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Hydrox Nominees Pty Ltd

Masters Home Improvement Store, Dalton Drive East, Maroochydore

Noise Impact Assessment

70Q-14-0324-TRP-517457-1

8 Oct 2015

Job Title: Masters Home Improvement Store, Dalton Drive East, Maroochydore **Report Title: Noise Impact Assessment**	
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EXECUTIVE SUMMARY

Vipac Engineers & Scientists Ltd (Vipac) has completed a Noise Impact Assessment for the proposed Masters Home Improvement (MHI) store located on Dalton Drive East, Maroochydore. The impacts of noise emissions from the development on neighbouring Noise Sensitive Receivers (NSRs) have been considered and assessed according to Economic Development Queensland, State Planning Policy 5/10 and the Department of Environment and Heritage Protection noise criteria.

Noise sources associated with the proposed development include:

- Mechanical plant noise;
- Car park noise;
- Truck deliveries noise; and
- Refuse collection noise.

The following noise mitigation is proposed by Vipac for noise levels at NSRs to comply with applicable noise limits:

- A 10m wide landscape buffer separating the townhouses adjacent to the eastern property boundary of the site from the closest part of the MHI (a service road) is required (proposed by Masters);
- A noise barrier 2m in height is required on the western edge of the landscaped buffer (adjacent to the service road east of the proposed MHI building), as detailed in this report. Note that although a 2m noise barrier is adequate, a 4m fence has been included in the design layout by the proponent for the loading area which will provide additional noise shielding. The 2m noise barrier should continue around the bin collection area, with no gaps, and should extend all the way to the southern site boundary, as presented in Figure 5-2.

  Noise barriers may consist of an earth mound, an acoustic fence, or a combination thereof. Barriers should be constructed in accordance with Department of Transport and Main Roads Standard Specification MRS 11.15, "Noise Barriers". Of most importance, barriers should have no gaps between palings, or between palings and posts and ground. A minimum surface density of 12.5kg/m^2 should be used;
- Selection of the total mechanical plant system (including rooftop plant, plant rooms, exhaust and inlet vents and any other plant) to have a total sound power level of 76 dB(A). Higher noise levels may be permitted with additional noise mitigation measures such as acoustic screens or enclosures or by locating plant away from nearby residences;
- For car park usage by staff outside the hours of 7am and 10pm, a noise management plan should be put in place to advise staff to use the car park west of the MHI building to minimise the potential for noise disturbance;
- Truck deliveries should not occur (and forklifts should not operate) between the hours of 10pm and 7am; and
- Refuse collection should not occur between the hours of 10pm and 7am.

The following recommendation to reduce noise is not required to comply with the applicable noise criteria. However, this will further reduce noise impacts associated with the development:

- Signage should be used to encourage delivery truck drivers to close truck doors quietly, stop engines when they are not required, minimize revving and use care when unloading cargo.

In conclusion, noise impacts associated with the proposed development can be controlled to an acceptable level by implementing the recommendations in this report.

TABLE OF CONTENTS

1. INTRODUCTION

Vipac Engineers & Scientists Ltd (Vipac) was commissioned by Hydrox Nominees to provide a noise impact assessment for the proposed Masters Home Improvement store (MHI), to be located on Dalton Drive East, Maroochydore.

The purpose of this assessment is to determine the impacts of any potential noise emissions from the development onto neighbouring noise sensitive receivers (NSRs).

Noise impacts have been assessed in accordance with Economic Development Queensland (EDQ), State Planning Policy 5/10 (SPP 5/10) and the Department of Environment and Heritage Protection (EHP) noise criteria.

2. PROPOSED DEVELOPMENT AND SURROUNDING AREA

The proposed development is to consist of a Home Improvement Store, located on Dalton Drive East, Maroochydore.

The following information about the surrounding area was observed on site and presented in Figure 2-1:

- North: Vacant land and golf course;
- East: Two storey townhouses on Dalton Drive and golf course;
- South: Dalton Drive, and further south two storey townhouses on Dalton Drive; and
- West: Dalton Drive, and further west vacant land.

The nearest NSRs are the two storey townhouses immediately east of the development at 47 to 49 Dalton Drive and the townhouse south of the site at 54 Dalton Drive. A 10m landscape buffer separating the eastern property boundary from the closest part of the MHI (a service road) is proposed by Masters.

Noise sources associated with the proposed development that may potentially impact on NSRs include:

- Car parking;
- Refuse collection,
- Truck deliveries; and
- Mechanical plant.

Figure 2-1: Aerial Photograph of the Site, NSRs and Noise Monitoring Location

3. EXISTING NOISE LEVELS

Unattended noise logging was conducted to obtain background noise levels for the purposes of calculating noise limits.

An environmental noise logger was used to measure the existing noise levels on site. The location of the noise logger is shown in Figure 2-1. Noise monitoring was conducted between 7th of November, 2014 and the 18th of November 2014 on site. The instrumentation, measurement details and measurement results are presented in Appendix A.

Background noise levels used to determine noise limits are presented in Table 3-1.

Table 3-1:Measured Background Noise Levels Used to Calculate Noise Limits

Noise Descriptor	Day (7am to 6pm)	Evening (6pm to 10 pm)	Night (10pm to 7am)
L_{A90}	45	50	46

4. NOISE POLICY

The major noise sources and the applicable noise criteria are summarised in Table 4-1.

Table 4-1: Noise Sources and Applicable Noise Policies

Noise Source	Applicable Noise Criteria
Mechanical plant noise	Environmental Protection Act 1994 (Reprinted as in force on January 1st 2009), Division 3, Default Noise Standards, Section 440U Air Conditioning and Section 440V Refrigeration Equipment (EPA 1994) Economic Development Queensland's (EDQ's) PDA Guideline no. 14, "Environmental values and sustainable resource use" State Planning Policy 5/10 Guideline, "Air Noise and Hazardous Materials" Environmental Protection (Noise) Policy 2008 - Acoustic Quality Objectives
Truck deliveries, refuse collection, car parking	Economic Development Queensland's (EDQ's) PDA Guideline no. 14, "Environmental values and sustainable resource use" State Planning Policy 5/10 Guideline, "Air Noise and Hazardous Materials" Environmental Protection (Noise) Policy 2008 - Acoustic Quality Objectives

Based on the noise criteria presented in Table 4-1 and the noise monitoring results presented in Section 3, the applicable noise limits for all noise sources are presented in Table 4-2. The noise limits have been derived from the strictest noise limits in the applicable noise policies. A full discussion of all applicable noise criteria is presented in Appendix B.

Table 4-2: All Applicable Noise Limits

Noise Source	Noise Criteria	Noise Limit	Period	Where
Air-conditioning and mechanical plant	EPP 2008 Acoustic Quality Objectives	50 dB(A) L_{A90}	Day (7am to 6pm)	At the external façade of neighbouring residences
		50 dB(A) L_{A90}	Evening (6m to 10pm)	At the external façade of neighbouring residences
		35 dB(A) L_{A90}[1]	Night (10pm to 7am)	At the external façade of neighbouring residences
Truck deliveries, refuse collection, car parking	EPP 2008 Acoustic Quality Objectives	65 dB(A) L_{A1}[1]	Day (7am to 10pm)	At the external façade of neighbouring residences
		45 dB(A) L_{A1}[1]	Night (10pm to 7am)	At the external façade of neighbouring residences

[1] *Noise limit includes a 5 dB(A) factor for attenuation of noise from outdoors to indoors, assuming partially open windows*

5. NOISE MODELLING METHODOLOGY

Noise calculations were carried out using SoundPLAN noise modelling software. A 3D computational model was created based on the data in Table 5-1 and the drawings in Appendix C.

Table 5-1: Data and Assumptions Used in Noise Modelling

Parameter	Data
Neighbouring residence locations	Site inspection and Google Earth geographical software
Neighbouring residence receiver heights	1.8m above and 4.6m above natural terrain as obtained from elevation data for ground floor and first floor receivers respectively
Calculation method	International standard ISO 9613 2:1996, "Acoustics - Attenuation of sound during propagation outdoors – Part 2: General method of calculation" (ISO 9613) as implemented in SoundPLAN software. An example noise calculation is included in Appendix D.
Terrain Data	2014.11.11-From Civil N-B9083.30 - X - SURVEY.dwg, received from Cardno HRP 24/11/2014

5.1 Car Park Noise

Potential car park noise emissions include:

- Engine starts,
- Car revving; and
- Car door slams.

