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CH Hydrangea Pty Ltd

Fulfilment Centre – Proposed Development of Lot 14 of the Flagstone Logistics Estate

Noise Impact Assessment

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

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Executive Summary

This noise impact assessment has been prepared on behalf of CH Hydrangea Pty Ltd (Applicant) in support of a development application over part of the land at 4499-4651 Mount Lindesay Highway, North Maclean QLD 4280 and described as part of Lot 39 on SP338781 (site). This PDA Development Application seeks approval for a Development Permit for a Material Change of Use for a Warehouse (Distribution Centre) and Low impact industry.

The proposed development will function as distribution centre for the tenant, for the receipt, warehousing, storing and distribution of products, and will include a facility that enables material to be printed for distribution, and limited storage of dangerous goods. The proposed development will operate 24 hours a day, 7 days a week and will be located within Stage 2 of the overarching PDA Development Approval for the Flagstone Logistics Estate (EDQ Reference: DEV2018/961/18).

Based on the designated criteria, noise generated by the development was assessed at the nearest applicable receptor locations. Noise generated by the development is predicted to comply with the assessment criteria with the implementation of practical noise management strategies. A detailed mechanical plant assessment is strongly recommended during the detailed design stage of the project to ensure compliance can be achieved as the development includes a large quantity of rooftop mechanical plant.

Compliance with the criteria outlined in Section 5 is predicted to be achieved based on the recommendations outlined in this report.

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1 Introduction

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The assessment consisted of the following:

- Description of the project location and the surrounding area,
- Description of proposed acceptable operations,
- Applicable noise criteria for the project,
- Predicted potential noise levels from the project at the nearest property boundaries,
- Assessment of predicted noise levels against the noise criteria, and
- Noise mitigation recommendations where required.

Results were assessed against the noise emission standards for the Protection of General Amenity from Schedule 6 of the Logan City Council Planning Scheme 2015 criteria.

2 Project Location and Surrounding Area

The proposal is to develop the site at for a multi-level warehouse with an approximate GFA of 141,056m² on a total site area of approximately 9.959 ha. The site is in the Greater Flagstone Priority Development Area and forms part of the Endorsed North Maclean Context Plan, with land surrounding the context plan area zoned primarily rural residential. The location of the project is shown in Figure 2-1 to Figure 2-3. The area can be classified as predominantly rural in nature.

