

Traffic Noise Impact Assessment

Ridgeview Residential Development
Stages 8 to 12

Lot 101 on SP297314, Raynbird Road, Narangba

Satterley


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Prepared by:	Aidan Daniels
Position:	Engineer – Acoustics
Signed:	
Date:	3 August 2021

Approved by:	Sasho Temelkoski RPEQ 13551
Position:	Managing Director
Signed:	
Date:	3 August 2021

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atf ATP Engineering Trust
ABN: 95 634 079 845

Gold Coast

34 Lakefront Crescent
Varsity Lakes QLD 4227
Ph: (07) 5593 0487

Brisbane

Unit 34, 30 Anstey Street
Albion QLD 4010
Ph: (07) 3256 1747

Perth

Suite 59, 102 Railway Street
West Perth WA 6005
Ph: (08) 9265 1424

E-mail: admin@atpconsulting.com.au
Internet: www.atpconsulting.com.au

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Executive Summary

ATP Consulting Engineers (ATP) was engaged by Satterley to prepare a traffic noise impact assessment (NIA) for the Ridgeview residential development at Lot 101 on SP297314 Raynbird Road in Narangba.

A portion of the development is located within a haulage buffer as Raynbird Road is one of two haulage roads for the Boral quarry located approximately 3km west of the development. The Key Resource Area transport route (*haulage road*) is marked with a 100m wide buffer zone (either side) to trigger consideration of current and future traffic noise along the haulage road.

This report has been prepared in support of RAL Application for Stages 8 to 12 of the Ridgeview development.

This is Issue 2 of the report considering the latest development layout dated 24 May 2022, and latest earthworks dated 11 July 2022.

Traffic noise impact assessment for the proposed development has been carried out in accordance with the Moreton Bay Regional Council *Planning Scheme Policy – Noise*.

Within a 10-year planning horizon, at the time of full establishment of the residential development, there is a potential for traffic noise impact on the future dwellings on the allotments nearest to Raynbird Road.

In accordance with the adopted streetscape strategy for the development, it is proposed to construct noise barriers along Raynbird Road to protect the development from traffic noise impacts.

The recommended noise barriers are to be constructed along the southern boundary of Lots 1266 to 1278, and be of varying height, with the top of the noise barrier 2.0m to 3.8m above the finished surface level along the edge of the allotment. The alignment and heights of the noise barrier fences are presented in Table 6.1 and Figure 6.1 of this report.

The primary objective of the recommended noise barriers is to provide an acceptable level of noise amenity at the private open spaces (backyards) and to protect the ground floors of the future dwellings.

The results of the traffic noise modelling indicate that, with the proposed noise barriers, the noise levels at the private open spaces are in compliance with the criteria of 57dB(A) L_{10,18hr} (free-field) at all allotments within a 10-year planning horizon.

However, the ground and upper floors of some allotments nearest to Raynbird Road will be exposed to residual traffic noise, although the traffic noise impact is relatively minor:

- At the ground floors, 13 allotments nearest to Raynbird Road will be subject to external façade traffic noise levels corresponding to QDC Noise Category 1.
- At the upper floors, 3 allotments will be subject to Noise Category 1; and 10 allotments will be subject to Noise Category 2.

The dwellings must be built to comply with QDC MP4.4 Noise Categories listed in Table 6.2 of this report or, alternatively, be acoustically designed in accordance with AS3671-1989.

Provided the recommended planning and design noise control measures are implemented in the construction of the residential development, the road traffic noise from Raynbird Road will not impose any further constraints on the establishment of the development.

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Acoustics Glossary

A-weighting	Correction to sound levels to mimic the response of the human ear at low sound frequencies.
AADT	Annual average daily traffic. The total traffic flow over a 24 hour period along a specific segment of road.
Decibel (dB)	(1) Degree of loudness (2) A unit for expressing the relative intensity of sounds on a scale from zero for the average least perceptible sound to about 130 for the average pain level. A unit used to express relative difference in power or intensity, between two acoustic signals, equal to ten times the common logarithm of the ratio of the two levels, one of which is a standard reference value.
dB(A)	The A-weighted sound pressure level.
Façade adjusted	The noise level at 1m from a building façade is calculated by adding 2.5dB to the free-field noise level to account for sound reflected from the building façade. The external noise levels at the buildings facades are “façade-adjusted”.
Free-field	Noise level without any reflected sound from buildings or other hard, reflective surfaces (except for the ground plane).
L_{Aeq,T}	“Average-energy” sound level used in situations where sound varies over time. L _{Aeq,T} is the A-weighted sound pressure level that has the same energy as the fluctuating sound over the time period T sec.
L_{A10,T}	L _{A10,T} is a statistical parameter that is the A-weighted sound pressure level that is exceeded for 10% of the measurement time T. Used as a traffic noise descriptor in Queensland.
L_{A10,18hr}	The arithmetic average of the 18 individual L _{A10,1hr} values between 6:00am and 12:00am (midnight). It is a derived descriptor which is used as a main traffic noise descriptor in the Calculation of Road Traffic Noise (CoRTN) procedure developed by the UK Department of Environment, Welsh Office, HMSO, 1988
L_{A90,T}	Background sound level. L _{A90,T} is a statistical parameter that is the A-weighted sound pressure level that is exceeded for 90% of the measurement time T.
Noise	Unwanted sound.
Sound pressure	The fluctuations in air, measured in Pascals (Pa).
Sound Pressure Level, L_p (SPL)	Logarithmic measure of sound pressure on a decibel scale, referenced to the human hearing threshold of 2×10^{-5} Pa.
Weighted Sound Reduction Index (R_w)	A single-number quantity which characterises the airborne sound insulation of a material or building element over a range of frequencies.

1. Introduction

1.1 Project Background

ATP Consulting Engineers (ATP) was engaged by Satterley to prepare a traffic noise impact assessment (NIA) for the Ridgeview residential development at Lot 101 on SP297314 Raynbird Road in Narangba.

