot 1007	61	Yes	68	No	58	Yes
P1.4_Lot 1008	61	Yes	68	No	58	Yes
P1.4_Lot 1009	61	Yes	68	No	58	Yes
P1.4_Lot 1010	61	Yes	68	No	58	Yes
P1.4_Lot 1011	61	Yes	68	No	58	Yes
P1.4_Lot 1012	61	Yes	68	No	58	Yes
P1.4_Lot 1013	60	Yes	68	No	57	Yes
P1.4_Lot 1014	61	Yes	68	No	57	Yes
P1.4_Lot 1015	61	Yes	67	No	57	Yes
P1.4_Lot 1016	61	Yes	67	No	58	Yes
P1.4_Lot 1017	61	Yes	67	No	57	Yes
P1.4_Lot 1018	61	Yes	67	No	58	Yes
P1.4_Lot 1019	61	Yes	67	No	58	Yes
P1.4_Lot 1020	61	Yes	67	No	58	Yes
P1.4_Lot 1021	61	Yes	67	No	58	Yes
P1.4_Lot 1022	60	Yes	67	No	57	Yes
P1.4_Lot 1023	60	Yes	67	No	57	Yes
P1.4_Lot 1024	59	Yes	67	No	55	Yes
P1.4_Lot 1025	59	Yes	64	No	57	Yes
P1.4_Lot 1047	58	Yes	62	Yes	54	Yes
P1.4_Lot 1048	56	Yes	61	Yes	53	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L <sub>10,18hr</sub> dB(A) free-field	Compliance ≤60dB(A) L <sub>10,18hr</sub>
	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>		
P1.4 Lot 1049	56	Yes	60	Yes	52	Yes
P1.4 Lot 1050	55	Yes	59	Yes	52	Yes
P1.4 Lot 1051	55	Yes	59	Yes	52	Yes
P1.4 Lot 1052	55	Yes	59	Yes	52	Yes
P1.4 Lot 1055	60	Yes	63	Yes	54	Yes
P1.4 Lot 1056	61	Yes	63	Yes	55	Yes
P1.4 Lot 1057	61	Yes	63	Yes	55	Yes
P1.4 Lot 1058	60	Yes	63	Yes	54	Yes
P1.4 Lot 1059	60	Yes	63	Yes	53	Yes
P1.4 Lot 1060	60	Yes	63	Yes	53	Yes
P1.4 Lot 1061	60	Yes	63	Yes	54	Yes
P1.4 Lot 1062	60	Yes	63	Yes	54	Yes
P1.4 Lot 1063	60	Yes	63	Yes	54	Yes
P1.4 Lot 1064	58	Yes	62	Yes	56	Yes
P1.4 Lot 1065	56	Yes	61	Yes	54	Yes
P1.4 Lot 1066	56	Yes	60	Yes	53	Yes
P1.4 Lot 1067	55	Yes	60	Yes	53	Yes
P1.4 Lot 1068	56	Yes	60	Yes	53	Yes
P1.4 Lot 1069	56	Yes	60	Yes	54	Yes
P1.4 Lot 1070	56	Yes	61	Yes	54	Yes
P1.4 Lot 1071	57	Yes	61	Yes	54	Yes
P1.4 Lot 1072	57	Yes	61	Yes	55	Yes
P1.4 Lot 1073	57	Yes	61	Yes	54	Yes
P1.4 Lot 1074	56	Yes	61	Yes	54	Yes
P1.4 Lot 1075	56	Yes	60	Yes	54	Yes
P1.4 Lot 1076	57	Yes	59	Yes	52	Yes
P1.4 Lot 1077	57	Yes	59	Yes	52	Yes
P1.4 Lot 1078	57	Yes	59	Yes	53	Yes
P1.4 Lot 1079	56	Yes	59	Yes	51	Yes
P1.4 Lot 1080	56	Yes	59	Yes	51	Yes
P1.4 Lot 1081	56	Yes	59	Yes	51	Yes
P1.4 Lot 1082	56	Yes	59	Yes	52	Yes
P1.4 Lot 1083	56	Yes	59	Yes	52	Yes
P1.4 Lot 1084	56	Yes	59	Yes	52	Yes
P1.4 Lot 1085	56	Yes	59	Yes	53	Yes
P1.4 Lot 1086	53	Yes	58	Yes	52	Yes
P1.4 Lot 1163	54	Yes	59	Yes	54	Yes
P1.4 Lot 1164	55	Yes	59	Yes	54	Yes
P1.4 Lot 1165	55	Yes	60	Yes	54	Yes
P1.4 Lot 1166	57	Yes	60	Yes	54	Yes
P1.4 Lot 1167	59	Yes	62	Yes	54	Yes
P1.4 Lot 1168	59	Yes	62	Yes	55	Yes
P1.5 Lot 1026	58	Yes	65	No	54	Yes
P1.5 Lot 1027	57	Yes	65	No	54	Yes
P1.5 Lot 1028	59	Yes	66	No	55	Yes
P1.5 Lot 1169	58	Yes	62	Yes	56	Yes
P1.5 Lot 1170	57	Yes	61	Yes	54	Yes
P1.5 Lot 1171	57	Yes	61	Yes	53	Yes
P1.5 Lot 1172	57	Yes	60	Yes	53	Yes
P1.5 Lot 1173	54	Yes	59	Yes	51	Yes
P1.5 Lot 1174	54	Yes	58	Yes	51	Yes
P1.5 Lot 1175	53	Yes	58	Yes	50	Yes
P1.5 Lot 1176	53	Yes	58	Yes	50	Yes
P1.5 Lot 1177	52	Yes	57	Yes	50	Yes
P1.5 Lot 1178	52	Yes	57	Yes	50	Yes
P1.5 Lot 1179	52	Yes	56	Yes	50	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L <sub>10,18hr</sub> dB(A) free-field	Compliance ≤60dB(A) L <sub>10,18hr</sub>
	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>		
P1.5 Lot 1180	52	Yes	56	Yes	49	Yes
P1.5 Lot 1181	55	Yes	59	Yes	52	Yes
P1.5 Lot 1182	56	Yes	59	Yes	53	Yes
P1.5 Lot 1183	57	Yes	60	Yes	54	Yes
P1.5 Lot 1184	54	Yes	58	Yes	53	Yes
P1.5 Lot 1185	54	Yes	58	Yes	52	Yes
P1.5 Lot 1186	54	Yes	58	Yes	52	Yes
P1.5 Lot 1187	54	Yes	58	Yes	51	Yes
P1.5 Lot 1188	54	Yes	57	Yes	51	Yes
P1.5 Lot 1189	54	Yes	57	Yes	51	Yes
P1.5 Lot 1190	54	Yes	57	Yes	51	Yes
P1.5 Lot 1191	53	Yes	57	Yes	51	Yes
P1.5 Lot 1192	54	Yes	57	Yes	52	Yes
P1.5 Lot 1193	54	Yes	57	Yes	51	Yes
P1.5 Lot 1194	53	Yes	56	Yes	51	Yes
P1.5 Lot 1202	52	Yes	56	Yes	51	Yes
P1.5 Lot 1203	53	Yes	56	Yes	51	Yes
P1.5 Lot 1204	53	Yes	56	Yes	51	Yes
P1.5 Lot 1205	52	Yes	56	Yes	51	Yes
P1.5 Lot 1206	52	Yes	55	Yes	50	Yes
P1.5 Lot 1207	52	Yes	55	Yes	50	Yes
P1.5 Lot 1220	52	Yes	55	Yes	51	Yes
P1.5 Lot 1221	51	Yes	55	Yes	50	Yes
P1.5 Lot 1226	51	Yes	53	Yes	50	Yes
P1.5 Lot 1227	51	Yes	54	Yes	51	Yes
P1.5 Lot 1228	52	Yes	54	Yes	51	Yes
P1.5 Lot 1229	52	Yes	55	Yes	51	Yes
P1.5 Lot 1241	65	No	66	No	54	Yes
P1.5 Lot 1242	65	No	66	No	50	Yes
P1.5 Lot 1243	65	No	66	No	49	Yes
P1.5 Lot 1244	65	No	66	No	49	Yes
P1.5 Lot 1245	65	No	66	No	49	Yes
P1.5 Lot 1246	65	No	66	No	49	Yes
P1.5 Lot 1247	65	No	66	No	49	Yes
P1.5 Lot 1248	64	No	66	No	49	Yes
P1.5 Lot 1249	64	No	66	No	49	Yes
P1.5 Lot 1250	64	No	66	No	49	Yes
P1.5 Lot 1251	64	No	66	No	50	Yes
P1.5 Lot 1335	62	Yes	66	No	56	Yes
P1.5 Lot 1336	59	Yes	62	Yes	58	Yes
P1.5 Lot 1337	58	Yes	61	Yes	57	Yes
P1.5 Lot 1338	56	Yes	60	Yes	56	Yes
P1.5 Lot 1339	56	Yes	59	Yes	55	Yes
P1.5 Lot 1340	55	Yes	58	Yes	54	Yes
P1.5 Lot 1341	54	Yes	57	Yes	54	Yes
P1.5 Lot 1342	54	Yes	57	Yes	53	Yes
P1.5 Lot 1343	54	Yes	56	Yes	53	Yes
P1.6 Lot 2004	62	Yes	68	No	58	Yes
P1.6 Lot 2005	62	Yes	68	No	59	Yes
P1.6 Lot 2006	62	Yes	68	No	59	Yes
P1.6 Lot 2007	62	Yes	68	No	59	Yes
P1.6 Lot 2008	62	Yes	68	No	58	Yes
P1.6 Lot 2009	61	Yes	67	No	58	Yes
P1.6 Lot 2010	61	Yes	67	No	57	Yes
P1.6 Lot 2011	60	Yes	66	No	56	Yes
P1.6 Lot 2012	59	Yes	66	No	56	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L <sub>10,18hr</sub> dB(A) free-field	Compliance ≤60dB(A) L <sub>10,18hr</sub>
	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>		
P1.6_Lot 2013	59	Yes	66	No	56	Yes
P1.6_Lot 2014	59	Yes	68	No	57	Yes
P1.6_Lot 2015	54	Yes	60	Yes	53	Yes
P1.6_Lot 2016	57	Yes	61	Yes	56	Yes
P1.6_Lot 2017	58	Yes	61	Yes	54	Yes
P1.6_Lot 2018	58	Yes	62	Yes	54	Yes
P1.6_Lot 2019	59	Yes	62	Yes	54	Yes
P1.6_Lot 2020	59	Yes	62	Yes	54	Yes
P1.6_Lot 2021	59	Yes	62	Yes	54	Yes
P1.6_Lot 2022	59	Yes	62	Yes	53	Yes
P1.6_Lot 2023	60	Yes	63	Yes	54	Yes
P1.6_Lot 2024	60	Yes	63	Yes	54	Yes
P1.6_Lot 2025	60	Yes	64	No	55	Yes
P1.6_Lot 2030	55	Yes	60	Yes	52	Yes
P1.6_Lot 2031	54	Yes	59	Yes	52	Yes
P1.6_Lot 2032	54	Yes	59	Yes	52	Yes
P1.6_Lot 2033	54	Yes	58	Yes	52	Yes
P1.6_Lot 2034	54	Yes	58	Yes	52	Yes
P1.6_Lot 2035	53	Yes	58	Yes	51	Yes
P1.6_Lot 2036	53	Yes	58	Yes	51	Yes
P1.6_Lot 2037	53	Yes	58	Yes	51	Yes
P1.6_Lot 2038	53	Yes	57	Yes	51	Yes
P1.6_Lot 2039	54	Yes	58	Yes	53	Yes
P1.6_Lot 2040	54	Yes	59	Yes	53	Yes
P1.6_Lot 2041	58	Yes	64	No	56	Yes
P1.6_Lot 2042	56	Yes	61	Yes	55	Yes
P1.6_Lot 2043	55	Yes	60	Yes	53	Yes
P1.6_Lot 2044	54	Yes	58	Yes	53	Yes
P1.6_Lot 2045	53	Yes	57	Yes	52	Yes
P1.6_Lot 2046	53	Yes	57	Yes	52	Yes
P1.6_Lot 2047	54	Yes	58	Yes	53	Yes
P1.6_Lot 2048	54	Yes	59	Yes	54	Yes
P1.6_Lot 2049	55	Yes	59	Yes	54	Yes
P1.6_Lot 2050	55	Yes	60	Yes	54	Yes
P1.6_Lot 2051	56	Yes	61	Yes	55	Yes
P1.6_Lot 2052	58	Yes	63	Yes	56	Yes
P1.6_Lot 2053	59	Yes	68	No	55	Yes
P1.6_Lot 2054	58	Yes	65	No	57	Yes
P1.6_Lot 2055	58	Yes	65	No	56	Yes
P1.6_Lot 2056	56	Yes	60	Yes	55	Yes
P1.6_Lot 2057	55	Yes	59	Yes	54	Yes
P1.6_Lot 2058	55	Yes	58	Yes	53	Yes
P1.6_Lot 2059	54	Yes	58	Yes	53	Yes
P1.6_Lot 2060	54	Yes	57	Yes	52	Yes
P1.6_Lot 2061	54	Yes	57	Yes	52	Yes
P1.6_Lot 2062	51	Yes	55	Yes	50	Yes
P1.6_Lot 2063	52	Yes	55	Yes	50	Yes
P1.6_Lot 2064	52	Yes	55	Yes	50	Yes
P1.6_Lot 2065	52	Yes	55	Yes	51	Yes
P1.6_Lot 2066	52	Yes	55	Yes	50	Yes
P1.6_Lot 2067	51	Yes	55	Yes	50	Yes
P1.6_Lot 2068	52	Yes	55	Yes	50	Yes
P1.6_Lot 2069	52	Yes	54	Yes	50	Yes
P1.6_Lot 2070	52	Yes	55	Yes	50	Yes
P1.6_Lot 2071	51	Yes	55	Yes	49	Yes
P1.6_Lot 2072	53	Yes	55	Yes	52	Yes

Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L <sub>10,18hr</sub> dB(A) free-field	Compliance ≤60dB(A) L <sub>10,18hr</sub>
	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>		
P1.6_Lot 2073	53	Yes	55	Yes	52	Yes
P1.6_Lot 2074	53	Yes	55	Yes	52	Yes
P1.6_Lot 2075	53	Yes	56	Yes	52	Yes
P1.6_Lot 2076	53	Yes	56	Yes	53	Yes
P1.6_Lot 2077	53	Yes	56	Yes	53	Yes
P1.6_Lot 2078	54	Yes	57	Yes	51	Yes
P1.6_Lot 2079	54	Yes	57	Yes	52	Yes
P1.6_Lot 2080	53	Yes	56	Yes	50	Yes
P1.6_Lot 2081	53	Yes	56	Yes	51	Yes
P1.6_Lot 2082	52	Yes	56	Yes	50	Yes
P1.6_Lot 2083	52	Yes	55	Yes	49	Yes
P1.6_Lot 2084	51	Yes	55	Yes	49	Yes
P1.6_Lot 2085	51	Yes	55	Yes	49	Yes
P1.6_Lot 2086	51	Yes	54	Yes	49	Yes
P1.6_Lot 2087	51	Yes	54	Yes	49	Yes
P1.6_Lot 2088	52	Yes	55	Yes	51	Yes
P1.6_Lot 2089	52	Yes	55	Yes	50	Yes
P1.6_Lot 2090	53	Yes	56	Yes	52	Yes
P1.6_Lot 2091	54	Yes	56	Yes	53	Yes
P1.6_Lot 2092	53	Yes	56	Yes	52	Yes
P1.6_Lot 2093	53	Yes	56	Yes	52	Yes
P1.6_Lot 2094	54	Yes	56	Yes	52	Yes
P1.6_Lot 2095	54	Yes	56	Yes	52	Yes
P1.6_Lot 2096	54	Yes	57	Yes	53	Yes
P1.6_Lot 2097	54	Yes	57	Yes	53	Yes
P1.6_Lot 2098	55	Yes	58	Yes	54	Yes
P1.6_Lot 2099	54	Yes	58	Yes	52	Yes
P1.6_Lot 2100	54	Yes	57	Yes	51	Yes
P1.6_Lot 2101	53	Yes	57	Yes	50	Yes
P1.6_Lot 2102	53	Yes	57	Yes	50	Yes
P1.6_Lot 2103	53	Yes	56	Yes	50	Yes
P1.6_Lot 2104	53	Yes	56	Yes	49	Yes
P1.6_Lot 2105	52	Yes	56	Yes	49	Yes
P1.6_Lot 2106	52	Yes	56	Yes	49	Yes
P1.6_Lot 2107	52	Yes	55	Yes	49	Yes
P1.6_Lot 2108	56	Yes	60	Yes	55	Yes
P1.6_Lot 2109	56	Yes	59	Yes	55	Yes
P1.6_Lot 2110	56	Yes	59	Yes	54	Yes
P1.6_Lot 2111	56	Yes	59	Yes	54	Yes
P1.6_Lot 2112	55	Yes	59	Yes	54	Yes
P1.6_Lot 2113	55	Yes	59	Yes	54	Yes
P1.6_Lot 2114	55	Yes	58	Yes	53	Yes
P1.6_Lot 2115	54	Yes	58	Yes	53	Yes
P1.6_Lot 2116	54	Yes	58	Yes	52	Yes
P1.6_Lot 2117	53	Yes	57	Yes	50	Yes
P1.6_Lot 2118	54	Yes	58	Yes	51	Yes
P1.6_Lot 2132	53	Yes	57	Yes	52	Yes
P1.6_Lot 2133	52	Yes	56	Yes	51	Yes
P1.6_Lot 2134	53	Yes	56	Yes	49	Yes
P1.6_Lot 2135	53	Yes	56	Yes	49	Yes
P1.6_Lot 2136	54	Yes	56	Yes	49	Yes
P1.6_Lot 2137	54	Yes	57	Yes	49	Yes
P1.6_Lot 2138	53	Yes	56	Yes	50	Yes
P1.6_Lot 2139	51	Yes	56	Yes	50	Yes
P1.6_Lot 2140	51	Yes	55	Yes	50	Yes
P1.6_Lot 2141	51	Yes	55	Yes	50	Yes



Lot No.	Building Facades				Private Open Space	
	Ground Floor		Upper Floor		L <sub>10,18hr</sub> dB(A) free-field	Compliance ≤60dB(A) L <sub>10,18hr</sub>
	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>	L <sub>10,18hr</sub> dB(A) facade-adjusted	Compliance ≤63dB(A) L <sub>10,18hr</sub>		
P1.6_Lot 2142	51	Yes	54	Yes	50	Yes
P1.6_Lot 2143	52	Yes	55	Yes	50	Yes
P1.6_Lot 2144	53	Yes	55	Yes	51	Yes
P1.6_Lot 2145	53	Yes	55	Yes	50	Yes
P1.6_Lot 2146	52	Yes	55	Yes	49	Yes
P1.6_Lot 2147	52	Yes	55	Yes	48	Yes
P1.6_Lot 2148	52	Yes	54	Yes	49	Yes
P1.6_Lot 2152	52	Yes	55	Yes	50	Yes
P1.6_Lot 2153	53	Yes	55	Yes	51	Yes
P1.6_Lot 2154	52	Yes	55	Yes	51	Yes
P1.6_Lot 2155	52	Yes	56	Yes	51	Yes
P1.6_Lot 2156	52	Yes	56	Yes	51	Yes
P1.6_Lot 2157	53	Yes	56	Yes	50	Yes
P1.6_Lot 2158	53	Yes	56	Yes	50	Yes
P1.6_Lot 2159	53	Yes	55	Yes	50	Yes
P1.6_Lot 2160	53	Yes	55	Yes	50	Yes
P1.6_Lot 2161	52	Yes	55	Yes	49	Yes
P1.6_Lot 2162	52	Yes	55	Yes	49	Yes
P1.6_Lot 2163	52	Yes	55	Yes	49	Yes
P1.6_Lot 2164	52	Yes	55	Yes	50	Yes
P1.6_Lot 2165	52	Yes	55	Yes	49	Yes
P1.6_Lot 2166	52	Yes	54	Yes	49	Yes

Noise contour maps showing the traffic noise levels across Area 1 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 development site will be impacted by traffic noise from Teviot Road, Greenbank Road and the major internal collector roads.

