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ACN 605 729 995 P/L

GARDEN CENTRE

LOT 150 WELSHPOOL ROAD EAST, WATTLE GROVE

ACOUSTIC ASSESSMENT

SEPTEMBER 2016

OUR REFERENCE: 20914-4-16192



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1. INTRODUCTION

Herring Storer Acoustics was commissioned by ACN 605 729 995 P/L to undertake an acoustic assessment of noise emissions from a proposed garden centre located at Lot 150 Welshpool Road East, Wattle Grove.

The Garden Centre is proposed on the south-west portion of the site fronting Welshpool Road East, for the display and retail sale of a range of landscaping supplies, garden products, ornaments and implements.

The proposed garden centre site is zoned "Rural Composite" with adjacent lots to the west also zoned "Rural Composite". These lots comprise a landscaping supplies yard and animal establishment (Dog Kennels) on Lots 1 and 2 Welshpool Road East respectively. Lot 149, to the south-east of the site, accommodates a dwelling and equestrian training track. To the immediate north of the site, the land is reserved for "Parks and Recreation" and has a Bush Forever designation. Welshpool Road East is an "Other" Regional Road where it abuts the subject site. Garden Centres currently operate on Lot 146 and Lot 101 Welshpool Road East, to the south and south-east of the subject site.

This assessment takes into account the noise levels from delivery of materials for the garden centre and; customer loading within the garden centre. The assessment is provided to support an application for planning approval.

The proposed Garden Centre will be operated on the following basis:

Opening Hours:	Monday – Saturday 6:30am – 5:00pm
	Sunday 7.30am – 5.00pm (Including Public Holidays)

As part of the study, the following was carried out:

- Identification of individual operations and the associated noise levels.
- Monitoring of existing ambient noise.
- Assess the predicted noise levels at the nearest surrounding noise sensitive premises for compliance with the appropriate criteria.
- If exceedances are predicted, comment on possible noise amelioration options for compliance with the appropriate criteria.

For information, a locality plan is shown in Appendix A.

2. SUMMARY

Assessment has been conducted on the proposed garden centre operations at Lot 150 Welshpool Road East, Wattle Grove.

For noise associated with the garden centre, the applicable criterion for this assessment is an L_{A10} 39 to 41 dB(A) for the nearest residential locations given the proposed hours of operation (prior to 09:00 Sundays). It is noted that whilst the neighbouring residences have been considered as noise sensitive premises, they conduct similar types of businesses (garden centres / dog kennels) or are closely located to existing activities similar to the proposed garden centre, hence the acceptability of the new business is likely to have minimal impact on the existing acoustic environment.

Noise received at the residential premises, for the worst case garden centre operating scenario has been determined, to be L_{A10} 34 to 40 dB(A) dependant on the location.

Ambient noise monitoring of the area resulted in a day time noise level generally around 64 dB(A). Given the background noise level, the noise emission attributable to the proposed garden centre would not contain any annoying characteristics, such as tonality or impulsiveness, therefore would not attract any penalties in accordance with the regulations.

The above noise levels are based on an operating scenario for prior to 09:00 Sundays and Public Holidays and prior to 07:00 weekdays and Saturday with the following conditions:

- No Delivery of materials.
- No operations of the large loader and excavator (Equipment used is the mini loaders and forklifts).

For other time periods, operation of all equipment and delivery of material complies.

Given these operating parameters, noise levels received at the nearest premises has been calculated to comply with the *Environmental Protection (Noise) Regulations 1997* for the operating times as outlined in this assessment.

3. CRITERIA

The allowable noise level at the surrounding locales is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate maximum allowable external noise levels determined by the calculation of an influencing factor, which is then added to the base levels shown below. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern.

