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PLANS AND DOCUMENTS
referred to in the PDA APPROVAL

Attention: Wendy Truer

Date: 04 Dec 2014

Company: Lend Lease Corporation Ltd

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Email: Wendy.Truer@lendlease.com

Doc No.: 517498-1

From: Daniel Cheetham

Ref No.: 70Q-13-0319-TRP-517498-1

Subject: Yarrabilba Development, Precinct 2 - Traffic Noise Report Addendum - Precinct 2, Village 4a

19 MAR 2015

MEDQ

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Dear Wendy,

This document presents a reassessment of the acoustic requirements for the Precinct 2 Village 4a area in the Yarrabilba development. The reassessment is necessary due to a change in the Lot layout in Village 4a.

A previous report has been issued by Vipac assessing traffic noise levels in all areas of Precinct 2 - Vipac report 70Q-13-0319-TRP-515727-3 "Yarrabilba Development, Precinct 2 - Traffic Noise Assessment", dated 16 Apr 2014.

The applicable noise limits (as obtained from the previous report) are summarised in Table 1.

Table 1: Applicable Noise Limits

Noise Criteria	Noise Limit	Period	Where
The Department of Transport and Main Roads' Road Traffic Noise Management: Code of Practice	60 dB(A) $L_{A10(18hr)}$, free field	6am to 12 pm	Future residences (external)
AS/NZS 2107:2000 Acoustics—Recommended design sound levels and reverberation times for building interiors (AS2107)	40 dB(A) $L_{Aeq,Night(1hr)}$, indoors	Night (10pm to 7am)	Sleeping areas in future residences, indoors
	45 dB(A) $L_{Aeq,Day(1hr)}$ indoors	Day (7am to 10pm)	Living areas in future residences, indoors

Revised noise calculations were performed for Village 4a using SoundPLAN noise modelling software, with the same parameters and assumptions used in the previous Vipac report, with the revised Lot layout received from RPS, "106127-03C.dwg", received 26/11/2014.

With the new Lot layout, predicted noise levels are up to 68 dB(A) $L_{A10(18hr)}$ at the ground floor and 69 dB(A) $L_{A10(18hr)}$ at the first floor. This exceeds the applicable 60 dB(A) noise limit by up to 8 dB(A) at the ground floor and 9 dB(A) at the first floor. 22 Lots exceed the noise limits at the ground floor and 24 Lots exceed the noise limits at the first floor as shown in Table 2 and Table 3.

Table 2: Lots Exceeding Applicable External Noise Limits at the Ground Floor Level

Lot	$L_{A10(18hr)}$ (dB(A))	Lot	$L_{A10(18hr)}$ (dB(A))	Lot	$L_{A10(18hr)}$ (dB(A))
20	67	28	67	355	67
21	67	29	68	356	68
22	67	31	67	357	67
23	67	32	67	358	67
24	67	351	67	359	67
25	67	352	68	360	67
26	67	353	67		
27	67	354	67		

Table 3: Lots Exceeding Applicable External Noise Limits at the First Floor Level

Lot	L _{A10(18hr)} (dB(A))	Lot	L _{A10(18hr)} (dB(A))	Lot	L _{A10(18hr)} (dB(A))
20	69	28	69	353	69
21	68	29	69	354	69
22	68	30	62	355	69
23	68	31	68	356	69
24	68	32	69	357	69
25	68	350	63	358	69
26	68	351	69	359	69
27	69	352	69	360	69

Noise contour maps are included in Appendix A. Predicted noise levels at all Lots affected by significant levels of traffic noise are presented in Appendix B.

Floors of future residences where the noise limits are exceeded will need to be designed and constructed to comply with the indoor noise limits in AS/NZS 2107:2000, "Acoustics—Recommended design sound levels and reverberation times for building interiors" (AS2107).

The recommended acoustic ratings for all walls, windows and roofing were calculated using the procedures in AS3671 "Acoustics – Road Traffic Noise Intrusion Building Siting and Construction" using worst case assumptions about room dimensions and building orientations.

