RENZO TONIN & ASSOCIATES
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Acoustics
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Our Reference: QC329-01F01 Covella Estate Teviot Downs (r2)

24 September 2021

Avid Property Group, c/- RPS
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Covella Estate, Pub Lane, Greenbank - Revised Road and Rail Noise Assessment for Stages 4 to 26

1 Introduction

Renzo Tonin & Associates has conducted an assessment and updated the noise model for the proposed Covella Estate residential subdivision at Pub Lane, Greenbank. The assessment determined expected traffic and rail noise impacts on future residential lots for Stages 4 to 26. This report is required due to allotment layout and design terrain changes.

2 Background

In December 2012, our office prepared a traffic noise assessment for the residential subdivision on behalf of Teviot Downs Estate Pty Ltd, which was submitted to the Urban Land Development Authority (ULDA) as part of the development application (Our Ref: Q8999-01F01 (REV1) FINAL ACOUSTIC REPORT.DOC – *Residential Subdivision, Teviot Down Estate, Pub Lane, Greenbank, Noise Impact Assessment*, dated 19th December 2012). That study assessed the extent of road noise intrusion from Pub Lane and rail noise from the Brisbane to Sydney railway corridor onto the subdivision.

The report was approved by the ULDA on 31st January 2013.

In December 2016, our office prepared a report to address a permissible change application over Stages 1,2,4-9,11-15,17,20,21,24-26,28 and 29. That report was required as a result of changes in lot layout, lot numbers and minor changes in proposed acoustic fence designs along Pub Lane (Our Ref: QA900-02F01 Permissible Change (r1) – *Residential Subdivision (Teviot Down Estate), Pub Lane, Greenbank - Permissible Change Application for Stages 1,2,4-9,11-15,17,20,21 and 24-29*, dated 16th December 2016). A development approval was issued by the Economic Development Queensland (EDQ) on 29th January 2021 (Ref: DEV2012/284/47).

In January 2017, our office prepared a report to address road and rail impacts over the balance lots (Our Ref: QA900-02F02 Teviot Downs-Balance Lots (r2) – *Residential Subdivision (Teviot Down Estate), Pub Lane, Greenbank - Development Application for Stages 3,10,16,18,19,22,23 and 27 (Balance Lots)*, dated 23rd

January 2017). A development approval was issued by the EDQ on 18th December 2020 (Ref: DEV2017/831/17).

On 12th September 2021, our office prepared an updated report for Stages 1,2 and 3 due to the changes that have occurred in the design and construction of fences along Pub Lane [Our Ref: QA900-03F01 Amended Noise Assessment due to barrier changes Stages 1,2 and 3 (r0)]. That assessment also addressed changes in traffic volumes and posted speed for Pub Lane. The assessment was conducted as a desktop study only based on fence surveying inputs provided by Saunders Havill. The investigations found discrepancies between the EDQ approved fences and constructed fences. Avid Property Group has advised via telephone conversation on 13/09/2021 that rectification works will be completed within three (3) years. Certification of fully constructed fences will be required at completion.

3 Assessment Rail Noise Impacts

This assessment and the corresponding updated computer noise model have used the site layout provided by RPS on on 10th September 2021 (Ref: *132965-26N Proposal Plan Ultimate - Clean Base DXF*). The design terrain model was provided by Calibre Group on 16th July 2021 (Ref: *20210716 Covella Overall Contours.dwg*). Note that if the finished pad levels of lots change substantially (greater than 200mm increase), a revised assessment may be needed using the new finished site levels.

The methodologies and assumptions implemented in the December 2012, December 2016, January 2017 and September 2021 reports have been adopted in this assessment.

Note that our modelling includes generic dwellings. At the time of conducting the modelling, exact building footprints or plans were not known. In the absence of suitable information, generic dwelling shapes were assumed for calculation purposes.

We recommend further assessments by a qualified acoustic engineer (RPEQ) in order to determine the appropriate building design and treatment required to effectively mitigate noise impacts for the provision of acceptable acoustic amenity in habitable rooms.

