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Acoustics 

1135 LEAKES ROAD, TARNEIT  
RAIL NOISE ASSESSMENT  
Rp 001 20210924 | 14 October 2021

**Project:** 1135 LEAKES ROAD, TARNEIT

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**Report No.:** Rp 001 20210924

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## 1.0 INTRODUCTION

HBL VIC Pty Ltd is developing land at 1135 Leakes Road, Tarneit, as a multi-lot residential subdivision. The subdivision includes approximately 755 lots, including a portion of the land adjacent to the Regional Rail Link (RRL).

A planning permit for the residential subdivision was issued in August 2019, with an amendment<sup>1</sup> issued in June 2021, following a change to the original endorsed plan.

The area within the development site adjacent to the rail corridor is located within the Design and Development Overlay – Schedule 10 (DDO 10) of the Wyndham Planning Scheme. The schedule requirements have been reflected in condition 5 of the amended planning permit, specifically:

5. *Prior to certification of any Plan of Subdivision containing a lot within the Design and Development Overlay (DDO10), a restriction/MCP or another document must be added to the Plan of Subdivision to the satisfaction of the Responsible Authority. The restriction must provide that:*
  - a. *Buildings for accommodation, a child care centre, a display home, a hospital, a hotel or a tavern to be constructed in such a way as to ensure internal bedroom noise levels will not exceed 65 dB LAmax and 40 dB LAeq,8h for the night period from 10pm to 6am. The restriction may include specific construction requirements to the satisfaction of the Responsible Authority;*
  - b. *Describes any design, attenuation or construction measures necessary to achieve the above internal bedroom noise standard; and*
  - c. *Describes the lots within Design and Development Overlay (Schedule 10) to which the restriction applies.*

This report has been prepared to address condition 5 of the amended planning permit, through:

- Confirming the design noise levels from the railway line operations;
- Detailing recommended noise attenuation and minimum construction measures required to dwellings on potential affected lots to achieve relevant internal noise levels; and
- Confirming the affected lots to which the noise attenuation and minimum construction measures apply.

A glossary of acoustic terms used throughout this report is included as Appendix A.

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<sup>1</sup> WYP11430/19.04 (Amended), issued 2 June 2021

## 2.0 SUBJECT SITE AND SURROUNDS

The development is located on land at 1135 Leakes Road, Tarneit shown in Figure 1. The site is bounded by the following:

- Farming land to the west
- Residential dwellings on large rural character properties to the north
- Partially-constructed new residential development to the east and south.

The amended (endorsed) masterplan is included as Appendix B and indicates future noise sensitive uses on the south side of the RRL corridor.

The subject site is currently zoned Urban Growth Zone 11 (UGZ11) and is surrounded by other Urban Growth zoning types. The planning map and DDO10 of the Wyndham Planning Scheme relevant to the site is included as Appendix C.

**Figure 1: Aerial photograph of subject site (Source: Nearmap)**



### 3.0 DESIGN RAILWAY NOISE LEVELS

#### 3.1 Internal

Condition 5 of the amended planning permit requires buildings for accommodation, a child care centre, a display home, a hospital, a hotel or a tavern are to be constructed in such a way as to ensure internal bedroom noise levels will not exceed 65 dB  $L_{Amax}$  and 40 dB  $L_{Aeq,8h}$  for the night period from 10 pm to 6 am.

Design, attenuation, or construction measures must therefore be considered for affected lots within the DDO10 overlay. Specifically, the noise attenuation measures shall be such to mitigate noise levels from the RRL to the following noise levels within bedrooms:

- 65 dB  $L_{Amax}$  from a single rail pass-by event; and
- 40 dB  $L_{Aeq,8h}$  from cumulative rail pass-by events, for the period between 10 pm and 6 am.

#### 3.2 External

Railway noise levels at the site have previously been measured by MDA in July 2018, a summary of which is provided in Appendix D.

From site observations, it was noted that trains did not sound their horn while passing the noise monitoring locations. As such, the measured maximum noise levels do not include any contribution of horn noise.

The amended (endorsed) masterplan layout for the site (refer Appendix B) identifies the facade of the nearest dwelling within the subdivision, at approximately the same location as the noise level measurement position. The design external noise level at the facade of the nearest lot to the RRL corridor is 58 dB  $L_{Aeq,8h(10pm-6am)}$ , and 89 dB  $L_{Amax}$ .

#### 4.0 DESIGN, ATTENUATION, CONSTRUCTION MEASURES

There are several options for the control of rail noise within bedrooms of future dwellings on lots within the DDO10 overlay, discussed below.