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 are as follows:

- Noise barrier along Teviot Road;
- Noise barrier along major internal collector roads (Everleigh Drive), at rear-loaded allotments where the outdoor living areas face the road;
- Acoustic setback along Greenbank Road;
- For front-loaded allotments on the major internal collector roads, ensure that outdoor living areas are located on the protected façade;
- Acoustic setback along internal collector roads (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 internal collector roads.

Summary of the recommended noise control measures is presented in Figure 6.1.

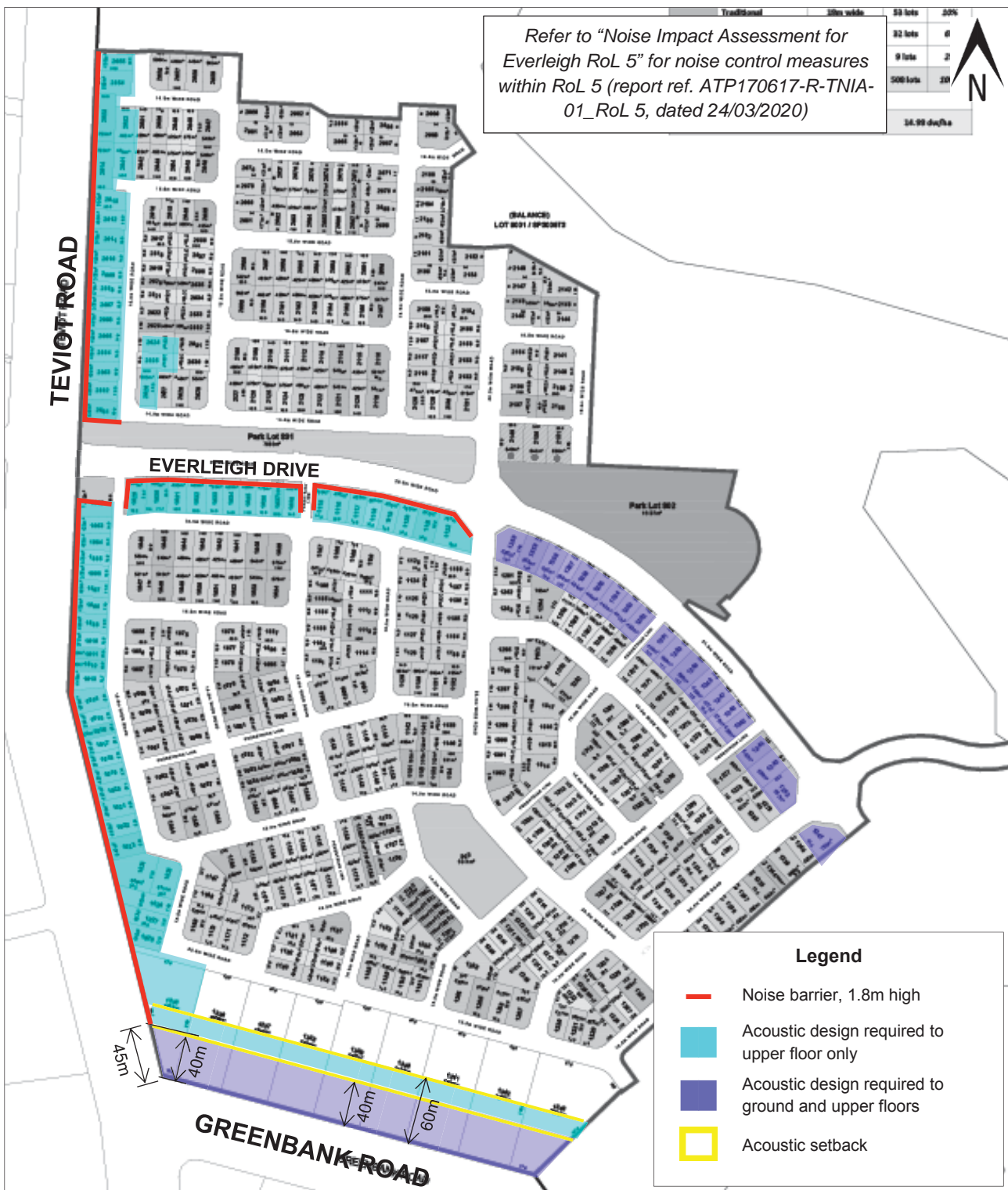


Figure 6.1 Noise control measures – Area 1

## 6.1 Noise barriers

### 6.1.1 Noise barrier along Teviot Road

The noise barrier generally follows the western site boundary along Teviot Road. The alignment and height of the noise barrier is described in Table 6.1.

**Table 6.1 Noise barrier along Teviot Road**

Location	Description	Height of noise barrier
Precinct 1.5	Starts at Lot 1335, 45m north of southern boundary	1.8m
	Finishes at Lot 1026, joining noise barrier at Precinct 1.4	1.8m
Precinct 1.4	Starts at Lot 1024	1.8m
	Finishes at Lot 1002	1.8m
	Return along whole northern boundary of Lot 1002	1.8m
Precinct 1.1	Starts at Lot 2001	1.8m
	Return along whole southern boundary of Lot 2001	1.8m
	Finishes at Lot 2003, joining noise barrier at Precinct 1.6	1.8m
Precinct 1.6	Starts at Lot 2004	1.8m
	Finishes at Lot 2055, joining noise barrier at RoL 5 development precinct north of Area 1	1.8m

Civil engineering drawings of Precincts 1.1, 1.2, 1.3 and 1.4 have been completed by Premise. Earthworks and construction of the noise barrier has already been carried out in several areas.

The noise barrier and retaining walls should be constructed as per the civil engineering drawings by Premise (refer to Appendix H). For areas awaiting detailed engineering design, including Precincts 1.5, 1.6 and the future development area to the north, the recommended levels of the noise barrier are presented in Table 6.2.

**Table 6.2 Noise barrier along Teviot Road – Levels**

*Area 1 Precinct 1.6:*

Lot No.	Pad level	Top of retaining wall, RL	Retaining wall height above pad level	Noise barrier height	Top of noise barrier, RL	Height of retaining wall + noise barrier
2009	68.60	70.60	2.00	1.80	72.40	3.80
2010	69.25	71.35	2.10	1.80	73.15	3.90
2011	69.65	72.00	2.35	1.80	73.80	4.15
2012	69.95	72.20	2.25	1.80	74.00	4.05
2013	70.20	72.30	2.10	1.80	74.10	3.90
2038	70.40	72.30	1.90	1.80	74.10	3.70
2051	70.00	72.00	2.00	1.80	73.80	3.80
2052	69.60	72.00	2.40	1.80	73.80	4.20
2053	69.70	72.00	2.30	1.80	73.80	4.10

Precinct 1.5:

Lot No.	Lot level	Top of retaining wall, RL	Retaining wall height above lot level	Noise barrier height	Top of noise barrier, RL	Height of retaining wall + noise barrier
Lot 1135 (northern extent)	57.70	57.70	0.00	1.80	59.50	1.80
Lot 1135 (southern extent)	55.50	55.50	0.00	1.80	57.30	1.80

The finished pad levels of the first row of allotments generally sits below the height of Teviot Road. As such, retaining walls will be (or have already been) constructed at the allotments 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”. Recommended location of the noise barrier relative to the allotments on Teviot Road is presented in Figure 6.2.

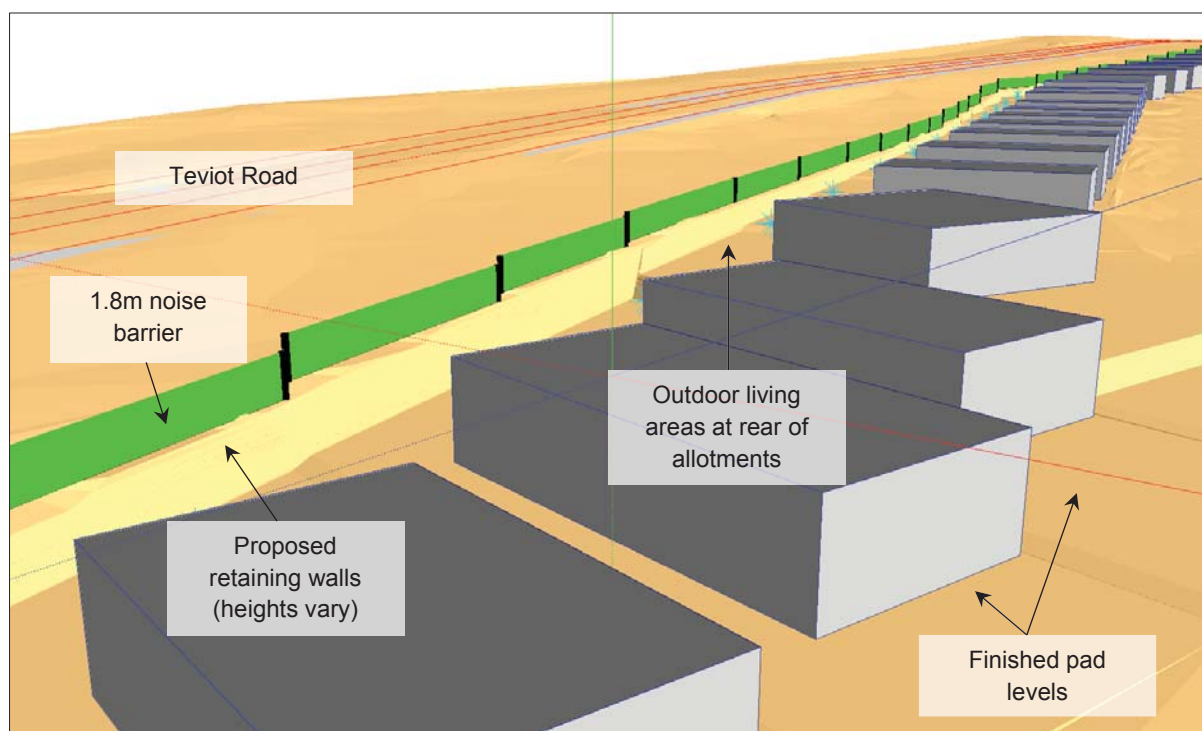


Figure 6.2 Noise barrier – 3d perspective

The height of the noise barrier in Area 1 should be 1.8m measured from the top of the retaining wall.

### 6.1.2 Noise barrier along Everleigh Drive

The noise barrier follows the northern boundary of the rear-loaded lots adjacent to Everleigh Drive.

The noise barrier in this section should be constructed as per the civil engineering drawings by Premise (refer to Appendix H).

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



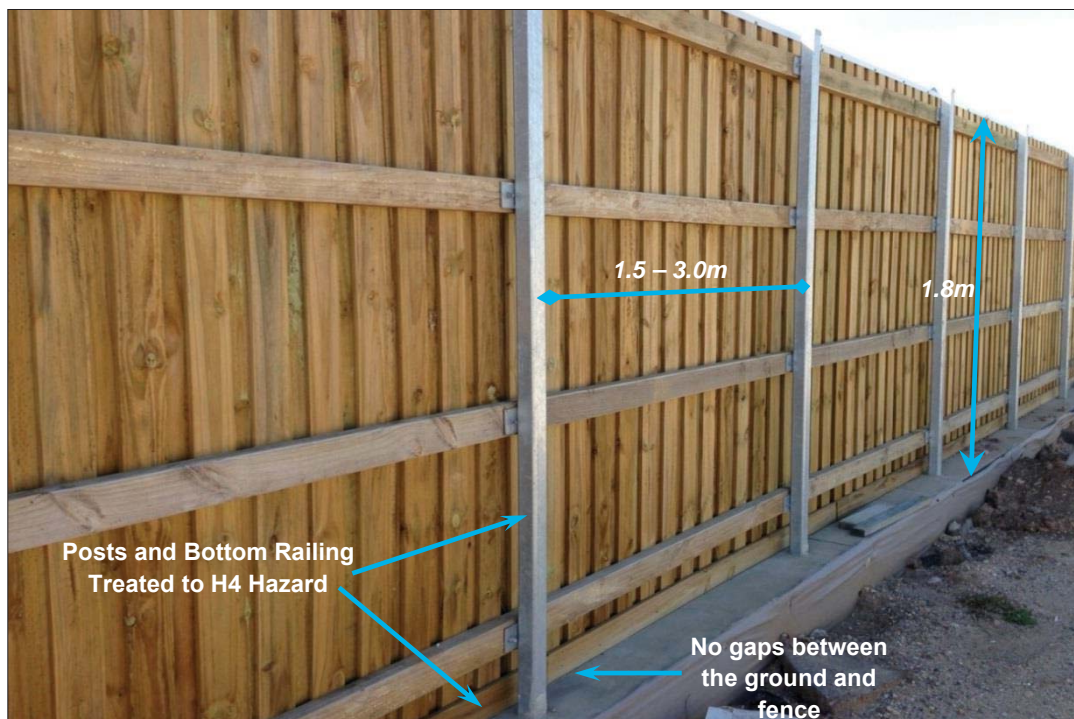
**Table 6.3 Noise barrier along Everleigh Drive**

Location	Description	Height of noise barrier
Precinct 1.3	Starts at Lot 1029	1.8m
	Return along western boundary of Lot 1029 (barrier extends to 6m from front boundary)	1.8m
	Finishes at Lot 1038	1.8m
	Return along eastern boundary of Lot 1038 (barrier extends to 6m from front boundary)	1.8m
	Starts at Lot 1115	1.8m
	Return along western boundary of Lot 1115 (barrier extends to 6m from front boundary)	1.8m
	Finishes at Lot 1122	1.8m

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

- Material with minimum surface density of 15kg/m<sup>2</sup>, 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 6.3.



**Figure 6.3 Typical timber noise barrier fence**

## 6.2 Acoustic setbacks

- Interface Lots along Greenbank Road:

Acoustic buffer zone of 40m (for low-set dwellings) and 60m (for high-set dwellings) is the preferred noise control strategy and will eliminate the need for a noise barrier along Greenbank Road. Outside the buffer zone no acoustic design is required.

Buildings located within 40m buffer from the site boundary require acoustic design to the ground and upper floors. Buildings located 40 to 60m from the site boundary require acoustic design to the upper floors only. Beyond 60m no acoustic design will be required.

Private open spaces at the Interface Lots should have minimum setback distance of 40m from the site boundary. If the private open spaces are protected by 1.8m high noise barrier, or located in a protected courtyard recessed into the building, the private open spaces are allowed to be within 40m of the site boundary.

## 6.3 Front loaded lots facing Everleigh Drive

Front loaded lots facing Everleigh 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 Everleigh 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 6.4.

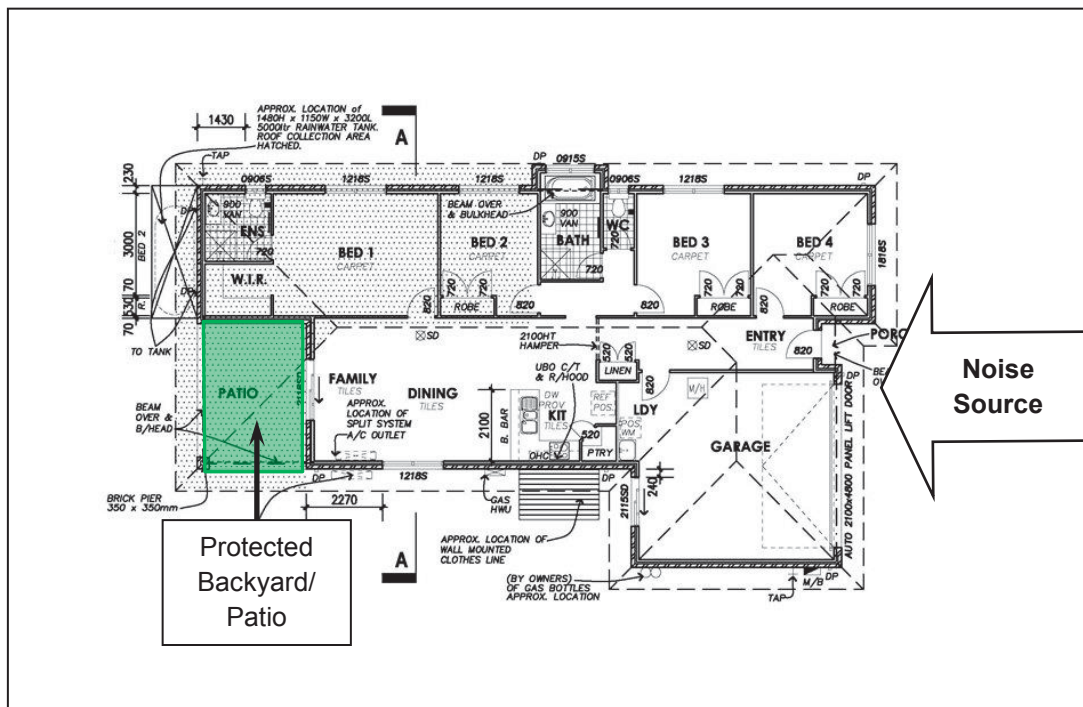


Figure 6.4 Outdoor living area on protected facade

## 6.4 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 proposed noise barriers and acoustic setbacks, 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<sub>10,18hr</sub> 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 Everleigh Drive and within the 40m buffer along Greenbank Road.