A portion of the development is located within a haulage buffer as Raynbird Road is one of two haulage roads for the Boral quarry located approximately 3km west of the development. The Key Resource Area transport route (*haulage road*) is marked with a 100m wide buffer zone (either side) to trigger consideration of current and future traffic noise along the haulage road.

This report has been prepared in support of RAL Application for Stages 8 to 12 of the Ridgeview development.

This is Issue 2 of the report considering the latest development layout dated 24 May 2022, and latest earthworks dated 11 July 2022.

1.2 Study Objectives

Study objectives are as follows:

- Site-specific noise measurements using automated noise loggers to obtain data on the existing traffic noise levels over a typical seven day period.
- Consideration of the relevant performance outcomes and traffic noise criteria applicable to the proposed development.
- Development of a 3D noise propagation model considering the development layout and future road traffic along Raynbird Road.
- Assessment of traffic noise levels ($L_{10,18hr}$) from Raynbird Road, within a 10-year planning horizon, at the facades and private open spaces of the proposed dwellings.
- Recommendation of traffic noise mitigation measures.

1.3 Subject site

The Ridgeview development is located along Raynbird Road in Narangba on the land described as Lot 101 on SP297314, within the Moreton Bay Regional Council local government area.

The location of the development and the Key Resource Transport Corridor buffer zone is presented in Figure 1.1.

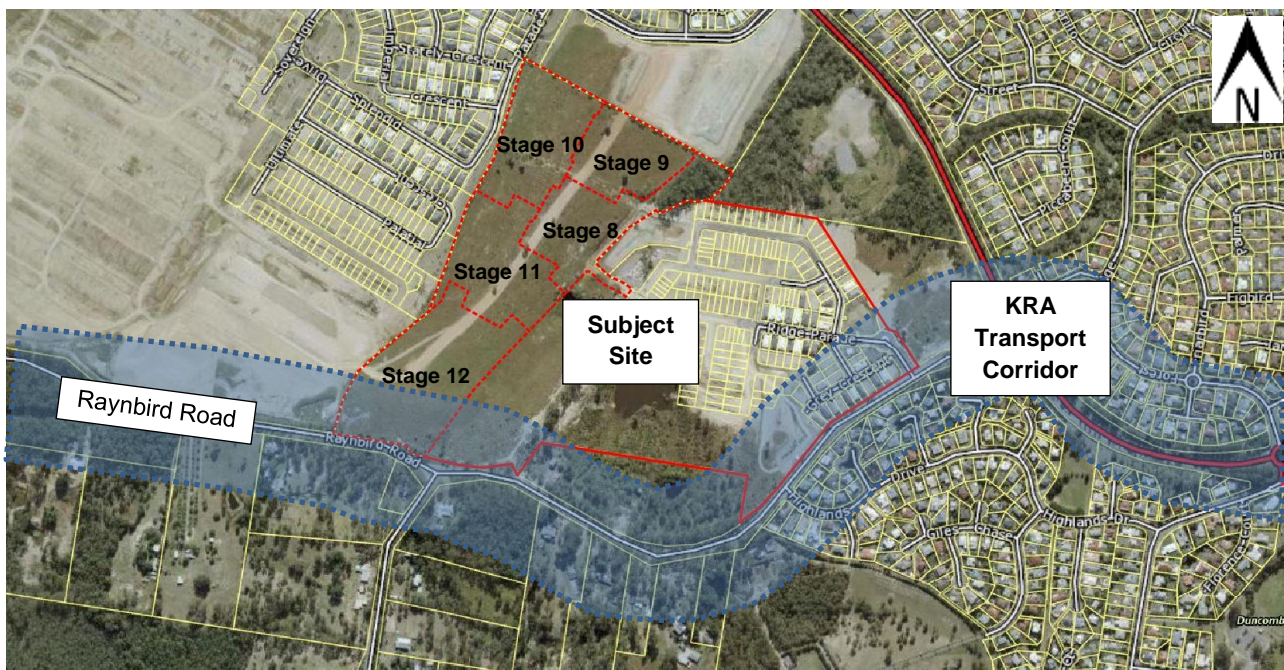


Figure 1.1 Site Location and KRA Transport Corridor

The development is located within a residential zone with the proposed dwellings consisting of one or two storeys. Each dwelling will have a patio or backyard area which will qualify as a private open space. Passive recreation area for the development is also provided with parklands at various locations.

The proposed subdivision layout and earthworks design for Stages 8 to 12 of the Ridgeview development is presented in Appendix A.

2. Existing Noise Amenity

2.1 Noise Measurement Location

Noise monitoring was carried out at the subject site to obtain information about the existing traffic noise levels for model validation. The noise monitoring locations are presented in Table 2.1.

Table 2.1 Noise Measurement Locations

Name	Location	Distance from edge of road	Measurement Period	Instrument
Location 1	75m west of Browns Creek Road	13m from Raynbird Road	28 September to 6 October 2017	ARL Ngara environmental noise logger
Location 2	120m east of Highlands Drive	7m from Raynbird Road	26 May to 1 June 2018	ARL Ngara environmental noise logger

The noise measurement locations are presented in Figure 2.1 and site photos are presented in Appendix B.