##### 4.1 Dwelling layout and/or building orientation

Locating bedrooms within dwellings as far as practical or shielded from the rail corridor can assist in reducing the requirement for providing increased sound insulation of the facade.

As glazing is typically the acoustically-weakest element of the facade, reducing glazed areas for bedroom facades that face the rail line can also assist in reducing the extent of upgraded glazing required.

Attention must also be given to providing appropriate roof and ceiling constructions, so the glazing performance is not undermined.

##### 4.2 Facade design

Should bedrooms of future dwellings directly face the rail line, their roof-ceiling and facades would need to be constructed and incorporate sufficient sound insulation such that the internal design levels can be achieved.

To achieve the required internal design noise levels, indicative sound insulation requirements, provided as a weighted sound reduction ( $R_w$ ) for building components have been determined.

The minimum sound insulation requirements and indicative constructions are detailed in Table 1.

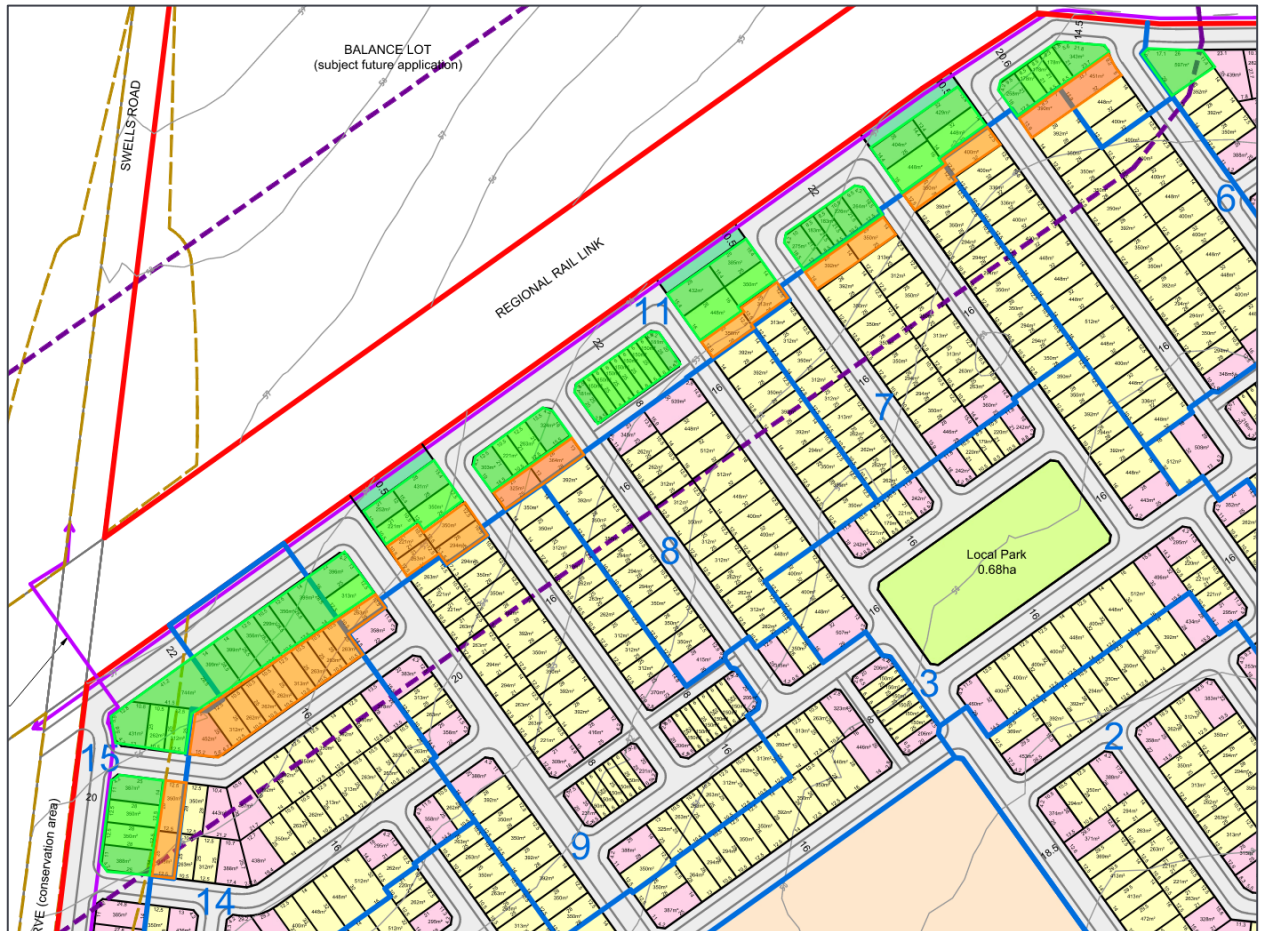
**Table 1: Minimum sound insulation requirements and indicative constructions to bedrooms**