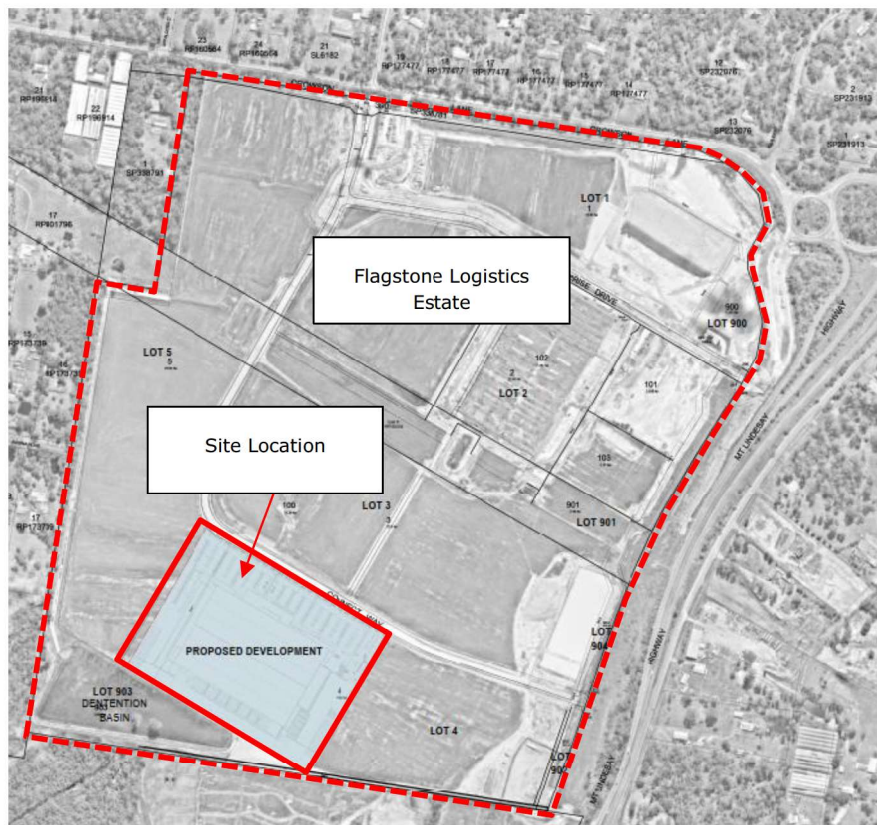


Figure 2-1 – Project Location

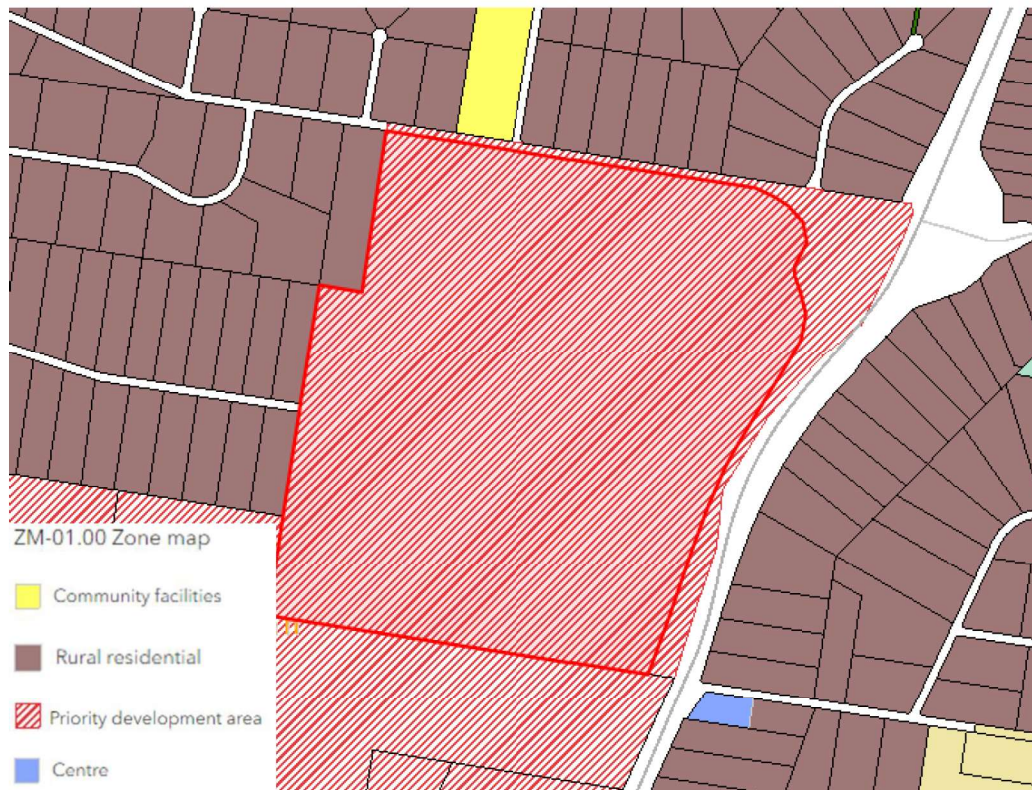


Figure 2-2 - Site Location and Surrounding Zoning

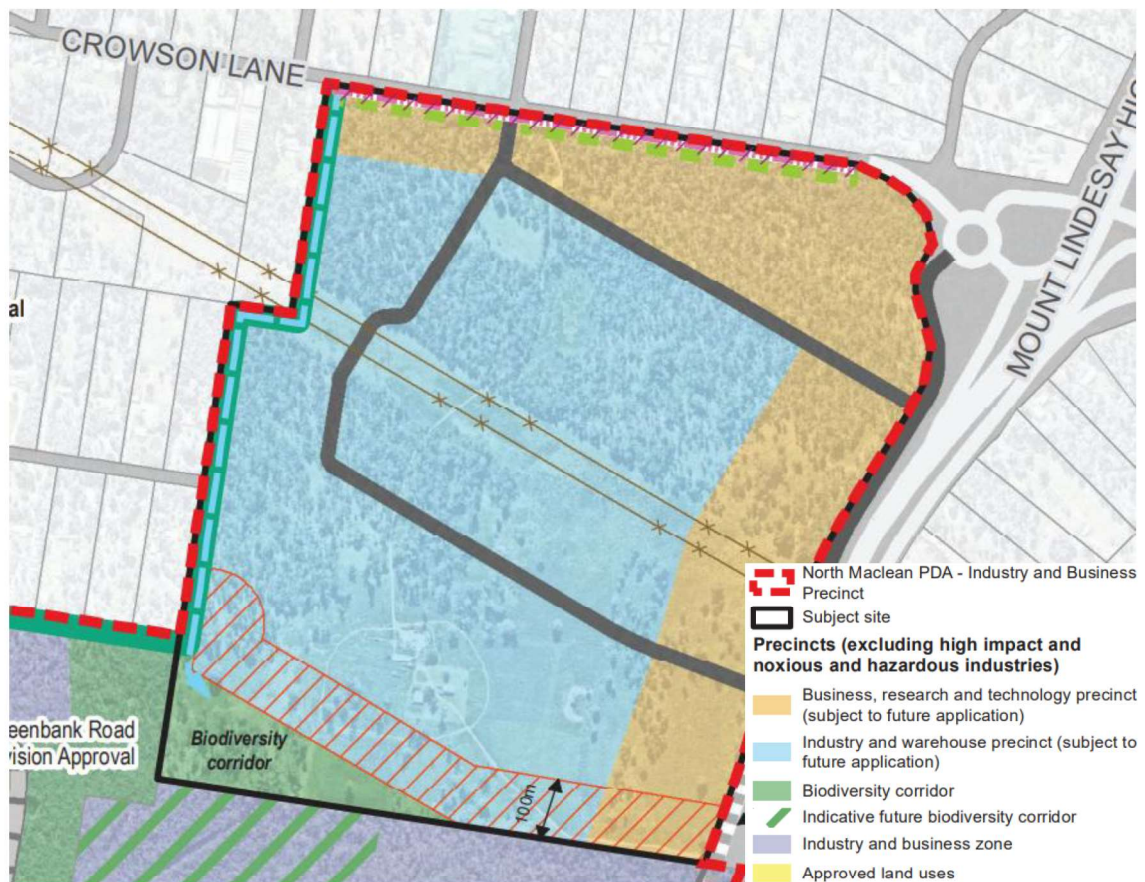


Figure 2-3 - Site Location and Proposed Precinct Zoning

The Endorsed North Maclean Context Plan indicates future precincts within the site, displayed in Figure 2-3.

3 Proposed Operations

The proposed development will consist of a single multi-level warehouse and associated offices, car park, trailer parking facilities and hardstand. The facility is proposed to operate 24 hours, 7 days a week. The proposed site layout has been provided and is shown below in Figure 3-1. Figure 2-3 shows the zoning of the site and surrounding area.