The highest noise emissions associated with a car park is typically a car door slam. A point noise sources was entered in the noise model to represent noise emissions in a representative worst-case location. An L_{Amax} sound power spectra with an overall level of 93 dB(A) was used for the point source. This value has been previously measured by Vipac.

The location of the car park noise source is presented in Figure 5-1.

5.2 Truck Deliveries Noise

Delivery trucks will travel along the access road at the east side of the site. Delivery trucks will enter from the south, deliver to the Garden Centre dock and main receiving dock, and exit north of the site. The site layout has been designed to allow trucks to stop in front of loading docks to be loaded/unloaded through the side, without the need for trucks to reverse into the loading docks (see Figure 5-1).

The highest noise source associated with delivery trucks are engine noise. Noise sources were entered in the noise model to represent the noise emissions from truck engine noise. Sound power spectra with an overall level of 94 dB(A) previously measured by Vipac was used for these noise sources.

Forklifts may help transfer the delivered items from the loading bay into the building. Masters have advised that forklifts will only be used at the main receiving dock (at the northeast corner of the site). Noise sources associated with forklifts include forklift engine noise, pallet jack noise, and reverse beepers. Of these, the highest noise source is expected to be forklift reverse beepers. A forklift reverse beeper noise source with a sound power of 104 dB(A) (including a tonal penalty of 5 dB(A)) has been entered into the noise model near the main receiving dock area of the MHI building.

5.3 Refuse Collection Noise

Refuse collection was modelled as a bin being lifted by a truck by means of a hydraulic system and then being put down (dropped) on the ground The sound power levels used for the bin lifting and dropping noise sources were 88 dB(A) for the hydraulic lift system and 108 dB(A) for the bin dropping.

Additionally, a truck engine noise source was incorporated in the noise model to predict truck movements. A sound power level of 94 dB(A) for engine noise been has been used for this noise source. Refuse trucks will travel along the access road at the east side of the site, entering from the south and exiting north of the site without requiring to reverse(see Figure 5-1).

Bin lifting and dropping noise source were located at the bin area at the northeast of the site as presented in Figure 5-1.

5.4 Mechanical Plant Noise

At this stage, mechanical plant specifications are unknown. In order to predict noise impacts, a point source was entered in the noise model on the MHI building roof in a representative worst-case location. The purpose was to determine a maximum permitted sound power level that would achieve compliance with the noise criteria.

A sound power spectrum with overall level of 93 dB(A) L_{Aeq} was used. The location of the mechanical plant noise source is presented in Figure 5-1.

5.5 Noise Source Locations

Figure 5-1 shows the location of all the noise sources, as entered in the noise model. Note that the mechanical plant noise source is located on the rooftop level.

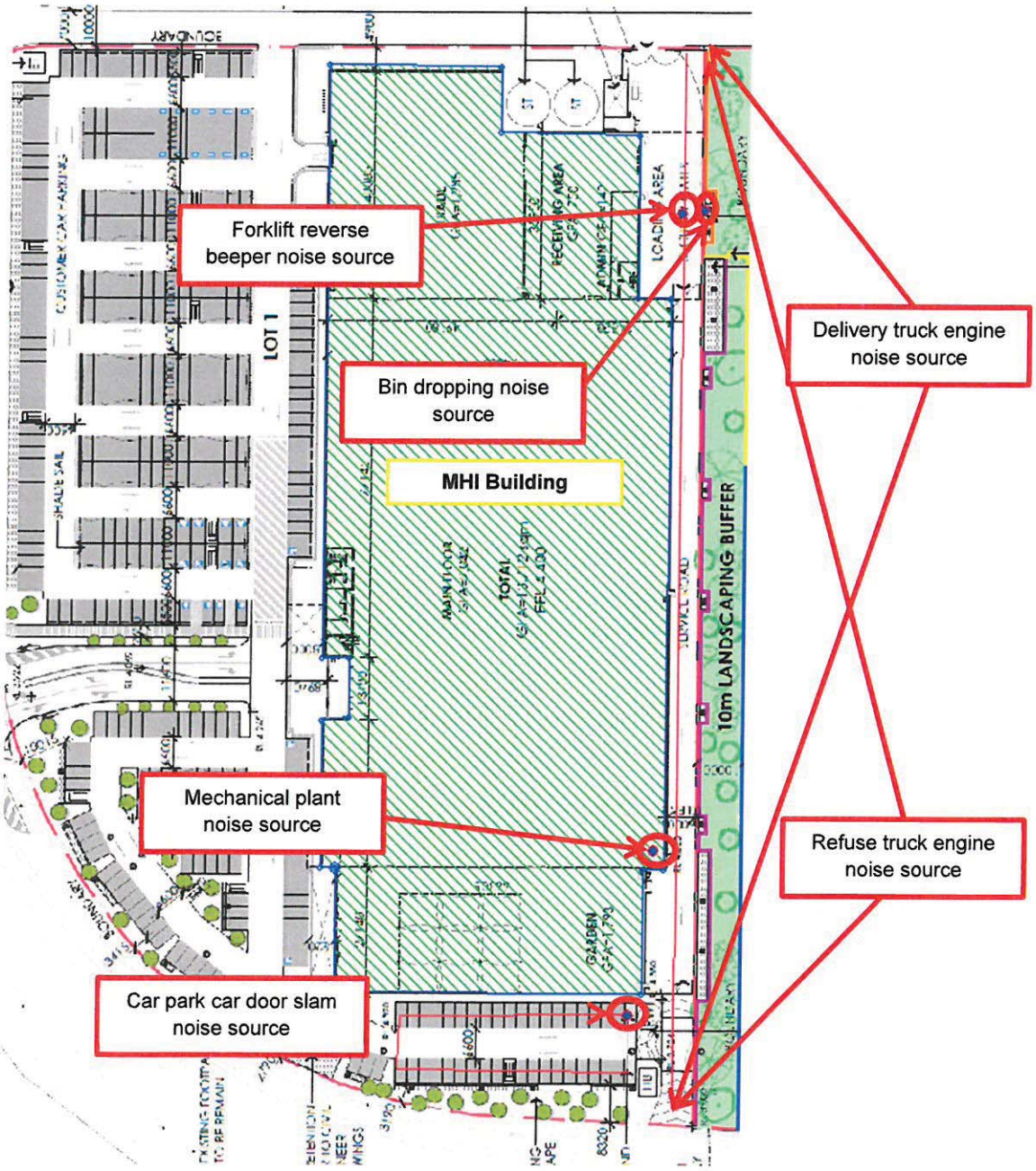


Figure 5-1: Location of the Noise Sources as Entered in the Noise Model

5.6 Acoustic Fence

A 2m high noise barrier is required east of the proposed Masters building, as shown in Figure 5-2. The noise barrier would be located along the western side of the 10m buffer area. This noise barrier has been included in the noise modelling results. The noise barrier should continue around the bin collection area, with no gaps, and should extend all the way to the southern site boundary, as presented in Figure 5-2. Note that although a 2m noise barrier is adequate, a 4m fence has been included in the design layout by the proponent for the loading area which will provide additional noise shielding.