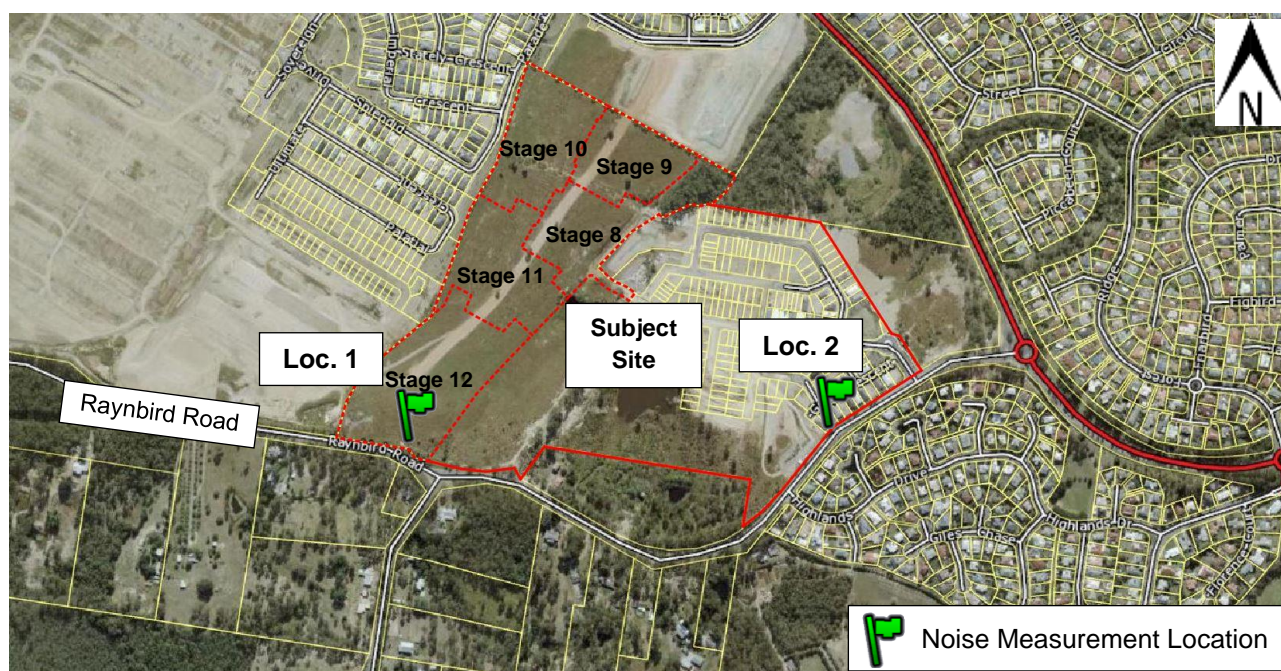


Figure 2.1 Noise Measurement Location

The speed limit along Raynbird Road is 70km/h past the monitoring location, reducing to 60km/h to the east¹. The different vehicle speeds have been factored into the noise propagation modelling as per the CoRTN procedure (refer to Section 4.1 of this report).

The eastern boundary of the development is separated from Oakey Flat Road by distance of at least 175m. Due to the large separation distance, the proposed development will not be impacted by traffic

¹ Speed limit on Raynbird Road is 70km/h at the western section (375m west of Highlands Drive) and 60km/h at the eastern section of the development.

noise from Oakey Flat Road. This is supported by observations made on site by ATP, which show that the dominant noise source is intermittent pass-by of vehicles on Raynbird Road.

2.2 Instrument Used

The noise measurements were carried out using the following instruments:

- Environmental Noise Logger – ARL Ngara (S/N 87811d and 87811c); and
- Sound Level Calibrator – NC 74.

The noise measurement instruments conform to AS/NZS IEC61672.1-2019 and the measurements were undertaken in accordance with AS1055-1997 and AS2702-1984. A calibration drift of <0.1 dB(A) was observed between the pre and post measurement calibrations of the instrument.

2.3 Meteorological Conditions

Light rainfall was experienced during part of the noise monitoring periods, on 2 to 3 October 2017 and 26 to 29 May 2018. The noise data recorded during periods with rain was excluded.

The meteorological data² for the noise measurement period are presented in Appendix C.

2.4 Noise Measurement Results

The results of the noise measurements at Location 1 are presented in Table 2.2 and in Appendix D.

Table 2.2 Noise Measurement Results – Location 1

Date	Day	Traffic noise levels		Background noise levels	
		L _{10,18hr} (6am-12am)	L _{10,1hr max} (6am-12am)	L _{90,18hr} (6am-12am)	L _{90,8hr} (10pm-6am)
28 September 2017	Thursday	61	68	40	33
29 September 2017	Friday	60	65	39	31
30 September 2017	Saturday	59	64	37	30
1 October 2017	Sunday	57	63	38	32
2 October 2017	Monday	57	64	43	39
3 October 2017	Tuesday	60	67	40	36
4 October 2017	Wednesday	60	65	40	34
5 October 2017	Thursday	60	65	40	35
Arithmetic Mean		59	65	40	34
Arithmetic Mean – weekdays, fine weather		60	66	40	33

² Daily weather observation data sourced from www.bom.gov.au for Redcliffe weather station (Id 040958).

The results of the noise measurements at Location 2 are presented in Table 2.3 and in Appendix D.

Table 2.3 Noise Measurement Results – Location 2

Date	Day	Traffic noise levels		Background noise levels	
		L _{10,18hr} (6am-12am)	L _{10,1hr max} (6am-12am)	L _{90,18hr} (6am-12am)	L _{90,8hr} (10pm-6am)
26 May 2018	Saturday	64	70	41	32
27 May 2018	Sunday	62	71	39	33
28 May 2018	Monday	65	73	40	37
29 May 2018	Tuesday	65	72	40	30
30 May 2018	Wednesday	66	72	43	31
31 May 2018	Thursday	65	71	42	31
Arithmetic Mean		64	71	41	32
Arithmetic Mean – weekdays, fine weather		65	71	43	31

3. Traffic Noise Criteria

3.1 External Traffic Noise Levels

The proposed development is located along Raynbird Road which is a designated haulage road under Key Resource Area - KRA 46 administration by Moreton Bay Regional Council.

Traffic noise impacts on the noise sensitive development need to be assessed in accordance with the Planning Scheme Policy (Noise), effective 29 January 2020. The Noise Policy outlines the noise criteria applicable to the development.

The external traffic noise levels at the proposed development will be assessed using the following documents:

- Queensland Development Code (QDC) Mandatory Part 4.4 (*Buildings in a transport noise corridor*). The proposed dwellings must be built to comply with QDC MP4.4, which specifies the acoustic requirements for building construction based on the traffic noise levels predicted at the external facades. This assessment will identify the QDC MP4.4 noise category applicable to each dwelling at the proposed development.
- In addition the assessment is to address the requirement for each dwelling to have a private open space that meets the criteria specified in the Department of Transport and Main Roads (TMR) *Development Affected by Environmental Emissions from Transport Policy, Version 4* (October 2017).