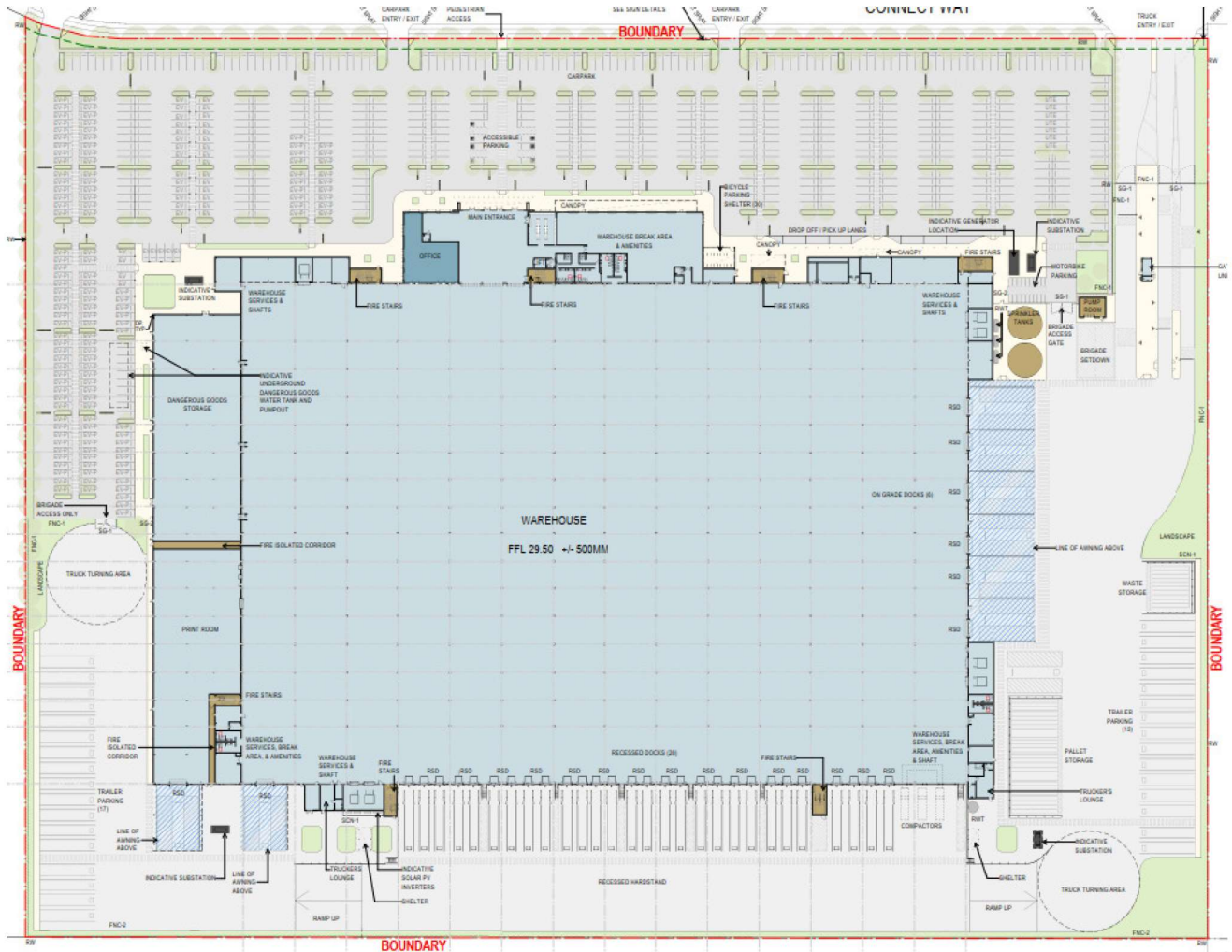


Figure 3-1 - Layout of the Project Facility

4 Noise Monitoring

4.1 Previous Noise Monitoring

Noise monitoring of the surrounding environment was captured in a preliminary assessment of the master plan estate. The noise monitoring was conducted by Acoustics RB Pty Ltd (report ref: RB/22-1390.M01 dated 13th July 2022) between the 21st and 26th of June 2022, in the location shown in Figure 4-1.

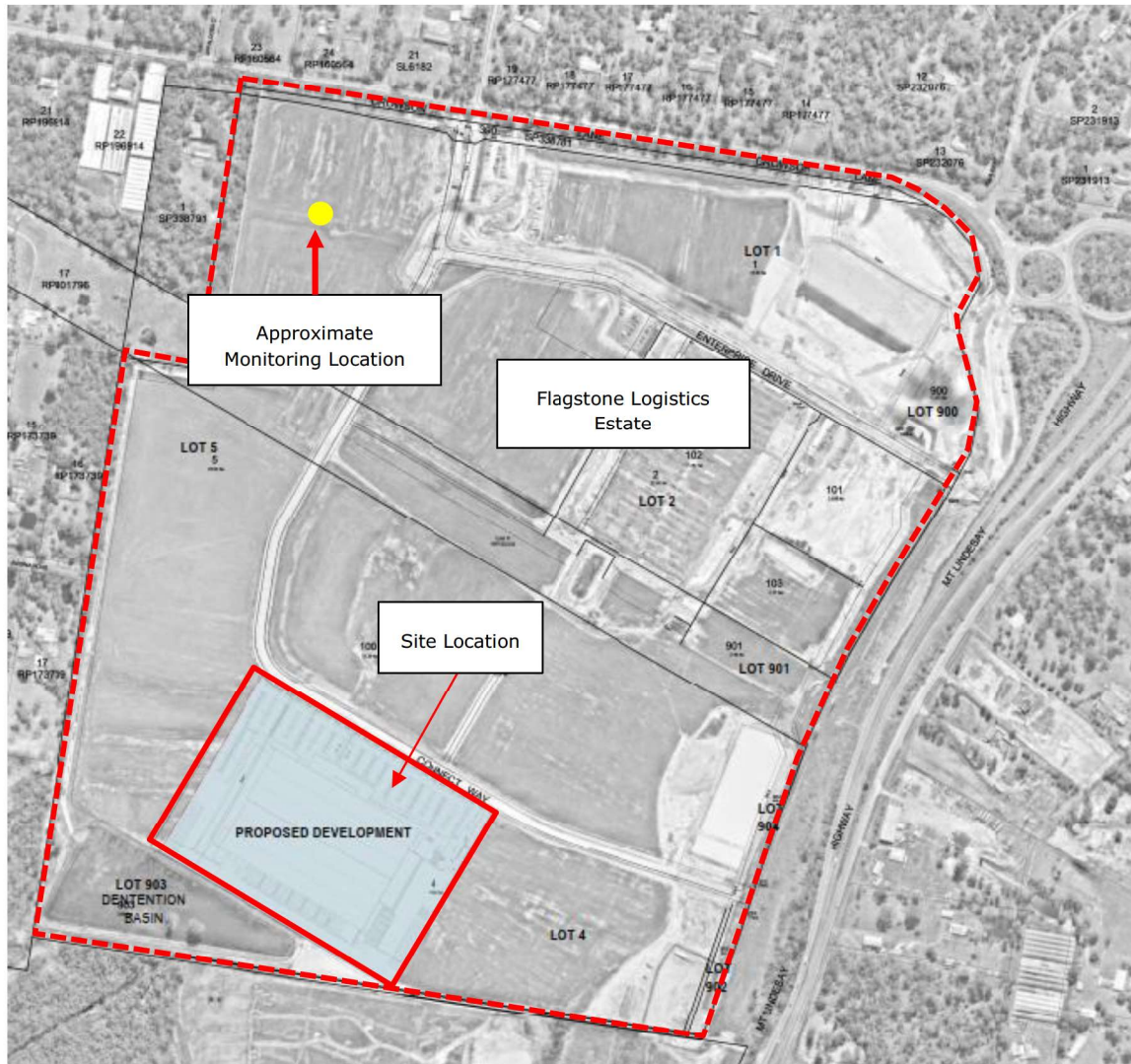


Figure 4-1 - Previous Acoustics RB Noise Monitoring Location (Approx.)

