

Proposed Residential Subdivision
44 Gaven Arterial Road, Maudsland
(Lot 4 on SP146972)

ROAD TRAFFIC NOISE IMPACT REPORT

Prepared For

Orchard Property Group

20 July 2017

crgref: 17106 report

1.0 INTRODUCTION

This report is in response to a request from Orchard Property Group for a road traffic noise impact assessment of a proposed residential development along the Gaven Arterial Road at Maudsland.

In undertaking the above, unattended noise monitoring was conducted at the subject site, and through modeling, predictions of road traffic noise impacts were produced. Based upon the predicted noise impact levels, recommendations regarding acoustic treatment to the development have been provided.

2.0 SITE & DEVELOPMENT DESCRIPTION

The proposal relates to the parcel of land described as Lot 4 on SP146972, No. 44 Gaven Arterial Road at Maudsland. For site location refer to Appendix A of this report.

The site is bounded by the Gaven Arterial Road to the north and residential properties to the east, south and west. The topography of the site and surrounding land generally slopes downwards from the Gaven Arterial Road.

The proposal is to subdivide the parcel of land to yield 31 residential lots (i.e. Lots 701 to 731) and park (Lot 902). Vehicular access to the subdivision is proposed from the east through a proposed residential subdivision. For development plans refer to Appendix B.

The future residential dwellings and outdoor recreation areas are likely to be affected by road traffic noise from the Gaven Arterial Road, which is controlled by Gold Coast City Council. The road at the location of the site is an asphalt paved two lane undivided road with a posted speed limit of 70 km/hr.

It is noted that significant earthworks are proposed over the subject site with the nearest lots to the road being approximately 3m to 6m below the natural ground level at the common boundary with the road corridor. This significant cut will act as an acoustic barrier for ground floor façades and recreation areas (and in some case first floor levels) of the lots nearest the road corridor.

3.0 AMBIENT NOISE SURVEY

3.1 Instrumentation

The following equipment was used to record ambient noise levels at the subject site.

- Rion NC 73 Calibrator; and
- Rion NL 21 Environmental Noise Logger.

All instrumentation used in this assessment hold current calibration certificate from a certified NATA calibration laboratory.

3.2 Unattended Noise Measurement Methodology

A logger was located to the north of the subject site and had a direct line of sight to the Gaven Arterial Road. The microphone was in a free-field location approximately 1.2m above ground and 20m from the nearest lane of Gaven Arterial Road. Refer to Figure 2 in Appendix A for the logger location.

The logger was set to record noise statistics in 15 minute blocks continually between Monday 19/06/2017 to Monday 26/06/2017.

Road traffic noise levels were conducted generally in accordance with Australian Standard AS2702 - 1984 “*Acoustics - Methods for the measurement of road traffic noise*”.

The operation of the sound level logging equipment was field calibrated before and after the measurement session with no significant drift from the reference signal recorded.

Weather conditions during the noise monitoring period were obtained from the Bureau of Meteorology website from the Gold Coast weather station. Weather conditions during the monitoring period were generally fine with a temperature range between 12 and 24°C, a relative humidity range between 49 and 92%.

3.3 Unattended Noise Measurement Results

Table 1 below presents the measured ambient road traffic noise levels from the logger location. Graphical presentation of the measured noise levels from the loggers are presented in the Appendix C.

Road Noise Descriptor	Time Period	Measured Level dB(A)				
		20/06	21/06	22/06	23/06	Average
L ₁₀ 18hr	6am to Midnight	64	65	64	65	65
L _{eq} 1hr Daytime	6am to 10pm	66	66	65	65	66
L _{eq} 1hr Night time	10pm to 6am	62	62	61	62	62

Table 1: Measured ambient noise levels at the logger location.