The applicable criteria from the QDC MP 4.4 and the TMR Policy are presented in Table 3.1.

Table 3.1 External Noise Criteria for New Residential Development

Transport infrastructure	Development type	Location within Development	Environmental Criteria		
			Criteria	Category	QDC MP4.4 Category
Haul Road	Residential	Building facades	L _{10,18hr} at 1m from the façade of the proposed building dB(A)	≥73	QDC MP4.4 Category 4
			68 - 72	QDC MP4.4 Category 3	
			63 - 67	QDC MP4.4 Category 2	
			58 - 62	QDC MP4.4 Category 1	
		Private open spaces of accommodation activities ³	≤57dB(A) L _{10,18hr} free field (measured L _{90,18hr} free field between 6am and midnight ≤ 45dB(A))		
	≤60dB(A) L _{10,18hr} free field (measured L _{90,18hr} free field between 6am and midnight > 45dB(A))				

³ TMR Policy – Table 3: State Controlled Road or Multi-modal Corridor which does not include a railway
 “Accommodation activity” includes caretaker’s accommodation, community residence, dual occupancy, dwelling house, dwelling unit, multiple dwelling, relocatable home park, residential care facility, resort complex, retirement facility, rooming accommodation, short-term accommodation and tourist park

The noise criteria for accommodation activities depends on the background noise levels at the development. The noise criteria applicable to quiet areas (e.g. rural) is more stringent compared to areas with higher background noise levels (e.g. urban areas).

The existing background noise levels between 6am and midnight are lower than 45dB(A) $L_{90,18hr}$. Therefore, the external noise criterion for private open spaces is:

- Private open spaces (free-field): $\leq 57\text{dB(A)} L_{10,18hr}$.

3.2 Queensland Development Code (QDC) MP4.4

Buildings located in a transport noise corridor must be built to comply with QDC MP4.4. Under QDC MP4.4, the external façade traffic noise levels are grouped into five noise categories. Buildings located within Noise Category 1 or greater require acoustic treatment to the building envelope as per the deemed-to-comply specifications set out in QDC MP4.4. The traffic noise categories are presented in Table 3.2.

Table 3.2 QDC Noise Categories

Noise Category	Level of transport noise* $L_{A10,18hr}$ for State-controlled and designated local government roads
Category 4	≥ 73 dB(A)
Category 3	68 – 72 dB(A)
Category 2	63 – 67 dB(A)
Category 1	58 – 62 dB(A)
Category 0	≤ 57 dB(A)

*Measured at 1m from building facade

The noise categories applicable to the proposed development will be determined in this report.

As an alternative to the deemed-to-comply construction specifications from QDC MP4.4, the buildings can be constructed as per the advice of a qualified acoustical engineer. The engineer can carry out floor plan specific acoustic design in accordance with AS 3671-1989 and provide acoustic design specifications for the external walls, windows and roof/ceiling to ensure compliance with the internal noise criteria from AS/NZS 2107:2016.

3.3 Internal Noise Criteria

In case of exceeding the external noise criteria, the internal criteria as specified in AS/NZS 2107:2016 must be achieved. The recommended design sound levels ($L_{Aeq,T}$ dB(A)) for noise sensitive places near major roads are presented in Table 3.3.

Table 3.3 Residential Internal Design Sound Levels

Type of building	Type of occupancy	Design sound level ($L_{Aeq,T}$) range
Residential building	Living Areas	35 to 45 dB(A)
	Sleeping Areas	35 to 40 dB(A)
	Working Areas	35 to 45 dB(A)

4. Traffic Noise Calculation Methodology

Traffic noise levels at the proposed development, within a planning horizon of 10 years (year 2031⁴), were calculated using SoundPLAN noise propagation modelling software.

SoundPLAN calculates traffic noise as per the procedure specified in the UK Department of Transport Welsh Office *Method of Calculation of Road Traffic Noise* (CoRTN). CoRTN is an accepted traffic noise calculation procedure applied widely in Australia.

4.1 Modelling Assumptions

The assumptions and data used in the traffic noise propagation model are presented in Table 4.1.

Table 4.1 Data and Assumptions – Traffic Noise Model

Terrain	<ul style="list-style-type: none"> Elevation data for the property was sourced from the concept bulk earthworks plans prepared by Peak Urban (Project No. 20-0192, Rev 3), dated 11 July 2022, which are presented in Appendix A. Elevation data for the surrounding were obtained from Department of Natural Resources and Mines Airborne Laser Scanning (LiDAR) 1 metre elevation data. Ground surface absorption factor of 0 was applied to all paved surfaces and 1 for all grassed areas.
Buildings	<ul style="list-style-type: none"> Single storey buildings (height 3.5m) were modelled within the development. Noise levels have been calculated at the ground floor, as well as potential upper floors (should two storey buildings be established).
Road Traffic	<ul style="list-style-type: none"> Current traffic volumes were sourced from the Moreton Bay Regional Council data (2015). Refer to Appendix E. Future traffic volumes (AADT 24 hr volumes) for the year 2028 have been provided by the project's traffic consultant. The traffic volumes consider background growth in addition to traffic generated by the proposed development and the Sovereign Drive development upon completion. Traffic volumes for the 10 year planning horizon (year 2031) were calculated from the 2028 traffic volumes, assuming 5% growth per annum. Raynbird Road has one lane in each direction. Speed limit on Raynbird Road is 70km/h at the western section (375m west of Highlands Drive) and 60km/h at the eastern section of the development. Pavement surface type on Raynbird Road is dense graded asphalt. The CoRTN procedure requires traffic volume data input for 18 hours. Traffic volume for 18-hour period (6:00am to midnight) was considered as 94% of the 24 hour AADT. CoRTN Calibration Factors for Queensland Conditions were considered in this assessment, as per the procedure from the TMR CoP Vol. 1⁵: <ul style="list-style-type: none"> Adjustment of -1.7dB was applied to the calculated façade traffic noise levels; and Adjustment of -0.7dB was applied to the calculated free-field traffic noise levels. Noise emission line for passenger vehicles (Austroads Class 1 and 2) is 0.5m above road surface. Noise emission line for heavy vehicles (Austroads Class 3 and up) engine noise is 1.5m above road surface. CoRTN correction factor of -0.8dB is applicable to the heavy vehicle engine noise source. Noise emission line for heavy vehicles (Austroads Class 3 and up) exhaust noise is 3.6m above road surface. CoRTN correction factor of -8.0dB is applicable to the heavy vehicle exhaust noise source.