The raw data from the noise monitoring was obtained from Charter Hall and processed in preparation for establishment with the appropriate criteria detailed in Section 5. The results processed by Vipac are shown in Table 4-1.

Table 4-1 - Monitoring Location Noise Levels

Dates	L _{Aeq}			L _{A10}			RBL			L _{A90}		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
21/06/2022	48	44	45	50	47	47	-	33	28	40	37	40
22/06/2022	48	45	45	51	48	47	36	33	29	42	37	41
23/06/2022	50	45	45	52	48	47	35	35	28	42	37	40
24/06/2022	49	50	-	51	53	-	37	-	-	43	45	-
Total	49	46	45	51	49	47	36	33	28	42	41	40

5 Criteria

5.1 EDQ

It is acknowledged that EDQ does not stipulate a specific noise criteria. In absence of this, this report will assess the proposed development against the criteria stated for the local government area the site is situated in – Logan City Council.

5.2 Logan City Council Planning Scheme

Schedule SC6.2.3 'Environmental Management' in the Logan City Council Planning Scheme 2015 stipulates noise emission standards for the protection of residential and general amenity. Table 3.2.1.1 – Noise emission standards for the protection of residential amenity stipulates the applicable criteria for the development and has been reproduced in Table 5-1. Table 3.2.1.2 – Noise emission standards for the protection of general amenity has been reproduced in Table 5-2.

Table 5-1 - Noise Emission Standards for the Protection of Residential Amenity

Noise level at the boundary of premises			
Noise type	Time period	Monday to Saturday	Sunday and public holidays
Non-steady sound*	Day 7:00am – 6:00pm	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$
	Evening 6:00pm to 10:00pm	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$
	Night 10:00 – 7:00am	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 0 \text{ dB(A)}$ and $L_{Amax} \leq 60\text{dB(A)}$	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 0 \text{ dB(A)}$ and $L_{Amax} \leq 60\text{dB(A)}$
Continuous noise*	Anytime	$L_{A90,T} \text{ plus } 0 \text{ dB(A)}$	$L_{A90,T} \text{ plus } 0 \text{ dB(A)}$

*As defined in AS1055.1 – 1997 Acoustics – Description and measurement of environmental noise.

Note – Adjustments for tonality and impulsiveness to be included in accordance with AS1055.1 – 1997 Acoustics – Description and measurement of environmental noise.

Table 5-2 - Noise Emission Standards for the Protection of General Amenity

Noise level at the boundary of premises			
Noise type	Time period	Monday to Saturday	Sunday and public holidays
Non-steady sound*	Day 7:00am – 6:00pm	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 10 \text{ dB(A)}$	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$
	Evening 6:00pm to 10:00pm	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 10 \text{ dB(A)}$	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$
	Night 10:00 – 7:00am	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$ and $L_{Amax} \leq 80\text{dB(A)}$	$L_{Aeq,adj,T} \leq L_{A90} \text{ plus } 5 \text{ dB(A)}$ and $L_{Amax} \leq 60\text{dB(A)}$
Continuous noise*	Anytime	$L_{A90,T} \text{ plus } 5 \text{ dB(A)}$	$L_{A90,T} \text{ plus } 5 \text{ dB(A)}$

*As defined in AS1055.1 – 1997 Acoustics – Description and measurement of environmental noise.

Note – Adjustments for tonality and impulsiveness to be included in accordance with AS1055.1 – 1997 Acoustics – Description and measurement of environmental noise.

Given the closest receptors are in residentially zoned properties, if the residential criteria can be achieved at these receptors, then all other receptors (residential or otherwise) are predicted to comply with the residential **and** general amenity criteria.

The noise levels from Table 4-1 have been used to determine the project noise criteria which has been tabulated in Table 5-3.

Table 5-3 – LCC Project Noise Criteria

Noise Type	Time period	Monday to Sunday inc. Public Holidays L_{Aeq} dB(A)*
Non-steady sound	Day 7:00am – 6:00pm	47 dB(A)
	Evening 6:00pm to 10:00pm	46 dB(A)
	Night 10:00 – 7:00am	40 dB(A) and $L_{Amax} \leq 60dB(A)$
Continuous noise	Day 7:00am – 6:00pm	42 dB(A)
	Evening 6:00pm to 10:00pm	41 dB(A)
	Night 10:00 – 7:00am	40 dB(A)

*The criteria for residential amenity is the same for Monday-Saturday and Sundays including public holidays.