TABLE 1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF
Industrial and Utility Premises	All Hours	65	80	90

Note: L_{A10} is the noise level exceeded for 10% of the time.
 L_{A1} is the noise level exceeded for 1% of the time.
 L_{Amax} is the maximum noise level.
 IF is the influencing factor.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

“impulsiveness” means a variation in the emission of a noise where the difference between L_{Apeak} and $L_{Amax Slow}$ is more than 15 dB when determined for a single representative event;

- “modulation”** means a variation in the emission of noise that –
- (a) is more than 3dB $L_{A \text{ Fast}}$ or is more than 3 dB $L_{A \text{ Fast}}$ in any one-third octave band;
 - (b) is present for more at least 10% of the representative assessment period; and
 - (c) is regular, cyclic and audible;
- “tonality”** means the presence in the noise emission of tonal characteristics where the difference between –
- (a) the A-weighted sound pressure level in any one-third octave band; and
 - (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,
- is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A \text{ Slow}}$ levels.

Where the noise emission is not music, if the above characteristics exist and cannot be practicably removed, then any measured level is adjusted according to Table 2 below.

TABLE 2 - ADJUSTMENTS TO MEASURED LEVELS

Where tonality is present	Where modulation is present	Where impulsiveness is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: These adjustments are cumulative to a maximum of 15 dB.

The nearest potential noise sensitive premises to the proposed development have been identified using the area map in Figure 1. Due to location of the premises the influencing factor has been assessed as 4 to 6 dB(A).

Abbedale Park, Res A and B

Major Roads within 100m

Tonkin Highway or Welshpool Road East +6 dB

Res C

Major Roads within 450m

Tonkin Highway and Welshpool Road East +4 dB

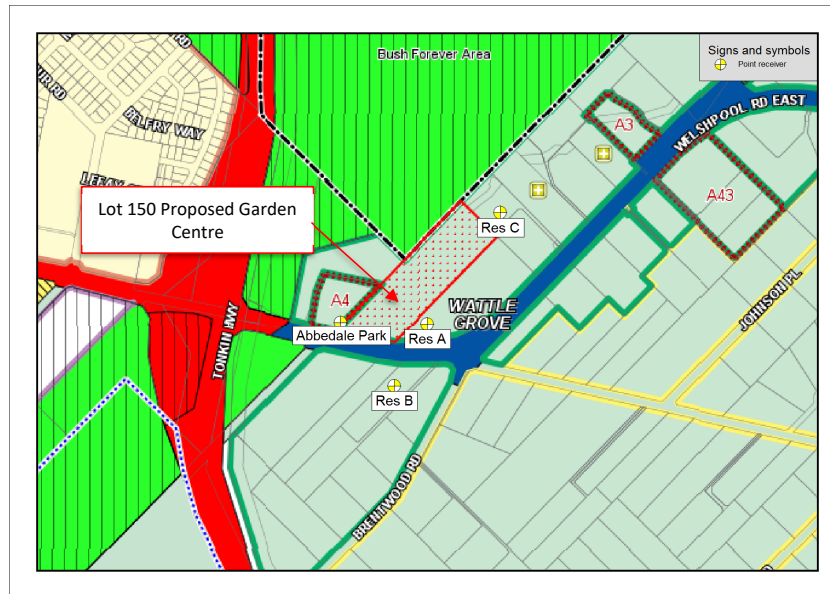


FIGURE 1 – RECEIVER LOCATIONS

4. CALCULATED NOISE LEVELS

Noise immissions¹ at the nearest neighbouring residential premises, due to noise associated with the proposed garden centre operations, were modelled with the computer programme SoundPlan. Sound power levels used for the calculations are based on measured sound pressure levels of similar equipment proposed for use on site.

The modelling of noise levels has been based on noise sources and sound power levels shown in Table 3.

TABLE 3 – SOUND POWER LEVEL - NOISE SOURCES dB(A)

Element name	Unit	Frequency Hz									dB(A)
		31.5	63	125	250	500	1k	2k	4k	8k	Sum
Forklift	dB(A)	-	57	61	65	68	71	69	64	59	75
Front End Loader (Garden Centre)	dB(A)	46	72	73	80	86	93	90	87	82	101
		48	60	70	81	89	93	91	86	78	
		58	68	76	85	91	91	89	88	73	
Mini Loader	dB(A)	59	68	84	83	90	93	89	83	73	96
Semi-trailer Truck (Delivery)	dB(A)	35	54	66	82	84	90	86	77	68	98
		40	53	70	79	88	88	85	74	66	
		53	60	75	83	92	87	81	71	63	
Customer Vehicle	dB(A)	-	50	59	62	68	69	70	69	-	75
Pump	dB(A)	-	32	49	62	63	68	67	63	-	72