⁴ 10 years after the development is established.

⁵ Source: Australian Road Research Board, 1982, *An Evaluation of the UK DoE Traffic Noise Prediction* (Report No. 122, ARRB - NAASRA Planning Group). Referenced in the TMR CoP Vol. 1.

Receivers	<ul style="list-style-type: none"> • Building Facades: Receivers were attached to the most exposed facades of each building at the proposed development. Receivers are placed at a height of 1.5m above each floor level (ground floor as well as potential upper floors). • SoundPLAN adds +2.5dB(A) to the calculated noise levels when the receivers are attached to the buildings, thus the tabulated traffic noise levels are façade adjusted. • Private Open Spaces: Receiver was placed at 1.5m above ground level within the backyard areas on the ground floor. • 2.0m grid spacing was used for calculation of noise contour maps.
Noise Mitigation Measures	<ul style="list-style-type: none"> • The recommended noise mitigation measures are presented in Section 6 of this report. • The allotments along Raynbird Road in Stage 12 (Lots 1266 to 1278) will be protected from traffic noise by noise barriers.

4.2 Road Noise Model Validation

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

Traffic flow data, as considered in the SoundPLAN validation model, is presented in Table 4.2.

Table 4.2 Traffic Flow Data for Validation

Road	2015 Traffic Flow AADT ⁶	2017 Traffic Flow AADT ⁷	2018 Traffic Flow AADT	Heavy Vehicles (%)
Raynbird Road	1,530	1,687	1,771	17.2%

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

Table 4.3 SoundPLAN Validation Results

Measurement Location	Measured* L _{10,18hr} dB(A)	Calculated* L _{10,18hr} dB(A)	Difference dB	Validation Factor
Location 1	60	60	0	N/A
Location 2	65	65	0	N/A

*Free field

The calculated road traffic noise level is within the acceptable tolerance of ± 2 dB(A), thus there is no need for the addition of a validation factor to the road traffic noise levels within the planning horizon (year 2031).

⁶ Traffic count site: ATC1 – Raynbird Road 150m West of Highlands Drive. Data provided by Moreton Bay Regional Council.

⁷ 2017 and 2018 traffic flows have been calculated from the 2015 traffic flows, with allowance for 5.0% growth per year.

4.3 Traffic Noise Calculation Model (Year 2031)

The road traffic noise calculations were carried out for a planning horizon of 2031. The projected traffic flow on Raynbird Road is presented in Table 4.4.

Table 4.4 Traffic Flow Data for 10 Year Planning Horizon

Road	Section	2031 Traffic Flow AADT	Heavy Vehicles (%)
Raynbird Road	West of western site access road	5360	17.2%
	Western site access road to Highland Drive	5013	17.2%
	Highlands Drive to eastern site access road	5591	17.2%
	Eastern site access road to Oakey Flat Road	9840	17.2%

Overview of the SoundPLAN model is presented in Figure 4.1 and Figure 4.2.