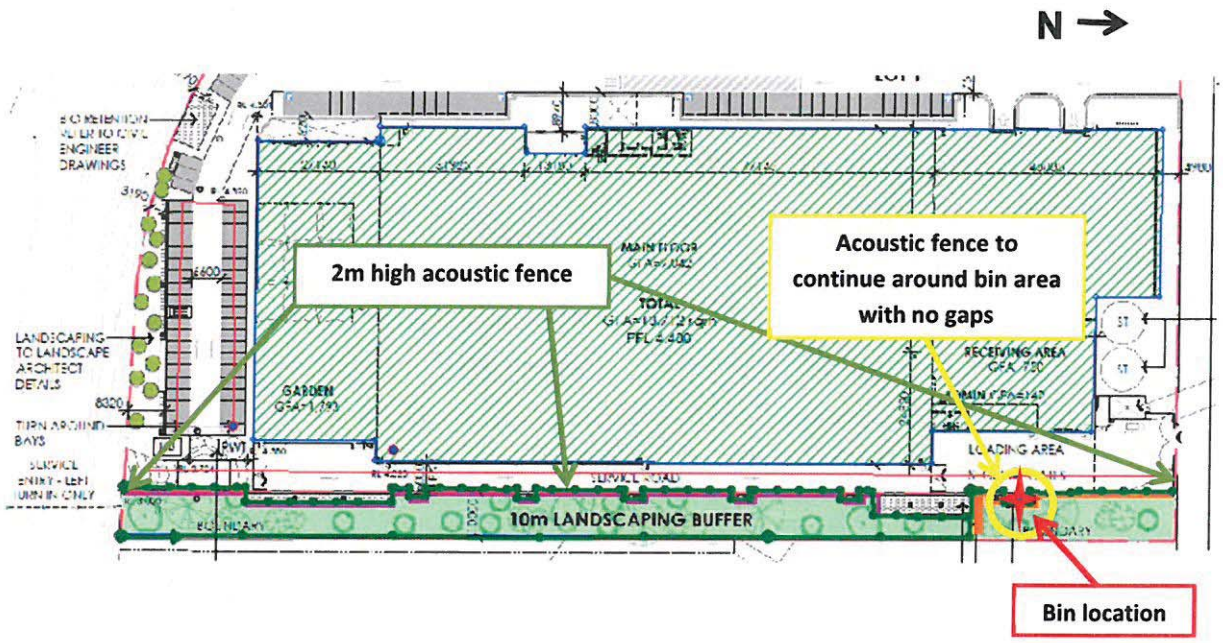


Figure 5-2: Recommended Noise Barrier, Existing Fence, and Extension of Fence

6. NOISE MODELLING RESULTS

6.1 Car Park Noise Predictions

Table 6-1 shows the results of the car park noise predictions at the most exposed NSR.

Table 6-1: Car Park Noise Predictions at the Most Exposed NSR with a 2m Acoustic Fence and a 10m Wide Buffer

Noise Source	Predicted Outdoors L_{A1}, in dB(A)	Outdoors L_{A1} noise criteria, in dB(A)			Noise criteria exceedance, in dB(A)		
		Day	Evening	Night	Day	Evening	Night
Car door slam	49	65	65	45	Complies	Complies	4

Car park noise complies with applicable noise limits during the day and evening, and exceeds the applicable noise limits at night.

The car park is not expected to be used by patrons outside the hours of 7am to 10pm, as the store will be closed during this period. The southern car parks may be utilised by staff of the store, however staff are not expected to be on site after 9:15pm, or before 7am, as advised by Masters. For car park usage by staff outside the hours of 7am and 10pm, it is recommended that a noise management plan be prepared for the site advising staff to use the car park west of the MHI building to minimise potential for noise disturbance.

6.2 Truck Deliveries Noise Predictions

Table 6-2 shows the results of truck deliveries noise and forklift noise predictions at the most exposed NSR.

Table 6-2: Truck Deliveries and Fork Lift Noise Predictions at the Most Exposed NSR With a 2m Acoustic Fence and a 10m Wide Buffer

Noise Source	Predicted Outdoors L_{A1}, in dB(A)	Outdoors L_{A1} noise criteria, in dB(A)			Noise criteria exceedance, in dB(A)		
		Day	Evening	Night	Day	Evening	Night
Truck engine	59	65	65	45	Complies	Complies	14
Forklift Reverse Beeper	56	65	65	45	Complies	Complies	11

Predicted noise levels comply with applicable noise limits during the day and evening, and exceed the applicable noise limits at night. It is recommended that deliveries do not occur (and forklift should not operate) between the hours of 10pm and 7am to comply with the applicable noise limits.

6.3 Refuse Collection Noise Predictions

Table 6-3 shows the results of refuse collection noise predictions at the most exposed NSR.

Table 6-3: Refuse Collection Noise Predictions at the Most Exposed NSR With a 2m Acoustic Fence and a 10m Wide Buffer

Noise Source	Predicted Outdoors L_{A1}, in dB(A)	Outdoors L_{A1} noise criteria, in dB(A)			Noise criteria exceedance, in dB(A)		
		Day	Evening	Night	Day	Evening	Night
Truck Engine	59	65	65	45	Complies	Complies	14
Bin dropping	53	65	65	45	Complies	Complies	8

Predicted noise levels comply with applicable noise limits during the day and evening, and exceed the applicable noise limits at night. It is recommended that refuse collection does not occur between the hours of 10pm and 7am to comply with the applicable noise limits.

6.4 Mechanical Plant Noise Predictions

Table 6-4 shows the results of mechanical plant noise predictions at the most exposed NSR.

Table 6-4: Mechanical Plant Noise Predictions at the Most Exposed NSR With a 2m Acoustic Fence and a 10m Wide Buffer

Noise Source	Predicted Outdoors L_{A90}, in dB(A)	Outdoors L_{A90} noise criteria, in dB(A)			Noise criteria exceedance, in dB(A)		
		Day	Evening	Night	Day	Evening	Night
Mechanical Plant	53	50	50	35	3	3	18

The maximum sound power level for the total mechanical plant system (including rooftop plant, plant rooms, exhaust and inlet vents and any other plant) that results in compliance with the noise criteria is 75 dB(A). Higher levels may be permitted with additional noise treatments such as noise screens, or placing mechanical plant noise sources away from the closest residences.

7. RECOMMENDATIONS

- A 10m landscape buffer separating the townhouses adjacent to the eastern property boundary of the site from the closest part of the MHI (a service road) is required (proposed by Masters);
- A noise barrier 2m in height is required on the western edge of the landscaped buffer (adjacent to the service road east of the proposed MHI building), as shown in Figure 5-2. The noise barrier should continue around the bin collection area, with no gaps, and should extend all the way to the southern site boundary, as presented in Figure 5-2. Note that although a 2m noise barrier is adequate, a 4m fence has been included in the design layout by the proponent for the loading area which will provide additional noise shielding.

  Noise barriers may consist of an earth mound, an acoustic fence, or a combination thereof. Barriers should be constructed in accordance with Department of Transport and Main Roads Standard Specification MRS 11.15, "Noise Barriers". Of most importance, barriers should have no gaps between palings, or between palings and posts and ground. A minimum surface density of 12.5kg/m^2 should be used.
- Selection of the total mechanical plant system (including rooftop plant, plant rooms, exhaust and inlet vents and any other plant) to have a total sound power level of 75 dB(A). Higher noise levels may be permitted with additional noise mitigation measures such as acoustic screens or enclosures or by locating plant away from nearby residences;
- For car park usage by staff outside the hours of 7am and 10pm, a noise management plan should advice staff to use the car park west of the MHI building to minimise potential for noise disturbance;
- Truck deliveries should not occur (and forklifts should not operate) between the hours of 10pm and 7am; and
- Refuse collection should not occur between the hours of 10pm and 7am.

The following recommendation to reduce noise is not required to comply with the applicable noise criteria. However, this will further reduce noise impacts associated with the development:

- Signage should be used to encourage delivery truck drivers to close truck doors quietly, stop engines when they are not required, minimize revving and use care when unloading cargo.

8. CONCLUSIONS

Vipac Engineers & Scientists Ltd (Vipac) has completed a noise impact assessment for the proposed Masters Home Improvement store on Dalton Drive East, Maroochydore. The impacts of noise emissions from the development on neighbouring Noise Sensitive Receivers have been considered and assessed according to Economic Development Queensland, State Planning Policy 5/10 and the Department of Environment and Heritage Protection noise criteria.

A 10m landscape buffer is proposed by Masters separating the townhouses adjacent to the eastern property boundary of the site from the closest part of the MHI (a service road). A 2m noise barrier along the eastern boundary of the site will be sufficient to comply with the noise criteria applicable for the development. However, a 4m fence has been included in the design layout by the proponent for the loading area which will provide additional noise shielding). Additional recommendations are given in this report for noise impacts to reduce noise emissions associated with the development.