### ***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 Everleigh Drive will exceed the traffic noise criterion.

The lots which are predicted to exceed the traffic noise criterion of 63dB(A)  $L_{10,18hr}$  are listed in Table 6.4.

**Table 6.4 Lots requiring acoustic design**

Precinct	Acoustic requirements	
	Ground floor	Upper floor
Precinct 1.1	Acoustic design required for: <ul style="list-style-type: none"> <li>• Lot 1252</li> <li>• Lot 1253</li> <li>• Lot 1254</li> <li>• Lot 1255</li> <li>• Lot 1256</li> <li>• Lot 1257</li> <li>• Lot 1258</li> <li>• Lot 1259</li> <li>• Lot 1260</li> </ul>	Acoustic design required for: <ul style="list-style-type: none"> <li>• Lot 1252</li> <li>• Lot 1253</li> <li>• Lot 1254</li> <li>• Lot 1255</li> <li>• Lot 1256</li> <li>• Lot 1257</li> <li>• Lot 1258</li> <li>• Lot 1259</li> <li>• Lot 1260</li> <li>• Lot 2001</li> <li>• Lot 2002</li> <li>• Lot 2003</li> <li>• Lot 2026</li> </ul>
Precinct 1.2	None	None
Precinct 1.3	None	Acoustic design required for: <ul style="list-style-type: none"> <li>• Lot 1002</li> <li>• Lot 1003</li> <li>• Lot 1029</li> <li>• Lot 1030</li> <li>• Lot 1031</li> <li>• Lot 1032</li> <li>• Lot 1033</li> <li>• Lot 1034</li> <li>• Lot 1035</li> <li>• Lot 1036</li> <li>• Lot 1037</li> <li>• Lot 1038</li> <li>• Lot 1115</li> <li>• Lot 1116</li> <li>• Lot 1122</li> </ul>
Precinct 1.4	None	Acoustic design required for: <ul style="list-style-type: none"> <li>• Lot 1004</li> <li>• Lot 1005</li> <li>• Lot 1006</li> <li>• Lot 1007</li> <li>• Lot 1008</li> <li>• Lot 1009</li> <li>• Lot 1010</li> <li>• Lot 1011</li> <li>• Lot 1012</li> <li>• Lot 1013</li> </ul>



Precinct	Acoustic requirements	
	Ground floor	Upper floor
		<ul style="list-style-type: none"> <li>• Lot 1014</li> <li>• Lot 1015</li> <li>• Lot 1016</li> <li>• Lot 1017</li> <li>• Lot 1018</li> <li>• Lot 1019</li> <li>• Lot 1020</li> <li>• Lot 1021</li> <li>• Lot 1022</li> <li>• Lot 1023</li> <li>• Lot 1024</li> <li>• Lot 1025</li> </ul>
Precinct 1.5	Acoustic design required for: <ul style="list-style-type: none"> <li>• Lot 1241</li> <li>• Lot 1242</li> <li>• Lot 1243</li> <li>• Lot 1244</li> <li>• Lot 1245</li> <li>• Lot 1246</li> <li>• Lot 1247</li> <li>• Lot 1248</li> <li>• Lot 1249</li> <li>• Lot 1250</li> <li>• Lot 1251</li> </ul>	Acoustic design required for: <ul style="list-style-type: none"> <li>• Lot 1026</li> <li>• Lot 1027</li> <li>• Lot 1028</li> <li>• Lot 1241</li> <li>• Lot 1242</li> <li>• Lot 1243</li> <li>• Lot 1244</li> <li>• Lot 1245</li> <li>• Lot 1246</li> <li>• Lot 1247</li> <li>• Lot 1248</li> <li>• Lot 1249</li> <li>• Lot 1250</li> <li>• Lot 1251</li> <li>• Lot 1335</li> </ul>
Precinct 1.6	None	Acoustic design required for: <ul style="list-style-type: none"> <li>• Lot 2004</li> <li>• Lot 2005</li> <li>• Lot 2006</li> <li>• Lot 2007</li> <li>• Lot 2008</li> <li>• Lot 2009</li> <li>• Lot 2010</li> <li>• Lot 2011</li> <li>• Lot 2012</li> <li>• Lot 2013</li> <li>• Lot 2014</li> <li>• Lot 2025</li> <li>• Lot 2041</li> <li>• Lot 2053</li> <li>• Lot 2054</li> <li>• Lot 2055</li> </ul>

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.

#### **6.4.1 Noise control measures outside Area 1**

Refer to “*Noise Impact Assessment for Everleigh RoL 5*” for noise control measures within RoL 5 (report ref. ATP170617-R-TNIA-01\_RoL 5, dated 24/03/2020).

Refer to “*Traffic Noise Impact Assessment – Everleigh, Greenbank: Precinct 2 – RoL Application; Area 1 – Review of Previous Noise Impact Assessment*” (report ref. ATP170617-R-TNIA-01\_Precinct 2 RoL and Area 1 Review, Issue 1 dated 5 March 2019) for noise control measures required for Precinct 2, the interface lots along Greenbank Road and the allotments located near the “South entry road”.

Provided the recommended planning and design noise control measures are implemented in the construction of Everleigh Area 1, 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 Area 1 of the Everleigh development, the following is concluded:

- Noise barriers must be constructed along Teviot Road and Everleigh Drive.
- No noise control measures are required along Greenbank Road, provided that dwellings have minimum setback distance of 40m for low-set buildings and 60m for high-set buildings.
- The ground and upper floors of front-loaded lots adjacent to Everleigh Drive have to be designed as per AS3671-1989 to mitigate traffic noise ingress.
- The upper floors of the allotments located in close proximity to Teviot Road and Everleigh Drive have to be designed as per AS3671-1989 to mitigate traffic noise ingress.
- Provided the recommended planning and design noise control measures are implemented in the construction of Everleigh Area 1, road traffic noise will not impose any further constraints on the establishment of the development.

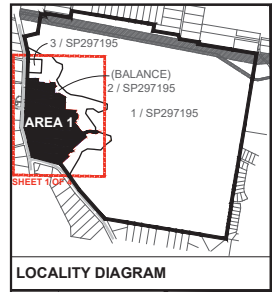
## 8. References

- Australian Standard AS1055.1-1997 (*Acoustics - Description and Measurement of Environmental Noise Part 1: General Procedures*)
- Australian Standard AS1055.2-1997 (*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 AS3671-1989 (*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*)'

## 9. Appendices

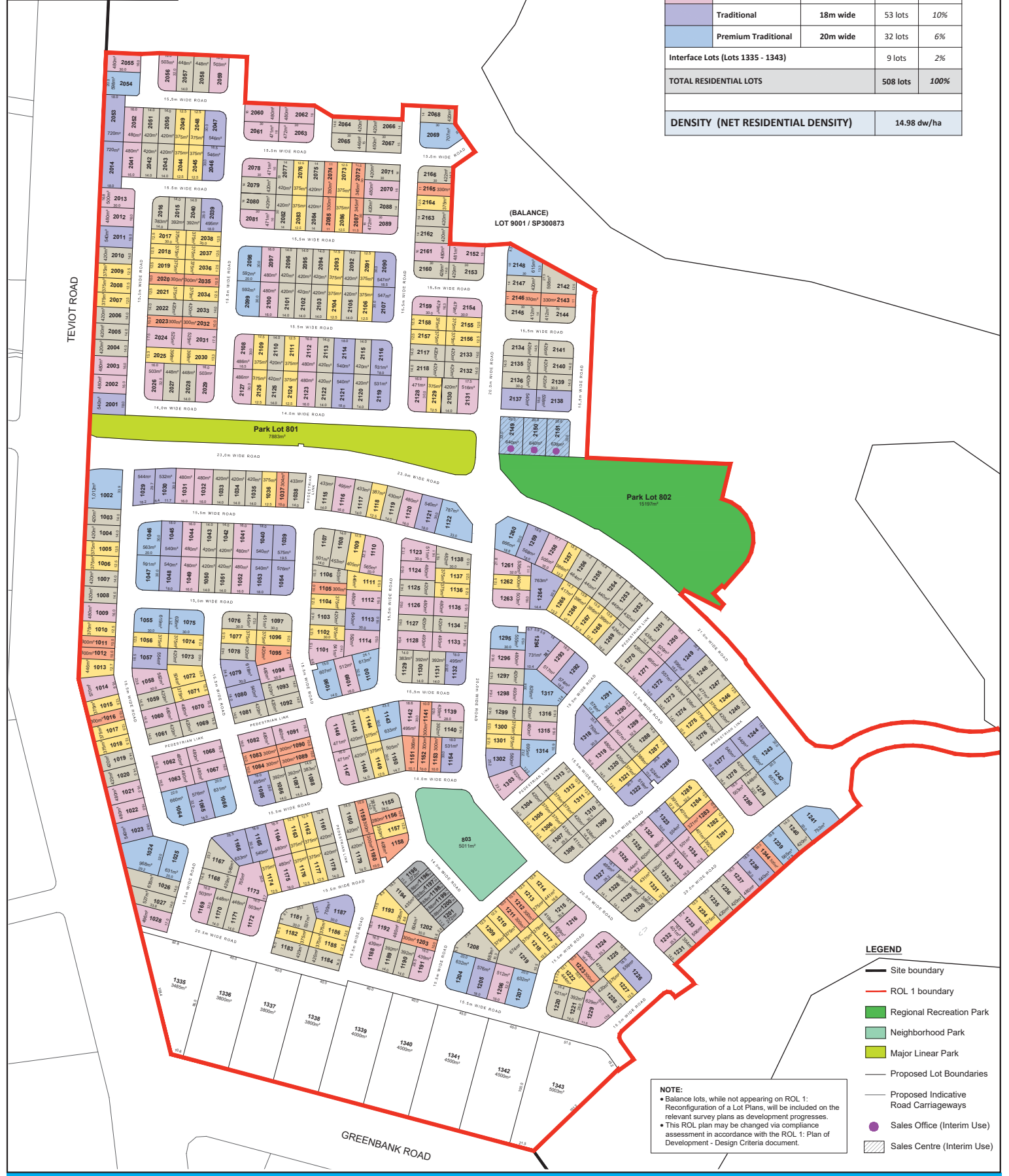
- Appendix A – Area 1 lot layout
- Appendix B – Site photos
- Appendix C – Meteorological data
- Appendix D – Noise measurement results
- Appendix E – Average weekday traffic volumes, 2051
- Appendix F – Validation of traffic noise model
- Appendix G – Traffic noise levels
- Appendix H – Civil engineering drawings

## Appendix A – Area 1 lot layout



**ROL 1 - YIELD SUMMARY**

LOT TYPE	INDICATIVE LOT FRONTAGE	TOTAL	
		LOTS	%
Terrace	7.5m wide	7 lots	1%
Villa	10m wide	35 lots	7%
Premium Villa	12.5m wide	98 lots	19%
Courtyard	14m wide	170 lots	33%
Premium Courtyard	16m wide	104 lots	20%
Traditional	18m wide	53 lots	10%
Premium Traditional	20m wide	32 lots	6%
Interface Lots (Lots 1335 - 1343)		9 lots	2%
<b>TOTAL RESIDENTIAL LOTS</b>		<b>508 lots</b>	<b>100%</b>
<b>DENSITY (NET RESIDENTIAL DENSITY)</b>		<b>14.98 dw/ha</b>	



- LEGEND**
- Site boundary
  - ROL 1 boundary
  - Regional Recreation Park
  - Neighborhood Park
  - Major Linear Park
  - Proposed Lot Boundaries
  - Proposed Indicative Road Carriageways
  - Sales Office (Interim Use)
  - Sales Centre (Interim Use)

**NOTE:**

- Balance lots, while not appearing on ROL 1: 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 1: Plan of Development - Design Criteria document.



## Appendix B – Site photos



**Photo 1 – Noise monitoring location 1 (Teviot Road), looking south**



**Photo 2 – Noise monitoring location 1 (Teviot Road), looking west**





**Photo 3 – Noise monitoring location 1 (Teviot Road), looking north-west**



**Photo 4 – Noise monitoring location 1 (Teviot Road), looking north-east**



Photo 5 – Noise monitoring location 2 (Greenbank Road)

## Appendix C – Meteorological data



# Greenbank (Defence), Queensland March 2020 Daily Weather Observations



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

# Logan City, Queensland September 2015 Daily Weather Observations

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	mm	mm	hours	km/h	local	°C	%	eighths	°C	%	eighths	km/h	hPa	°C	%	eighths	km/h	hPa
1	Tu	7.5	25.1	0	3.6				15.6	68	0	SW	6			24.1	25	0	N	6	
2	We	6.1	23.7	0	4.0				16.4	54	2	N	2			23.2	35	1	ESE	15	
3	Th	13.8	26.4	0.8	4.6				20.0	89	7	WSW	6			26.0	31	1	W	26	
4	Fr	11.8	24.4	0	3.2				18.1	56	1	WSW	7			23.1	46	7	ESE	6	
5	Sa	10.7	23.0	0	5.8				18.0	75	1	W	2								
6	Su	11.3	25.0	0	3.8				17.6	79	7	S	2								
7	Mo	12.8	25.3	0	2.2				19.8	92	6		Calm			24.4	55	5	NNE	19	
8	Tu	14.1	29.2	0	1.6				21.8	65	2	N	6			26.8	45	6	N	7	
9	We	9.0	24.7	0	3.2				18.0	39	1	WSW	15			21.5	37	1	ESE	11	
10	Th	9.5	24.0	0	4.0				18.4	62	1	NNW	2			22.4	52	3	ESE	15	
11	Fr	12.7	21.6	0	6.2				19.4	55	7	SE	15			20.4	56	6	SSE	17	
12	Sa	14.9	23.9	0	3.2				18.4	68	8		Calm								
13	Su	11.7	23.9	0.1	3.8				18.7	71	7		Calm								
14	Mo	11.2	24.4	0	4.0				18.9	69	7		Calm			23.1	50	6	ESE	11	
15	Tu	12.3	26.6	0	4.0				19.5	71	2	W	2			23.8	59	1	NNE	7	
16	We	12.9	29.2	0	3.4				20.0	73	0	SSW	15			25.0	57	7	NE	7	
17	Th	15.0	18.7	4.6	2.1				17.2	93	8	NNE	7			18.6	93	8	NE	4	
18	Fr	10.0	22.0	12.6	2.3				16.8	66	1	SSW	11			17.4	76	8	S	19	
19	Sa	14.9	22.9	0.8	4.2				20.1	53	1	S	22								
20	Su	10.3	22.3	0	5.4				19.3	62	3	S	9								
21	Mo	12.6	23.5	1.6	3.1				19.5	72	2	SSW	4			22.2	58	2	ENE	7	
22	Tu	12.3	29.9	0	4.0				18.8	77		S	4			27.0	40	6	NW	7	
23	We	12.6	22.2	0	4.0				17.9	68	4	SE	6			17.5	71	8	SE	22	
24	Th	7.8	22.1	1.3	5.1				16.6	47	1	WSW	6			20.0	46	2	E	19	
25	Fr	8.1	23.0	0	4.4				18.2	54	1	SW	6			20.0	56	7	SSE	22	
26	Sa	10.6	23.0	0	3.4				18.9	65	2	SW	11								
27	Su	10.7	22.8	0	4.0				18.9	66	2	WSW	4								
28	Mo	10.1		4.2	2.8				17.9	74	4	WNW	4			23.7	55	4	NE	13	
29	Tu		25.8	0																	
30	We	10.9	27.0	4.2	11.8				19.9	60	0	SW	4			24.9	51	2	ESE	7	
<b>Statistics for September 2015</b>																					
Mean		11.3	24.3		4.0				18.6	67	3		6			22.6	52	4		12	
Lowest		6.1	18.7		1.6				15.6	39	0		Calm			17.4	25	0	NE	4	
Highest		15.0	29.9	12.6	11.8				21.8	93	8	S	22			27.0	93	8	W	26	
Total				30.2	117.2																





## Appendix D – Noise measurement results



**Unattended Noise Measurements  
Everleigh, Greenbank - Location 1**

Noise Levels - 18hr Day (Traffic Noise)