Figure 4.1 SoundPLAN Traffic Noise Model – Overview

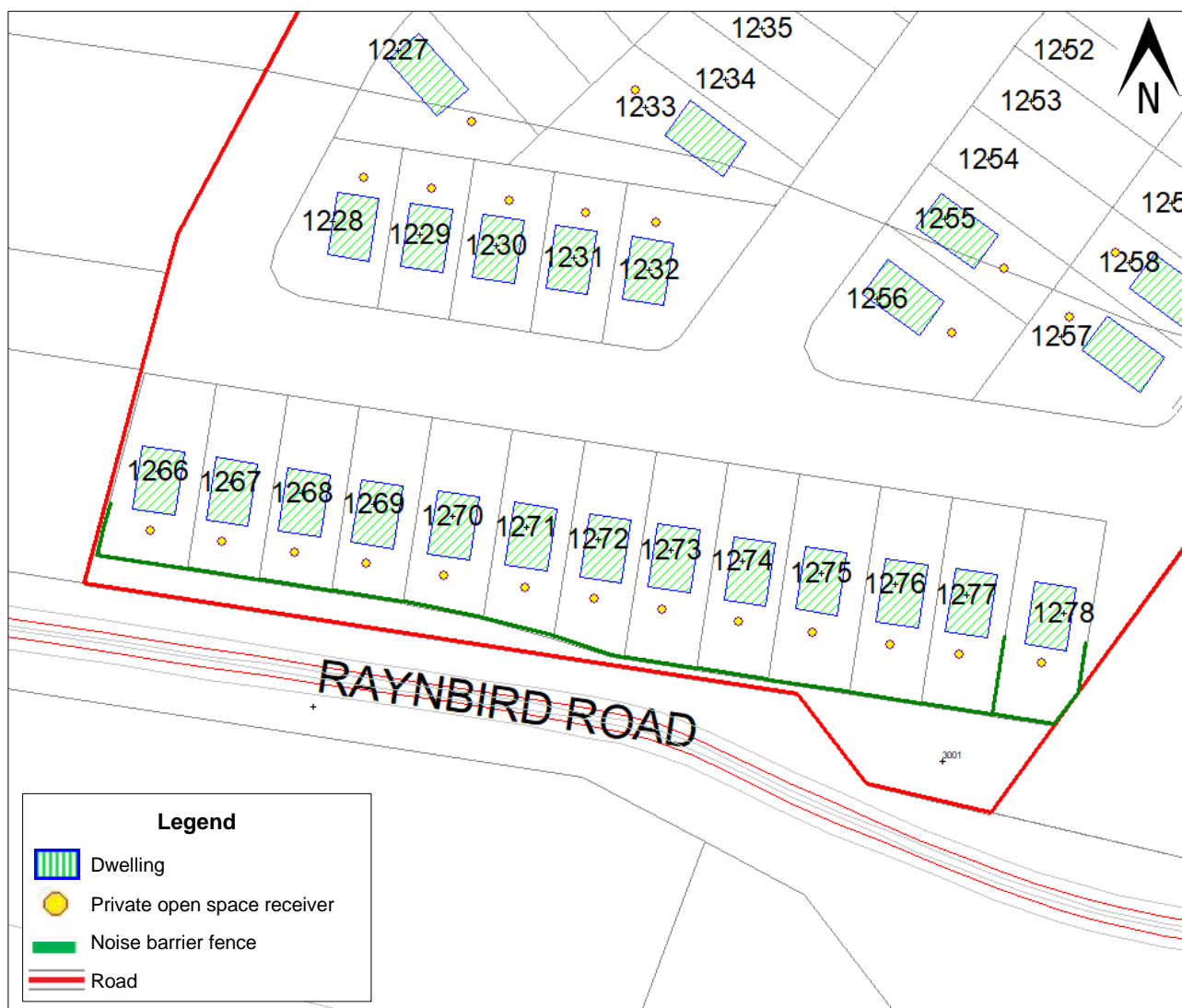


Figure 4.2 SoundPLAN Traffic Noise Model – Detail 1

The traffic noise model considers private open spaces at the locations shown in Figure 4.2, for assessment against the relevant noise criteria for private open spaces.

The finished pad levels of the allotments along Raynbird Road, as considered in the SoundPLAN model, are presented in Table 4.5.

Table 4.5 Finished Pad Levels of Allotments

Lot No.	Pad level, RL (AHD, m) Centre of lot
Lot 1266	72.00
Lot 1267	71.50
Lot 1268	71.70
Lot 1269	71.90
Lot 1270	71.50
Lot 1271	71.20

Lot No.	Pad level, RL (AHD, m) Centre of lot
Lot 1272	70.30
Lot 1273	69.30
Lot 1274	68.20
Lot 1275	66.80
Lot 1276	65.30
Lot 1277	64.30
Lot 1278	62.80

5. Calculated Traffic Noise Levels

5.1 Detached Dwellings

The highest calculated traffic noise levels at the proposed dwellings, with the recommended noise barrier fences in place, are presented in Table 5.1.

Table 5.1 Traffic Noise Levels at Building Facades – Year 2031

Lot No.	Ground Floor		Upper Floor	
	Calculated traffic noise level L _{10,18hr} dB(A)*	Noise Category QDC MP4.4	Calculated traffic noise level L _{10,18hr} dB(A)*	Noise Category QDC MP4.4
Lot 1227	43	Category 0	50	Category 0
Lot 1228	53	Category 0	55	Category 0
Lot 1229	53	Category 0	55	Category 0
Lot 1230	54	Category 0	56	Category 0
Lot 1231	54	Category 0	56	Category 0
Lot 1232	55	Category 0	56	Category 0
Lot 1233	51	Category 0	54	Category 0
Lot 1255	54	Category 0	56	Category 0
Lot 1256	56	Category 0	57	Category 0
Lot 1257	55	Category 0	57	Category 0
Lot 1258	54	Category 0	55	Category 0
Lot 1266	59	Category 1	65	Category 2
Lot 1267	58	Category 1	65	Category 2
Lot 1268	59	Category 1	65	Category 2
Lot 1269	59	Category 1	65	Category 2
Lot 1270	58	Category 1	64	Category 2
Lot 1271	59	Category 1	64	Category 2
Lot 1272	59	Category 1	63	Category 2
Lot 1273	59	Category 1	63	Category 2
Lot 1274	59	Category 1	63	Category 2
Lot 1275	58	Category 1	63	Category 2
Lot 1276	58	Category 1	62	Category 1
Lot 1277	59	Category 1	62	Category 1
Lot 1278	59	Category 1	62	Category 1

*facade adjusted

5.2 Private Open Spaces

The calculated traffic noise levels at the private open spaces of the proposed dwellings, with the recommended noise barrier fences in place, are presented in Table 5.2.

Table 5.2 Traffic Noise Levels at Private Open Spaces – Year 2031

Lot No.	Calculated traffic noise level L _{10,18hr} dB(A)*	Compliance with ≤57dB(A) L _{10,18hr} criterion?
Lot 1227 POS	41	Yes
Lot 1228 POS	44	Yes
Lot 1229 POS	44	Yes

Lot No.	Calculated traffic noise level L _{10,18hr} dB(A)*	Compliance with ≤57dB(A) L _{10,18hr} criterion?
Lot 1230 POS	45	Yes
Lot 1231 POS	45	Yes
Lot 1232 POS	51	Yes
Lot 1233 POS	46	Yes
Lot 1255 POS	53	Yes
Lot 1256 POS	55	Yes
Lot 1257 POS	51	Yes
Lot 1258 POS	48	Yes
Lot 1266 POS	56	Yes
Lot 1267 POS	55	Yes
Lot 1268 POS	56	Yes
Lot 1269 POS	56	Yes
Lot 1270 POS	56	Yes
Lot 1271 POS	56	Yes
Lot 1272 POS	56	Yes
Lot 1273 POS	56	Yes
Lot 1274 POS	56	Yes
Lot 1275 POS	56	Yes
Lot 1276 POS	56	Yes
Lot 1277 POS	56	Yes
Lot 1278 POS	56	Yes

**free field*

The noise levels at the private open spaces are within the criteria of 57dB(A) L_{10,18hr} (free-field) at all allotments, considering the proposed noise barriers and pad levels.

Full tabulated results of the calculated traffic noise levels are presented in Appendix G.

Noise contours showing the propagation of traffic noise across the development site are presented in Appendix H.