4.0 NOISE CRITERION

Performance PO2 of the “*General Development Provisions Code*” states the following with respect to noise immissions:

Performance outcomes	Acceptable outcomes
Amenity protection	
PO2 The proposed development prevents loss of amenity and threats to health and safety, having regard to: <ul style="list-style-type: none"> (a) noise; (b) hours of operation; (c) traffic; (d) signage; (e) visual amenity; (f) wind effects; (g) privacy; (h) vibration; (i) contaminating substances; (j) hazardous chemicals; (k) odour and emissions; and (l) safety. 	A02 No acceptable outcome provided.

As there is no defined criteria, we have applied the typical criteria applied to Council controlled roads and which has been previously used for other developments impacted by Gaven Arterial Road.

For road traffic noise in the year 2027 (ten years after the completion of the development),

- An external level of 63 dB(A) $L_{10,18hr}$;
- Where the above limits cannot be met, road traffic noise levels inside dwellings must comply with internal road traffic noise levels defined in AS/NZS 2107:2016 “*Acoustics – Recommended Design Sound Level and Reverberation Times for Building Interiors*”. These levels expressed as L_{Aeq} are presented in Table 2 below.

7. RESIDENTIAL BUILDINGS	Recommended Design Sound Level, L_{Aeq} , dB(A)	
	Satisfactory	Maximum
Houses and apartments near major roads –		
Living areas	35	45
Sleeping areas	30	40
Work areas	35	45

Table 2: Traffic noise internal noise limits from Australian/New Zealand Standard AS/NZS 2107.

Typically, Council accept the maximum limits for residential buildings near major roads (i.e. 45 dB(A) in living areas) as the indoor criteria.

Specific building treatment to achieve the indoor noise criteria detailed above is determined using the method defined in Australian Standard AS3671-1989: “*Acoustics – Road traffic noise intrusion - Building siting and construction*”.

5.0 RESULTS & CALCULATIONS

5.1 Traffic Volumes

The existing traffic volume for the Gaven Arterial Road, including percentage of heavy vehicles, has been obtained from the Transport Network Analysis Team of Gold Coast City Council. The predicted volumes for years 2017 and 2027 assume a 2% compound growth rate per annum as detailed on the Queensland Government's SPP Interactive Mapping System for Maudsland Road (intersects with Gaven Arterial Road to the west of the site). The current and predicted traffic volumes are as follows:

2011 Traffic Volume:	7,163 vehicles per 24 hour, 7% heavy vehicles.
2017 Traffic Volume:	8,067 vehicles per 24 hour, 7% heavy vehicles.
2027 Traffic Volume:	9,833 vehicles per 24 hour, 7% heavy vehicles.

5.2 Modeled Road Traffic Noise Levels – Existing Situation

Road traffic noise predictions were conducted using PEN3D, a CoRTN based model acceptable under the Environmental Protection (Noise) Policy. To verify the road traffic noise prediction model, the $L_{A10\ 18hr}$ traffic noise level was calculated and compared to the measured noise level. For PEN3D point calculation sheets refer to Appendix C.

The predicted $L_{A10\ 18hr}$ existing noise level, 20m from the Gaven Arterial Road is 65.0 dB(A). Compared with the measured $L_{A10\ 18hr}$ level of 64.6 dB(A), the model is within the allowable 2 dB(A) deviation from measured levels.

5.3 Modeled Road Traffic Noise Levels – Ultimate Situation

Based upon year ultimate traffic volumes, the PEN3D model predicts the following road traffic noise levels as detailed in Table 3.

The following parameters were used in developing the PEN3D model for the development site:

- 2.5 dB correction for building façade receivers.
- 70 km/hr posted speed limit on the Gaven Arterial Road.
- Dense graded asphalt road surface (no road surface correction required).
- Building façade receiver heights at 1.8m and 4.6m above finished ground levels.
- Parkland and private open space receiver heights at 1.5m above finished ground levels.
- Subdivision plans provided by RPS (refer to Appendix B).
- Finished earthwork levels provided by Burchills (refer to Appendix B).
- L_{Aeq} levels based on the measured differences between the $L_{A10\ 18hr}$ level (refer to Table 1).

For PEN3D calculation sheets refer to Appendix C.