The assumed construction specifications for future residences are given in Table 4.

Table 4: The Assumed Construction Specifications for Future Residences

Item	Construction	Expected R _w
External Wall	Brick Veneer	52
	10mm plasterboard	
Ceiling and Roof	Sheet metal / Cement tiles	38
	10mm Plasterboard	
	R2.5 Batts Insulation	
Glazing and Frames	4mm Float	24

Glazing requirements are specified in Table 5 Where glazing acoustic requirements are not specified in Table 5, glazing ratings from Table 4 can be used.

Table 5: Required Glazing Construction for Residences on Lots exceeding External Noise Limits to Comply with Indoor Noise Limits

Floor	Room	Orientation of Façade	Required R _w Acoustic Rating of Glazing and Frames
Ground	Bedrooms	E	33
		S	34
		W	33
	Living Rooms	E	28
		S	31
		W	28
First	Bedrooms	E	33
		S	35
		W	33
	Living Rooms	E	29
		S	30
		W	29

Table 5 lists the required R_w ratings (Weighted Sound Reduction Index) for glazing and frames. If consistency of glazing systems is preferred for each room, the higher of the required R_w ratings must be used.

It is required that the R_w performance ratings of the glazing systems (windows and frames) be certified by the supplier prior to installation. Glazing certificates will be required for building



certification. Where glazing system requirements are considered high, the design or glazed surface area can be reduced to minimise the acoustic rating required.

For floors of Lots where the noise criteria is exceeded, acceptable indoor noise levels can be achieved with the glazing recommendations specified, however external doors and windows must remain closed. Under these conditions, alternative ventilation will be required. Alternative ventilation may include air-conditioning, borrowed ventilation, mechanically assisted ventilation or other suitable methods.

The recommended glazing requirements are conservative ratings based on preliminary data and assumptions about room sizes and component construction. It is recommended that building construction acoustic requirements be recalculated when final details of room dimensions and building component construction are available.

If you have any queries regarding this document, please do not hesitate to contact the undersigned on (07) 3377 0400.

Yours faithfully

VIPAC ENGINEERS & SCIENTISTS LTD

A handwritten signature in black ink, appearing to read "Daniel Cheetham".

Daniel Cheetham
Consulting Engineer

REVIEWED BY:

A handwritten signature in black ink, appearing to read "Javed Moazzam".