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

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

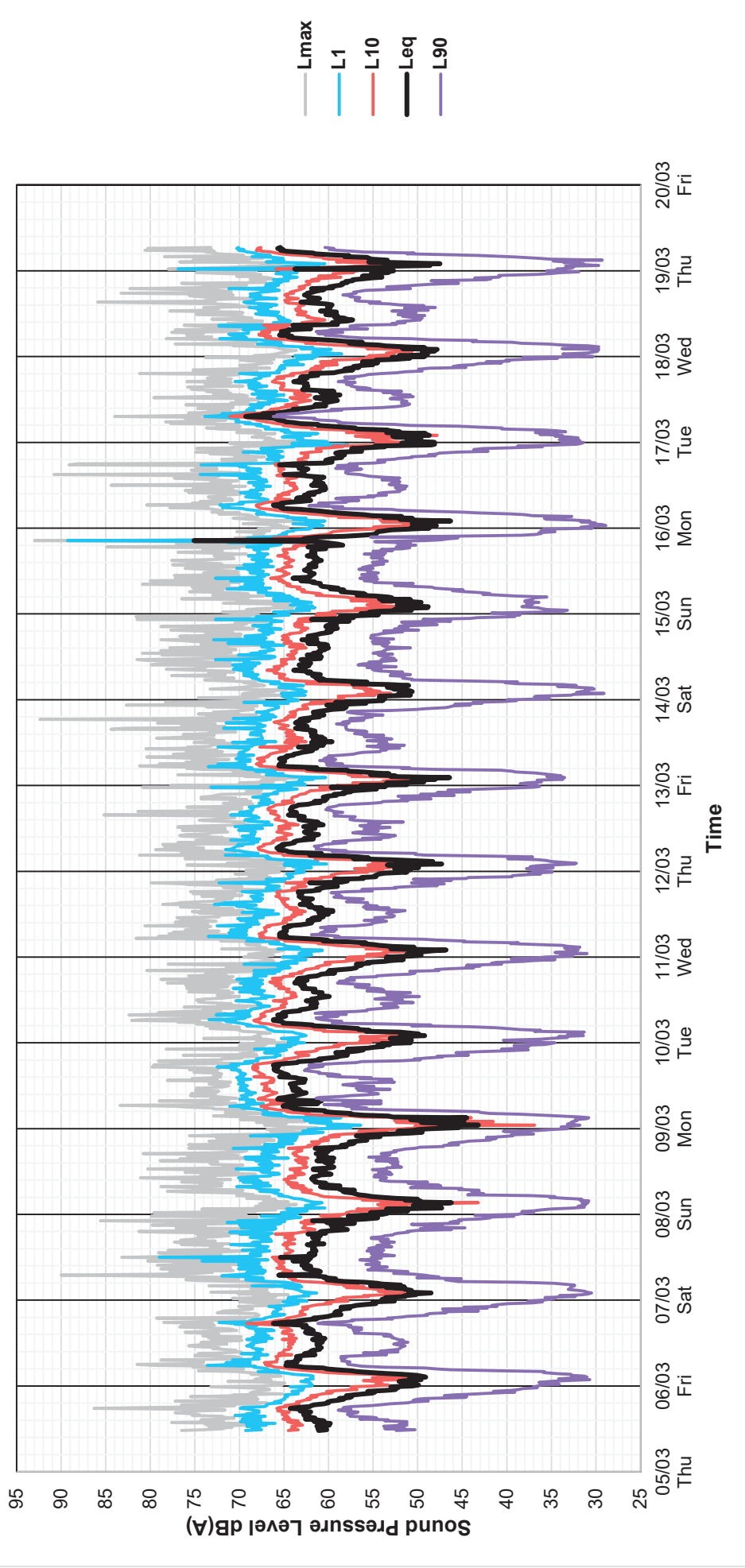
ARL Environmental Noise Logger  
 Logger Serial Number 15-203-537  
 Measurement Title Everleigh - RoL 5  
 Measurement started at 05/03/2020 11:09 AM  
 Measurement stopped at 19/03/2020 06:34 AM  
 Frequency Weighting A  
 Time Averaging Fast  
 Statistical Interval 15 min  
 Pre-measurement Ref. 94.0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

**Note**

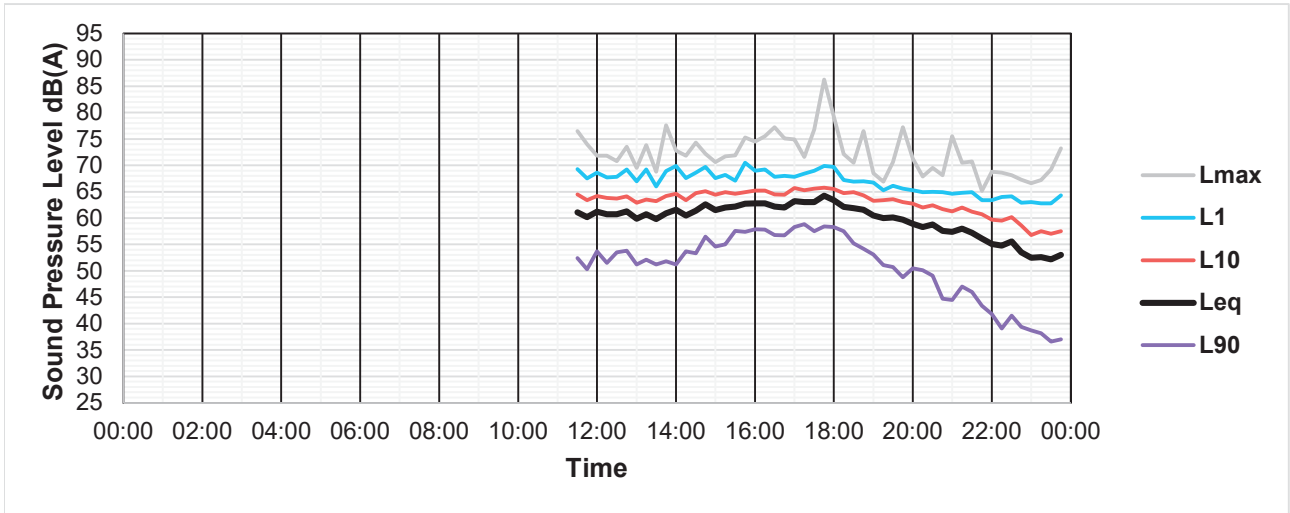
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- Rainfall recorded on this day



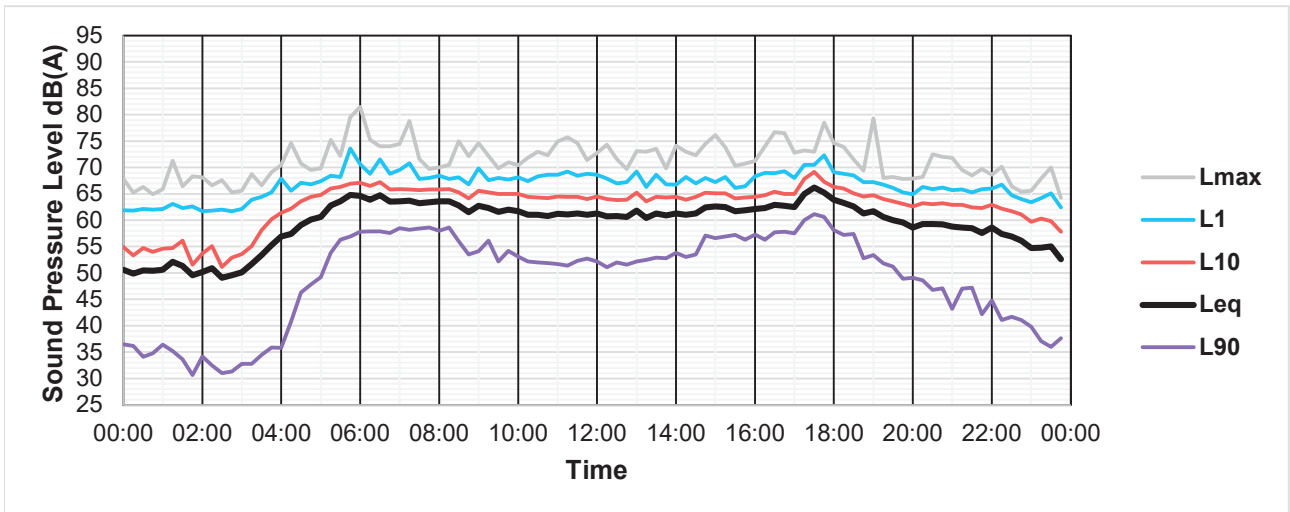
### Unattended Noise Measurements 5 to 19 March 2020



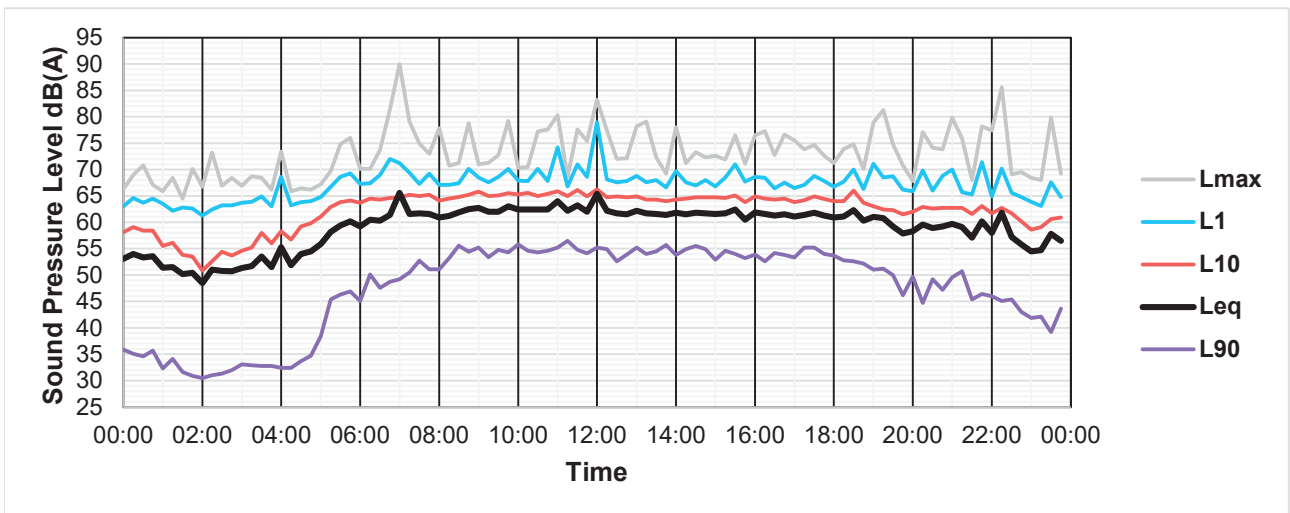
### Unattended Noise Measurements Thursday 5 March 2020



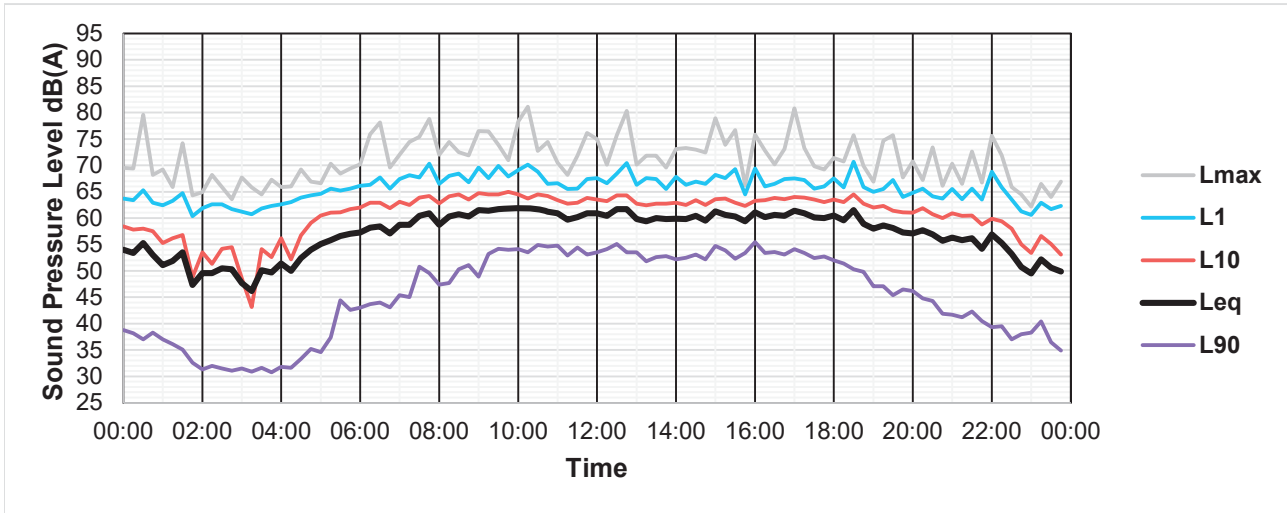
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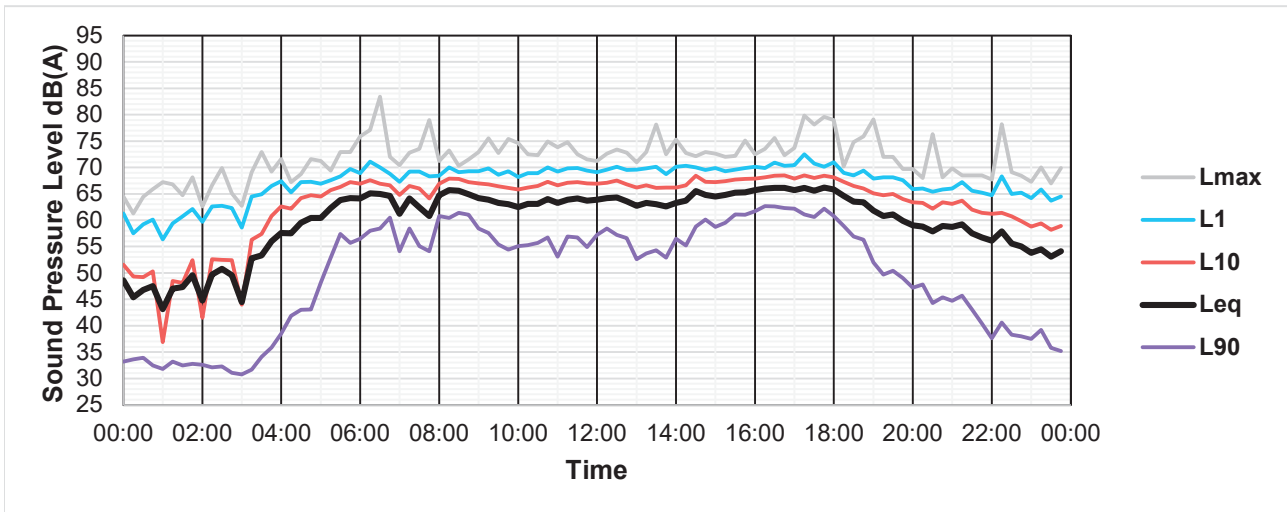
### Unattended Noise Measurements Saturday 7 March 2020



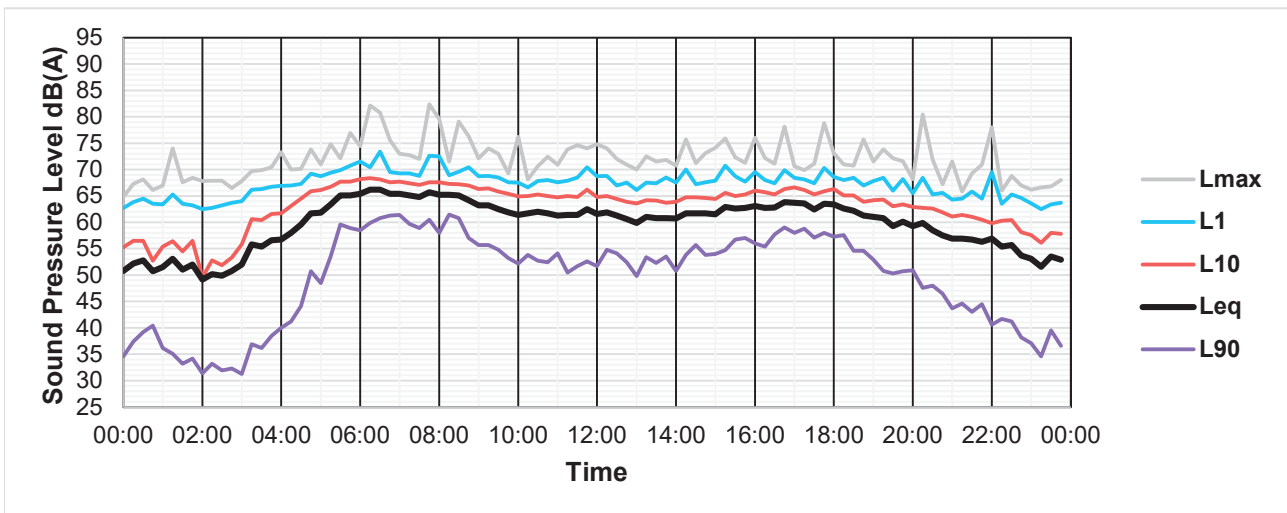
### Unattended Noise Measurements Sunday 8 March 2020



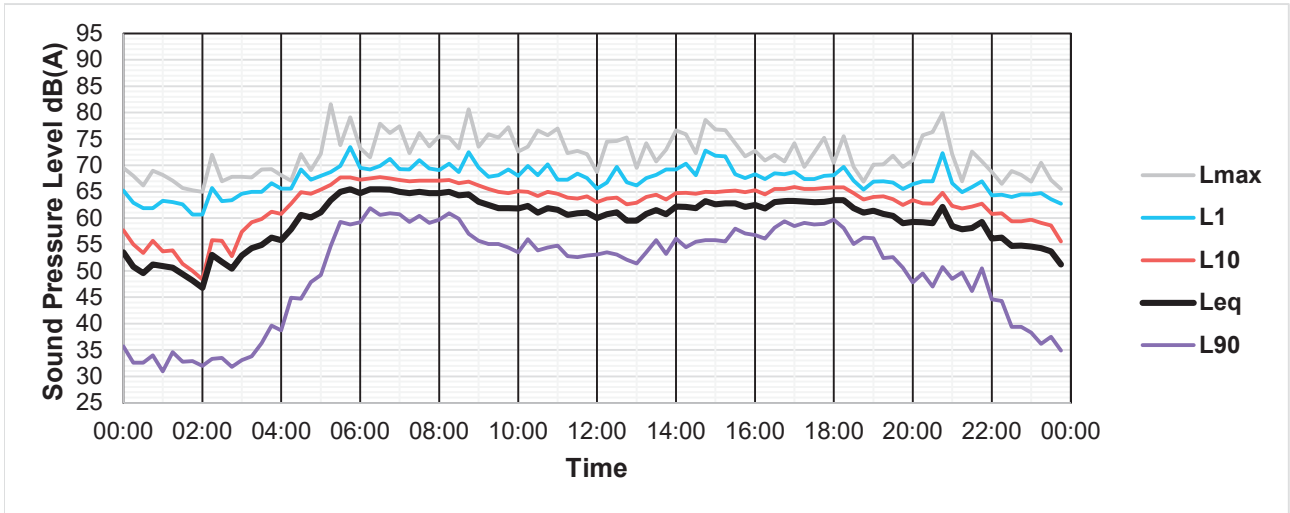
### Unattended Noise Measurements Monday 9 March 2020