Receiver Location	Predicted Ultimate Traffic Noise – Façade Corrected dB(A)		
	L ₁₀ (18hr)	L _{eq} (1hr) day	L _{eq} (1hr) night
Ground Floor Level Building Façades nearest to the Road			
Lot 701	60	61	57
Lot 702	60	61	57
Lot 703	58	59	55
Lot 704	55	56	52
Lot 705	53	54	50
Lot 706	52	53	49
Lot 707	51	52	48
Lot 708	51	52	48
Lot 709	50	51	47
Lot 710	51	52	48
Lot 711	51	52	48
Lot 712	52	53	49
Lot 713	52	53	49
Lot 714	52	53	49
Lot 715	51	52	48
Lot 716	50	51	47
Lot 717	52	53	49
Lot 718	52	53	49
Lot 719	52	53	49
Lot 720	52	53	49
Lot 721	52	53	49
Lot 722	53	54	50
Lot 723	53	54	50
Lot 724	53	54	50
Lot 725	52	53	49
Lot 726	52	53	49
Lot 727	52	53	49
Lot 728	52	53	49
Lot 729	52	53	49
Lot 730	53	54	50
Lot 731	53	54	50

Table 3 (Cont.): Predicted traffic noise impact levels at the development site with no barrier.

Receiver Location	Predicted Ultimate Traffic Noise – Façade Corrected dB(A)		
	L ₁₀ (18hr)	L _{eq} (1hr) day	L _{eq} (1hr) night
First Floor Level Building Façades nearest to the Road			
Lot 701	70	71	67
Lot 702	69	70	66
Lot 703	69	70	66
Lot 704	62	63	59
Lot 705	57	58	54
Lot 706	55	56	52
Lot 707	53	54	50
Lot 708	52	53	49
Lot 709	52	53	49
Lot 710	52	53	49
Lot 711	52	53	49
Lot 712	53	54	50
Lot 713	53	54	50
Lot 714	53	54	50
Lot 715	52	53	49
Lot 716	52	53	49
Lot 717	53	54	50
Lot 718	53	54	50
Lot 719	53	54	50
Lot 720	53	54	50
Lot 721	53	54	50
Lot 722	53	54	50
Lot 723	54	55	51
Lot 724	54	55	51
Lot 725	53	54	50
Lot 726	53	54	50
Lot 727	54	55	51
Lot 728	56	57	53
Lot 729	56	57	53
Lot 730	55	56	52
Lot 731	54	55	51

Table 3 (Cont.): Predicted traffic noise impact levels at the development site with no barrier.

Receiver Location	Predicted Ultimate Traffic Noise – Free-field dB(A)
	L ₁₀ (18hr)
Ground Level Private Open Spaces nearest to the Road	
Lot 701	57
Lot 702	57
Lot 703	55
Lot 704	52
Lot 705	50
Lot 706	49
Lot 707	49
Lot 708	48
Lot 709	48
Lot 710	48
Lot 711	49
Lot 712	49
Lot 713	49
Lot 714	49
Lot 715	48
Lot 716	48
Lot 717	49
Lot 718	50
Lot 719	50
Lot 720	50
Lot 721	49
Lot 722	50
Lot 723	50
Lot 724	50
Lot 725	50
Lot 726	49
Lot 727	49
Lot 728	49
Lot 729	49
Lot 730	50
Lot 731	50
Communal Outdoor Recreation Areas	
Park Lot 902	48

Table 3 (Cont.): Predicted traffic noise impact levels at the development site with no barrier.

6.0 RECOMMENDED ACOUSTIC TREATMENTS

Based upon the ultimate road traffic noise modelling (Section 5.3), road traffic noise is predicted to exceed the external noise criterion of 63 dB(A) $L_{A10\ 18hr}$ at future first floor levels (if constructed) of dwellings on Lots 701 to 703; hence further acoustic treatments are required.