Javed Moazzam
Reviewing Engineer



APPENDIX A: NOISE CONTOUR MAPS

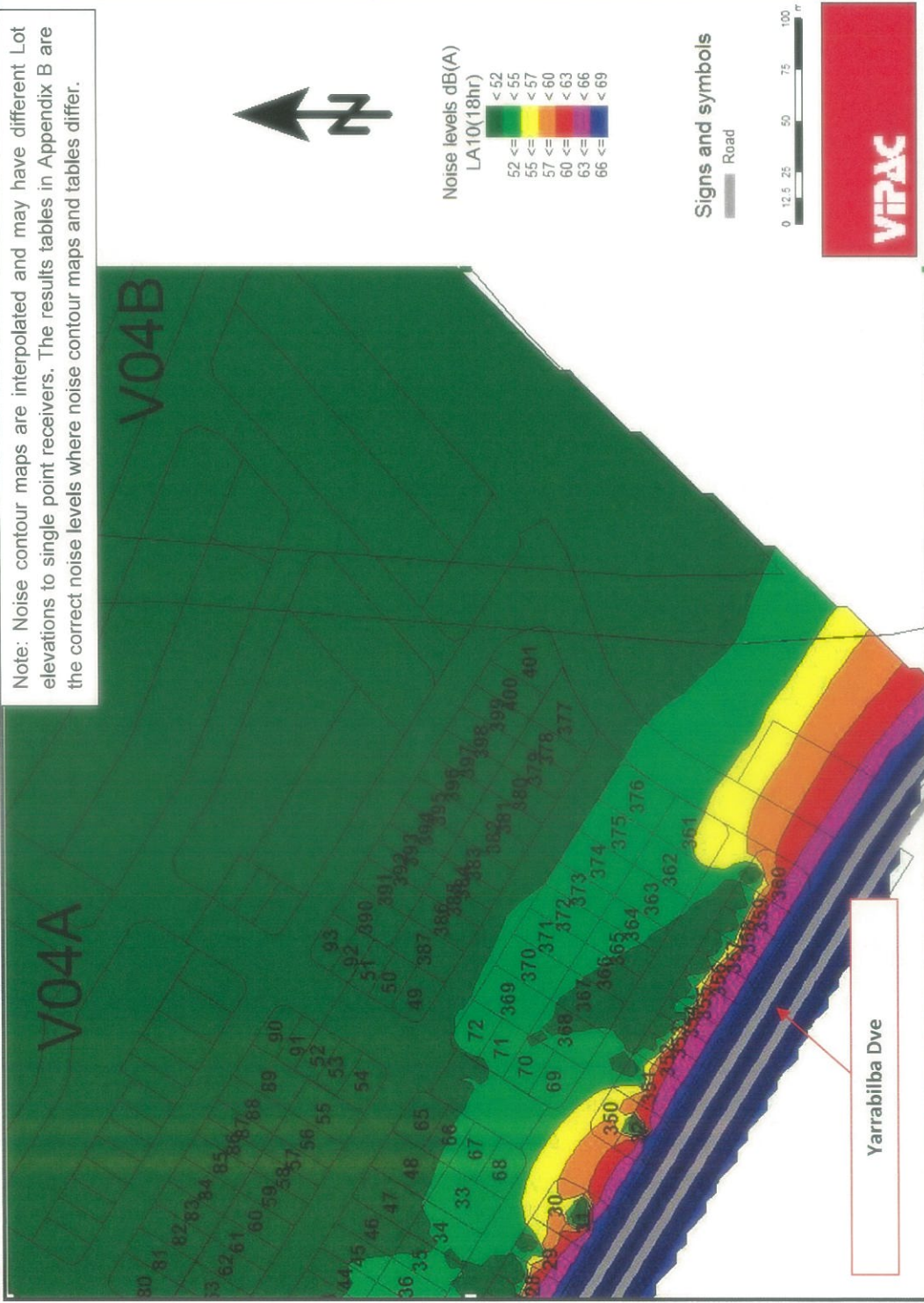


Figure A-1: Predicted Free Field $LA_{10}(18hr)$ Road Traffic Noise Levels at the Ground Floor - East