¹ Immissions – noise received at a source

² Emissions – noise emanating from a source and / or location

Based on noise emissions² from the above equipment, the following two operating scenarios were developed:

1. An overall, worst case operating scenario has been developed. This scenario allows for all equipment to be operating at the same time, within the garden centre. The equipment comprises the following:
 - A. Forklifts x 2;
 - B. Front End Loader x 1;
 - C. Excavator x 1; and
 - D. Semi-Trailer Truck x 1.
 - E. Pond pumps x 3
 - F. Customer vehicles
2. A second scenario for the Sunday and Public Holiday prior to 09:00 am operations. For this scenario, the equipment is limited to the following:
 - A. Forklifts x 2; and
 - B. Mini Loader x 1.
 - C. Pond pumps x 3
 - D. Customer vehicles

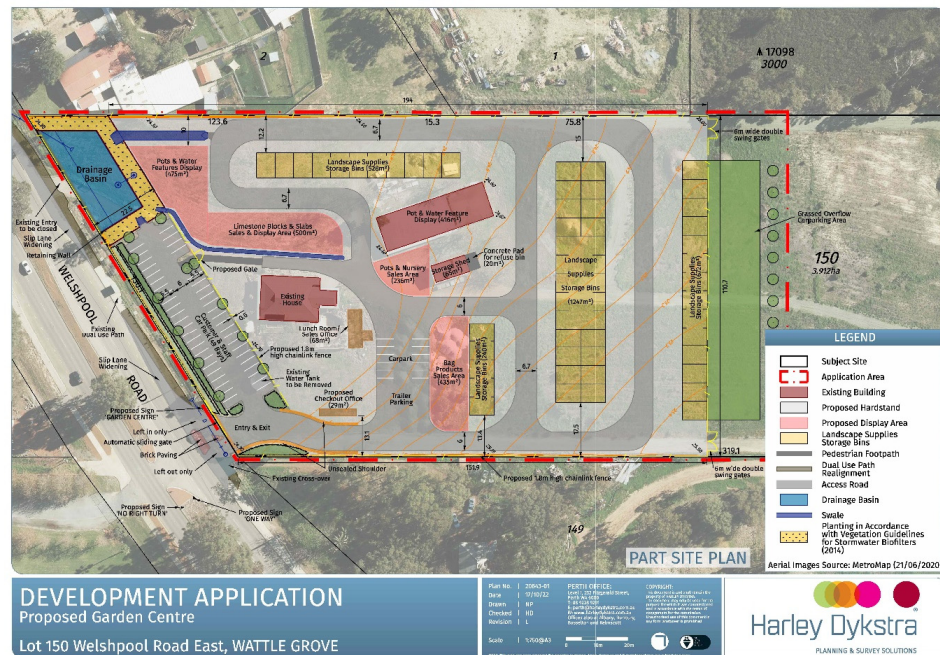


FIGURE 2 – SITE LAYOUT

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This is understood that the above scenario would be representative of the maximum noise levels associated with the proposed garden centre.

The following input data was used in the calculations:

- a) Provided backgrounds.
- b) Sound Power Levels listed in Table 4.
- c) Ground contours and receiver point provided by client.

Weather conditions for modelling were as stipulated in the Environmental Protection Authority's "Draft Guidance for Assessment of Environmental Factors No. 8 - Environmental Noise" and for the day period are as listed in Table 4.

TABLE 4 – WEATHER CONDITIONS

Condition	Night	Day
Temperature	15°C	20°C
Relative humidity	50%	50%
Pasquill Stability Class	F	E
Wind speed	3 m/s*	4 m/s*

* From sources, towards receivers.

5. MONITORING

To establish the current acoustic environment, noise monitoring has been carried out. An acoustic monitor was located at the proposed development site and set to record continuous noise levels between 8th and 23rd February 2017 in accordance with the guidelines contained in the Environmental Protection (Noise) Regulations 1997.

Noise monitoring results are summarised below in table 5, with the graphical results contained in Appendix C and pictures in Figure 3.