Assessment of noise affected habitable rooms (to determine the required building shell treatments) has been undertaken in accordance with Australian Standard AS3671:1989 “Acoustics – Road traffic noise intrusion – Building Siting and Construction”. Based upon predicted impact levels, the TNR values (Traffic Noise Reduction) as defined in AS3671:1989 are as follows:

Lot Number	Space	Impact dB(A)	Criteria dB(A)	TNR dB(A)
701	First Floor Bedrooms facing the Gaven Arterial Rd	67	40	27
702		66	40	26
703		66	40	26

Lot Number	Space	Impact dB(A)	Criteria dB(A)	TNR dB(A)
701	First Floor Living Areas facing the Gaven Arterial Rd	71	45	26
702		70	45	25
703		70	45	25

Table 4: TNR values for noise affected habitable rooms.

TNR values between 10 and 25 (refer to Table 4) are considered as Construction Category 2 within AS3671:1989 which is “Standard construction, except for lightweight elements such as fibrous cement or metal cladding or all glass façades. Windows, doors and other openings must be closed”.

Australian Standard AS3671:1989 also provides guidance on standard building construction as presented in Table 5 below.

Space	Building Component	Rw	Indicative Acoustic Treatment **Verify with supplier proposed element achieves required Rw**
Standard Building Construction:			
Noise Affected Living Areas and Bedrooms	Glazing	24	4mm glass in a standard grade frame
	External Wall	33 - 35	Conventional timber stud framed wall, clad externally with 9mm thick timber or hardboards or flat cellulose-cement sheets, and internally with 10mm thick plasterboard
	Roof / Ceiling	33 - 35	Conventional pitched roof with tiles or corrugated metal, over 10mm thick plasterboard

Table 5: Standard building construction presented in Australian Standard AS3671:1989.

To allow occupants to close windows and doors and still have a supply of fresh air, provision for air conditioning or sealed mechanical ventilation is required to noise affected habitable rooms.

TNR values between 26 and 35 (refer to Table 4) are considered as Construction Category 3 within AS3671:1989, which is *“Special construction, chosen in accordance with Clause 3.4. Windows, doors and other openings must be closed.”*

Hence, to achieve the internal noise criterion at first floor habitable rooms of future dwellings on Lots 701 to 703, with a TNR values greater than 25, we recommend that additional noise assessments be conducted once building plans are finalized (only if first floor levels are constructed).

Assessment of habitable rooms should be undertaken in accordance with Australian Standard AS3671:1989 *“Acoustics – Road traffic noise intrusion – Building Siting and Construction”* to achieve the maximum internal noise levels prescribed in AS/NZS 2107:1987 *“Acoustics – Recommended Design Sound Level and Reverberation Times for Building Interiors”*.

To allow occupants to close windows and doors and still have a supply of fresh air, provision for air conditioning or sealed mechanical ventilation is required to noise affected habitable rooms.

7.0 DISCUSSION AND CONCLUSIONS

This report is in response to a request from Orchard Property Group for a road traffic noise impact assessment of a proposed residential development along the Gaven Arterial Road at Maudsland.

Based upon traffic volumes on the Gaven Arterial Road, road traffic noise levels are predicted to impact aboveground first floor levels of the nearest proposed residential lots (being Lots 701 to 703) at levels above the external traffic noise criteria of 63 dB(A) $L_{10\ 18hr}$.

It is noted that ground floor level façades and outdoor recreation areas are predicted to achieve the external noise criterion given that the nearest lots to the road are proposed within significant cut (between approximately 3m to 6m below the natural ground level at the common boundary with the road corridor). This significant cut will act as an acoustic barrier for ground floor façades and recreation areas (and in some case first floor levels) of the lots nearest the road corridor.

For First Floor Levels of future dwellings on Lots 701 to 703 (if constructed), acoustic building shell treatments are required to achieve the internal noise criterion at bedrooms and living areas fronting the Gaven Arterial Road. Based upon the predicted external noise impacts, additional noise assessments would be required for future dwellings (at dwelling design stage) at Lots 701 to 703 if first floor levels are constructed. Further, for noise impacted First Floor Level habitable rooms fronting the Gaven Arterial Road at Lots 701 to 703, provision for air conditioning or sealed mechanical ventilation is required to allow occupants to close windows and doors.