6. Discussion and Recommendations

Within a 10-year planning horizon, at the time of full establishment of the residential development, there is a potential for traffic noise impact on the future dwellings on the allotments nearest to Raynbird Road. In accordance with the adopted streetscape strategy for the development, it is proposed to construct noise barriers along Raynbird Road to protect the development from traffic noise impacts.

The recommended noise barriers are to be constructed along the southern boundary of Lots 1266 to 1278, and be of varying height, with the top of the noise barrier 2.0m to 3.8m above the finished surface level along the edge of the allotment.

The RLs at the base and top of the proposed noise barriers, as well as the pad levels of the allotments, are presented in Table 6.1.

Table 6.1 Proposed Noise Barrier RLs – Stage 12

x, m (Easting)	y, m (Northing)	Lot No.	Pad level, RL (AHD, m) Centre of lot	Base of noise barrier fence RL (AHD, m)	Noise barrier height, m	Top of noise barrier, RL (AHD, m)
<i>Along property boundary facing Raynbird Road</i>						
491858.74	6993044.86	1266	72.00	72.18	2.40	74.58
491857.51	6993040.36	1266	72.00	72.00	2.40	74.40
491856.28	6993035.86	1266	72.00	71.92	2.40	74.32
491871.63	6993033.53	1266	72.00	71.43	2.40	73.83
491872.13	6993033.46	1267	71.50	71.37	2.40	73.77
491883.87	6993031.68	1267	71.50	71.20	2.40	73.60
491884.59	6993031.60	1268	71.70	71.20	2.40	73.60
491896.26	6993029.86	1268	71.70	71.19	2.40	73.59
491896.93	6993029.78	1269	71.90	71.18	2.40	73.58
491908.62	6993027.96	1269	71.90	72.00	2.40	74.40
491909.34	6993027.83	1270	71.50	71.92	2.40	74.32
491922.32	6993025.16	1270	71.50	71.22	2.40	73.62
491922.93	6993025.01	1271	71.20	71.16	2.40	73.56
491934.58	6993022.04	1271	71.20	71.00	2.40	73.40
491935.14	6993021.93	1272	70.30	71.09	2.80	73.89
491944.74	6993018.75	1272	70.30	70.34	2.80	73.14
491946.57	6993018.43	1272	70.30	70.07	2.80	72.87
491947.26	6993018.31	1273	69.30	70.00	2.80	72.80
491959.01	6993016.52	1273	69.30	69.50	2.80	72.30
491959.73	6993016.43	1274	68.20	68.49	3.60	72.09
491971.26	6993014.53	1274	68.20	68.02	3.60	71.62
491971.99	6993014.41	1275	66.80	67.00	3.80	70.80
491985.18	6993012.41	1275	66.80	66.51	3.80	70.31
491985.85	6993012.28	1276	65.30	66.24	3.80	70.04
491997.63	6993010.51	1276	65.30	65.74	3.80	69.54

x, m (Easting)	y, m (Northing)	Lot No.	Pad level, RL (AHD, m) Centre of lot	Base of noise barrier fence RL (AHD, m)	Noise barrier height, m	Top of noise barrier, RL (AHD, m)
491998.29	6993010.40	1277	64.30	64.72	3.80	68.52
492009.90	6993008.62	1277	64.30	64.06	3.80	67.86
492010.57	6993008.49	1278	62.80	63.00	3.60	66.60
492020.73	6993006.99	1278	62.80	62.51	3.60	66.11
492024.87	6993012.38	1278	62.80	62.50	2.80	65.30
492026.13	6993020.93	1278	62.80	62.50	2.40	64.90
<i>Along property boundary between Lots 1227 and 1228</i>						
492009.90	6993008.62	1277	64.30	64.06	2.00	66.06
492012.18	6993021.88	1277	64.30	64.00	2.00	66.00

The recommended alignment and RLs of the top of the noise barrier at Stage 12 (Lots 1266 to 1278) is presented in Figure 6.1.



Figure 6.1 Noise Barrier Alignment – Stage 12

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

- Material with minimum surface density of 12.5kg/m^2 , e.g. timber palings with minimum thickness 22mm; compressed fibre-cement sheeting with minimum thickness of 9mm; 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.

Typical construction of a timber acoustic fence is illustrated in Figure 6.2.