3.1 Road Traffic Noise Results

The road noise modelling resulted in Noise Category 0 at lowset and highset receiver heights from road traffic noise (Pub Lane) for the eastern parts of Stages 18, 19B, 22B, 22C and 23B. These stages are predominantly affected by rail noise. The applicable rail noise categories for future dwellings are shown in Section 3.2 below.

3.2 Rail Noise Results

Rail noise contours at lowset and highset receivers are shown in the following figures:

Figure 2: QDC MP4.4 Noise Categories for lowset residences (Rail)

Figure 3: QDC MP4.4 Noise Categories for highset residences (Rail)

It can be seen in Figure 2 and Figure 3 that the maximum rail Noise Category is 2 at ground and upper floors.

The MP4.4 Code will require that the glazing, external walls, roof, floors and entry doors of the proposed dwellings achieve minimum R_W ratings based upon the relevant noise category. The R_W ratings are specified in Schedule 1 of the Code. An extract of Schedule 1 for noise categories of 1 to 3 are shown in Table 1.

Table 1: Minimum R_W rating for each relevant noise category

Noise Category	Minimum transport noise reduction (dBA) required for habitable rooms	Component of building's external envelope	Minimum RW required
2	30	Glazing	35 (Total area of glazing for a habitable room is greater than 1.8m^2)
			32 (Total area of glazing for a habitable room is less than or equal to 1.8m^2)
		External Walls	41
		Roof	38
		Floors	45
		Entry Doors	33
1	25	Glazing	27 (Total area of glazing for a habitable room is greater than 1.8m^2)
			24 (Total area of glazing for a habitable room is less than or equal to 1.8m^2)
		External Walls	35
		Roof	35
		Entry Doors	28

The minimum R_W rating for each building component can be achieved by:

- Using the materials specified in Schedule 2 of the Code http://www.hpw.qld.gov.au/SiteCollectionDocuments/mp-4-4-buildings-in-transport-noise-corridors.pdf; OR
- Using materials with manufacturer's specifications that, in combination, achieve the minimum R_W rating for the relevant building component and applicable Noise Category.