It is noted that provision for air conditioning or sealed mechanical ventilation and additional building shell treatments at Lots 701 to 703 are only required for First Floor Levels if constructed.

Overall, based upon the assessed attached Development Plans, the proposal can be shown to comply with the adopted noise criterion subject to the recommended treatments detailed in Section 6 being incorporated into the development.

Report Reviewed By:



JAY CARTER BSc
Director

Report Compiled by:



Matthew Lopez BEng
Consultant

APPENDIX A

Subject Site and Noise Measurement Location

Figure 1: Subject Site Location (Gold Coast City Plan Interactive Mapping Website).

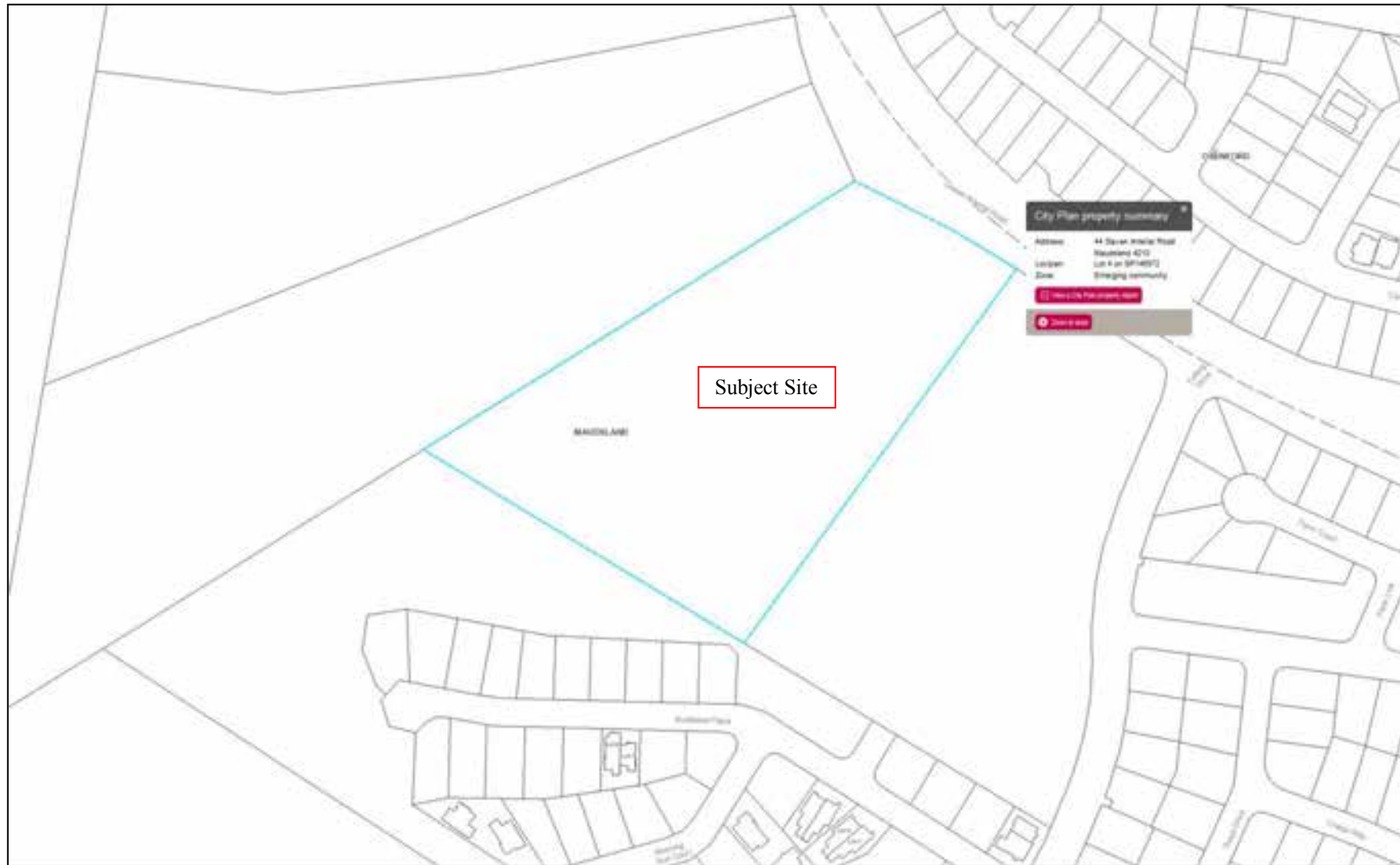