6 Noise Level Prediction

6.1 Noise Sensitive Receptors

This assessment will focus on the nearest sensitive receptors outlined below and shown in Figure 6-1. The LCC Planning Scheme Policy requires demonstration of compliance at the boundary of the premises as per Table 5-1. This noise assessment will present noise emissions at the boundary of the closest residential premises below.

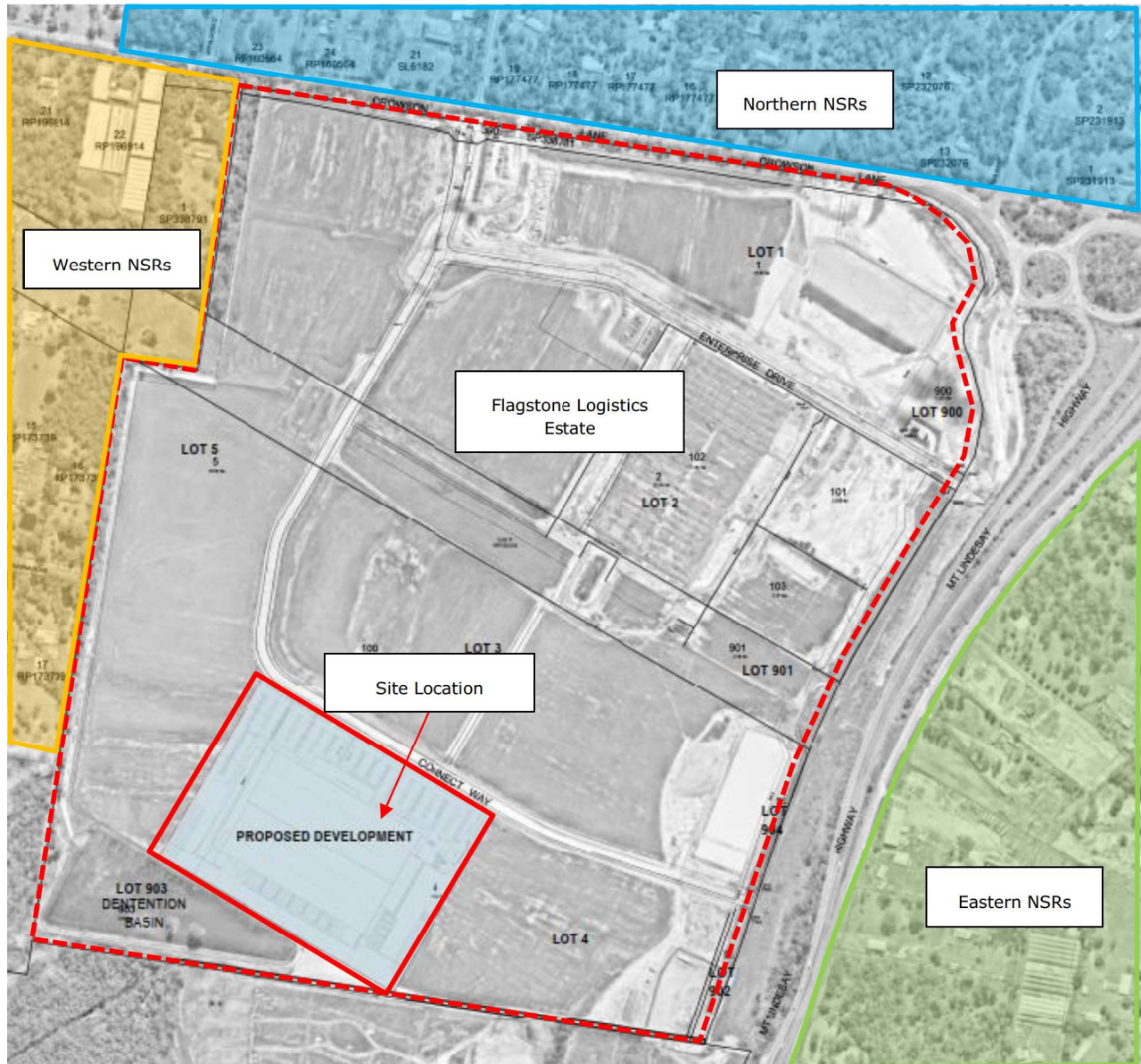


Figure 6-1 - Noise Sensitive Receptors

- Eastern NSRs:
 - 4524-4652 Mount Lindsay Highway.
- Northern NSRs:
 - 1-23 Stanley Court.
 - 17-149 Crowson Lane.
- Western NSRs:
 - 142-152 Rosina Road.