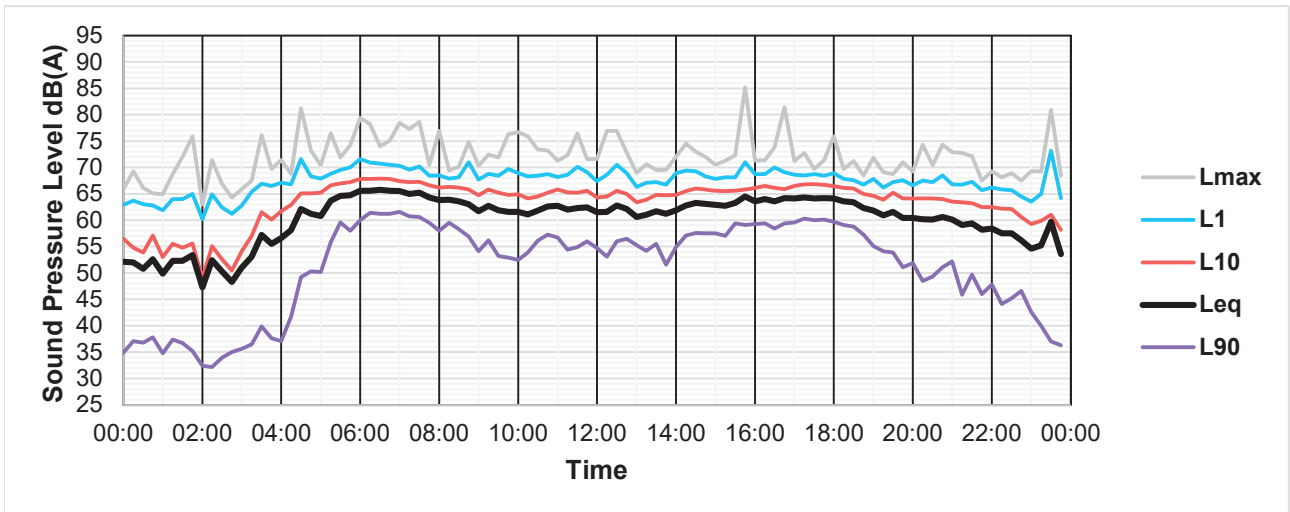
### Unattended Noise Measurements Tuesday 10 March 2020



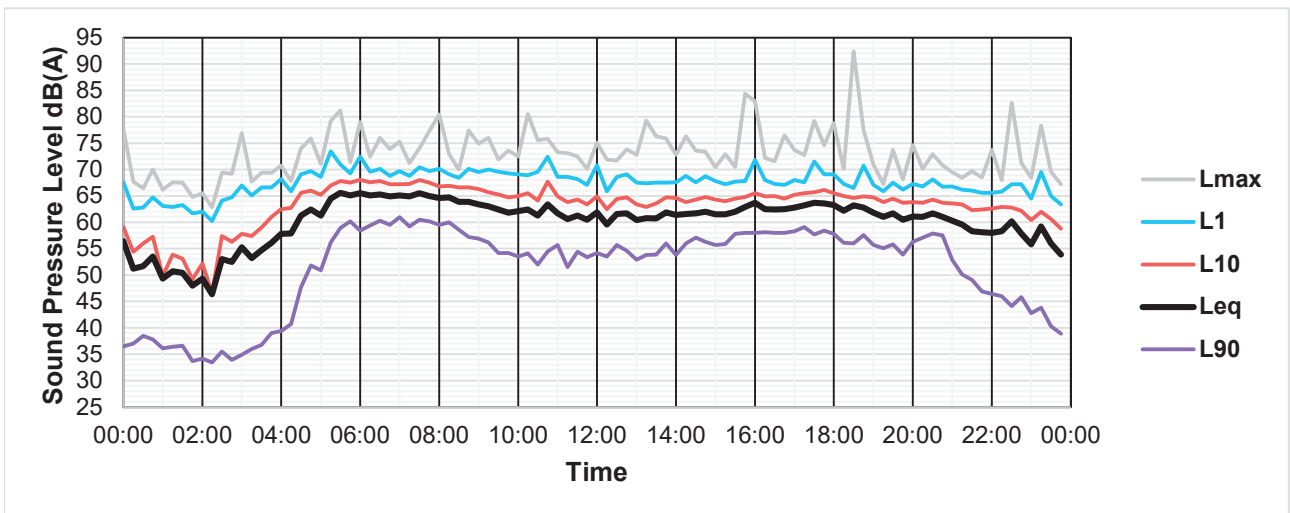
### Unattended Noise Measurements Wednesday 11 March 2020



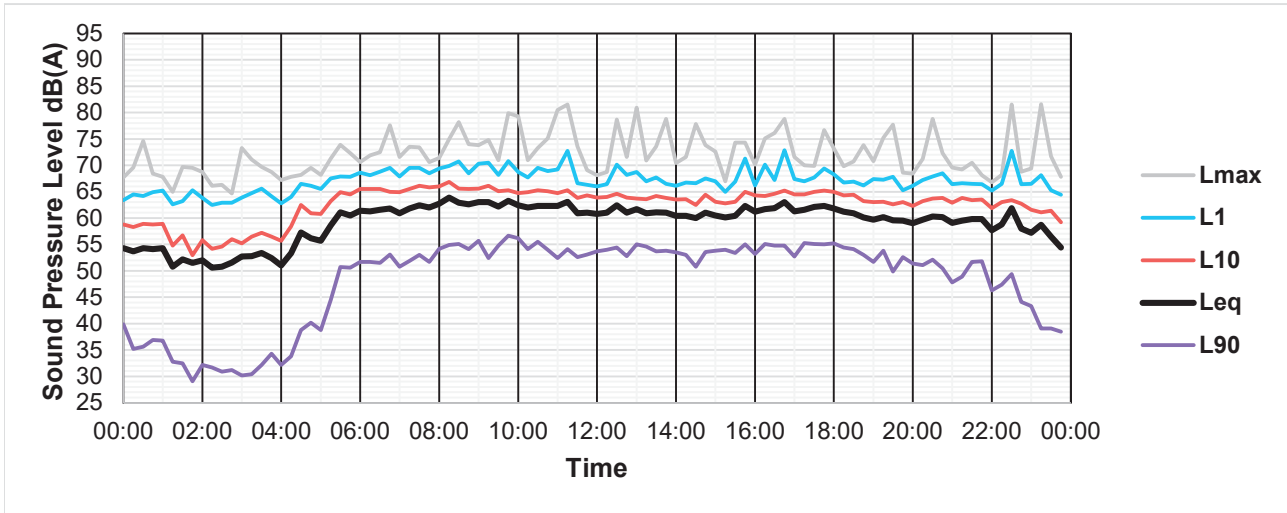
### Unattended Noise Measurements Thursday 12 March 2020



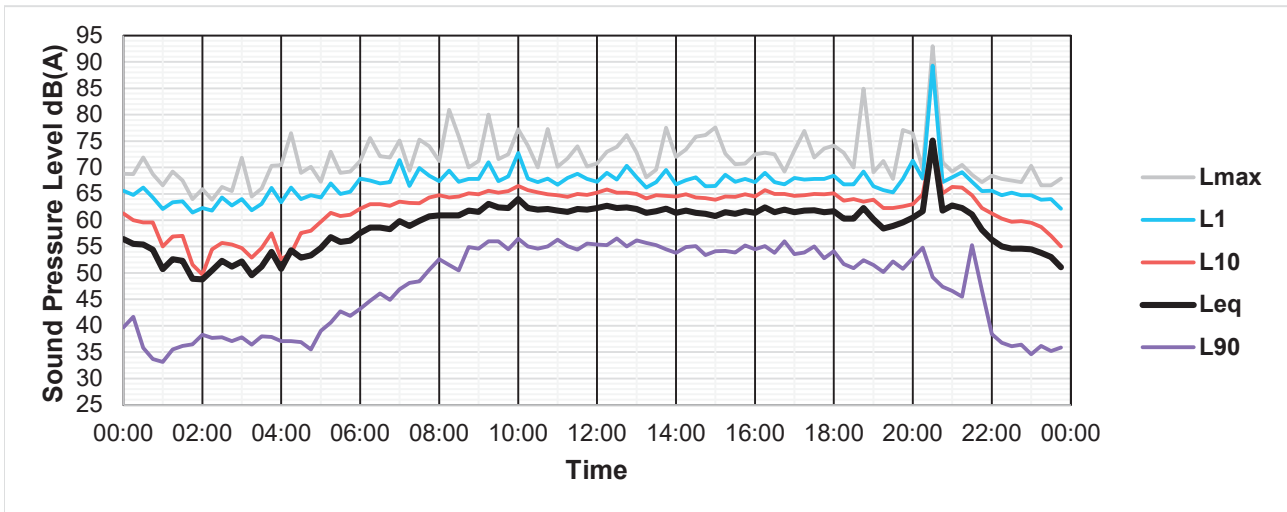
### Unattended Noise Measurements Friday 13 March 2020



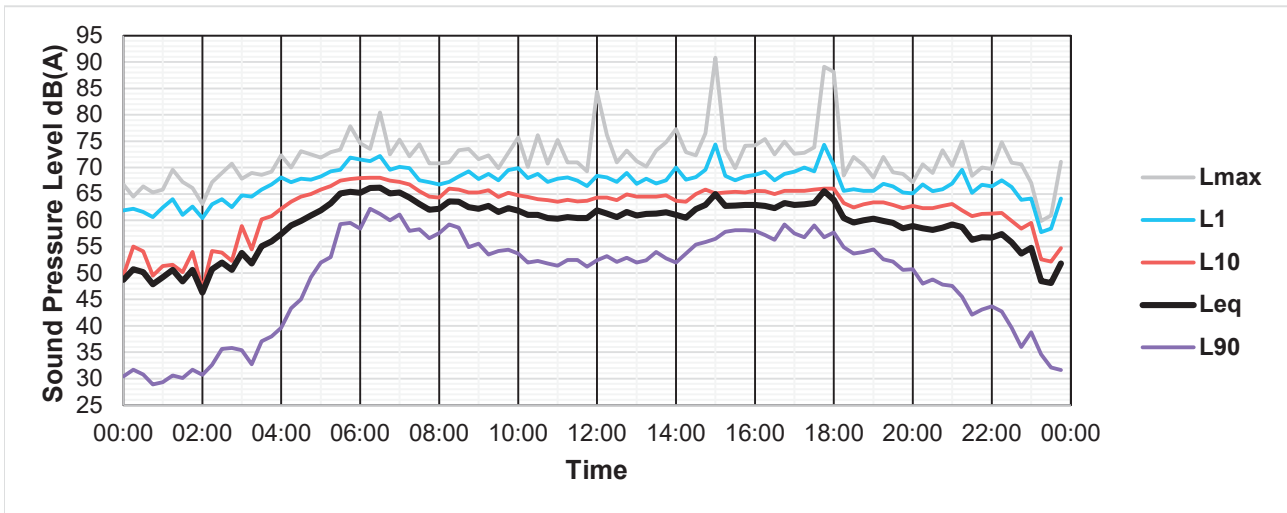
### Unattended Noise Measurements Saturday 14 March 2020



### Unattended Noise Measurements Sunday 15 March 2020

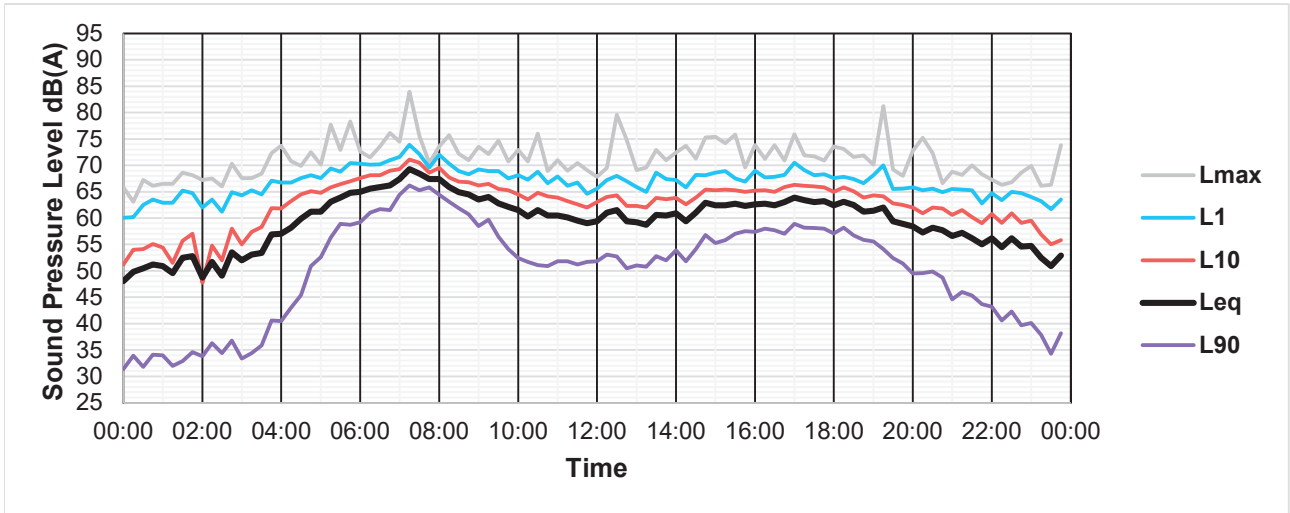


### Unattended Noise Measurements Monday 16 March 2020

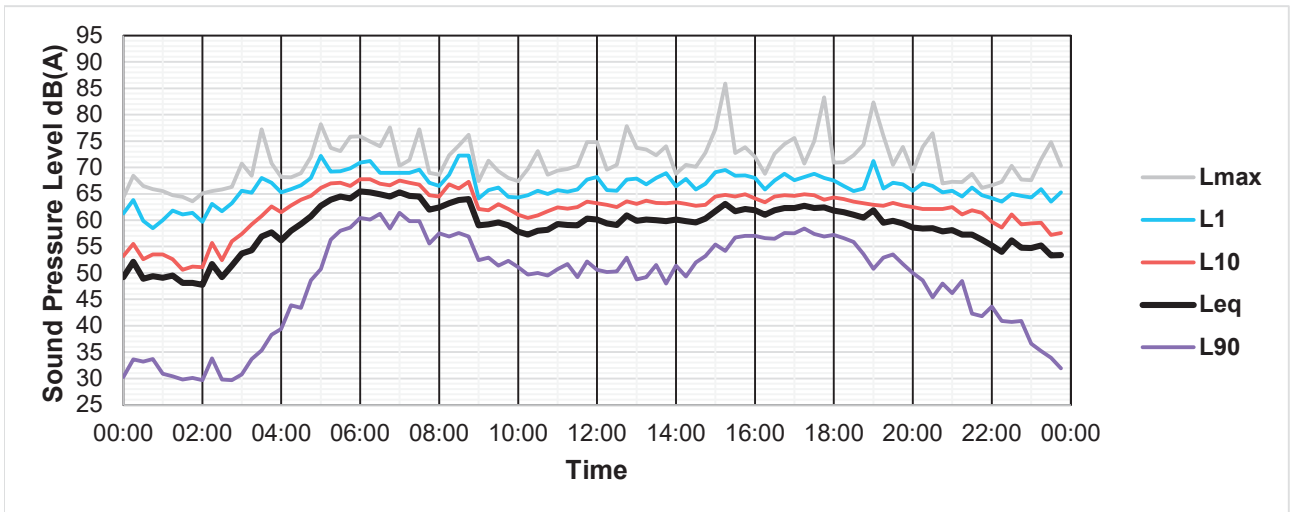




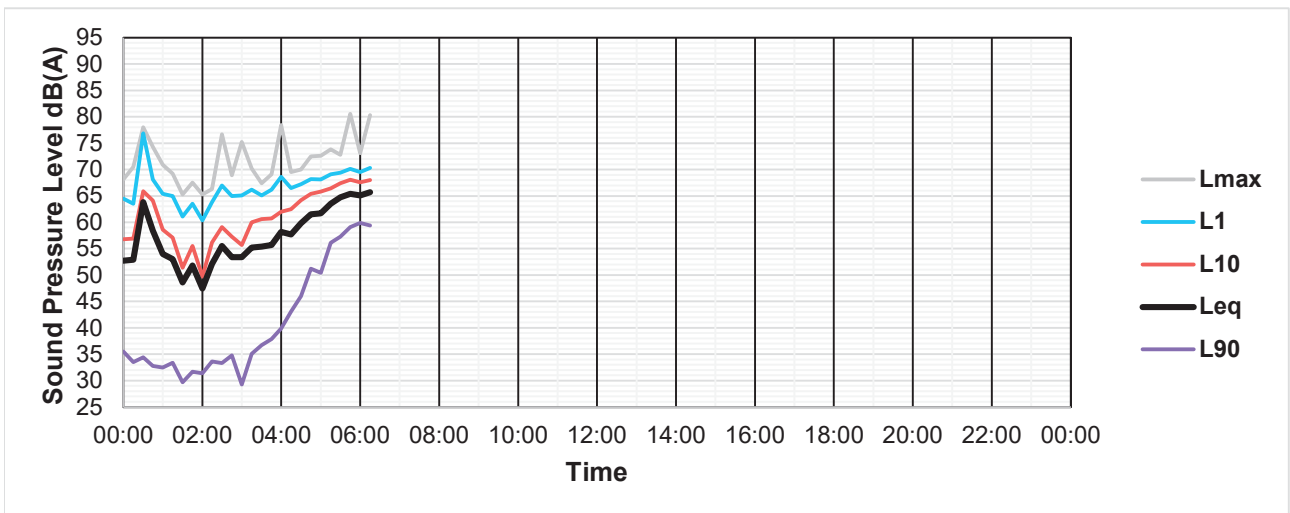
### Unattended Noise Measurements Tuesday 17 March 2020