In conclusion, noise impacts associated with the proposed development can be controlled to an acceptable level by implementing the recommendations in this report

APPENDIX A: NOISE MEASUREMENT DETAILS

Table A-1: Instrumentation

Instrument	Serial Number	Lab calibration due (at time of measurement)	Field Calibration
Larson Davis LD-831 Noise logger	831-7	17-Mar-2016	<0.5dB deviation between start and end of measurement
Ono Sokki SC2120	35100926	4-Dec-2014	N/A

Table A-2: Measurement Details for Noise Monitoring

Microphone Height	1.5m
Microphone Orientation	Pointing vertically upwards
SLM Time Weighting	Fast
SLM Frequency Weighting	A
Measurement Interval Period	15 minute intervals
Logger location	On the site as presented in Figure 2-1
Measurement weather	Some rain, noise measurement data was excluded for the 7th and 8th of November. Weather data is included in Section A.1
Date of measurement	Between the 7th of November, 2014 and the 18th of November 2014

Table A-3: Noise Monitoring Results (Free Field)

Noise Descriptor	Noise Level (dB(A))
Average LA10, 18hr (6am to 12am)	51
Average LA90, 8hr (10pm to 6am)	46
LAmax (24hr)	91
LAmax,Night (10pm to 7am)	79
Average LAeq,Day(7am to 6pm)	52
Average LAeq,Evening(6pm to 10pm)	56
Average LAeq,Night (10pm to 7am)	51
LAeq,Max 1hr Day (7am to 6pm)	57
LAeq,Max 1hr Evening(6pm to 10pm)	58
LAeq,Max 1hr Night(10pm to 7am)	54
Average LAeq, 15hr (7am to 10pm)	54
Average LAeq, 9hr (10pm to 7am)	51
Average LA90(7am to 6pm)	45
Average LA90(6pm to 10pm)	50
Average LA90(10pm to 7am)	46
RBL Day	43
RBL Evening	45
RBL Night	42

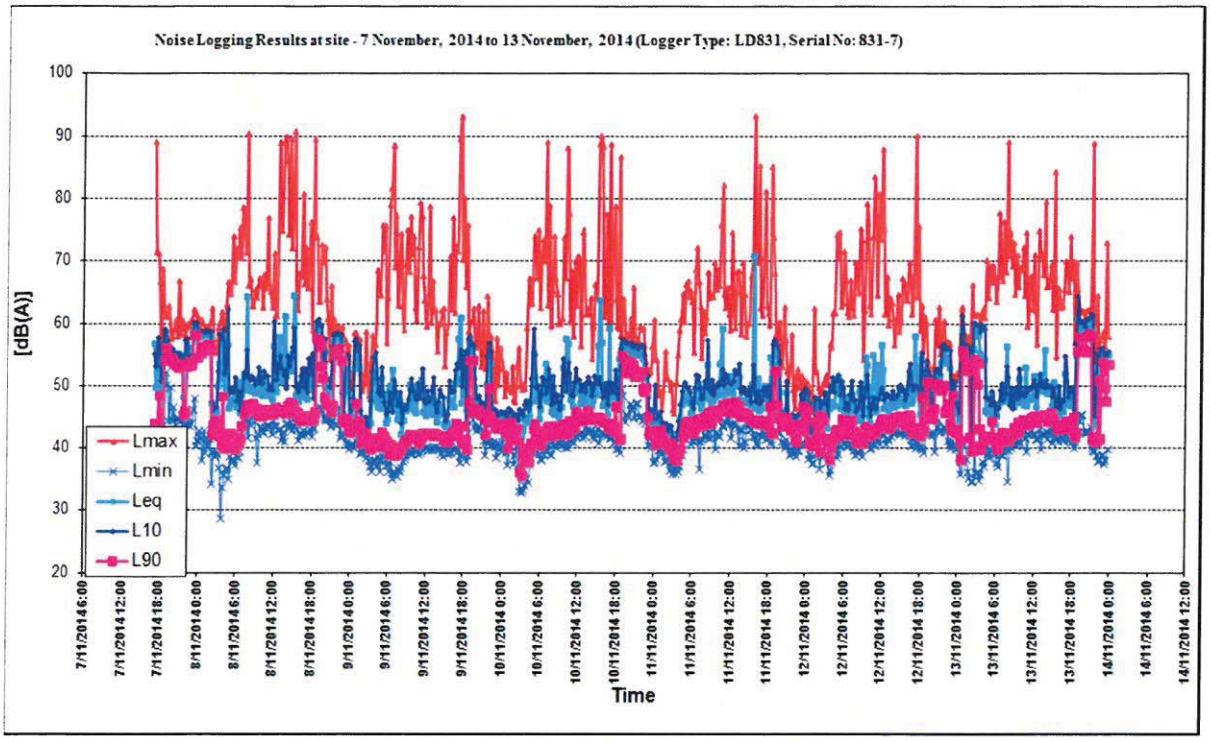


Figure A-1: Monitoring Results (Free Field) – 7th to 13th of November

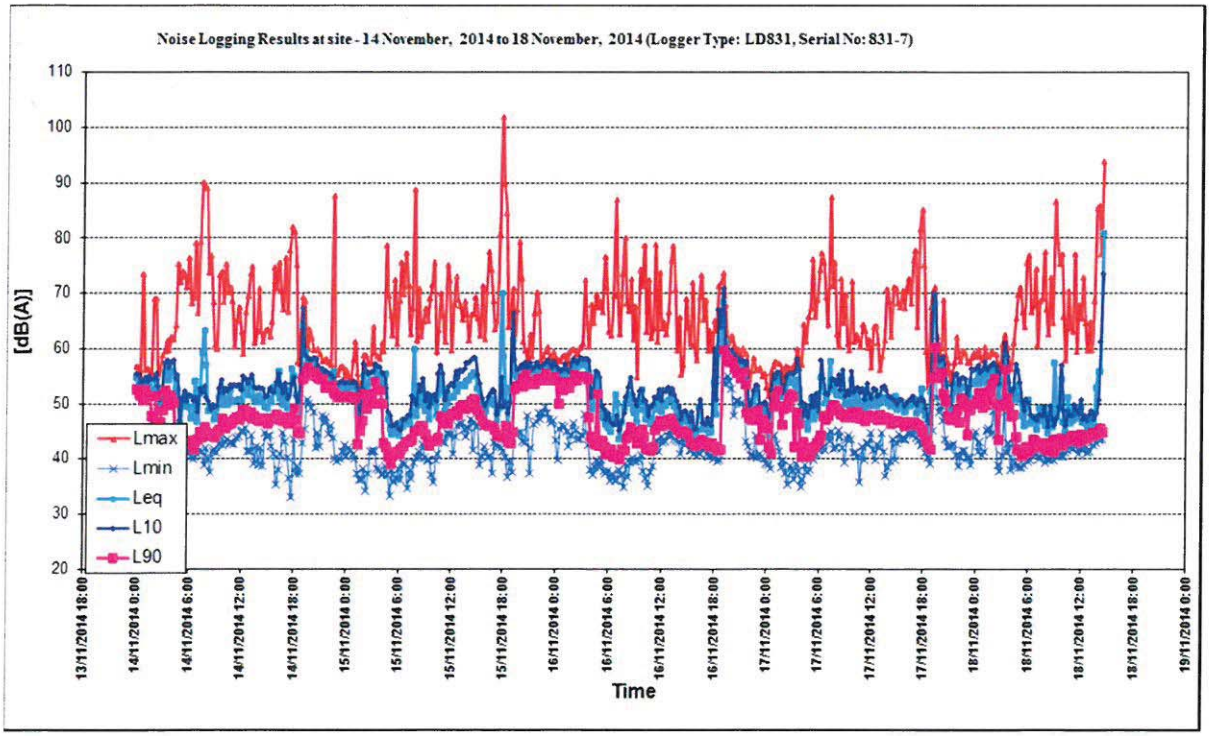


Figure A-2: Monitoring Results (Free Field) – 14th to 18th of November

A.1 Weather Data

Weather data during the measurement period was obtained from the Bureau of Meteorology weather station 040861 (Sunshine Coast Airport) and is presented in Table A- 4. Noise measurement data for the 7th and 8th of November was excluded due to rain.