6.2 Methodology and Assumptions

Noise modelling has been undertaken using the SoundPLAN 8.2 computational noise modelling software package. Vipac have undertaken numerous noise modelling and impact assessments previously using SoundPLAN for a range of projects, including infrastructure developments and industrial projects.

ISO 9613 has been used as the calculation methodology within the SoundPLAN noise model. ISO 9613 is an extensively used methodology around the world since it was published in 1996. Using this methodology within computer based noise modelling programs allows for precise calculations accounted for multiple sound transmission paths, reflections, screening/shielding, etc. Weather conditions which promote noise propagation (i.e. source to receptor wind directions) from part of the ISO 9613 methodology. Source to receptor winds however will not always occur, therefore prediction noise emissions during these conditions can be considered a worst case meteorological scenario.

6.2.1 Reference Information

Design drawings and information for the proposed facility were provided to Vipac for this assessment. The following drawings and specifications were used for the noise impact assessment:

- 'Site Plan' – Drawing No. DA03, revision A, provided by SBA dated 28/05/2025,
- Design Levels (for the estate) TIN provided by Charter Hall dated 23/09/2023,
- Bulk Earthworks site drawings by Arcadis "250514_ Tin Lot 14 Opt2.dwg" (for the proposed development) dated 14/05/2025, and
- Schedule 6 of the Logan City Council Planning Scheme 2015 (Version 8).

6.2.2 Noise Sources

Proposed equipment information for the site was provided by Charter Hall based on a detailed understanding of the proposed tenant. Noise levels from similar equipment associated the proposed operations on site have been sourced from previous Vipac studies (unless stated otherwise) and were predicted at the NSR locations detailed in Section 6.1. Noise sources are shown below in Table 6-1, their locations shown in Figure 6-2, with detailed modelling assumptions provided in Section 6.2.3.

Table 6-1 - Equipment Sound Pressure Levels

Noise Source	Sound Pressure Level (SPL) @1m L _{Aeq} dB(A)	Sound Pressure Level (SPL) @1m L _{AMax} dB(A)
Passenger Vehicle Pass By	62	67
Passenger Vehicle Ignition	72	75
Passenger Vehicle Door Close ¹	77	84
Heavy Vehicle Passby	80	89
Heavy Vehicle Reverse Beeping ^{1,2}	94	101
Electric forklifts (loading/unloading outside on eastern 'inbound' loading dock)	82	86
Electric forklifts (loading/unloading inside warehouse)		
Waste/Cardboard Compactors ^{1,3}	91	101 ⁴

¹ Includes 2 dB(A) adjustment to account for impulsiveness characteristics in accordance with AS1055.

² Includes 5 dB(A) adjustment to account for tonality characteristics.

³No noise data for proposed compactors provided. Sound pressure level calculated off similar type of twin auger compactor with 2x15kW motors, utilising Small Electric Motor sound pressure level calculation in Bies & Hansen Engineering Noise Control, Fifth Edition (Section 10.14.1).

⁴No maximum noise level provided. A positive difference of 10dB(A) between L_{Aeq} and L_{AMax} has been estimated.

6.2.3 Modelling Assumptions

For vehicle/external noise, the following information has been used in the modelling:

- Source locations are detailed in Figure 6-2.
- Vehicle generation for the site has been based on operational information provided by the proposed tenant of the facility, detailed below:
 - Light vehicle generation has been based on the staff number turnovers at the beginning and end of each day and night shift.
 - 24-hour operation movements:
 - 420 movements outbound between 4am and 5am for the number of staff departing after night shift is complete.
 - 568 movements inbound between 6am and 7am for the number of staff arriving for the day shift.
 - 568 movements outbound between 5pm and 6pm for the number of staff departing after day shift is complete.
 - 420 movements inbound between 6pm and 7pm for the number of staff arriving for the night shift.
 - 20 movements per hour between 7am and 5pm have been assumed to occur to account for site visitors.
 - Table 6-2 details the anticipated Heavy Vehicle (HV) generation 24-hour operation information:

Table 6-2 – Onsite Heavy Vehicle (HV) Generation per hour

Operation Hour	HV on Dock Doors	HV Utilising Trailer Parking	HV Total
0	31	5	36
1	9	2	10
2	9	2	10
3	8	1	9
4	6	1	7
5	1	0	1
6	0	0	0
7	11	2	13
8	19	3	22
9	15	3	18
10	17	3	20
11	17	3	20
12	17	3	20
13	18	3	21
14	14	3	17
15	13	2	15
16	8	1	9
17	11	2	13
18	14	2	16
19	15	3	18
20	12	2	14
21	15	3	18
22	14	2	16
23	9	2	11

- Reverse beeping alarms from heavy vehicle movements are assumed to occur for approximately 20 seconds per movement.
- Outbound vs Inbound heavy vehicle movements have been based on a 60/40 split of the total heavy vehicle movements between outbound (southern dock) and inbound (eastern dock).
 - This assumes that out of all heavy vehicles entering the site, 40% of the inbound vehicles will utilise the turning bay in the southeastern corner of the site in order to exit the site and will not utilise the southern and western hardstands for turning around to exit the site (the remaining 60% of the heavy vehicle movements will utilise the eastern, southern and western hardstands).