Figure 2: Subject Site, Logger Location and the Surrounding Environment (Gold Coast City Plan Interactive Mapping Website).



APPENDIX B

Development Plans

LOCALITY



GAVEN ARTERIAL ROAD



CLIENT
ORCHARD DEVELOPMENT P/L

Level Datum AHD Date 4 MAY 2017

Level Origin Surveyed RPS GC

LIDAR Drafted BJB

Local Authority Data Origin ESCADA

GOLD COAST CITY 134207-Bdy-2017-05-04

PLAN

PROPOSED SUBDIVISION

Lots 701-731 and Park Lot
cancelling Lot 4 on SP146972
Felling Drive, MAUDSLAND

SCALE:
1:1000 (A3)



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ACN 140 292 762
ABN 44 140 292 762

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Robina PO Box 1048 Robina Qld 4226

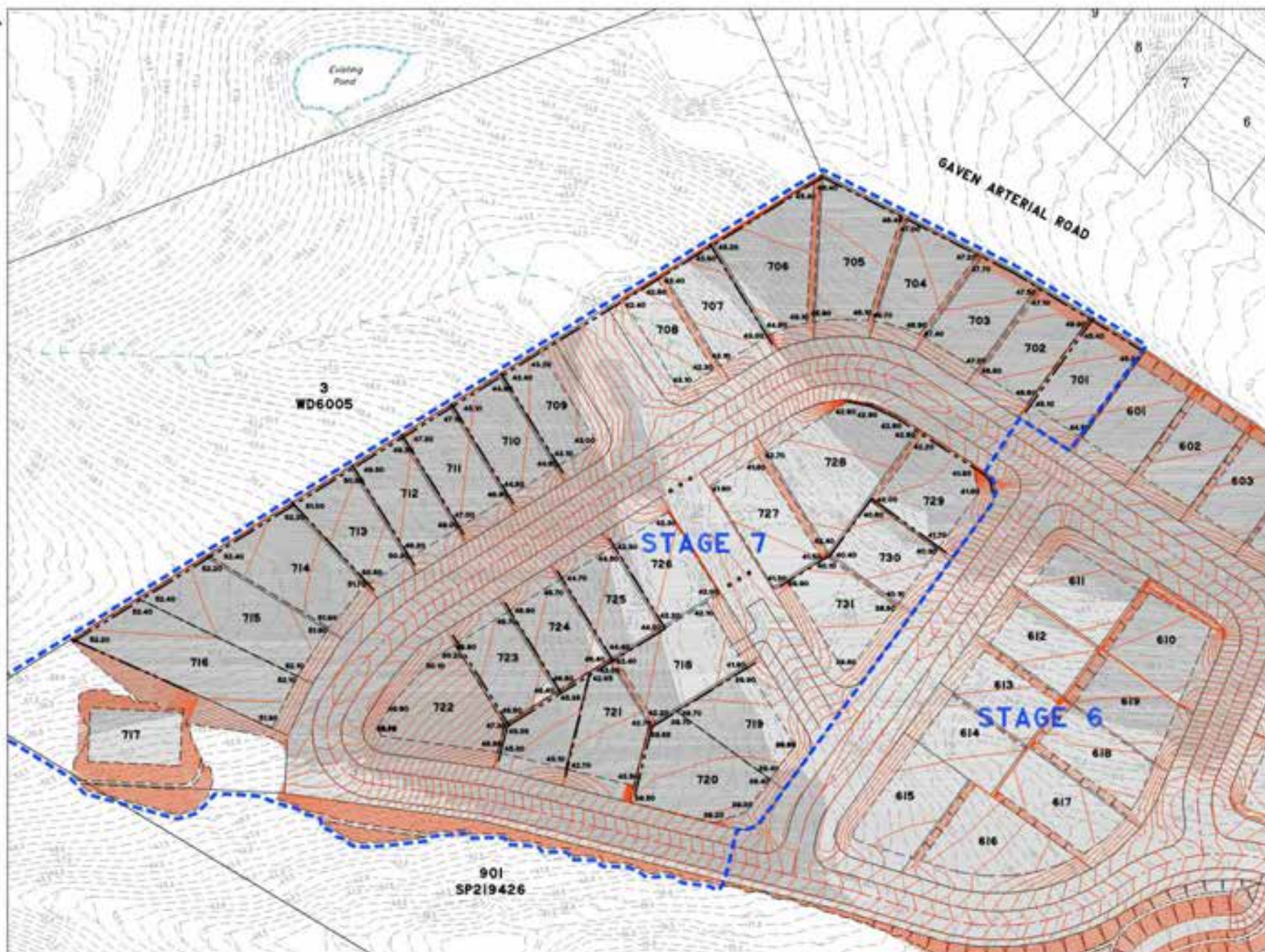
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Plan Ref: 134207-PP-4a