Table A- 4: Weather During Logging Period

Date	Day	Temps Min °C	Temps Max °C	Rain mm	Evap mm	Sun hours	Max wind gust Dir	Max wind gust Spd km/h	Max wind gust Time local	9 am Temp °C	9 am RH %	9 am Cld 8th	9 am Dir	9 am Spd km/h	9 am MSLP hPa	3 pm Temp °C	3 pm RH %	3 pm Cld 8th	3 pm Dir	3 pm Spd km/h	3 pm MSLP hPa
1	Sa	19.0	28.1	0			NNE	56	14:47	26.6	63		N	28	1015.6	26.4	71		NNE	39	1010.1
2	Su	19.7	30.0	0			SE	43	14:11	26.8	63		NW	13	1014.6	25.7	69		SE	26	1015.2
3	Mo	21.4	24.0	0			SE	43	03:48	22.6	69		SE	28	1021.5	22.5	61		ESE	26	1020.4
4	Tu	20.8	25.9	0			E	37	02:42	22.8	54		E	20	1023.7	24.2	47		E	19	1020.6
5	We	15.6	26.4	0			NE	30	16:50	24.3	53		ENE	17	1021.4	24.8	51		ENE	19	1017.5
6	Th	15.3	27.3	0			NNE	46	15:17	25.5	44		NNE	22	1016.0	25.5	68		NNE	33	1012.1
7	Fr	17.4	27.4	8.4			NNE	30	12:02	24.2	74		NE	13	1017.5	26.3	65		NE	24	1015.4
8	Sa	20.2	26.7	2.8			ESE	33	07:42	24.0	64		SE	22	1021.3	25.3	58		ESE	22	1018.5
9	Su	14.0	27.2	0			E	26	12:53	24.4	55		ESE	13	1020.5	25.6	52		NE	19	1017.7
10	Mo	16.7	28.0	0			NE	33	13:36	26.1	60		NE	13	1019.4	25.9	58		NE	24	1016.4
11	Tu	16.0	27.5	0			NNE	39	12:23	26.1	53		NE	19	1017.3	26.0	56		NNE	28	1014.1
12	We	15.9	28.6	0			NNE	28	12:07	26.6	55		ENE	15	1017.2	26.9	57		ENE	20	1014.3
13	Th	17.2	28.7	0			NE	33	14:33	26.9	61		NE	17	1018.2	26.5	58		NE	24	1016.1
14	Fr	17.6	29.9	0			NNE	50	13:47	27.2	57		NNE	26	1019.2	26.7	65		NNE	39	1014.5
15	Sa	19.3	33.3	0			NNE	57	13:44	29.6	52		NNW	20	1014.2	28.4	64		N	43	1008.1
16	Su	22.1	41.0	0			NNE	50	13:17	32.0	48		WNW	24	1008.7	28.3	68		NNE	30	1003.2
17	Mo	21.8	28.9	0			SE	43	09:05	28.3	66		SSE	31	1012.8	25.6	65		SE	24	1012.1
18	Tu	23.7	29.4	0			NNE	31	10:48	25.6	85		NE	11	1016.0	24.3	90		NE	17	1012.8
19	We	20.1	28.5	5.0			NNE	39	16:17	24.7	82		NNE	19	1017.7	25.6	81		NNE	24	1014.3
20	Th	16.4	29.0	7.8			NNE	37	16:00	25.2	73		ENE	6	1018.5	27.7	70		NNE	28	1015.1
21	Fr	21.4	30.7	0			N	50	17:47	27.9	72		NNE	26	1016.2	28.1	71		NNE	35	1011.7
22	Sa	22.7	30.5	0			N	52	15:07	30.2	59		N	22	1015.6	28.0	68		NNE	35	1012.2
23	Su	22.0	29.6	0			NNE	39	10:17	27.2	67		NNE	26	1018.3	27.6	63		NNE	28	1015.0
24	Mo	19.6	29.5	0			NNE	46	15:06	27.1	65		NNE	24	1018.3	27.6	66		NNE	35	1013.6
25	Tu	17.5	31.0	0			NNE	43	13:15	28.2	42		NNW	19	1016.1	28.3	68		NNE	28	1012.2
26	We	20.4	29.7	0			NE	33	14:18	26.5	75		NNE	17	1017.3	27.5	64		NE	24	1014.9
27	Th	19.5	30.2	0			NE	30	12:21	27.8	63		NE	15	1016.6	28.6	60		NE	20	1013.4
28	Fr	20.3	26.5	9.0			ESE	48	17:56	24.8	78		ESE	19	1018.3	23.8	78		ESE	26	1017.1
29	Sa	21.3	27.4	3.4			E	39	06:07	26.0	48		SE	22	1018.9	25.5	49		ESE	22	1016.7
30	Su	13.4	28.3	0			ENE	28	15:13	25.4	50		E	15	1017.1	26.1	51		ENE	19	1014.3

APPENDIX B: NOISE POLICY

B.1 Applicable Noise Policies

The development is located in a "Priority Development Area". Therefore, Economic Development Queensland's (EDQ's) PDA Guideline no. 14, "Environmental values and sustainable resource use" is applicable.

The EDQ policy refers to the Environmental Protection Act 1994 (EPA 1994), the Environmental Protection (Noise) Policy 2008 (EPP 2008) and State Planning Policy 5/10 Guideline, "Air Noise and Hazardous Materials". (SPP 5/10). SPP 5/10 has no specific noise limits, but in turn refers to the EPA 1994 and EPP 2008. Therefore, the EPP 2008 and EPA 1994 are the applicable noise policies.

The major noise sources and the applicable noise policies are summarised in Table B-1.

Table B-1: Noise Sources and Applicable Noise Policies

Noise Source	Applicable Noise Criteria
Mechanical plant noise	Environmental Protection Act 1994 (Reprinted as in force on January 1st 2009), Division 3, Default Noise Standards, Section 440U Air Conditioning and Section 440V Refrigeration Equipment (EPA 1994) Environmental Protection (Noise) Policy 2008 - Acoustic Quality Objectives
Truck deliveries, refuse collection, car parking	Environmental Protection (Noise) Policy 2008 - Acoustic Quality Objectives

B.2 Mechanical Plant Associated With the Proposed Development

B.2.1 EPA 1994

Sections 440U and 440V of the *Environmental Protection Act 1994* apply to premises at or for which there is air conditioning equipment and refrigeration equipment, respectively.

An occupier of premises must not use, or permit the use of, the equipment on any day-

- Before 7a.m., if it makes a noise of more than 3 dB(A) above the background level; or
- From 7a.m. to 10 p.m, if it makes a noise of more than 5 dB(A) above the background level; or
- After 10p.m, if it makes a noise of more than 3 dB(A) above the background level.

B.2.2 EPP 2008

The acoustic quality objectives from the Environmental Protection (Noise) Policy 2008 (EPP 2008) have been adopted to assess noise emissions from mechanical plant. The acoustic quality objectives are included in Table B-2.

Table B-2: EPP 2008 Acoustic Quality Objectives

NSRs	Time of Day	Acoustic Quality Objectives, dB(A)		
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$
Dwelling (Outdoors)	Day and Evening (7am –10pm)	50	55	65
Dwelling (Indoors)	Day and Evening (7am –10pm)	35	40	45
Dwelling (Indoors)	Day and Evening (7am –10pm)	30	35	40
Commercial and Retail activity (Indoors)	When the activity is open for business	45	-	-

The applicable noise limit during the day / evening is 50 dB(A) $L_{Aeq,1hr(7am\ to\ 10pm)}$ at the external façade of a residence.

During the night period (10pm to 7am), the applicable noise limit is 35 dB(A) $L_{Aeq,1hr(10pm\ to\ 7am)}$, indoors. A factor of 5 dB(A) has been added to take into account noise attenuation from outdoors to indoors, assuming partially

open windows, to obtain a night-time noise limit of 40 dB(A) $L_{Aeq,1hr(7am\ to\ 10pm)}$ at the external façade of a residence.

B.3 Refuse Collection, Truck Deliveries and Car Parking

Noise from truck deliveries, refuse collection, and car parking is transient, and has been described using the L_{A1} noise descriptor. The applicable EPP 2008 Acoustic Quality Objective noise limit during the day /evening is 65 dB(A) L_{A1} at the external façade of a residence.