### Unattended Noise Measurements Wednesday 18 March 2020



### Unattended Noise Measurements Thursday 19 March 2020





# Summary of Unattended Noise Measurements

**ATP150814 - Greenbank Development**  
**Location 2 (South)**  
**30 metres from edge of Greenbank Road**

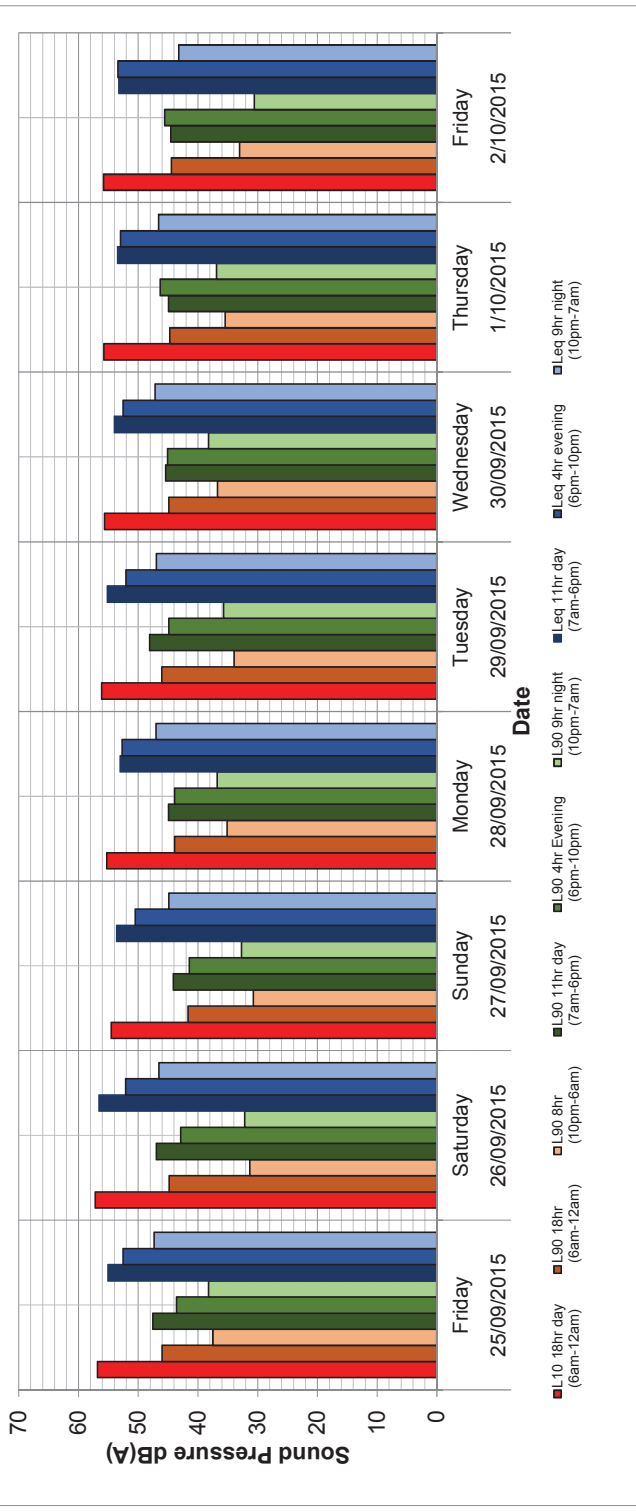
Type 1 Environmental Noise Logger  
 Logger Serial Number 8780d4  
 Measurement Title 20150924\_095323  
 Measurement started at 24/09/2015 - 18:00:00 #  
 Measurement stopped at 03/10/2015 - 18:30:00 #  
 Frequency Weighting A  
 Time Averaging Fast  
 Statistical Interval 15 minutes  
 Auxiliary Power Disabled  
 Tape Recorder Disabled  
 Short Term Leq Disabled  
 Short Term Leq Length N/A  
 Start Trigger N/A  
 Stop Trigger N/A  
 Master Timer N/A  
 Sub Timer N/A  
 Pre-measurement Reference 94.0  
 Post-measurement Reference 93.9  
 Engineering Units dB SPL

**Legend**  
 # : Severe weather experienced on the day

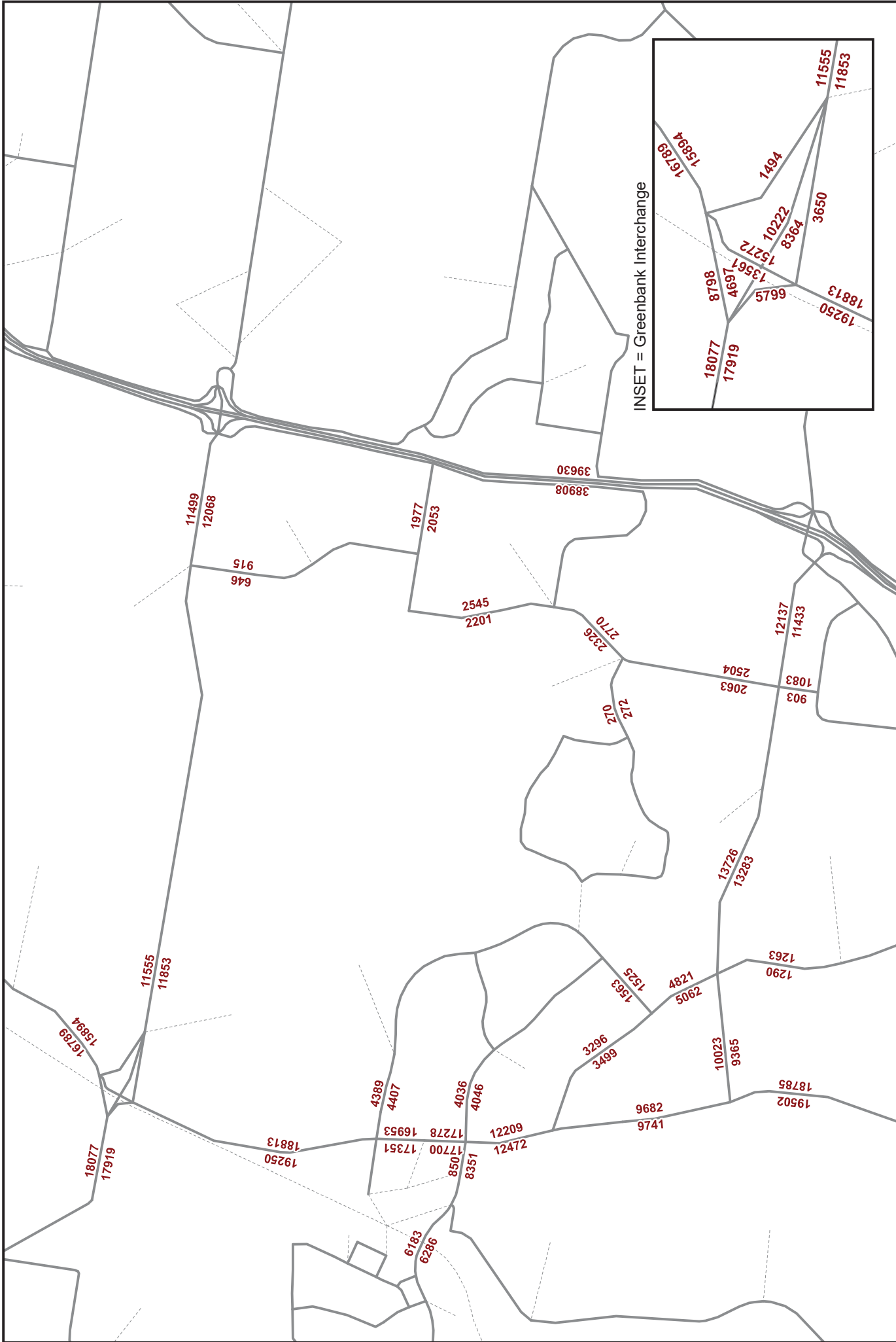
**Notes**  
 1: Only days with fine weather and 24 hours of recorded noise data were considered in the average

Date	Day	L10 18hr day (6am-12am)	L90 18hr (6am-12am)	L90 8hr (10pm-6am)	L90 11hr day (7am-6pm)	L90 4hr Evening (6pm-10pm)	L90 9hr night (10pm-7am)	Leq 11hr day (7am-6pm)	Leq 4hr evening (6pm-10pm)	Leq 9hr night (10pm-7am)
25/09/2015	Friday	57	46	38	48	44	38	55	53	47
26/09/2015	Saturday	57	45	31	47	43	32	57	52	47
27/09/2015	Sunday	55	42	31	44	41	33	54	50	45
28/09/2015	Monday	55	44	35	45	44	37	53	53	47
29/09/2015	Tuesday	56	46	34	48	45	36	55	52	47
30/09/2015	Wednesday	56	45	37	45	45	38	54	53	47
1/10/2015	Thursday	56	45	35	45	46	37	53	53	47
2/10/2015	Friday	56	44	33	45	46	31	53	53	43
<b>Average (Only weekdays)</b>		<b>55</b>	<b>44</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Average (All days)</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>46</b>	<b>44</b>	<b>36</b>	<b>54</b>	<b>52</b>	<b>46</b>

**Summary Chart**



## Appendix E – Average weekday traffic volumes, 2051



Forecast Average Weekday Traffic, 2051 (with Full SRIP)



## Appendix F – Validation of traffic noise model

Everleigh, Greenbank - RoL 5 Application  
Traffic noise validation model, Year 2020

Receiver	Location	L10(18h) dB(A)
Noise logger_Teviot Road 2020	GF	64



Greenbank Development  
Validation 2015 - Freefield Noise Levels

Receiver	Floor	L10(18h) dB(A)
Location 2_30m from Greenbank Road	GF	57

## Appendix G – Traffic noise levels

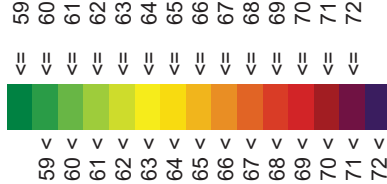
# Everleigh, Greenbank - Area 1

## Traffic Noise Modelling Year 2051

Ground Floor  
(1.8m AGL)

With Noise Barriers

Traffic noise level  
Facade adjusted  
L<sub>10</sub>(18hr)dB(A)



### Legend

- ..... Limit line - 63dB(A) criteria
- Road noise emission line
- ▭ Road surface
- ▭ Noise barrier

SCALE @ A4 1:5000



Grid Spacing: 3m  
Project Engineer: Sam Fraser  
Created: 24/03/2020  
Processed with SoundPLAN 8.2



# Everleigh, Greenbank - Area 1

## Traffic Noise Modelling Year 2051

First Floor  
(4.6m AGL)

With Noise Barriers

Traffic noise level  
Facade adjusted  
L<sub>10</sub>(18hr)dB(A)



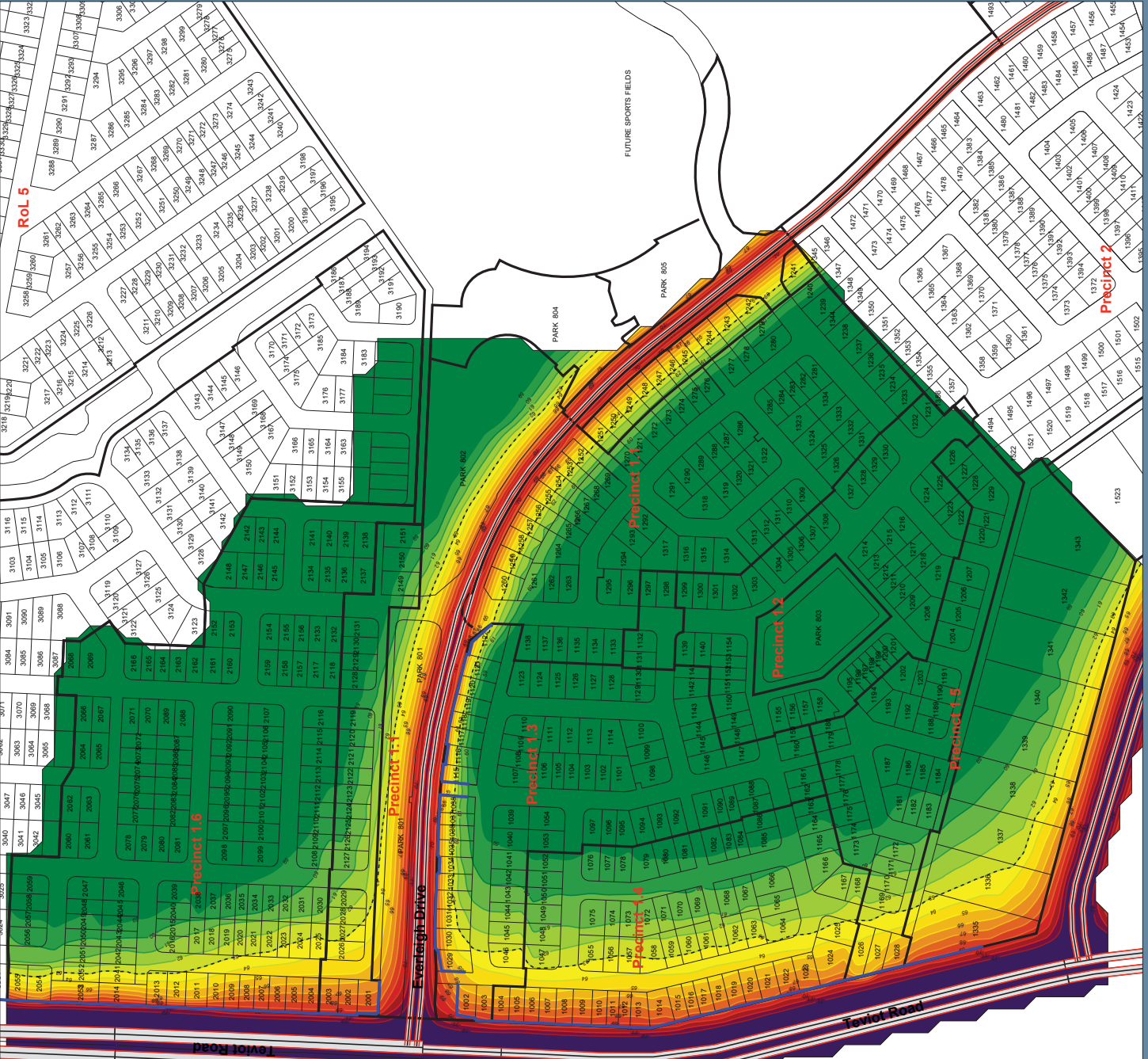
### Legend

- ..... Limit line - 63dB(A) criteria
- Road noise emission line
- ▭ Road surface
- ▭ Noise barrier

SCALE @ A4 1:5000



Grid Spacing: 10m  
Project Engineer: Sam Fraser  
Created: 24/03/2020  
Processed with SoundPLAN 8.2





## Appendix H – Civil engineering drawings



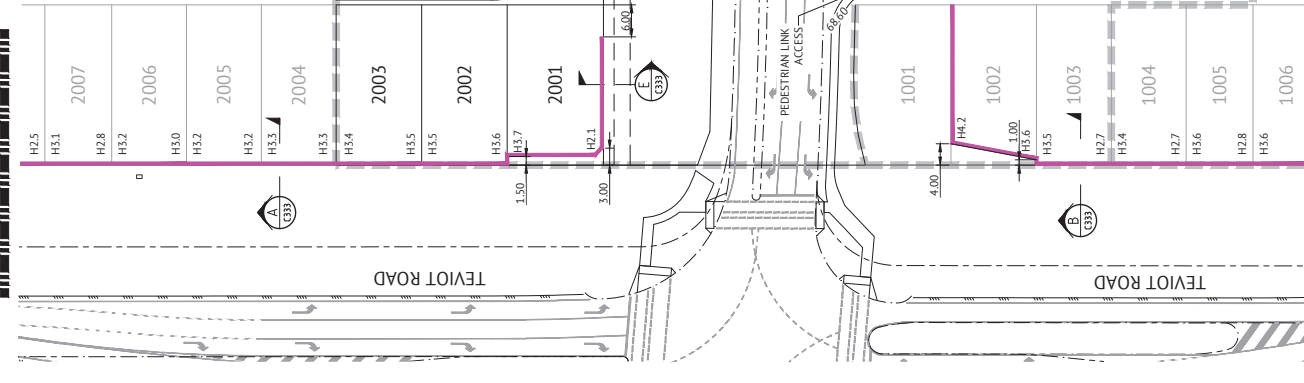
**NOTE:**  
THESE ACOUSTIC FENCE PLANS SHOULD BE  
READ IN CONJUNCTION WITH THE C200  
SERIES EARTHWORKS DRAWINGS.