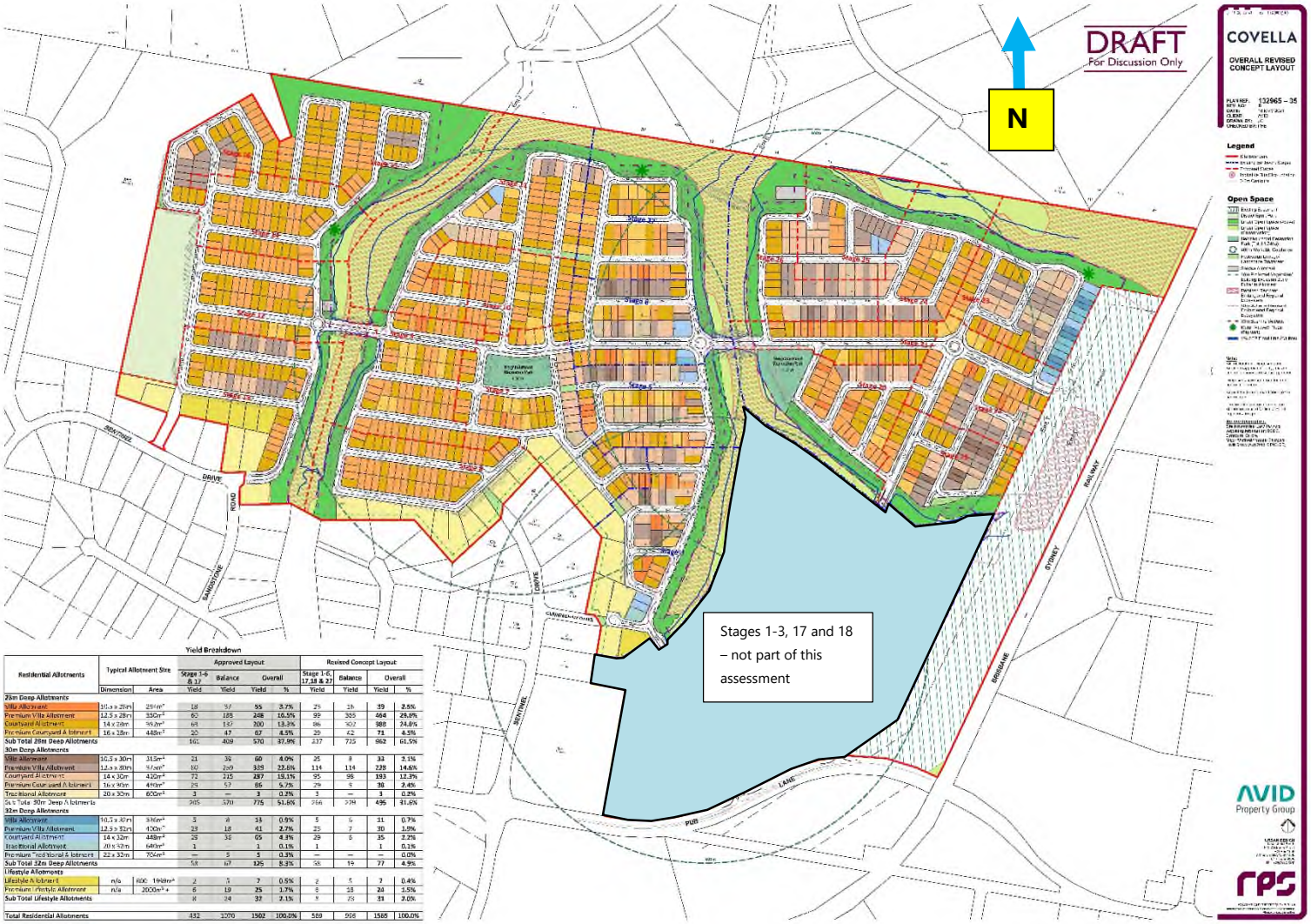
4 Conclusions

This assessment shows that the eastern parts of Stages 18, 19B, 22B, 22C and 23B are predominantly affected by rail noise. QDC MP4.4 rail Noise Category 2 are predicted at ground and upper floors.

Note that the modelling includes generic dwellings. At the time of conducting the modelling, exact building footprints or plans of those dwellings were not known. In the absence of suitable information, generic shapes were assumed for calculation purposes.

We recommend further assessments by a qualified acoustic engineer (RPEQ) in order to determine the appropriate building design and treatment required to effectively mitigate noise impacts for the provision of acceptable acoustic amenity in habitable rooms.

We trust that the information provided is adequate for you purpose at this stage. If you require any further information, please do not hesitate to contact us.



Yield Breakdown

Residential Allotments	Typical Allotment Size		Approved Layout				Revised Concept Layout			
			Stage 1-6 & 17	Balance	Overall		Stage 1-6, 17,18 & 27	Balance	Overall	
	Dimension	Area	Yield	Yield	Yield	%	Yield	Yield	Yield	%
25m Deep Allotments										
Villa Allotment	10.5 x 25m	264m²	18	37	55	3.7%	25	14	39	2.5%
Premium Villa Allotment	12.5 x 25m	330m²	60	185	248	16.5%	99	365	464	29.6%
Courtyard Allotment	14 x 25m	350m²	68	132	200	13.3%	86	302	388	24.8%
Premium Courtyard Allotment	16 x 25m	448m²	20	47	67	4.5%	29	42	71	4.5%
Sub Total 25m Deep Allotments			166	409	570	37.9%	237	725	962	61.5%
30m Deep Allotments										
Villa Allotment	10.5 x 30m	315m²	21	39	60	4.0%	25	8	33	2.1%
Premium Villa Allotment	12.5 x 30m	375m²	30	269	329	22.8%	114	114	228	14.6%
Courtyard Allotment	14 x 30m	420m²	72	215	287	19.1%	95	98	193	12.3%
Premium Courtyard Allotment	16 x 30m	480m²	29	57	86	5.7%	29	9	38	2.4%
Traditional Allotment	20 x 30m	600m²	3	—	3	0.2%	3	—	3	0.2%
Sub Total 30m Deep Allotments			305	570	775	51.6%	266	229	495	31.6%
32m Deep Allotments										
Villa Allotment	10.5 x 32m	336m²	5	8	13	0.9%	5	6	11	0.7%
Premium Villa Allotment	12.5 x 32m	400m²	23	18	41	2.7%	23	7	30	1.9%
Courtyard Allotment	14 x 32m	448m²	25	38	65	4.3%	29	6	35	2.2%
Traditional Allotment	20 x 32m	640m²	1	—	1	0.1%	1	—	1	0.1%
Premium Traditional Allotment	22 x 32m	704m²	—	5	5	0.3%	—	—	—	0.0%
Sub Total 32m Deep Allotments			54	67	125	8.3%	58	19	77	4.9%
Lifestyle Allotments										
Lifestyle Allotment	n/a	800 - 1998m²	2	5	7	0.5%	2	5	7	0.4%
Premium Lifestyle Allotment	n/a	2000m²+	6	19	25	1.7%	8	18	26	1.5%
Sub Total Lifestyle Allotments			8	24	32	2.1%	9	23	33	2.0%
Total Residential Allotments			432	1070	1502	100.0%	589	996	1585	100.0%