During the night period (10pm to 7am), the applicable noise limit is 40 dB(A) L_{A1}, indoors (as presented in Table B-2). A factor of 5 dB(A) has been added to take into account noise attenuation from outdoors to indoors, assuming partially open windows, to obtain a night-time noise limit of 45 dB(A) L_{A1} at the external façade of a residence.

B.4 Noise Limits

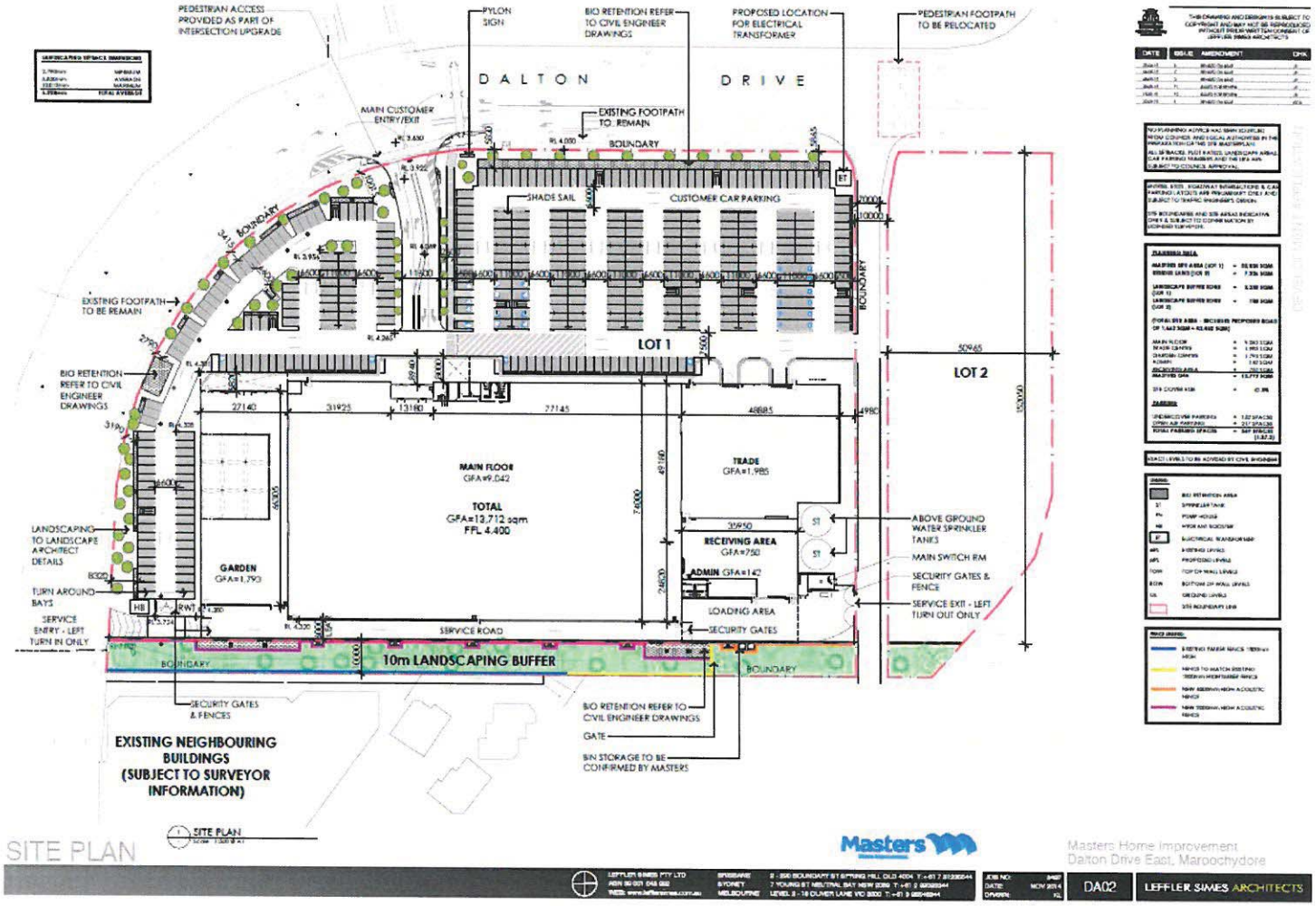
Based on the noise criteria presented in Sections B.2 to B.3 and the noise monitoring results presented in Section 3, the applicable noise limits for all noise sources are presented in Table B-3. The noise limits for air conditioning and mechanical plant have been derived from the strictest of the EPA 1994 and the EPP 2008 Acoustic Quality Objective noise limits.

Table B-3: All Applicable Noise Limits

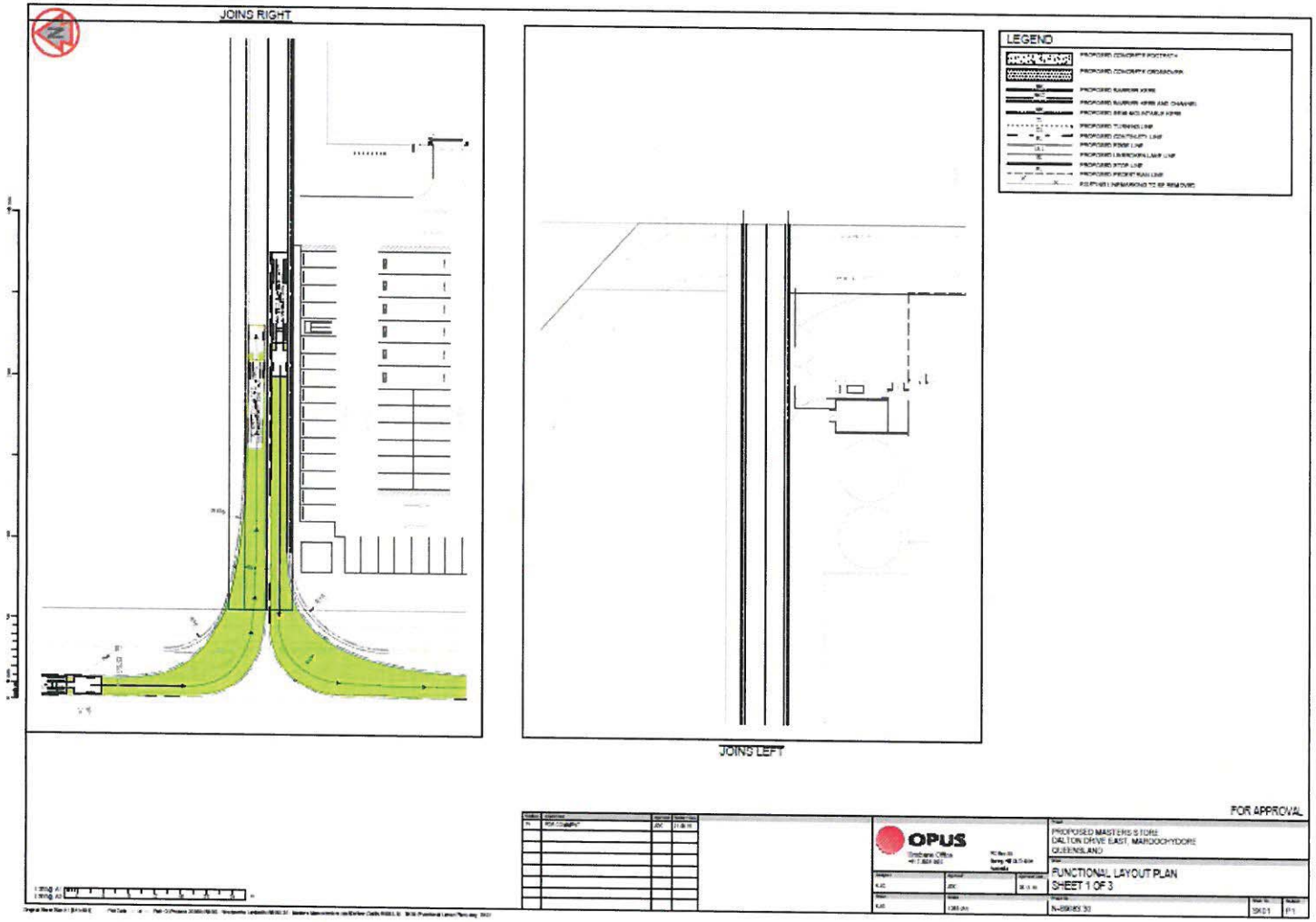
Noise Source	Noise Criteria	Noise Limit	Period	Where
Air-conditioning and mechanical plant	EPP 2008 Acoustic Quality Objectives	50 dB(A) L_{A90}	Day (7am to 6pm)	At the external façade of neighbouring residences
		50 dB(A) L_{A90}	Evening (6m to 10pm)	At the external façade of neighbouring residences
		35 dB(A) L_{A90}[1]	Night (10pm to 7am)	At the external façade of neighbouring residences
Refuse collection, truck deliveries, car parking	EPP 2008 Acoustic Quality Objectives	65 dB(A) L_{A1}[1]	Day (7am to 10pm)	At the external façade of neighbouring residences
		45 dB(A) L_{A1}[1]	Night (10pm to 7am)	At the external façade of neighbouring residences