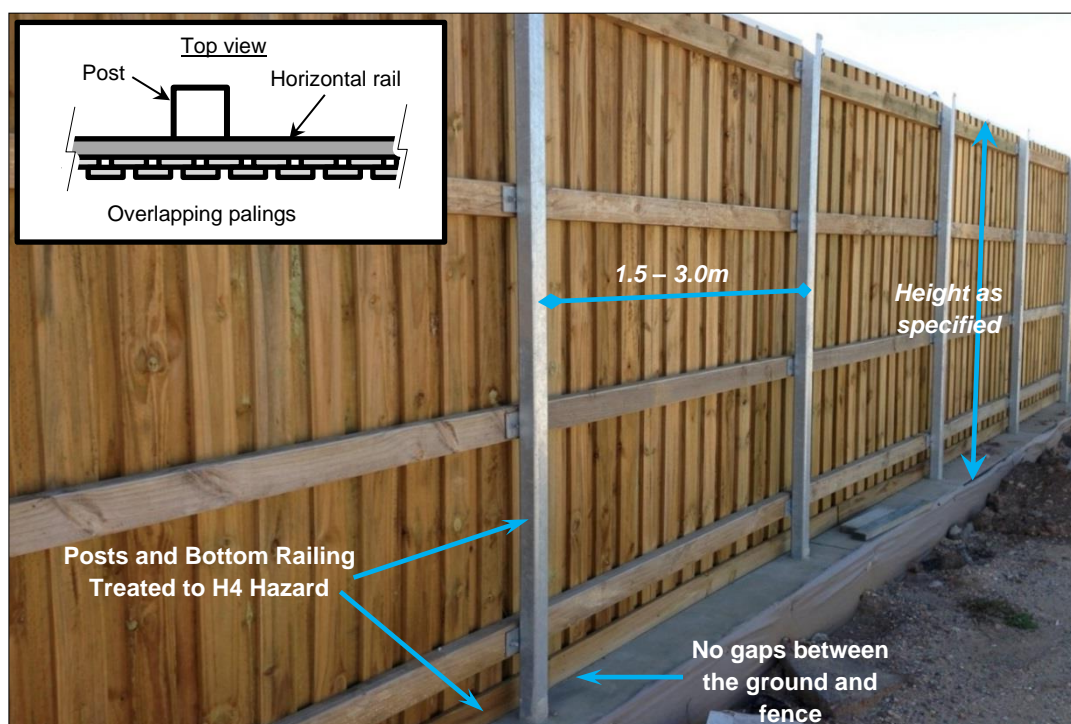


Figure 6.2 Typical Timber Acoustic Fence

The primary objective of the recommended noise barriers is to provide an acceptable level of noise amenity at the private open spaces (backyards) and to protect the ground floors of the future dwellings.

The results of the traffic noise modelling indicate that, with the proposed noise barriers, the noise levels at the private open spaces are in compliance with the criteria of $57\text{dB(A)} L_{10,18\text{hr}}$ (free-field) at all allotments within a 10-year planning horizon.

However, the ground and upper floors of some allotments nearest to Raynbird Road will be exposed to residual traffic noise, although the traffic noise impact is relatively minor:

- At the ground floors, 13 allotments nearest to Raynbird Road will be subject to external façade traffic noise levels corresponding to QDC Noise Category 1.

- At the upper floors, 3 allotments will be subject to Noise Category 1; and 10 allotments will be subject to Noise Category 2.

There are two options available for architectural treatment to the building facades as follows:

- **Option 1:** Implementation of the ‘acceptable forms of construction’ specified in Queensland Development Code (QDC) Mandatory Part 4.4 (*Buildings in a Transport Noise Corridor*). The buildings should be constructed to comply with the Noise Categories presented in Table 6.1.
- **Option 2:** Floor plan specific acoustic design in accordance with AS3671-1989 to ensure compliance with the internal noise criteria from AS/NZS 2107:2016.

The acoustic requirements applicable to each dwelling are presented in Table 6.2.

Table 6.2 Acoustic Requirements for Building Construction

Lot No.	Ground Floor	Upper Floor
	Noise Category QDC MP4.4	Noise Category QDC MP4.4
Lot 1227	Category 0	Category 0
Lot 1228	Category 0	Category 0
Lot 1229	Category 0	Category 0
Lot 1230	Category 0	Category 0
Lot 1231	Category 0	Category 0
Lot 1232	Category 0	Category 0
Lot 1233	Category 0	Category 0
Lot 1255	Category 0	Category 0
Lot 1256	Category 0	Category 0
Lot 1257	Category 0	Category 0
Lot 1258	Category 0	Category 0
Lot 1266	Category 1	Category 2
Lot 1267	Category 1	Category 2
Lot 1268	Category 1	Category 2
Lot 1269	Category 1	Category 2
Lot 1270	Category 1	Category 2
Lot 1271	Category 1	Category 2
Lot 1272	Category 1	Category 2
Lot 1273	Category 1	Category 2
Lot 1274	Category 1	Category 2
Lot 1275	Category 1	Category 2
Lot 1276	Category 1	Category 1
Lot 1277	Category 1	Category 1
Lot 1278	Category 1	Category 1

Provided the recommended planning and design noise control measures are implemented in the construction of the residential development, the road traffic noise from Raynbird Road will not impose any further constraints on the establishment of the residential development.

7. Conclusions

Based on the results of the noise impact assessment for Stages 8 to 12 of the Ridgeview development at Raynbird Road at Narangba, the following is concluded:

- Within a 10-year planning horizon, there is a potential for traffic noise impact on the future dwellings on the allotments nearest to Raynbird Road.
- In accordance with the adopted streetscape strategy for Raynbird Road, it is recommended to construct noise barrier fences as per Figure 6.1 of this report.
- The primary objective of the recommended noise barriers is to provide an acceptable level of noise amenity at the private open spaces (backyards) and to protect the ground floors of the future dwellings.
- The ground and upper floors of some allotments nearest to Raynbird Road will be exposed to residual traffic noise. The dwellings must be built to comply with QDC MP4.4 Noise Categories listed in Table 6.2 of this report or, alternatively, be acoustically designed in accordance with AS3671-1989.

Provided the recommended planning and design noise control measures are implemented in the construction of the residential development, the road traffic noise from Raynbird Road will not impose any further constraints on the establishment of the development.

8. References

- Australian Standard AS 1055-2018 (*Acoustics - Description and Measurement of Environmental Noise*)
- Australian Standard AS/NZS 2107:2016 (*Acoustics – Recommended design sound levels and reverberation times for building interiors*)
- Australian Standard AS 2702-1984 (*Acoustics – Methods for the Measurement of Road Traffic Noise*)
- Australian Standard AS 3671:1989 (*Acoustics – Road Traffic Noise Intrusion – Building sitting and construction*)
- Australian Standard AS/NZS IEC61672.1-2019 (*Electroacoustics - Sound level meters – Specifications*)
- Department of Transport and Main Roads, *Development Affected by Environmental Emissions from Transport Policy, Version 4 (October 2017)*
- Moreton Bay Regional Council, 2020, *Planning Scheme Policy - Noise*
- Queensland Development Code (QDC), *Mandatory Part 4.4 (Buildings in a Transport Noise Corridor)*

Appendix A – Proposed Development

Appendix B – Site Photos



Photo 1: Noise monitoring location 1



Photo 2: Noise monitoring location 1



Photo 3: Noise monitoring location 2



Photo 4: Noise monitoring location 2

Appendix C – Meteorological Data

Appendix D – Noise Monitoring Results

Appendix E – Moreton Bay Regional Council – Traffic Count Data

Appendix F – Validation of Traffic Noise Model

Appendix G – 2031 Traffic Noise Model

Appendix H – 2031 Grid Noise Map Contours