TABLE 5 – AVERAGE AMBIENT NOISE LEVELS (L_{Aeq})

Day of Week	Date	Average Day time (0700 to 1800) Noise Level dB(A)	Comment
08/02/2017	Wednesday	64	
09/02/2017	Thursday	66	
10/02/2017	Friday	67	Discounted Due to Rain
11/02/2017	Saturday	65	Discounted Due to Rain
12/02/2017	Sunday	63	
13/02/2017	Monday	65	
14/02/2017	Tuesday	64	
15/02/2017	Wednesday	64	
16/02/2017	Thursday	64	
17/02/2017	Friday	64	
18/02/2017	Saturday	62	
19/02/2017	Sunday	62	
20/02/2017	Monday	64	
21/02/2017	Tuesday	66	
22/02/2017	Wednesday	64	
23/02/2017	Thursday	66	
Average		64	



FIGURE 3 – MONITORING LOCATION

6. RESULTS

Calculated noise levels associated with the noise emissions from the proposed garden centre for the two scenarios is summarised below in Table 6. Appendix B contains the noise contour plot.

TABLE 6 – CALCULATED NOISE LEVEL

Receiver	Scenario 1	Scenario 2
	All Equipment Operating (L_{A10})	Limited Equipment Operating (L_{A10})
Abbedale Park (714 Welshpool Rd East)	43	36
Res A (740 Welshpool Rd East)	43	40
Res B (737 Welshpool Rd East)	37	34
Res C (776 Welshpool Rd East)	41	38

7. ASSESSMENT

The above noise levels are considered to not contain tonal characteristics, due to the ambient noise associated with nearby major road (Welshpool Road and Tonkin Highway).

Hence, Table 7 summarises assessable noise level emissions, for the scenarios considered.

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TABLE 7 – ASSESSMENT OF GARDEN CENTRE OPERATIONS L_{A10} NOISE LEVELS

Premises Receiving Noise	Operating Parameters		Time of Day	Assigned Level (dB)	Compliance	
	Scenario 1	Scenario 2			Scenario 1	Scenario 2
Abbedale Park (714 Welshpool Rd East)	43	36	0700 - 1900 hours Monday to Saturday (Day)	51	Complies	Complies
			0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period) 1900 - 2200 hours all days (Evening)	46	Complies	Complies
			2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	41	+2	Complies
Res A (740 Welshpool Rd East)	43	40	0700 - 1900 hours Monday to Saturday (Day)	51	Complies	Complies
			0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period) 1900 - 2200 hours all days (Evening)	46	Complies	Complies
			2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	41	+2	Complies
Res B (737 Welshpool Rd East)	37	34	0700 - 1900 hours Monday to Saturday (Day)	51	Complies	Complies
			0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period) 1900 - 2200 hours all days (Evening)	46	Complies	Complies
			2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	41	Complies	Complies
Res C (776 Welshpool Rd East)	41	38	0700 - 1900 hours Monday to Saturday (Day)	49	Complies	Complies
			0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period) 1900 - 2200 hours all days (Evening)	44	Complies	Complies
			2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	39	+2	Complies

8. CONCLUSION

Assessment has been conducted on the proposed garden centre operations at Lot 150 Welshpool Road East, Wattle Grove.

For noise associated with the garden centre, the applicable criterion for this assessment is an L_{A10} 39 to 41 dB(A) for the nearest residential locations given the proposed hours of operation (prior to 09:00 Sundays). It is noted that whilst the neighbouring residences have been considered as noise sensitive premises, they conduct similar types of businesses (garden centres / dog kennels) or are closely located to existing activities similar to the proposed garden centre, hence the acceptability of the new business is likely to have minimal impact on the existing acoustic environment.

Noise received at the residential premises, for the worst case garden centre operating scenario has been determined, to be L_{A10} 34 to 40 dB(A) dependant on the location.

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The above noise levels are based on an operating scenario for the prior to 09:00 Sundays and Public Holidays and prior to 07:00 weekdays and Saturday with the following conditions:

- No Delivery of materials.
- No operations of the large loader and excavator (Equipment used is the mini loaders and forklifts).

For other time periods, operation of all equipment and delivery of material complies.