External walls	Roof-ceiling	Glazing
$R_w > 45$	$R_w > 45$	$R_w > 31$
<p><i>Lightweight, e.g.:</i></p> <ul style="list-style-type: none"> <li>- 75 mm thick Autoclaved Aerated Concrete (AAC) (minimum 45 kg/m<sup>2</sup>) screw fixed to battens</li> <li>- Steel (0.55 mm base metal thickness) framing, with R2.0 insulation in cavity (90 mm thick, density 10 kg/m<sup>3</sup>)</li> <li>- 10 mm thick standard plasterboard internal wall lining (6 kg/m<sup>2</sup>)</li> </ul> <p><i>Masonry, e.g.:</i></p> <ul style="list-style-type: none"> <li>- 110 mm thick face brickwork</li> <li>- Steel or timber stud framing, with R2.0 insulation in cavity (90 mm thick, density 10 kg/m<sup>3</sup>)</li> <li>- 10 mm thick standard plasterboard internal wall lining (6 kg/m<sup>2</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>- Pitched roof, metal deck (0.48 mm base metal thickness); or concrete roof tiles with sarking</li> <li>- R4.0 insulation in roof cavity (195 mm thick, density 9 kg/m<sup>3</sup>)</li> <li>- Plasterboard internal ceiling lining(s) (minimum 13 kg/m<sup>2</sup>), e.g. 1 layer 13 mm thick sound rated or 2 layers 10 mm thick standard plasterboard</li> <li>Eaves to be sealed and treated to prevent minimise noise break in to the roof space</li> </ul>	<p>Windows:</p> <ul style="list-style-type: none"> <li>6 mm laminate; or DGU</li> <li>6 mm/8 mm cavity/4 mm</li> </ul> <p>Glazed sliding doors:</p> <ul style="list-style-type: none"> <li>10 mm laminate; or DGU</li> <li>6 mm/8 mm cavity/4 mm</li> </ul> <p>Note: based on total glazed area of up to 4 m<sup>2</sup> per bedroom</p>

The design and construction requirements will ultimately be dependent on the dwelling layout, orientation and specific dwelling type. It is recommended that homebuilders make their own inquiries should they consider alternative construction materials to those in Table 1.

These minimum sound insulation requirements apply to any bedrooms on lots adjacent the rail corridor, highlighted in green in Figure 2. Any double-storey dwellings on lots in the row behind potential single-storey dwellings (highlighted in orange) with bedrooms facing the rail corridor may also require acoustic treatment of their facades.

Figure 2: Lots within DDO10 overlay to which acoustic treatment to bedrooms is to apply