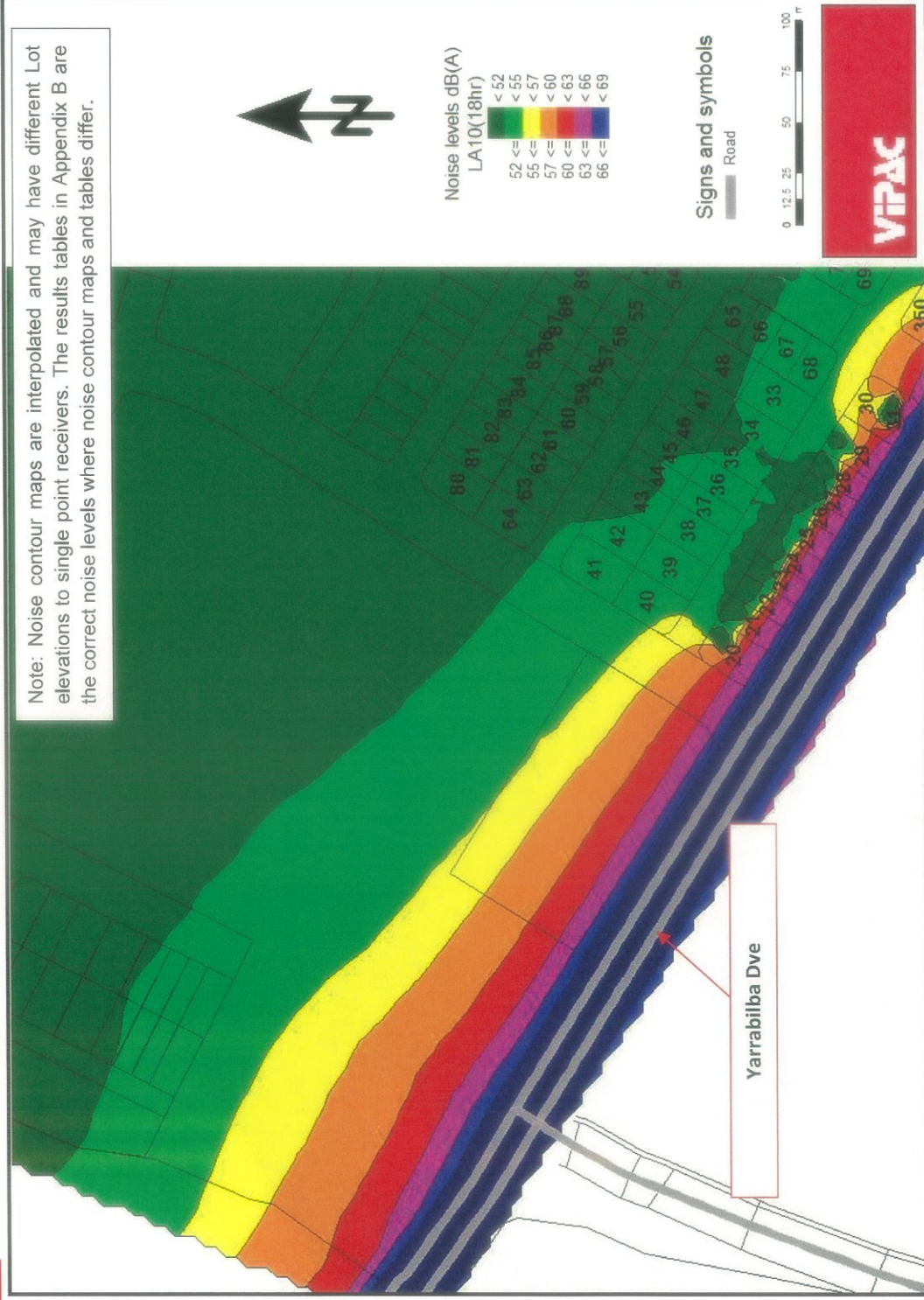


Figure A-2: Predicted Free Field $LA_{10}(18hr)$ Road Traffic Noise Levels at the Ground Floor - West