[1] *Noise limit includes a 5 dB(A) factor for attenuation of noise from outdoors to indoors, assuming partially open windows*

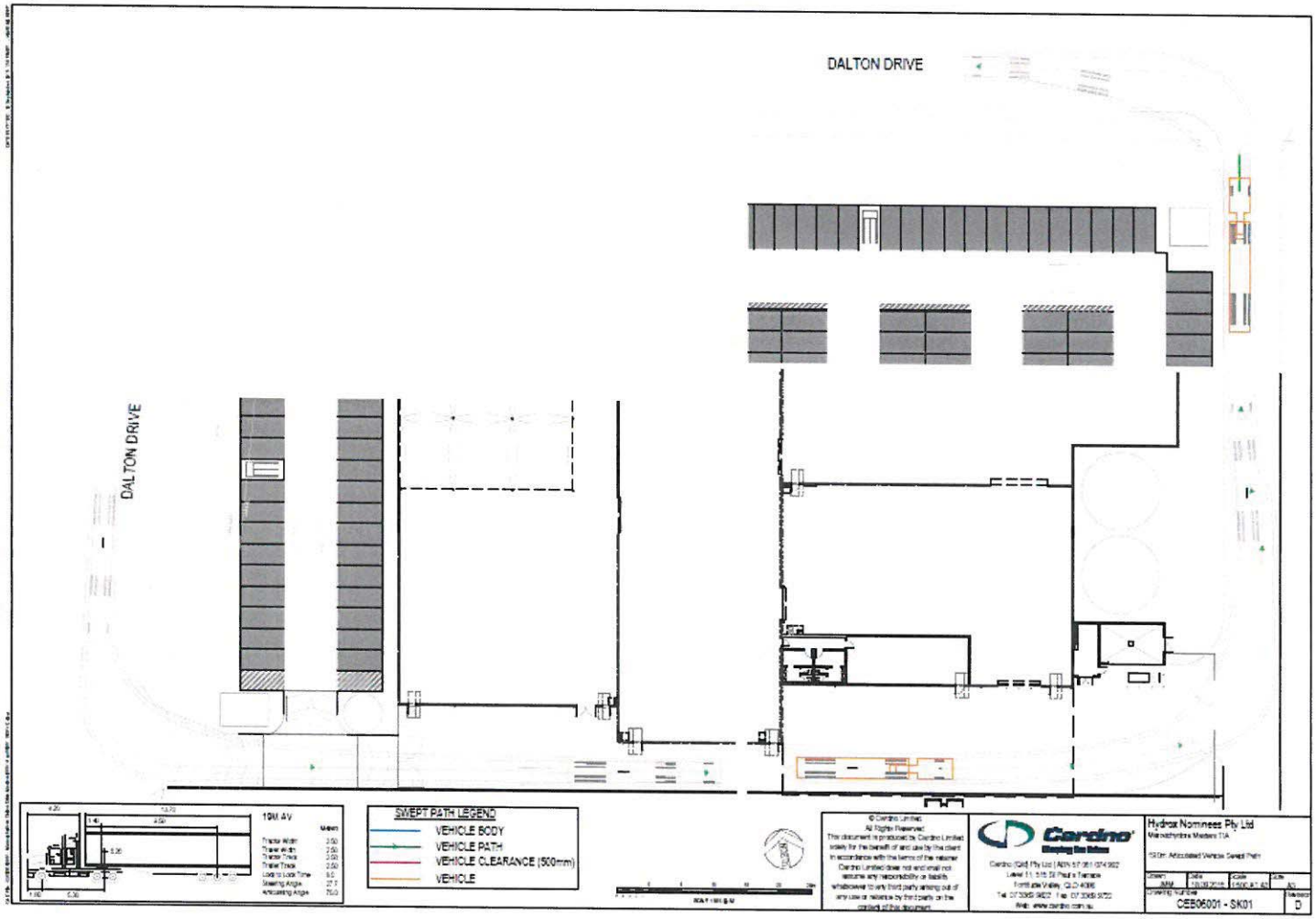
APPENDIX C: BUILDING PLANS


PEDESTRIAN ACCESS PROVIDED AS PART OF INTERSECTION UPGRADE
PYLON SIGN
BIO RETENTION REFER TO CIVIL ENGINEER DRAWINGS
PROPOSED LOCATION FOR ELECTRICAL TRANSFORMER
PEDESTRIAN FOOTPATH TO BE RELOCATED
DALTON DRIVE
MAIN CUSTOMER ENTRY/EXIT
EXISTING FOOTPATH TO REMAIN
BOUNDARY
SHADE SAIL
CUSTOMER CAR PARKING
LOT 1
LOT 2
50965
BIO RETENTION REFER TO CIVIL ENGINEER DRAWINGS
LANDSCAPING TO LANDSCAPE ARCHITECT DETAILS
TURN AROUND BAYS
SERVICE ENTRY - LEFT TURN IN ONLY
GARDEN GFA=1,793
MAIN FLOOR GFA=9,042
TOTAL GFA=13,712 sqm FFL 4.400
TRADE GFA=1,985
RECEIVING AREA GFA=750
ADMIN GFA=142
LOADING AREA
SECURITY GATES
SERVICE ROAD
ABOVE GROUND WATER SPRINKLER TANKS
MAIN SWITCH RM
SECURITY GATES & FENCE
SERVICE EXIT - LEFT TURN OUT ONLY
10m LANDSCAPING BUFFER
SECURITY GATES & FENCES
BIO RETENTION REFER TO CIVIL ENGINEER DRAWINGS
GATE
BIN STORAGE TO BE CONFIRMED BY MASTERS
EXISTING NEIGHBOURING BUILDINGS (SUBJECT TO SURVEYOR INFORMATION)
SITE PLAN
SITE PLAN
Masters
Masters Home Improvement
Dalton Drive East, Maroochydore
DA02
LEFFLER SIMES ARCHITECTS