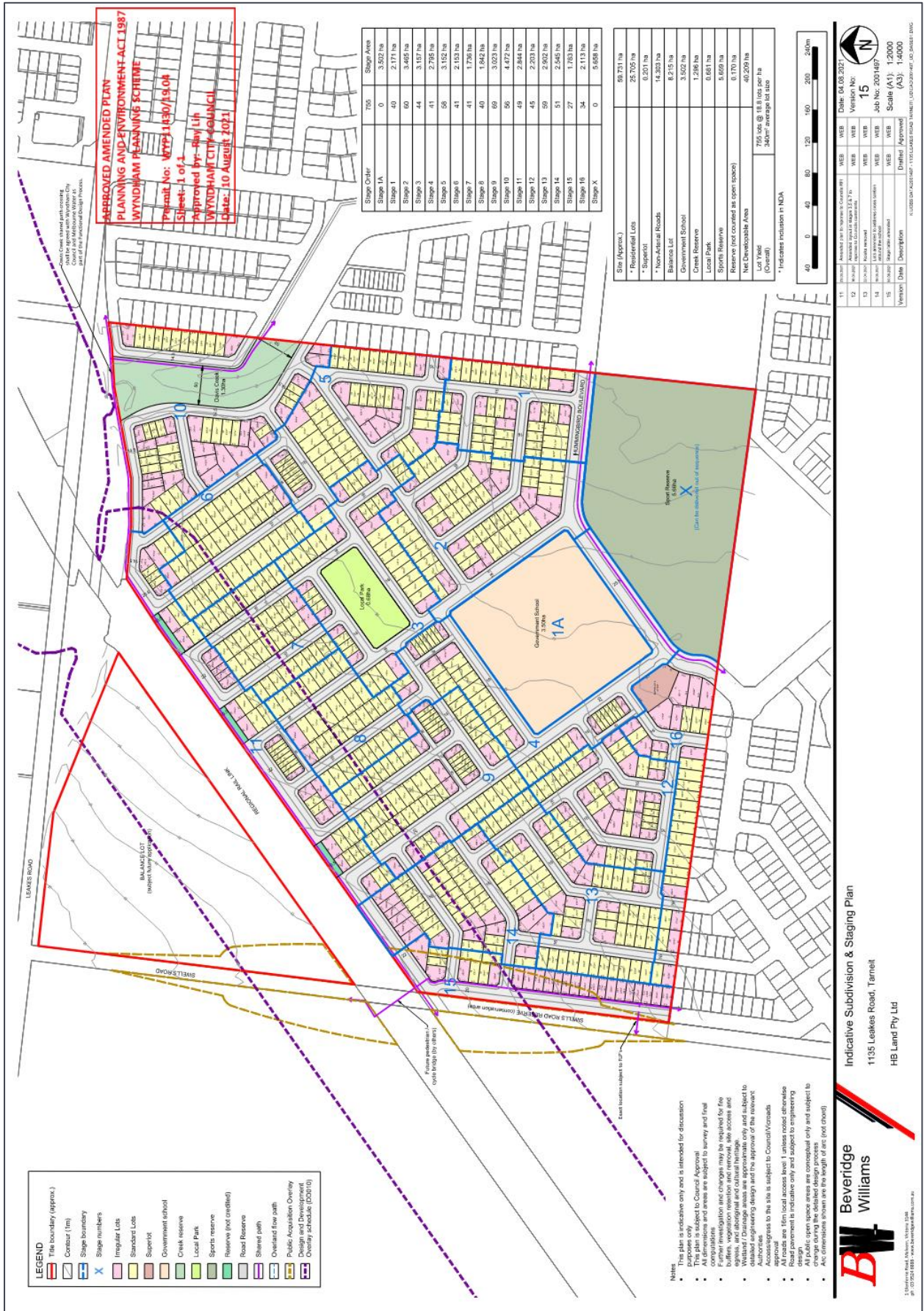




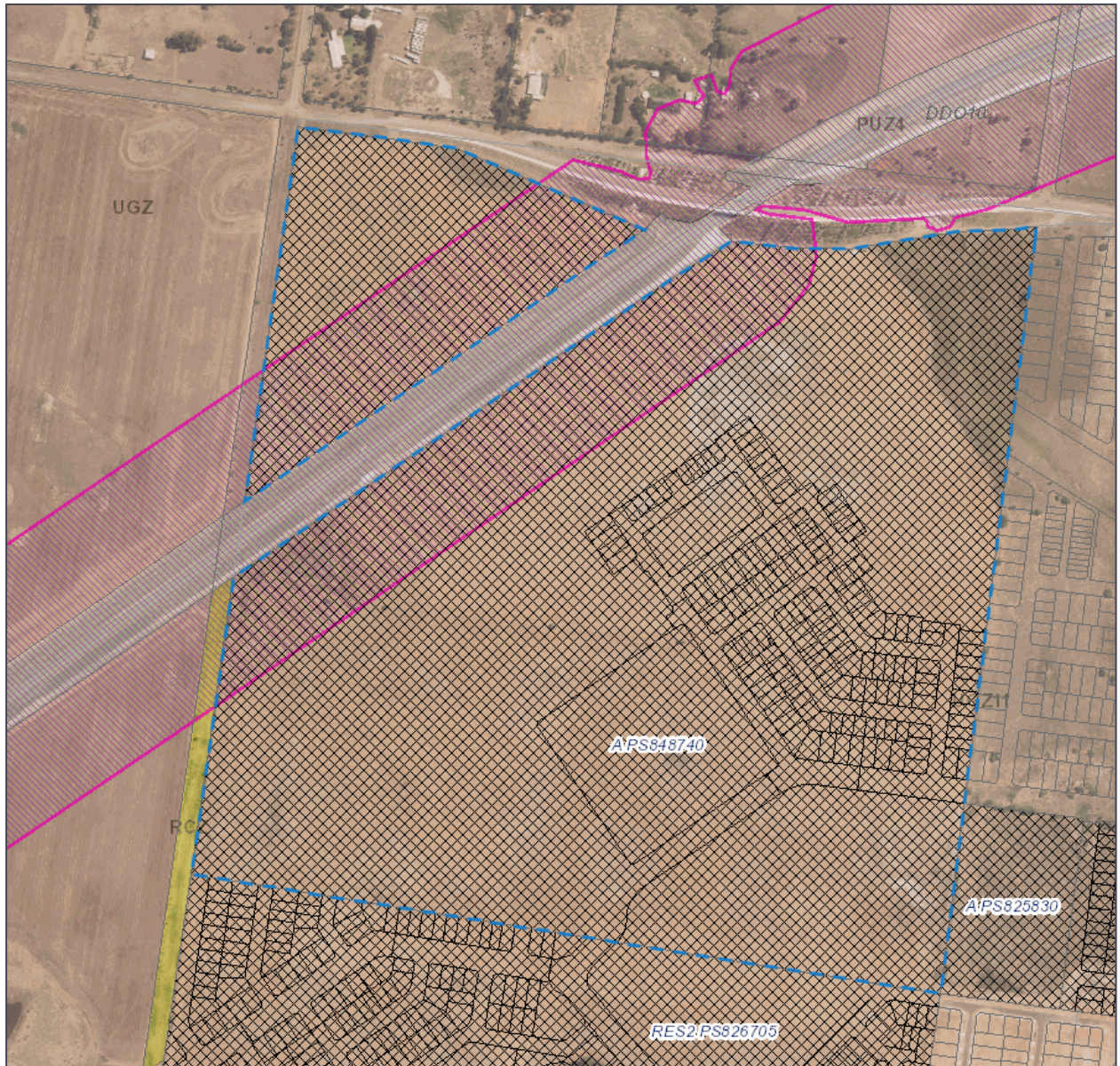
## APPENDIX A GLOSSARY OF ACOUSTIC TERMINOLOGY