**LEGEND**

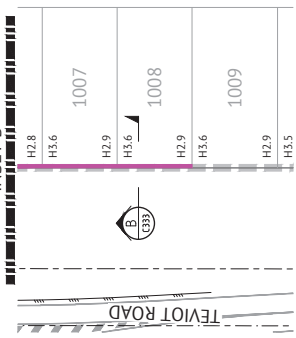
- 1.8m HIGH MODULAR WALLS, ACOUSTIC FENCE OR APPROVED EQUIVALENT.
- TOTAL HEIGHT FROM TOP OF FENCE TO LOWEST POINT ON EITHER SIDE OF ACOUSTIC FENCE
- CURRENT PROPOSED EARTHWORKS PAD LEVEL (FINAL LEVEL SUBJECT TO DETAILED DESIGN)
- PROPOSED FINISHED SURFACE LEVEL / FINISHED VERGE LEVEL ALONG TERTIARY ROAD

H3.65  
62.20  
58.75

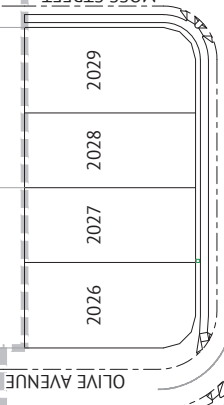
**REFER INSET A**



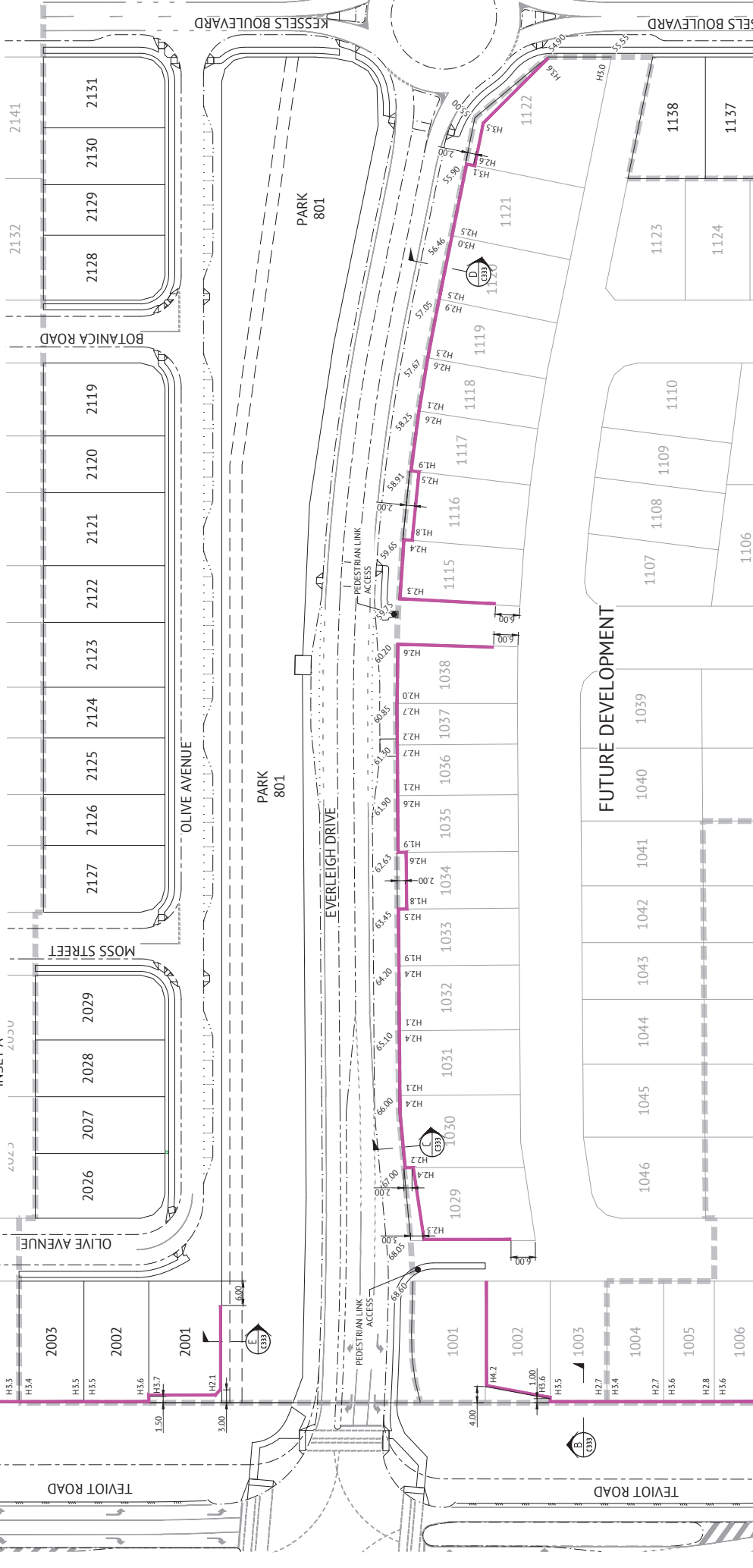
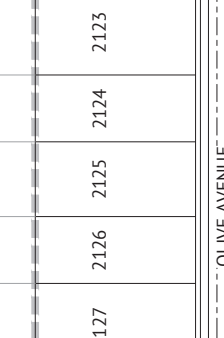
**REFER INSET B**



**INSET A**



**INSET B**



<b>BRISBANE OFFICE</b> LEVEL 1, 100 BRUNSWICK STREET PO BOX 361 FORTITUDE VALLEY, QLD 4006 PH: (07) 3255 2272 WEB: www.premise.com.au		<b>Premise</b>	
REVISIONS	DATE	DESCRIPTION	BY
1	13/04/18	AWARDED ACOUSTIC FENCE TO SUIT RETAINING WALL LOCATION CHANGES	AS/HA
2	13/04/18	ORIGINAL ISSUE	AS/HA
3	13/04/18	CONSTRUCTION ISSUE	AS/HA

PROJECT DIRECTOR	DATE
<i>[Signature]</i>	13/04/18

PROJECT MANAGER	DATE
JS	13/04/18

CHECKED	DATE
JS	13/04/18

SCALE	SCALE
1:500	1:500 (A1)

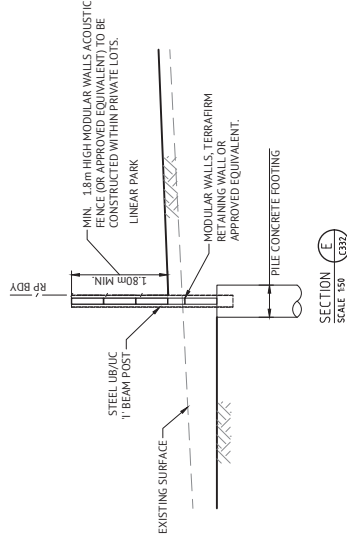
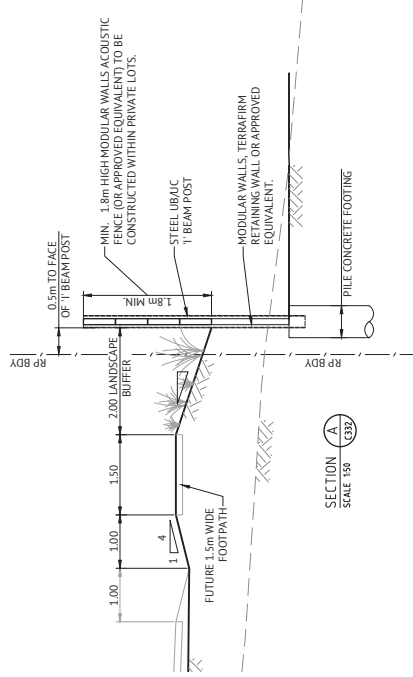
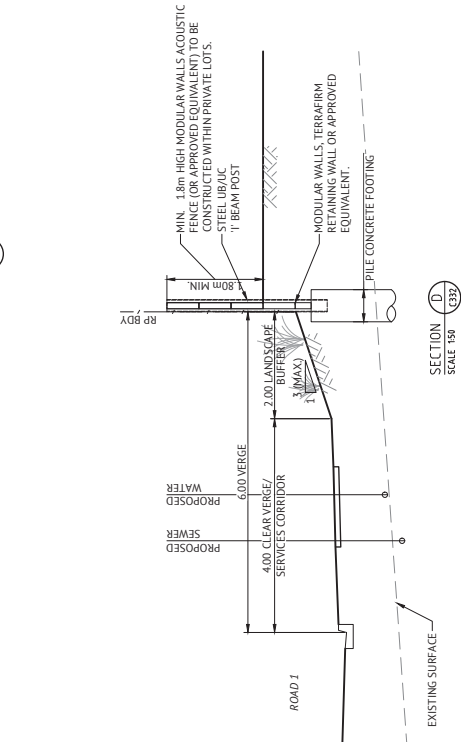
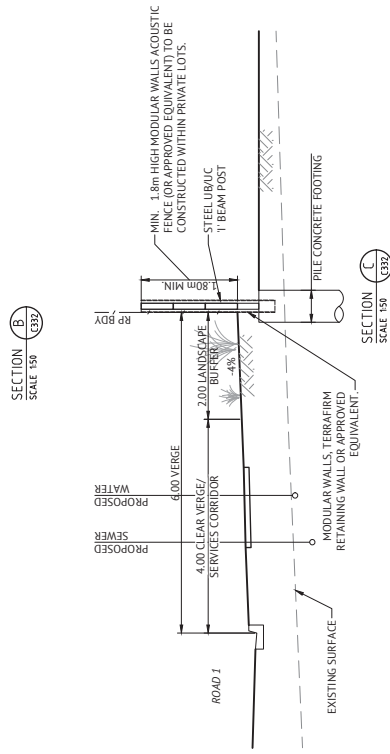
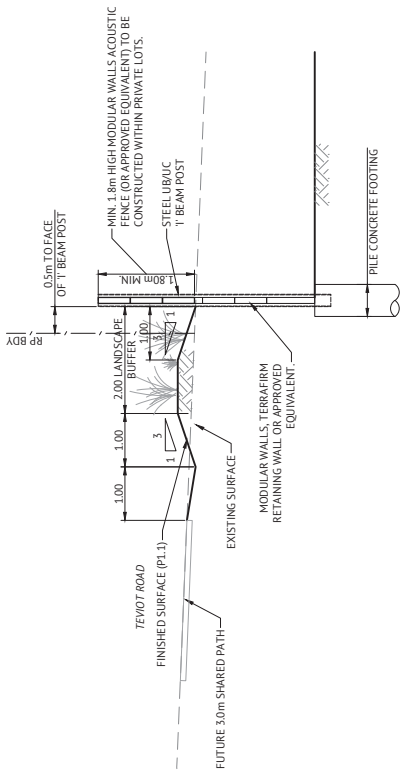
PROJECT	CLIENT
EVERLEIGH PRECINCT 1.1 SUBDIVISION DEVELOPMENT	MIRVAC

LOCATION	PROJECT NUMBER
TEVIOT ROAD, GREENBANK	MIR001-01

SHEET TITLE	SHEET NUMBER
ACOUSTIC FENCE LAYOUT PLAN	C332

DATE	REV
13/04/18	B





THESE DRAWINGS HAVE BEEN PREPARED IN ACCORDANCE WITH THE ATP CONSULTING ENGINEERS NOISE IMPACT ASSESSMENT, DOCUMENT REFERENCE: 15010001 DATED 24 MAY 2017, AND SUBSEQUENT AMENDMENTS DETAILED IN THE ATP CONSULTING ENGINEERS TECHNICAL MEMORANDUM, DOCUMENT NO. ATP/70517-TN-01, DATED 18 AUGUST 2017.

THE PROPOSED ACOUSTIC FENCE SHALL BE CONSTRUCTED AS FOLLOWS:

- THE ACOUSTIC FENCE SHOULD BE CONSTRUCTED TO COMPLY WITH TMR'S ROAD TRAFFIC NOISE MANAGEMENT;
- MATERIALS SHOULD HAVE A SURFACE DENSITY OF 15kg/m<sup>2</sup>. E.G. TIMBER PALINGS WITH MINIMUM THICKNESS 20mm; FIBRE-CEMENT SHEETING WITH MINIMUM THICKNESS OF 12mm;
- THE FENCE SHOULD BE CONSTRUCTED OF MASONRY AND AERATED CONCRETE. ANY GAPS, IF THE NOISE BARRIERS CONSTRUCTED OF TIMBER PALINGS, PLANKS SHOULD HAVE MINIMUM 5mm OVERLAP.
- NO GAPS SHALL BE LEFT BETWEEN THE PALINGS OR PLANKS. THE NOISE BARRIER SHOULD BE OF DURABLE CONSTRUCTION.

**NOTE:**  
THESE ACOUSTIC FENCE PLANS SHOULD BE READ IN CONJUNCTION WITH THE C200 SERIES EARTHWORKS DRAWINGS.

**27/06/18 CONSTRUCTION ISSUE**

DATE: 27/06/18

ISSUE: CONSTRUCTION ISSUE

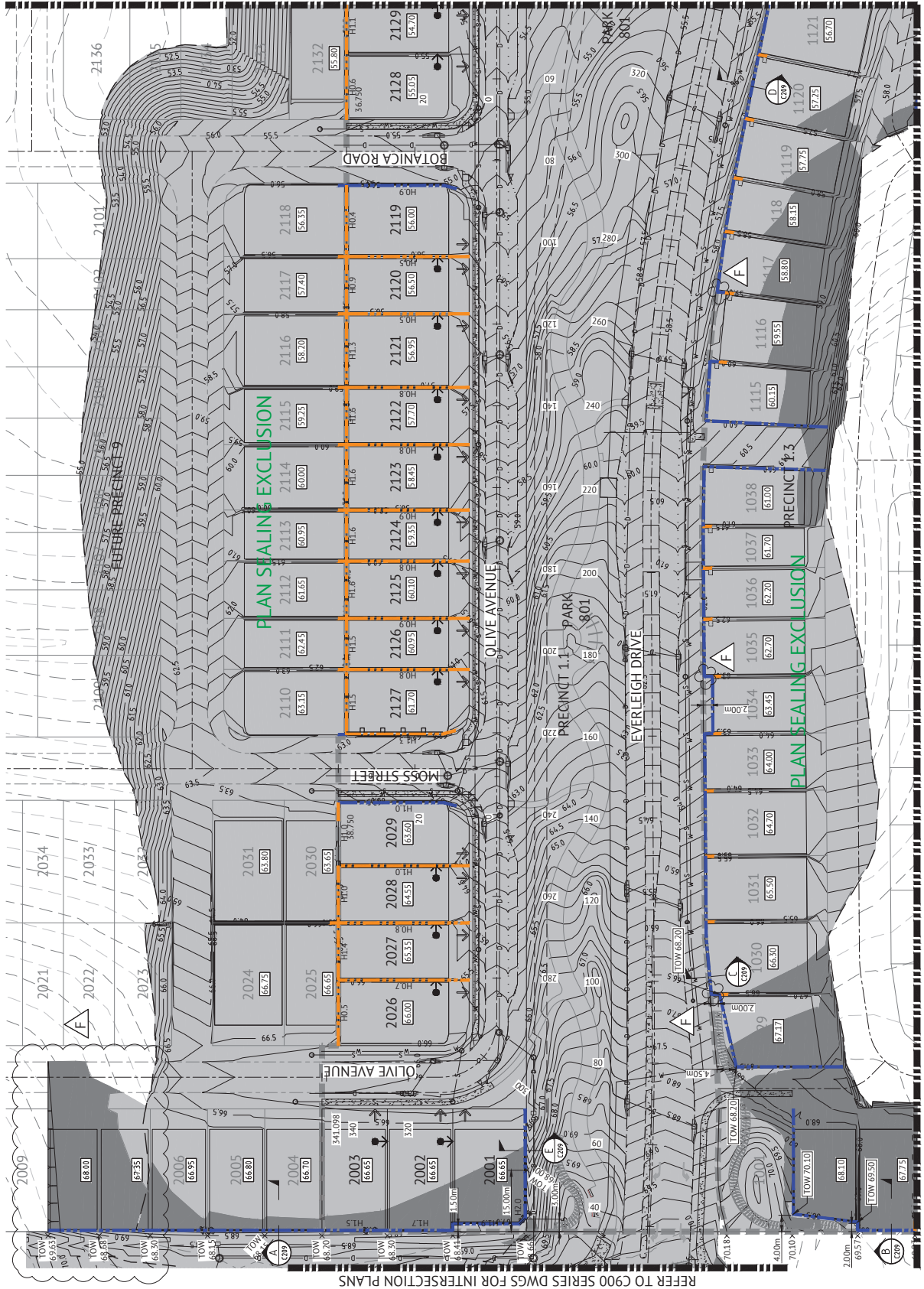
<p>BRISBANE OFFICE LEVEL 1, 100 BRUNSWICK STREET PO BOX 361 FORTITUDE VALLEY, QLD 4006 PH: (07) 33 53 2722 WEB: www.premise.com.au</p>	<p>BRQ: <i>A. Hanks</i> DATE: 06/10/17 SCALE: 1:50 (A1)</p>	<p>CLIENT: MIRVAC PROJECT: EVERLEIGH PRECINCT 1.1 SUBDIVISION DEVELOPMENT LOCATION: TEVOT ROAD, GREENBANK SHEET TITLE: ACOUSTIC FENCE TYPICAL SECTIONS</p>	<p>REV: A SHEET NUMBER: C333 DATE: 27/06/18</p>
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**LEGEND**

- EXTENT OF CUT
- EXTENT OF FILL
- FINISHED MAJOR CONTOURS (0.50m)
- FINISHED MINOR CONTOURS (0.25m)
- FINISHED SURFACE PAD LEVEL
- PROPOSED CONCRETE SLEEPER RETAINING WALL (AND HEIGHT), TIMBER TEXTURED SLEEPER, 150mm HIGH DESIGN SPECIFICATION BY MANUFACTURER.
- PROPOSED CONCRETE PANEL RETAINING WALL (AND HEIGHT), 2 COAT TEXTURED PAINT, DESIGN SPECIFICATION BY MANUFACTURER.
- FEATURE FENCE ON TOP OF RETAINING WALL BY LANDSCAPER
- ZERO LOT LINE
- EXISTING CONTOURS (0.50m)
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING WATER
- EXISTING ELECTRICITY
- EXISTING TELECOMMUNICATIONS
- EXISTING GAS



REFER TO C900 SERIES DWGS FOR INTERSECTION PLANS

JOINS DRAWING C204

JOINS DRAWING C203

**27/06/18 CONSTRUCTION ISSUE**

**EARTHWORKS VOLUMES**  
 STAGE POINT  
 CUT = -169645m³  
 FILL = 344129m³  
 BALANCE = 174485m³  
 (- EXPORT, + IMPORT)  
 NOTES:  
 1. EXISTING BUILDING AND COMPACTION FACTORS.  
 2. MINIMUM ROAD BOX INCLUDED IN VOLUMES.