Ambient noise monitoring of the area resulted in a day time noise level generally around 64 dB(A). Given the background noise level, the noise emission attributable to the proposed garden centre would not contain any annoying characteristics, such as tonality or impulsiveness, therefore would not attract any penalties in accordance with the regulations.

Given these operating parameters, noise levels received at the nearest premises have been calculated to comply with the *Environmental Protection (Noise) Regulations 1997* for the operating times as outlined in this assessment.

APPENDIX A

FIGURE A1 – LOCATION MAP

FIGURE A2 – RECEIVER LOCATION

FIGURE A3 – GARDEN CENTRE LAYOUT

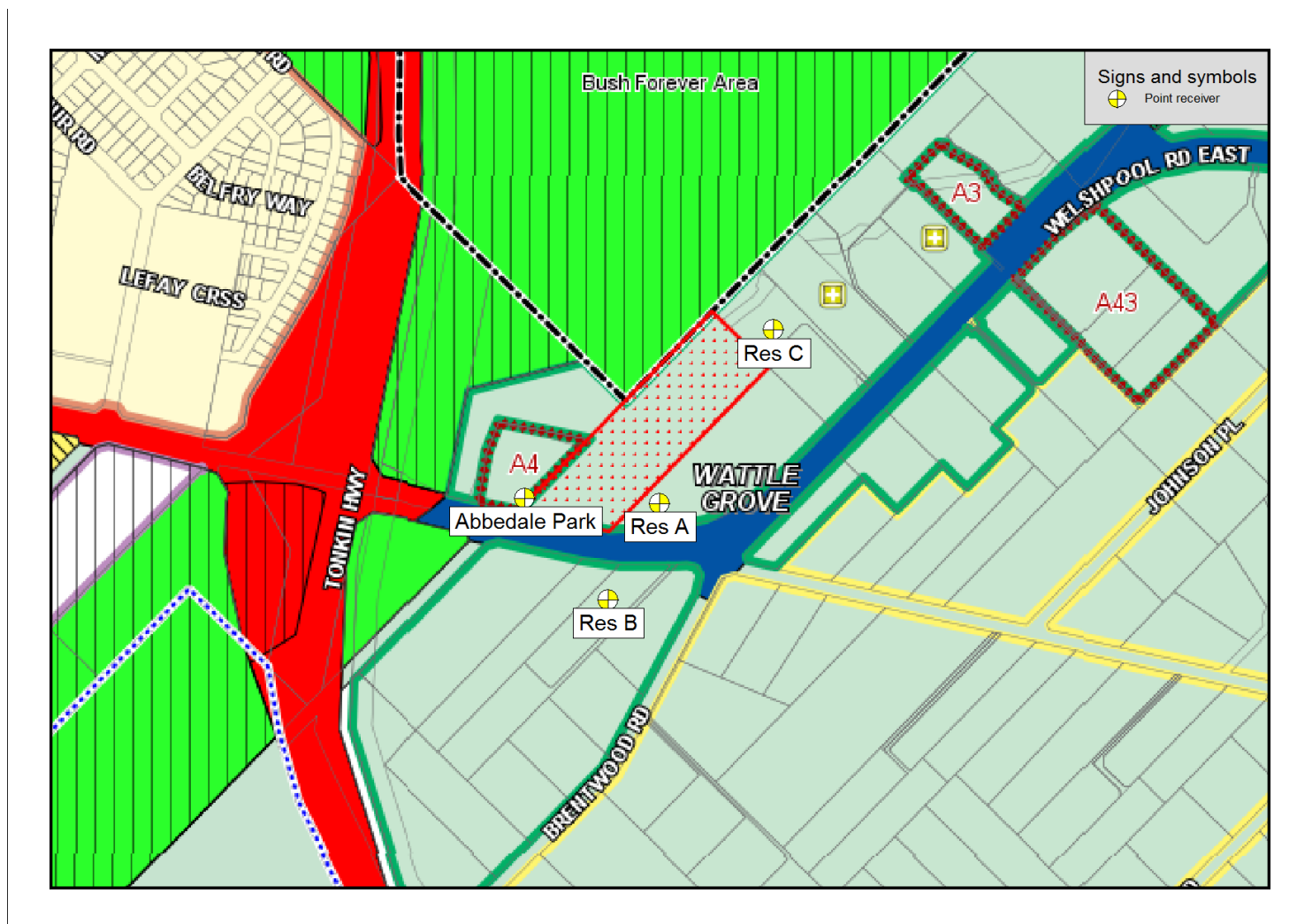
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Appendix A