<b>Ambient</b>	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
<b>A-weighting</b>	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
<b>dB</b>	<u>Decibel</u> . The unit of sound level.
<b><math>L_{Aeq}(t)</math></b>	The A-weighted equivalent continuous sound level. This is commonly referred to as the average noise level and is measured in dB.  The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours; for rail noise, this period between 10 pm and 6 am.
<b><math>L_{Amax}</math></b>	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
<b><math>R_w</math></b>	Weighted Sound Reduction Index. A single number rating of the sound insulation performance of a specific building element.  $R_w$ is measured in a laboratory, and is commonly used by manufacturers to describe the sound insulation performance of building elements such as plasterboard and concrete.

## APPENDIX B AMENDED PLAN FOR SUBDIVISION AT 1135 LEAKES ROAD



APPENDIX C PLANNING MAP AND DDO 10 AS RELEVANT TO SUBJECT SITE



## APPENDIX D RAILWAY NOISE MEASUREMENTS

Noise levels from the RRL were measured in July 2018, at two (2) locations on the development site, shown in Figure 3, approximately 30 m from the railway corridor.

**Figure 3: Railway noise measurement locations**



Measurements were obtained using two 01dB Cube Precision Integrating Sound Level Meters (Serial numbers: 11283 (Logger 1) and 11276 (Logger 2)). The noise measurements were obtained using the 'Fast' response time and A-weighting frequency network.

The microphones were fitted with a windshield and mounted on a tripod at a height of 1.5 m above local ground level under free field conditions. The equipment was checked before and after the survey and no significant calibration drift observed.

Photographs of the installed monitors are shown in Figure 4.

Figure 4: Noise monitor location



Weather data during the survey was obtained from the Bureau of Meteorology's weather station at Laverton. Weather conditions throughout the monitoring survey were mostly fine with some periods of moderate wind and rainfall on the Tuesday 17 July. Periods of inclement weather have been excluded from the assessment.

Maximum noise levels from train pass-bys at the site varied between 73 dB  $L_{Amax}$  and 93 dB  $L_{Amax}$ . In accordance with current practice in Victoria, the 95<sup>th</sup> percentile value (i.e. maximum noise level not exceeded by 95 per cent of individual train pass-by events) was determined and adopted for this assessment.

The maximum and average measured railway noise levels are summarised in Table 2.

Table 2: Measured railway noise levels

Date	Logger 1		Logger 2	
	dB $L_{Amax}$	dB $L_{Aeq,8h}$ (10pm-6am)	dB $L_{Amax}$	dB $L_{Aeq,8h}$ (10pm-6am)
Fri 13/7/18	88	53	89	53
Sat 14/7/18		54		54
Sun 15/7/18		57		58
Mon 16/7/18		55		55
Tue 17/7/18		55		55
Wed 18/7/18		55		56
Thurs 19/7/18		56		55
Fri 20/7/18		56		56
Sat 21/7/18		-		54