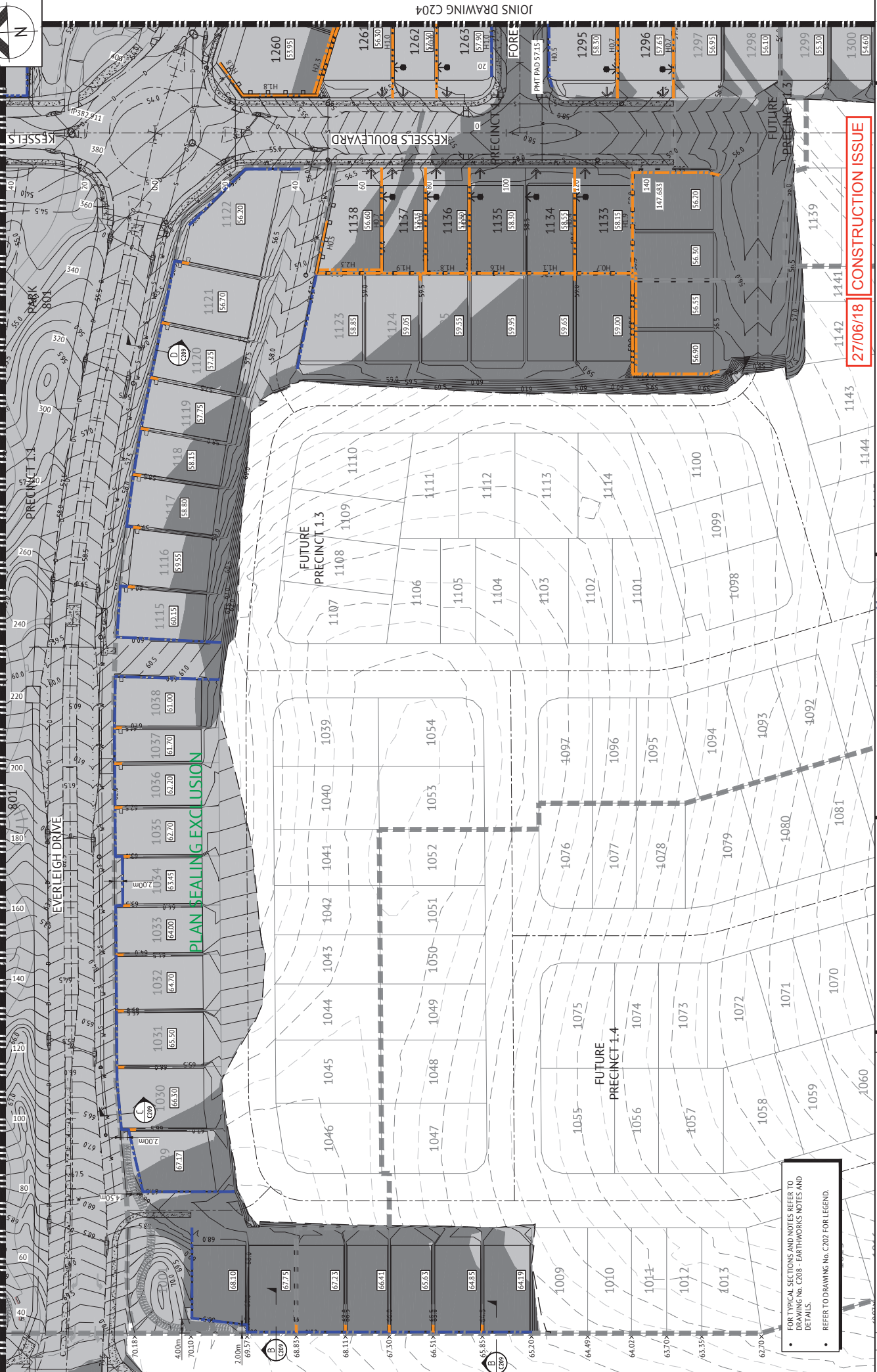
- NOTES**
- REFER BULK EARTHWORKS NOTES AND DETAILS DRAWINGS.
  - PROPOSED SERVICES WITHIN THE VICINITY OF RETAINING WALLS. REFER SERVICE DRAWINGS FOR SERVICE EXISTING DWELLINGS, FENCES ETC. TO BE DEMOLISHED & REMOVED OFF SITE BY OTHERS. FINAL RETAINING WALL TYPES TO BE CONFIRMED BY DEVELOPER PRIOR TO CONSTRUCTION.

- FOR TYPICAL SECTIONS AND NOTES REFER TO DRAWING NO. C208 - EARTHWORKS NOTES AND DETAILS.

**RETAINING WALL DESIGN:**  
 ALL RETAINING WALLS SHALL BE DESIGNED & CONSTRUCTED IN ACCORDANCE WITH THE 'DESIGN AND CONSTRUCTION RETAINING WALL SPECIFICATION' PREPARED BY PREMISE ENGINEERING.

**PROPERTY SERVICES UNDER RETAINING WALLS:**  
 CONTRACTOR SHALL REFER TO ALL LATEST SERVICE DRAWINGS TO ENSURE PROVISIONS ARE MADE FOR ALL PROPERTY SERVICE CONNECTIONS UNDER RETAINING WALLS.

<p>BRISBANE OFFICE          LEVEL 1, 100 BRUNSWICK STREET          PO BOX 361          FORTITUDE VALLEY, QLD 4006          PH: (07) 3252 2222          WEB: www.premise.com.au</p>	<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>DATE</th> <th>REV</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>22/06/18</td> <td>F</td> <td>CHANGES RETAINING WALL TYPES, LANDSCAPE FEATURES (SPARTAN, LOT 2007 &amp; 2008 EARTHWORKS SHOWING), MARKED BY TYPING WALL LOCATIONS AND DEAR PARK AND RECREATION PARK EARTHWORKS WALL TYPES (SPARTAN)</td> </tr> <tr> <td>22/06/18</td> <td>D</td> <td>ADDED RETAINING WALL RETURNS AT ADJACENT TO TOWNSHIP PARK ETL, ADDED LOT 1394</td> </tr> <tr> <td>22/06/18</td> <td>C</td> <td>ADDED RETAINING WALL RETURNS AT ADJACENT TO TOWNSHIP PARK ETL, ADDED LOT 1394</td> </tr> <tr> <td>22/06/18</td> <td>B</td> <td>ORIGINAL ISSUE</td> </tr> </tbody> </table>	DATE	REV	DESCRIPTION	22/06/18	F	CHANGES RETAINING WALL TYPES, LANDSCAPE FEATURES (SPARTAN, LOT 2007 & 2008 EARTHWORKS SHOWING), MARKED BY TYPING WALL LOCATIONS AND DEAR PARK AND RECREATION PARK EARTHWORKS WALL TYPES (SPARTAN)	22/06/18	D	ADDED RETAINING WALL RETURNS AT ADJACENT TO TOWNSHIP PARK ETL, ADDED LOT 1394	22/06/18	C	ADDED RETAINING WALL RETURNS AT ADJACENT TO TOWNSHIP PARK ETL, ADDED LOT 1394	22/06/18	B	ORIGINAL ISSUE	<p>RECORDED: JS          CHECKED: JS          PROJECT MANAGER: JS          PROJECT DIRECTOR: ROSA STONE</p>	<p>DATE: 22/06/18</p>	<p>BRNO: [Signature]          DATE: 22/06/18          SCALE: 1:500</p>	<p>CLIENT: MIRVAC          PROJECT: EVERLEIGH PRECINCT 1.1 SUBDIVISION DEVELOPMENT          LOCATION: TEVIOT ROAD, GREENBANK          SHEET TITLE: EARTHWORKS LAYOUT PLAN - SHEET 1 OF 6</p>	<p>PROJ CODE: MIR001-01          SHEET NUMBER: C202          REV: F</p>
DATE	REV	DESCRIPTION																			
22/06/18	F	CHANGES RETAINING WALL TYPES, LANDSCAPE FEATURES (SPARTAN, LOT 2007 & 2008 EARTHWORKS SHOWING), MARKED BY TYPING WALL LOCATIONS AND DEAR PARK AND RECREATION PARK EARTHWORKS WALL TYPES (SPARTAN)																			
22/06/18	D	ADDED RETAINING WALL RETURNS AT ADJACENT TO TOWNSHIP PARK ETL, ADDED LOT 1394																			
22/06/18	C	ADDED RETAINING WALL RETURNS AT ADJACENT TO TOWNSHIP PARK ETL, ADDED LOT 1394																			
22/06/18	B	ORIGINAL ISSUE																			



FOR TYPICAL SECTIONS AND NOTES REFER TO DRAWING NO. C208 - EARTHWORKS NOTES AND DETAILS.  
REFER TO DRAWING NO. C202 FOR LEGEND.

27/06/18 CONSTRUCTION ISSUE

<p>22/06/18 13/07/18 13/07/18 23/07/18 23/07/18</p> <p>DATE REV DESCRIPTION</p>	<p>REV DESCRIPTION</p>	<p>BRISBANE OFFICE LEVEL 1, 100 BRUNSWICK STREET PO BOX 361 FORTITUDE VALLEY, QLD 4006 PH: (07) 33 35 2322 WEB: www.premise.com.au</p>	<p>RECORDED CHECKED PROJECT MANAGER PROJECT DIRECTOR</p> <p>MM JS JS ASHIA STONE</p>	<p>BRQ DATE SCALE</p> <p><i>A. Hanks</i> 22/06/18 1:500 (A1)</p>	<p>CLIENT PROJECT LOCATION SHEET TITLE</p> <p>MIRVAC EVERLEIGH PRECINCT 1.1 SUBDIVISION DEVELOPMENT TEVIOT ROAD, GREENBANK EARTHWORKS LAYOUT PLAN - SHEET 2 OF 6</p>	<p>MIR001-01 C203 F</p>
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**LEGEND - PROPOSED**

- EXTENT OF CUT
- EXTENT OF FILL
- FINISHED MAJOR CONTOURS (0.50m)
- FINISHED MINOR CONTOURS (0.10m)
- FINISHED SURFACE PAD LEVEL
- PROPOSED CONCRETE SLEEPER RETAINING WALL (AND HEIGHT), TIMBER TEXTURED SLEEPERS AND 2 COAT PAINT, DESIGN SPECIFICATION BY MANUFACTURER
- PROPOSED CONCRETE PANEL RETAINING WALL (AND HEIGHT), 2 COAT TEXTURED PAINT, DESIGN SPECIFICATION BY MANUFACTURER
- FEATURE FENCE ON TOP OF RETAINING WALL BY LANDSCAPER
- FOOTPATH SPOT LEVEL
- ZERO LOT LINE
- STAGE BOUNDARY

**LEGEND - EXISTING**

- EXISTING RETAINING WALL
- EXISTING CONTOURS (0.50m)
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING WATER
- EXISTING ELECTRICITY
- EXISTING TELECOMMUNICATIONS
- EXISTING GAS

**RETAINING WALL DESIGN:**  
 ALL RETAINING WALLS SHALL BE DESIGNED & CONSTRUCTED IN ACCORDANCE WITH THE 'DESIGN AND CONSTRUCTION REQUIREMENTS FOR RETAINING WALLS' PREPARED BY PREMISE ENGINEERING.

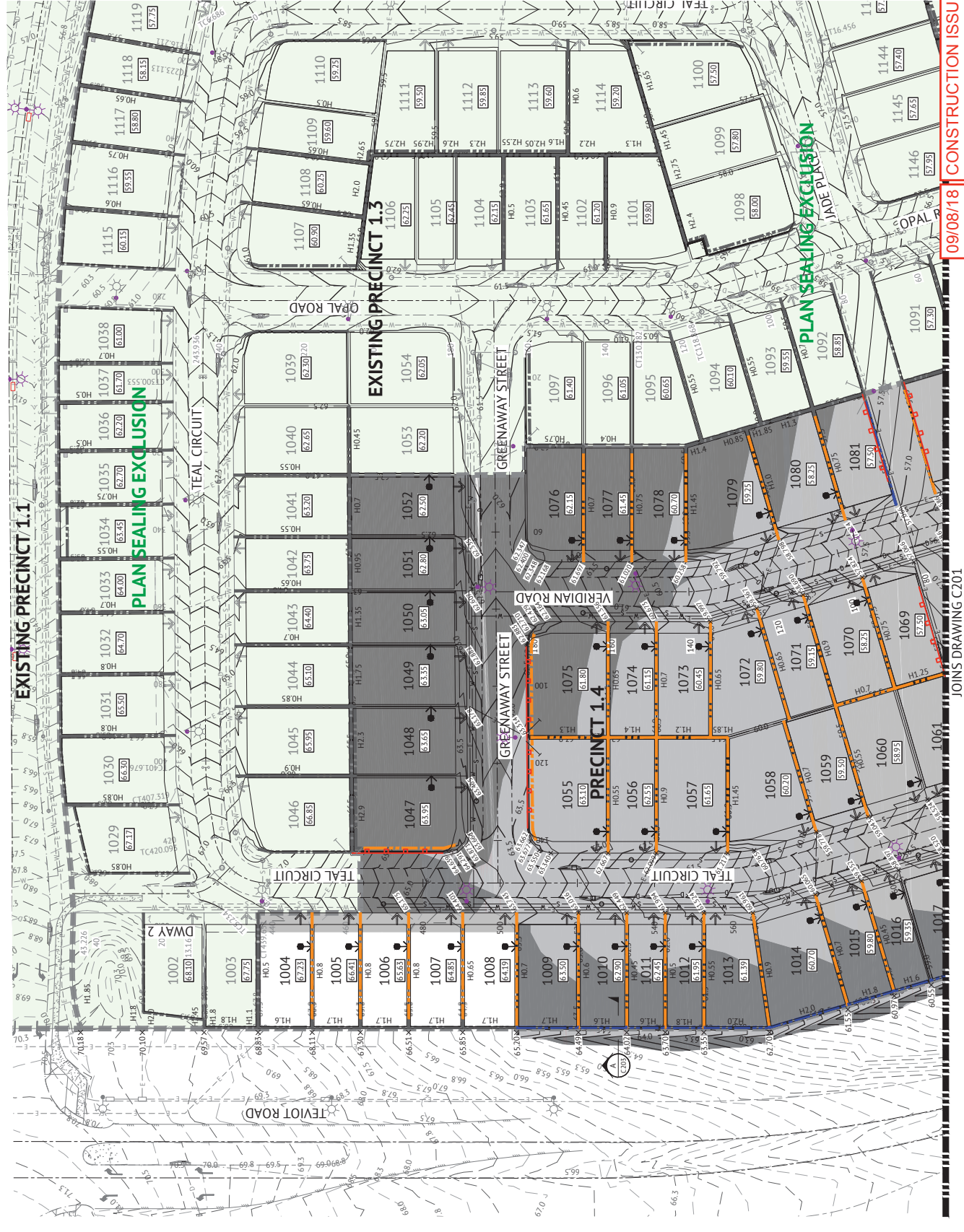
**NOTES**

- REFER BULK EARTHWORKS NOTES AND DETAILS DRAWINGS
- PROPOSED SERVICES WITHIN THE VICINITY OF EXISTING SERVICES SHALL BE IDENTIFIED IN THE EXISTING SERVICE DRAWINGS FOR SERVICE LOCATIONS & REMOVED OFF SITE BY OTHERS.
- FINAL RETAINING WALL TYPES TO BE CONFIRMED BY DEVELOPER PRIOR TO CONSTRUCTION.
- FOR TYPICAL SECTIONS AND NOTES REFER TO DRAWING No. C202 - EARTHWORKS NOTES AND DETAILS.

**PROPERTY SERVICES UNDER RETAINING WALLS:**  
 CONTRACTOR SHALL REFER TO ALL LATEST SERVICE DRAWINGS TO ENSURE PROVISIONS ARE MADE FOR ALL PROPERTY SERVICE CONNECTIONS UNDER RETAINING WALLS.

**PAD MOUNTED TRANSFORMER NOTE**

- RETAINING WALLS AND THEIR FOOTINGS SHALL NOT ENROACH INTO THE PMT SITE (AS PER RETAINING WALLS LOCATED ADJACENT ROAD RESERVE DETAILS).
- RETAINING WALL DESIGN SHALL CONSIDER ENERGY STORAGE AND RETAINING WALLS ARE LOCATED WITHIN 20.0M PMT SITE.



**09/08/18 CONSTRUCTION ISSUE**

<p>BRISBANE OFFICE        LEVEL 1, 100 BRUNSWICK STREET        PO BOX 361        FORTITUDE VALLEY, QLD 4006        PH: (07) 33 35 2272        WEB: www.premise.com.au</p>		<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>1</td> <td>09/08/18</td> <td>PRELIMINARY OFFSET REDUCED TO 1M &amp; MINOR EARTHWORKS CHANGE P.L. INTERFACE WITH LOTS</td> </tr> <tr> <td>2</td> <td>09/08/18</td> <td>FINAL</td> </tr> </table>	NO.	DATE	DESCRIPTION	1	09/08/18	PRELIMINARY OFFSET REDUCED TO 1M & MINOR EARTHWORKS CHANGE P.L. INTERFACE WITH LOTS	2	09/08/18	FINAL
NO.	DATE	DESCRIPTION									
1	09/08/18	PRELIMINARY OFFSET REDUCED TO 1M & MINOR EARTHWORKS CHANGE P.L. INTERFACE WITH LOTS									
2	09/08/18	FINAL									
<p>PREPARED BY: MICHAEL MALZNER        CHECKED BY: MICHAEL MALZNER        PROJECT MANAGER: JOSHUA STONE        PROJECT DIRECTOR: JOSHUA STONE</p>	<p>DATE: 08/08/18</p>	<p>SCALE: 1:500 (A3)</p>									
<p>BRQB: MICHAEL MALZNER        DATE: 08/08/18</p>	<p>CLIENT: MIRVAC</p>	<p>PROJECT: EVERLEIGH PRECINCT 1.4 SUBDIVISION DEVELOPMENT</p>									
<p>PROJECT MANAGER: JOSHUA STONE        PROJECT DIRECTOR: JOSHUA STONE</p>	<p>LOCATION: TEVIOT ROAD, GREENBANK</p>	<p>SHEET NUMBER: C200</p>									
<p>SCALE: 1:500 (A3)</p>	<p>DATE: 08/08/18</p>	<p>SHEET TITLE: EARTHWORKS LAYOUT PLAN - SHEET 1 OF 2</p>									
<p>SCALE: 1:500 (A3)</p>	<p>DATE: 08/08/18</p>	<p>PROJECT CODE: MIR001-04</p>									





JOINS DRAWING C200



- FOR TYPICAL SECTIONS AND NOTES REFER TO DRAWING NO. C207 - EARTHWORKS NOTES AND DETAILS.
- REFER TO DRAWING NO. C200 FOR LEGEND.

09/08/18 CONSTRUCTION ISSUE

DATE 09/08/18	REV A	DESCRIPTION ORIGINAL ISSUE	REVISIONS	
			NO	DATE
BRISBANE OFFICE LEVEL 1, 100 BRUNSWICK STREET PO BOX 361 FORTITUDE VALLEY, QLD 4006 PH: (07) 33 33 2322 WEB: www.premise.com.au			BRISBANE OFFICE MICHAEL MALZNER PROJECT MANAGER	BRISBANE OFFICE MICHAEL MALZNER PROJECT DIRECTOR
PROJECT EVERLEIGH PRECINCT 1.4 SUBDIVISION DEVELOPMENT TEVIOT ROAD, GREENBANK			CLIENT MIRVAC	
SHEET NUMBER C201			SHEET TITLE EARTHWORKS LAYOUT PLAN - SHEET 2 OF 2	
DRAWING NO. MIR001-04			PROJECT NO. MIRVAC	
DATE 08/08/18			SCALE 1:500 (A3)	
PROJECT DIRECTOR JOSHUA STONE			PROJECT MANAGER MICHAEL MALZNER	
PROJECT MANAGER MICHAEL MALZNER			PROJECT DIRECTOR JOSHUA STONE	
SCALE 1:500 (A3)			DATE 08/08/18	
SCALE 1:500 (A3)			DATE 08/08/18	
SCALE 1:500 (A3)			DATE 08/08/18	