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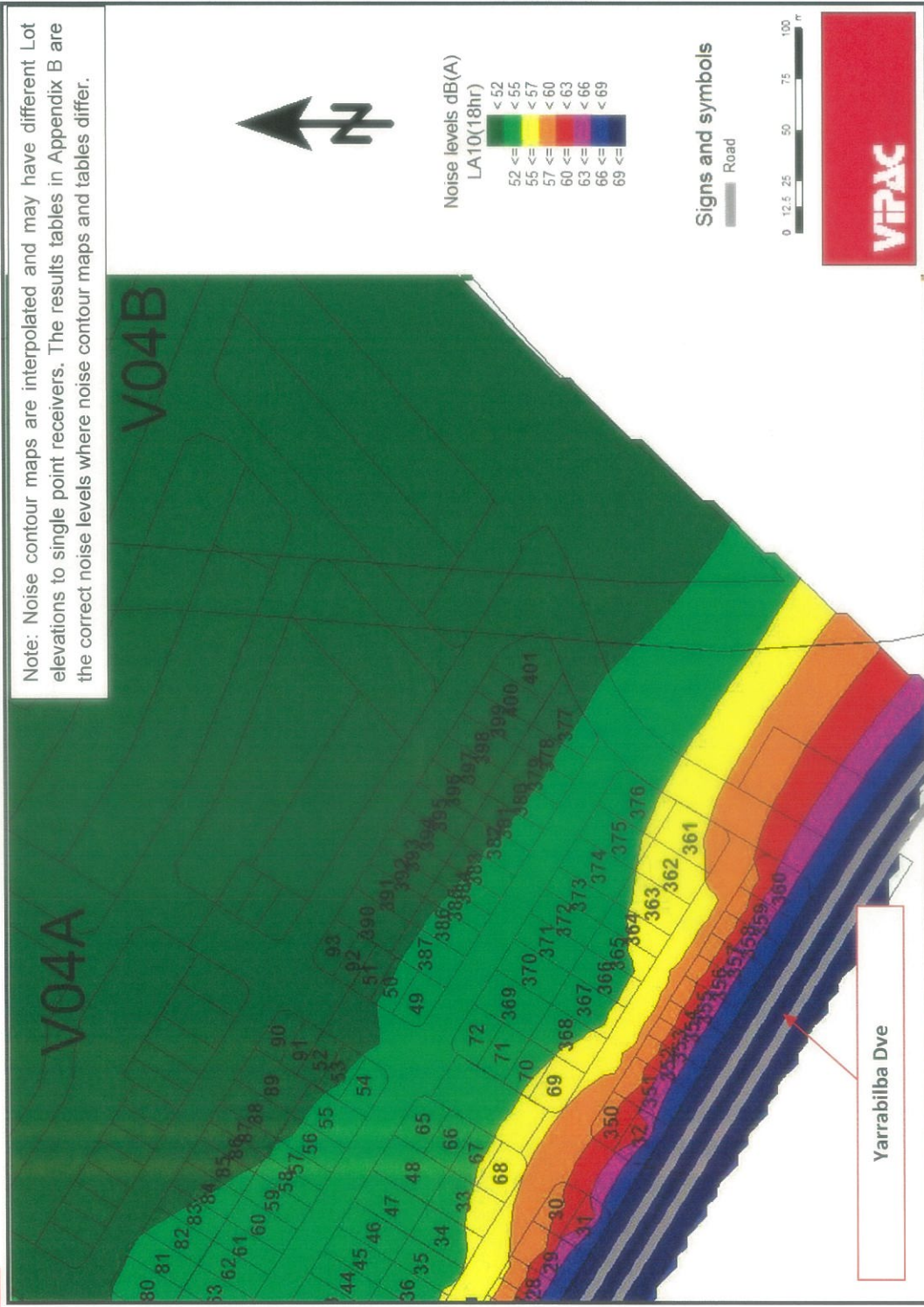


Figure A-3: Predicted Free Field $LA_{10}(18hr)$ Road Traffic Noise Levels at the First Floor - East