FIGURE A1 – LOCATION MAP



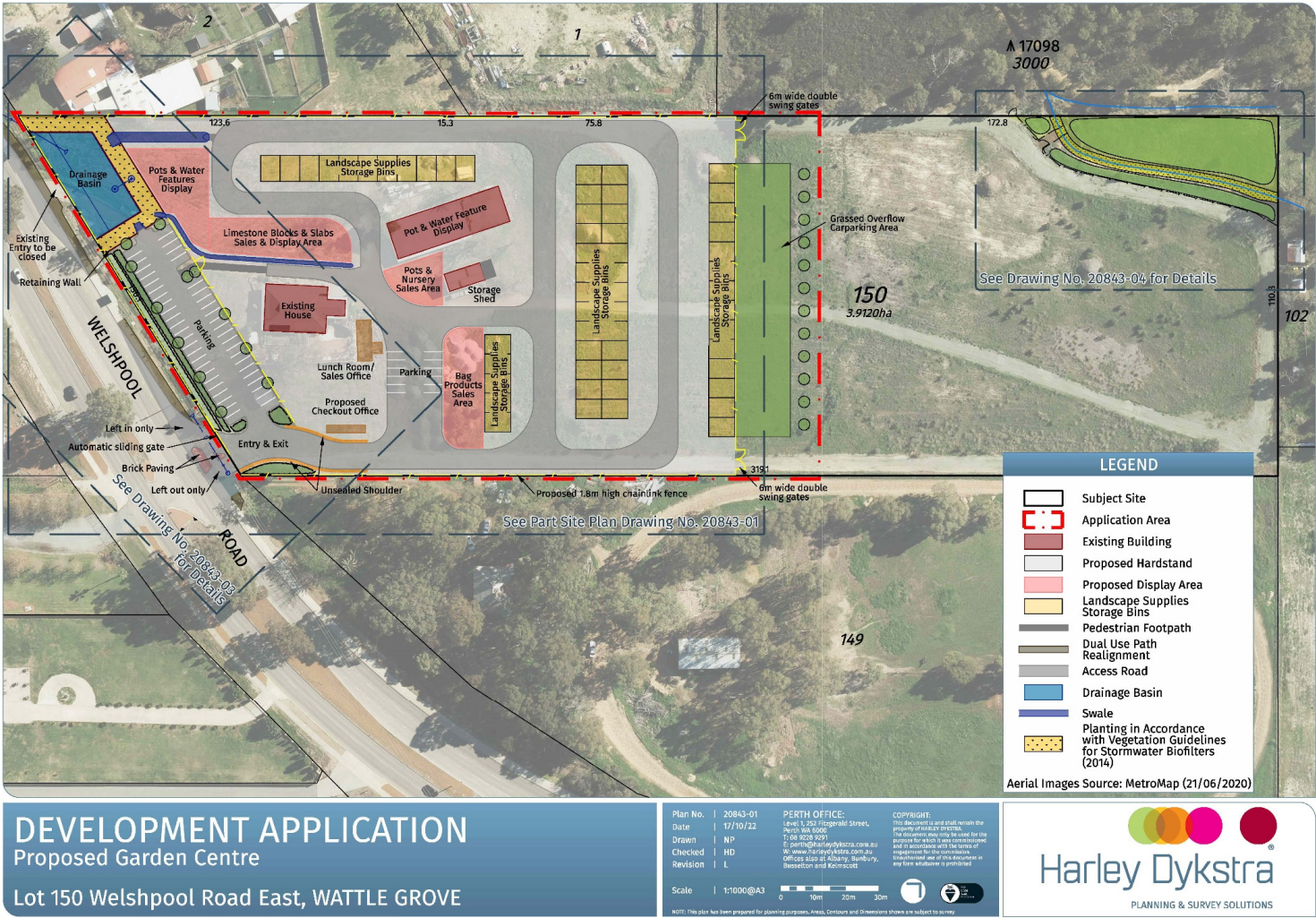
FIGURE A2 – RECEIVER LOCATION



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Appendix A