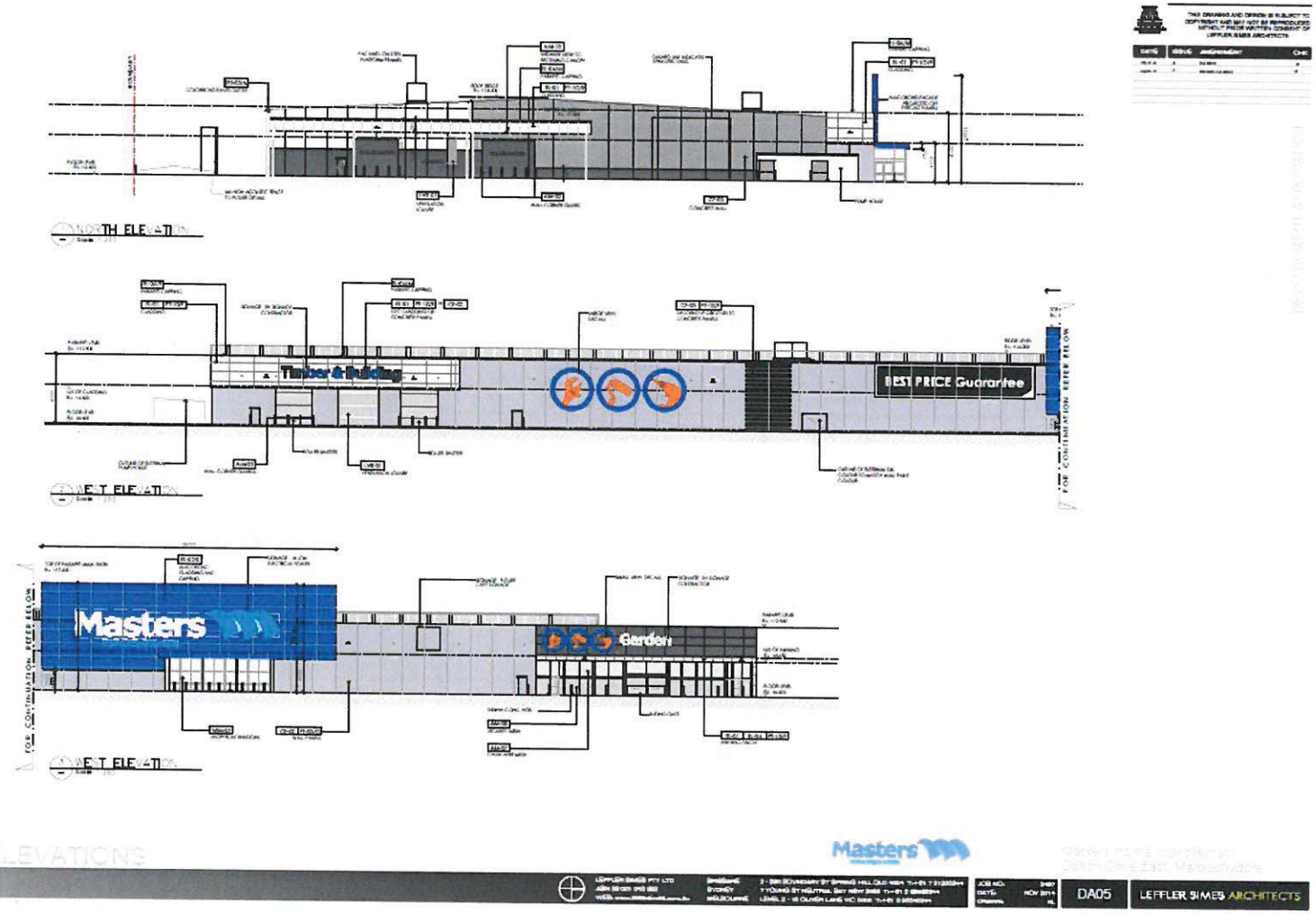
8 Oct 2015

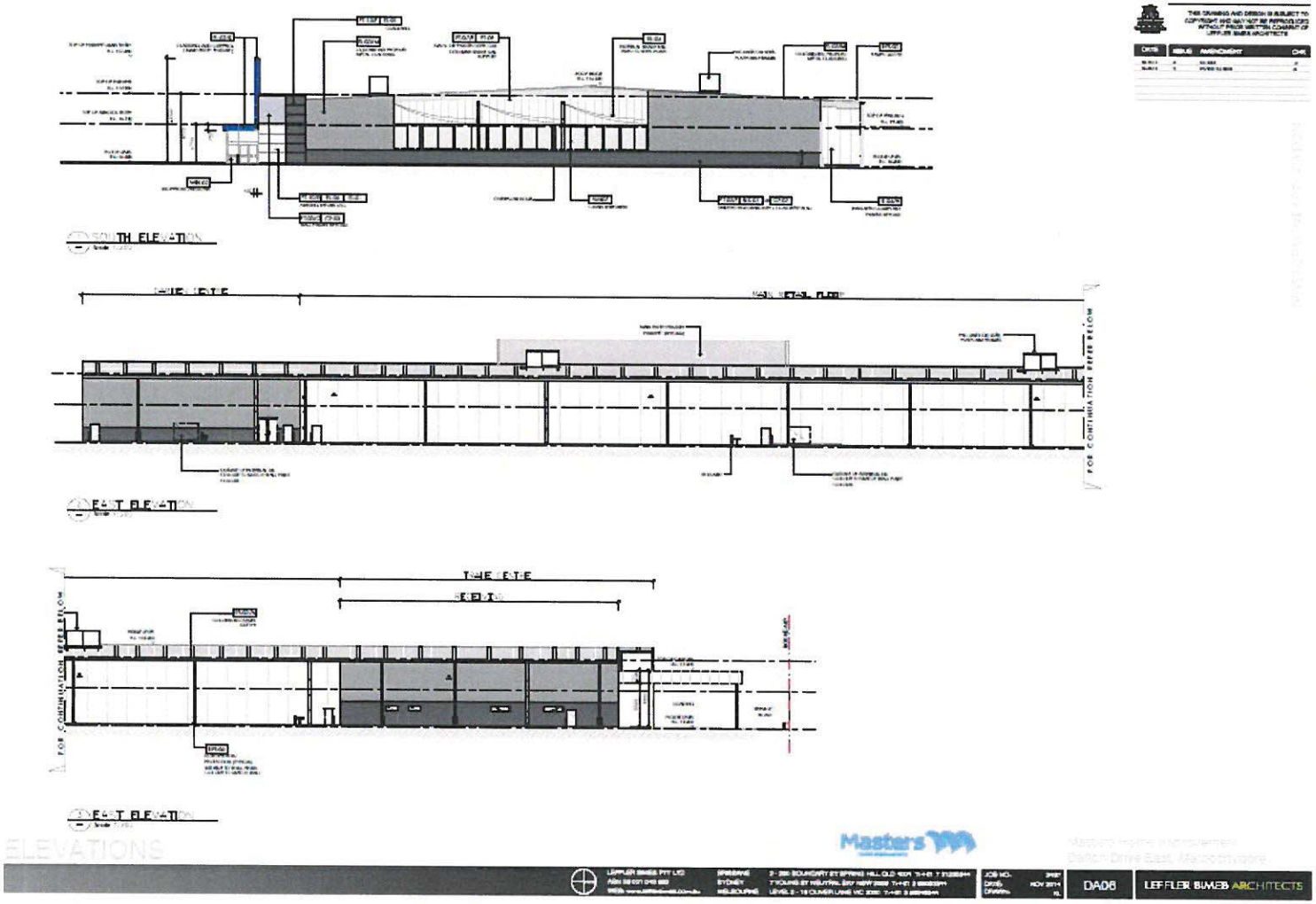

JOINS RIGHT
LEGEND
JOINS LEFT
FOR APPROVAL
OPUS
PROPOSED MASTERS STORE
DALTON DRIVE EAST, MAROOCHYDORE
QUEENSLAND
FUNCTIONAL LAYOUT PLAN
SHEET 1 OF 3

8 Oct 2015


DALTON DRIVE
DALTON DRIVE
SWEPT PATH LEGEND
VEHICLE BODY
VEHICLE PATH
VEHICLE CLEARANCE (500mm)
VEHICLE
Hydrox Nominees Pty Ltd
CEE06001 - SK01

8 Oct 2015


NORTH ELEVATION
Timber & Building
BEST PRICE Guarantee
EAST ELEVATION
Masters
Garden
EAST ELEVATION
ELEVATIONS
Masters
DA05
LEFFLER SIMES ARCHITECTS


SOUTH ELEVATION
EAST ELEVATION
EAST ELEVATION
ELEVATIONS
Masters
DA06
LEFFLER SIMES ARCHITECTS

APPENDIX D: EXAMPLE NOISE CALCULATION

Table D-1: Example Noise Calculation (from SoundPLAN Noise Modelling Software) – Noise from Bin Dropping at Most Exposed NSR

Noise Source	Noise Source Sound Power Level (dB(A))	Distance from Source to Receiver (m)	Attenuation Due to Distance (dB(A))	Attenuation Due to Ground Absorption (dB(A))	Attenuation Due to Shielding (dB(A))	Attenuation Due to Air Absorption (dB(A))	Addition due to reflective surfaces (dB(A))	Predicted External Free Field Sound Pressure Levels at NSR (dB(A))
Bin dropping	108.1	95.86	-50.62	-3.36	-9.09	-0.35	8.25	52.93