Sheet
1 of 1



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SCALE 1:500 (P.L. 500)

PRELIM DRAFT



PINEVUE
ENGINEERING

PROPOSED RESIDENTIAL
DEVELOPMENT
AT
LOT 4 on SP146972
FELLING DRIVE,
MAUDSLAND

FOR
ORCHARD (FELLING)
DEVELOPMENTS PTY LTD

A1 PRELIMINARY EARTHWORKS PRODUCTION

DISCLAIMER
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NOTES
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Burchills Engineering Pty Ltd
ABN 70 104 942 205

STAGE 7
BULK EARTHWORKS
ROADWORKS &
CIVIL SERVICES

PRELIMINARY EARTHWORKS
LAYOUT PLAN (STAGE 7)

CLIENT: ORCHARD (FELLING) DEVELOPMENTS PTY LTD	DATE: 05/05/2024
PROJECT: LOT 4 on SP146972	
DESIGNER: BURGESS ENGINEERING	
CHECKED: BURGESS ENGINEERING	
APPROVED: BURGESS ENGINEERING	
PROJECT NO: BE160318	SK05
SCALE: 1:500	PLAT: 001
	A

APPENDIX C

Measurement Results and Model Calculations / Predictions









POINT CALCULATIONS

Pen3D2000 V 1.10.0

Project Code:17106

File:G:\Users\Matty\CRGNAS\2017\17106 Residential Sub Gaven Arterial Maudsland RTN\17106a_existing.PEN

File Description:Data file covering existing

Wednesday 19 Jul, 2017 at 14:59:50

CoRTN Calculations

All road segments included. Segmentation angle: 1degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
monitor	28719.1	11547.7	1.2	65.0 free-field

File:G:\Users\Matty\CRGNAS\2017\17106 Residential Sub Gaven Arterial Maudsland RTN\17106a_ultimate.PEN