FIGURE A3 – GARDEN CENTRE LAYOUT

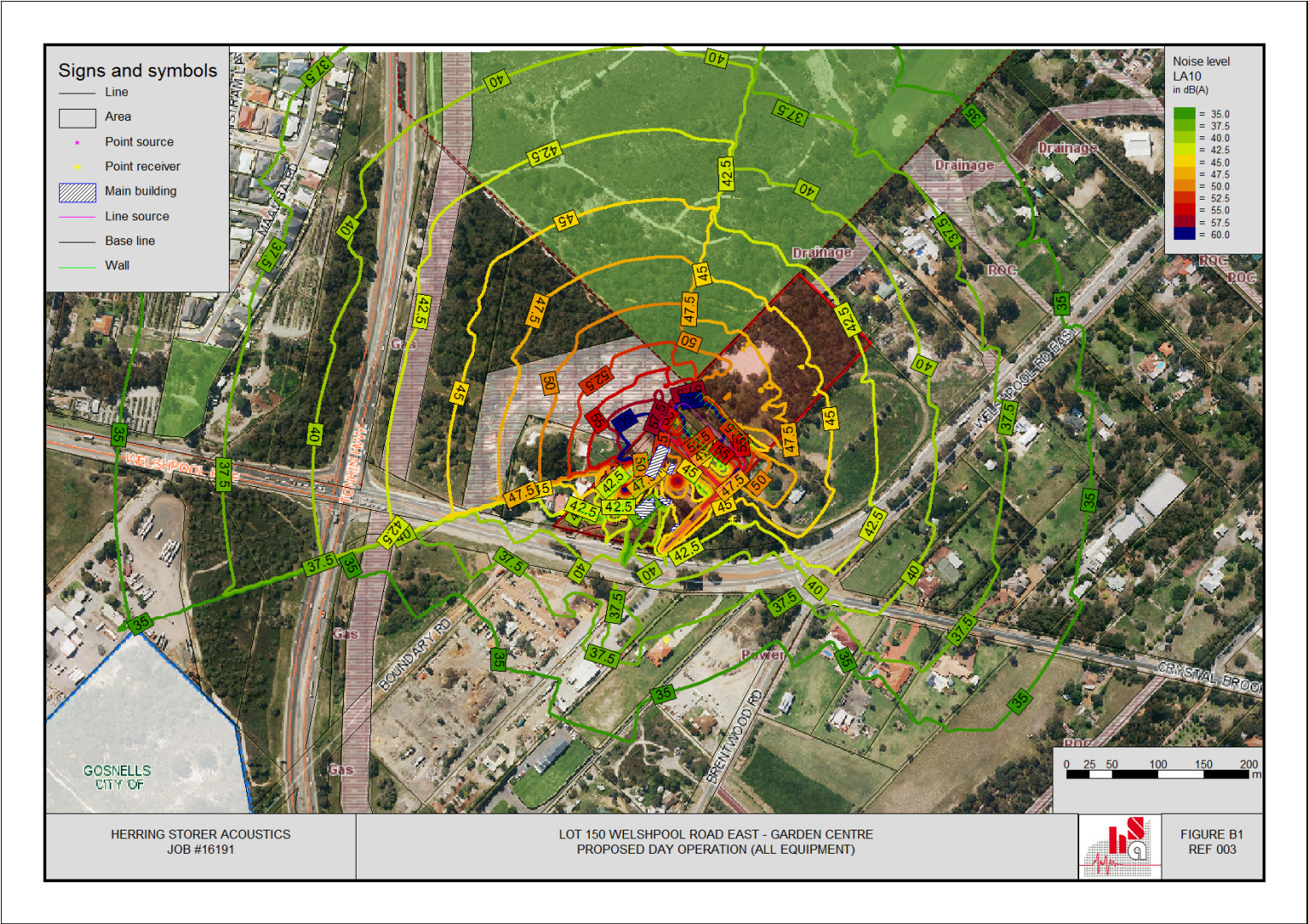


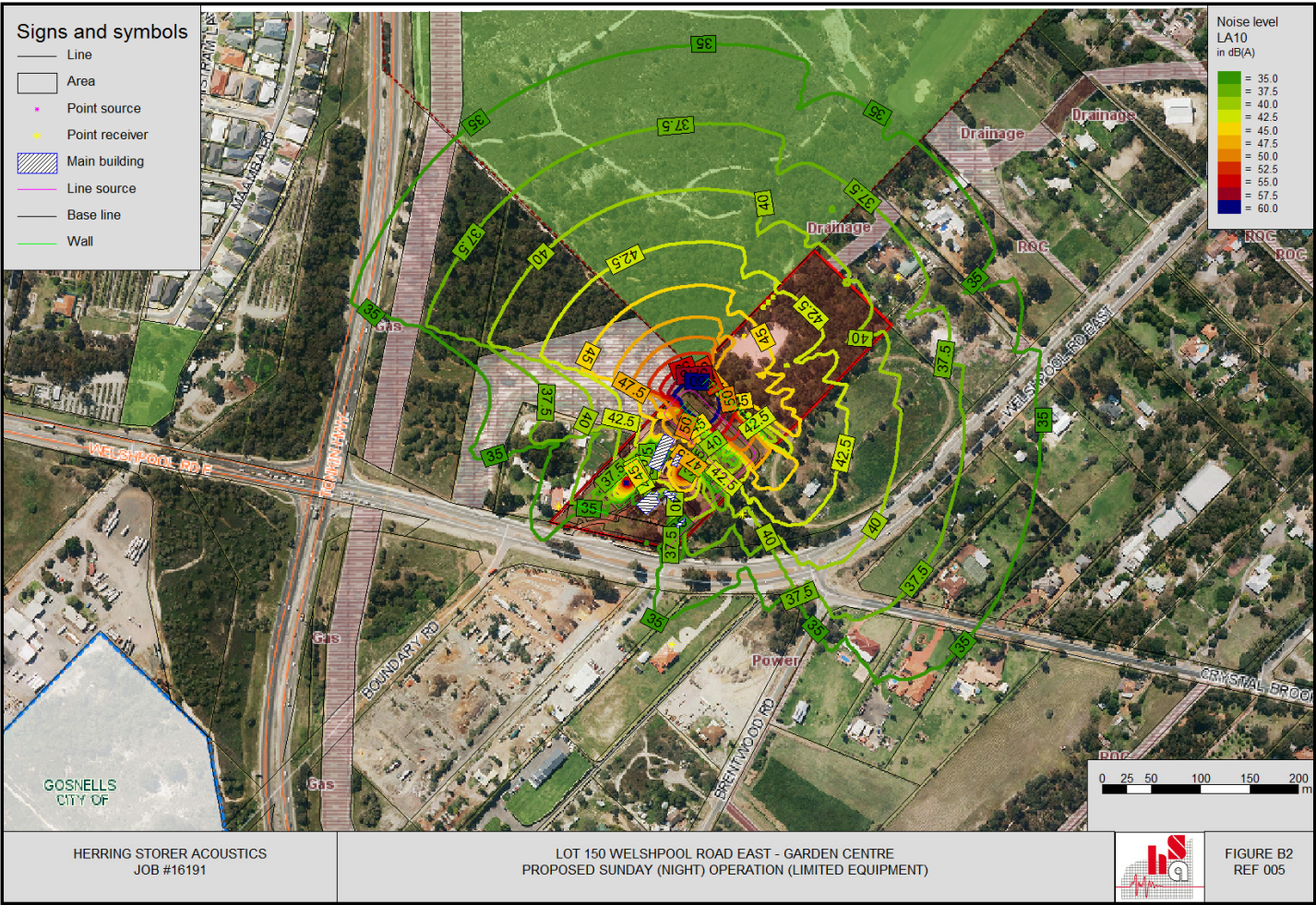
APPENDIX B

NOISE CONTOURS

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APPENDIX C

NOISE MONITORING RESULTS

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