Figure 1: Site location

Figure 2: QDC MP4.4 Noise Categories for lowset residences (Rail)

Job QC329-01 - Residential Subdivision - Teviot Downs

Railway Noise Level Contours (Lowset)

Generic Dwellings Included

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Stage 20

Stage 21

Stage 24

Stage 18

Stage 19A

Stage 19B

Stage 22A

Stage 22B

Stage 22C

Stage 23A

Stage 23B

At the time of conducting this calculation, exact building footprints or plans were unknown.In the absence of suitable information, generic dwelling shapes were assumed for calculation purposes.

We recommend further assessments by a qualified acoustic engineer (RPEQ) in order to determine the appropriate building design and treatment required to effectively mitigate noise impact for the provision of acceptable acoustic amenity in habitable rooms.

Noise level L_{max}
in dB(A)

		<	69.5	Noise Category 0
69.5 <=		<	74.5	Noise Category 1
74.5 <=		<	79.5	Noise Category 2
79.5 <=		<	84.5	Noise Category 3
84.5 <=				Noise Category 4

A3 Scale 1:2200

0 10 20 40 60 80 100 m

Figure 3: QDC MP4.4 Noise Categories for highset residences (Rail)

Job QC329-01 - Residential Subdivision - Teviot Downs

Railway Noise Level Contours (Highset)

Generic Dwellings Included

Renzo Tonin & Associates
PO Box 820
Spring Hill Qld 4004
Ph: 3367 3131

Stage 23A

Stage 23B

Stage 24

Stage 21

Stage 22A

Stage 22C

Stage 20

Stage 22B

Stage 19A

Stage 19B

Stage 18

At the time of conducting this calculation, exact building footprints or plans were unknown.In the absence of suitable information, generic dwelling shapes were assumed for calculation purposes.

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Noise level L_{max}
in dB(A)

		<	69.5	Noise Category 0
69.5 <=		<	74.5	Noise Category 1
74.5 <=		<	79.5	Noise Category 2
79.5 <=		<	84.5	Noise Category 3
84.5 <=				Noise Category 4

A3 Scale 1:2200

0 10 20 40 60 80 100 m

APPENDIX A Glossary of Terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment Period	The period in a day over which assessments are made.
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background Noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 115dB Limit of sound permitted in industry 120dB Deafening
dB(A)	A-weighted decibels. The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.

L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound Absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound Level Meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound Pressure Level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound Power Level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

Document Control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Authorised
15.06.2021	Draft	-	-	DR	-	-
22.07.2021	Rev 0	-	0	DR	PJ	PJ
13.09.2021	Rev 1	-	1	DR	PJ	PJ
24.09.2021	Rev 2	-	2	DR	PJ	PJ

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