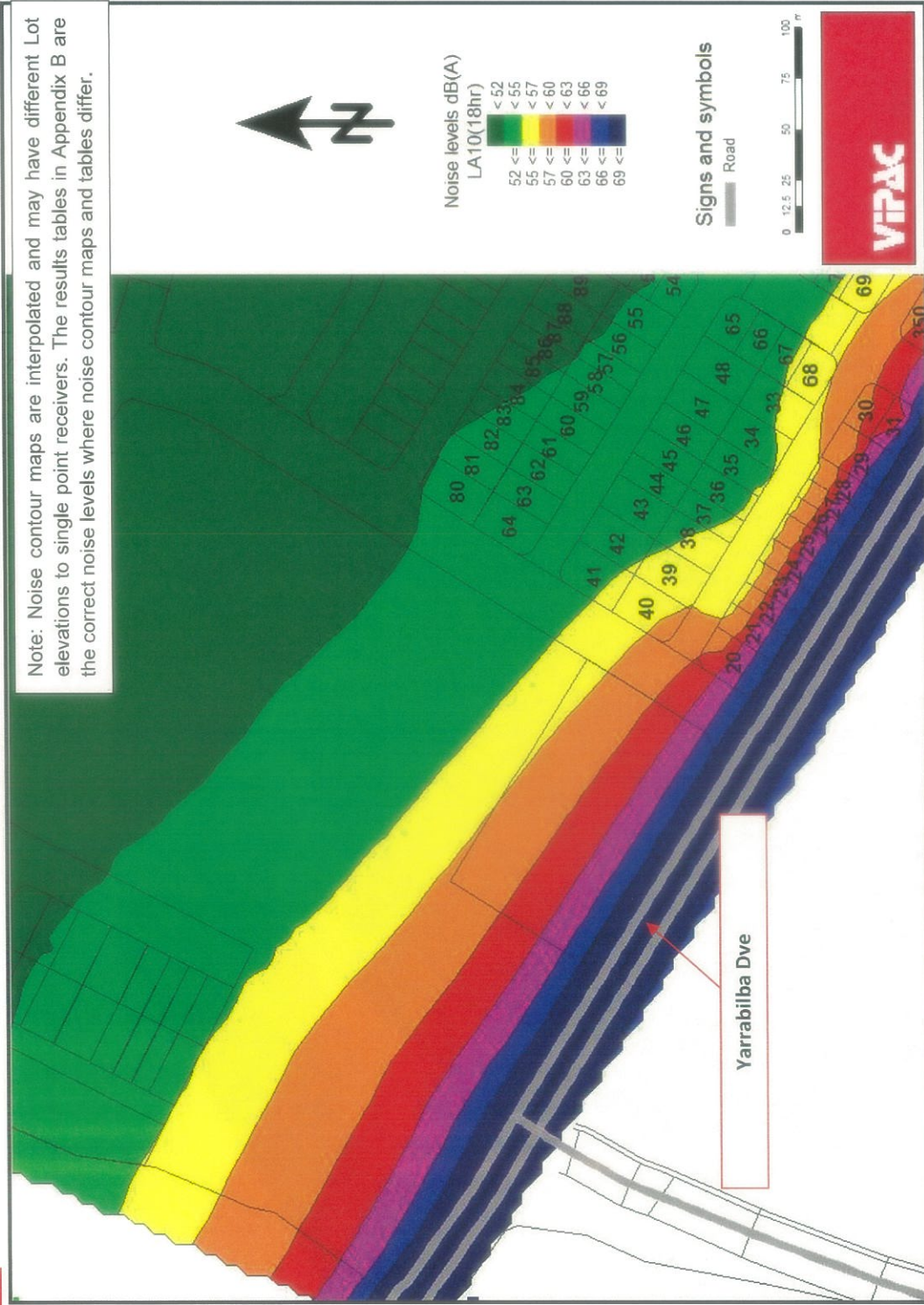


Figure A-4: Predicted Free Field $LA_{10}(18hr)$ Road Traffic Noise Levels at the First Floor - West

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APPENDIX B: CALCULATION RESULTS AND ASSUMED PAD LEVELS



Table B-1: Noise Modelling Results and Assumed Pad Heights

Lot	Assumed Building Pad AHD	Floor	Predicted Free Field L _{A10(18hr)} (dB(A))
20	46.00	Ground	67
		First	69
21	46.00	Ground	67
		First	68
22	46.00	Ground	67
		First	68
23	46.00	Ground	67
		First	68
24	46.00	Ground	67
		First	68
25	46.00	Ground	67
		First	68
26	45.56	Ground	67
		First	68
27	45.14	Ground	67
		First	69
28	44.72	Ground	67
		First	69
29	44.17	Ground	68
		First	69
30	43.15	Ground	59
		First	62
31	43.22	Ground	67
		First	68
32	40.84	Ground	67
		First	69
33	44.75	Ground	54
		First	56
34	45.49	Ground	53
		First	55
35	46.20	Ground	52
		First	55
36	46.75	Ground	52
		First	55
37	47.00	Ground	53
		First	55
38	47.00	Ground	53
		First	56
39	47.00	Ground	54
		First	57
40	46.90	Ground	55
		First	58
41	47.29	Ground	54
		First	55
42	47.46	Ground	53
		First	55
43	47.44	Ground	52
		First	55
44	47.40	Ground	52
		First	54
45	47.19	Ground	52
		First	54
46	46.70	Ground	52
		First	54
47	45.97	Ground	52
		First	54
48	45.17	Ground	52
		First	54
49	41.89	Ground	52
		First	53