File Description:Data file covering ultimate

Wednesday 19 Jul, 2017 at 15:08:46

CoRTN Calculations

All road segments included. Segmentation angle: 1degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
701	28978.9	10852.8	1.8	59.6
702	28966.3	10861.8	1.8	60.1
703	28951.8	10870.7	1.8	58.4
704	28936.9	10879.7	1.8	54.9
705	28916.2	10888.9	1.8	52.6
706	28901.4	10887.2	1.8	52.2
707	28881	10873.9	1.8	51.4
708	28865.9	10867.1	1.8	50.7
709	28837.5	10848.9	1.8	50.4
710	28825.5	10841.8	1.8	50.9
711	28812.8	10834	1.8	51.3
712	28799.4	10826.7	1.8	51.7
713	28785.4	10819.1	1.8	51.9
714	28772.8	10808.3	1.8	52.0
715	28752.8	10795.3	1.8	50.7
716	28741.9	10782.2	1.8	50.4
717	28738.7	10759.5	1.8	51.6
718	28878.1	10785.5	1.8	52.3
719	28889.9	10767.6	1.8	52.2
720	28881.8	10750.1	1.8	52.1
721	28853.7	10768	1.8	52.0
722	28811.4	10773.8	1.8	52.5
723	28825.3	10783.2	1.8	52.7
724	28839.6	10792	1.8	52.5
725	28852.3	10800.6	1.8	52.1
726	28866.4	10810.1	1.8	51.7
727	28890.6	10824.5	1.8	52.1
728	28920.6	10836.7	1.8	52.1
729	28940.5	10824.5	1.8	51.7
730	28925.8	10809.4	1.8	53.1
731	28915.2	10795.2	1.8	52.9
701	28983.3	10853.1	4.6	70.1
702	28967.3	10863.5	4.6	69.2
703	28958.4	10869	4.6	68.6
704	28942	10879.9	4.6	62.1
705	28916.2	10888.9	4.6	57.4
706	28901.4	10887.2	4.6	55.4
707	28881	10873.9	4.6	53.4
708	28865.9	10867.1	4.6	52.2
709	28837.5	10848.9	4.6	51.6
710	28825.5	10841.8	4.6	51.9
711	28812.8	10834	4.6	52.4
712	28799.4	10826.7	4.6	52.9
713	28785.4	10819.1	4.6	53.0
714	28772.8	10808.3	4.6	53.2
715	28752.8	10795.3	4.6	52.4
716	28741.9	10782.2	4.6	51.7
717	28738.7	10759.5	4.6	52.6
718	28878.1	10785.5	4.6	53.4
719	28889.9	10767.6	4.6	53.2

720	28881.8	10750.1	4.6	52.9
721	28853.7	10768	4.6	52.8
722	28811.4	10773.8	4.6	53.4
723	28825.3	10783.2	4.6	53.6
724	28839.6	10792	4.6	53.5
725	28852.3	10800.6	4.6	53.1
726	28866.4	10810.1	4.6	52.8
727	28890.6	10824.5	4.6	53.5
728	28920.6	10836.7	4.6	55.5
729	28940.5	10824.5	4.6	56.2
730	28925.8	10809.4	4.6	54.7
731	28915.2	10795.2	4.6	54.1
701	28978.9	10852.8	1.5	59
702	28966.3	10861.8	1.5	59.5
703	28951.8	10870.7	1.5	57.8
704	28936.9	10879.7	1.5	54.4
705	28916.2	10888.9	1.5	52.2
706	28901.4	10887.2	1.5	51.9
707	28881	10873.9	1.5	51.2
708	28865.9	10867.1	1.5	50.5
709	28837.5	10848.9	1.5	50.3
710	28825.5	10841.8	1.5	50.8
711	28812.8	10834	1.5	51.2
712	28799.4	10826.7	1.5	51.6
713	28785.4	10819.1	1.5	51.8
714	28772.8	10808.3	1.5	51.9
715	28752.8	10795.3	1.5	50.6
716	28741.9	10782.2	1.5	50.3
717	28738.7	10759.5	1.5	51.5
718	28878.1	10785.5	1.5	52.2
719	28889.9	10767.6	1.5	52.1
720	28881.8	10750.1	1.5	52
721	28853.7	10768	1.5	51.9
722	28811.4	10773.8	1.5	52.4
723	28825.3	10783.2	1.5	52.6
724	28839.6	10792	1.5	52.4
725	28852.3	10800.6	1.5	52
726	28866.4	10810.1	1.5	51.6
727	28890.6	10824.5	1.5	51.9
728	28920.6	10836.7	1.5	51.5
729	28940.5	10824.5	1.5	51
730	28925.8	10809.4	1.5	52.8
731	28915.2	10795.2	1.5	52.7
901	28820.8	10719.7	1.5	50.8