Lot	Assumed Building Pad AHD	Floor	Predicted Free Field L _{A10(18hr)} (dB(A))
50	42.07	Ground	51
		First	52
51	42.17	Ground	51
		First	52
52	44.83	Ground	51
		First	52
53	44.76	Ground	51
		First	52
54	44.54	Ground	52
		First	53
55	45.78	Ground	52
		First	53
56	46.52	Ground	51
		First	53
57	47.06	Ground	51
		First	53
58	47.60	Ground	52
		First	53
59	48.11	Ground	52
		First	53
60	48.48	Ground	51
		First	53
61	48.63	Ground	51
		First	53
62	48.70	Ground	52
		First	53
63	48.49	Ground	52
		First	53
64	47.99	Ground	52
		First	53
65	44.09	Ground	52
		First	54
66	43.82	Ground	52
		First	54
67	43.62	Ground	53
		First	55
68	43.43	Ground	54
		First	57
69	40.78	Ground	54
		First	57
70	41.05	Ground	53
		First	55
71	41.20	Ground	52
		First	54
72	41.39	Ground	52
		First	54
80	48.44	Ground	51
		First	53
81	49.00	Ground	51
		First	53
82	49.38	Ground	51
		First	53
83	49.36	Ground	51
		First	52
84	49.19	Ground	51
		First	52
85	48.80	Ground	51
		First	52
86	48.09	Ground	51
		First	52



Lot	Assumed Building Pad AHD	Floor	Predicted Free Field L _{A10(18hr)} (dB(A))
87	47.40	Ground	51
		First	52
88	46.78	Ground	51
		First	52
89	45.97	Ground	51
		First	52
90	44.95	Ground	50
		First	51
91	44.86	Ground	51
		First	52
92	42.22	Ground	51
		First	52
93	42.25	Ground	50
		First	51
350	40.80	Ground	60
		First	63
351	39.73	Ground	67
		First	69
352	38.82	Ground	68
		First	69
353	38.31	Ground	67
		First	69
354	37.89	Ground	67
		First	69
355	37.50	Ground	67
		First	69
356	36.89	Ground	68
		First	69
357	36.49	Ground	67
		First	69
358	36.02	Ground	67
		First	69
359	35.52	Ground	67
		First	69
360	35.01	Ground	67
		First	69
361	34.87	Ground	56
		First	58
362	35.69	Ground	55
		First	57
363	36.61	Ground	54
		First	56
364	37.13	Ground	53
		First	56
365	37.57	Ground	53
		First	56
366	38.09	Ground	53
		First	56
367	38.89	Ground	53
		First	55
368	39.74	Ground	53
		First	56
369	40.23	Ground	53
		First	54
370	39.27	Ground	53
		First	54
371	38.55	Ground	53
		First	54
372	37.97	Ground	53
		First	55

Lot	Assumed Building Pad AHD	Floor	Predicted Free Field L _{A10(18hr)} (dB(A))
373	37.23	Ground	53
		First	55
374	36.62	Ground	53
		First	55
375	35.67	Ground	54
		First	55
376	34.85	Ground	54
		First	56
377	34.07	Ground	51
		First	53
378	34.64	Ground	51
		First	53
379	35.29	Ground	51
		First	53
380	35.94	Ground	51
		First	53
381	36.61	Ground	51
		First	53
382	37.37	Ground	52
		First	53
383	38.06	Ground	52
		First	53
384	38.57	Ground	52
		First	53
385	39.13	Ground	52
		First	53
386	39.83	Ground	52
		First	53
387	40.73	Ground	52
		First	53
390	40.95	Ground	51
		First	52
391	40.01	Ground	51
		First	52
392	39.27	Ground	51
		First	52
393	38.71	Ground	50
		First	52
394	38.16	Ground	50
		First	51
395	37.46	Ground	50
		First	51
396	36.71	Ground	50
		First	51
397	36.06	Ground	50
		First	51
398	35.33	Ground	50
		First	51
399	34.65	Ground	50
		First	51
400	34.00	Ground	50
		First	51
401	33.58	Ground	50
		First	51