- Heavy vehicles utilising trailer parking has been split evenly between the eastern and western trailer parking bays.
- Heavy vehicle and passenger vehicle pass bys have been modelled as line noise sources at 2m and 0.5m above ground respectively.
- Truck reversing beepers have been modelled as point sources at 2m above ground.
- Car door slams and ignitions have been modelled as point sources, with a point source for each car parking bay, as shown in Figure 6-2. The sound power levels of each have been positively adjusted to account for the number of carparks each noise source represents.
- The three compactors in the southeastern corner of the building have each assumed to operate for approximately 33% of the time, to account for the possibility that at least one compactor will always be in use.
 - The compactors have been modelled as point sources approximately 2.5m above ground level.
- External Electric forklift operation will only occur on the inbound side of the warehouse, to assist with unloading inbound vehicle deliveries.
 - Electric forklifts have been modelled as operating for 100% of the time during the day, evening and night periods to provide for a worst-case assessment.
- The proposed tenant has indicated a total of 9 electric forklifts will be in use inside the warehouse assisting with inbound deliveries and outbound despatch.
 - Electric forklifts internally have been modelled to operate 100% of the time.
- Mechanical plant is anticipated to operate 24/7.
- All vehicle movements were assumed to travel at a maximum 20km/hr.
- Noise level predictions have been made at 1.5m above ground level.

For all internal warehouse noise, the following information has been used in order to model a conservative operation assumption:

- Wall Material: As per the current elevation drawings, the proposed wall construction is concrete tilt panel and Kingspan 'Vale' Ribbed insulated panelling. For the purposes of a conservative assessment, all facades and roof has been modelled as sheet metal, providing an approximate R_w rating of 18 (prediction shown in Appendix C) as it is expected Kingspan insulated panelling will have a higher acoustic performance rating than R_w18 .
- A total of 9 electric forklifts have been modelled within the warehouse as confirmed by Charter Hall. All 9 are located on the inbound side of the warehouse.
 - Forklift noise sources have been modelled as a point source at 1.0m above ground.
- Floor: Concrete slab.
- The internal warehouse noise is a sum of all noise sources inside the entire area contributing to one diffusive noise environment.
- The proposed tenant has indicated that the roller doors will generally be closed when not in use. Considering the internal noise environment contains far less noise sources than outside, the expected noise emissions from inside the warehouse is expected to be negligible. However, for the purposes of a conservative assessment, roller doors on the inbound (eastern) loading dock have been modelled as open.
 - The roller doors on the outbound (southern) loading dock have been modelled as closed, as these are typically only open once a heavy vehicle is ready for loading, the heavy vehicle is expected to fully encompass the roller door opening, shielding internal noise as a result.
- Roller doors for the eastern loading dock area dimensions are approximately 5m wide and 5m high in accordance with the elevation drawings.
- The modelled building as a noise source accounts for the ground and first floor levels to a total height of 8.7m only. The remaining levels 2-4 are fully enclosed and are not expected to generate any significant noise through the facades themselves. Consequently, levels 2-4 have not been modelled as noise generating facades but have been included in the model to contribute to the expected shielding the building provides.
- The maximum building height is 29.53m to the roof ridge per the current elevation drawings (exclusive of any future mechanical plant screening requirements).

- The predicted results shown in Section 7 are inclusive of 24/7 operation of mechanical plant, with the preliminary mechanical plant assessment assumptions detailed in Section 7.2.

Table 6-3 summarises the number of movements/activity assumptions.

Table 6-3 - Movement/Activity Assumptions

Noise Source	Assumed events per D/E/N period or % per hour
	EDQ/LCC
Passenger Vehicle Pass By	768/420/988
Passenger Vehicle Ignition	
Passenger Vehicle Door Close	1536/840/1976*
Heavy Vehicle Passby	As per Table 6-2
Heavy Vehicle Reverse Beeping	20 seconds per HV movement
Electric forklift (loading/unloading outside on loading dock)	100%
Electric forklift (loading/unloading inside warehouse)	
Compactors	33%

*2 events per car movement.

Figure 6-2 presents the modelled noise source locations.

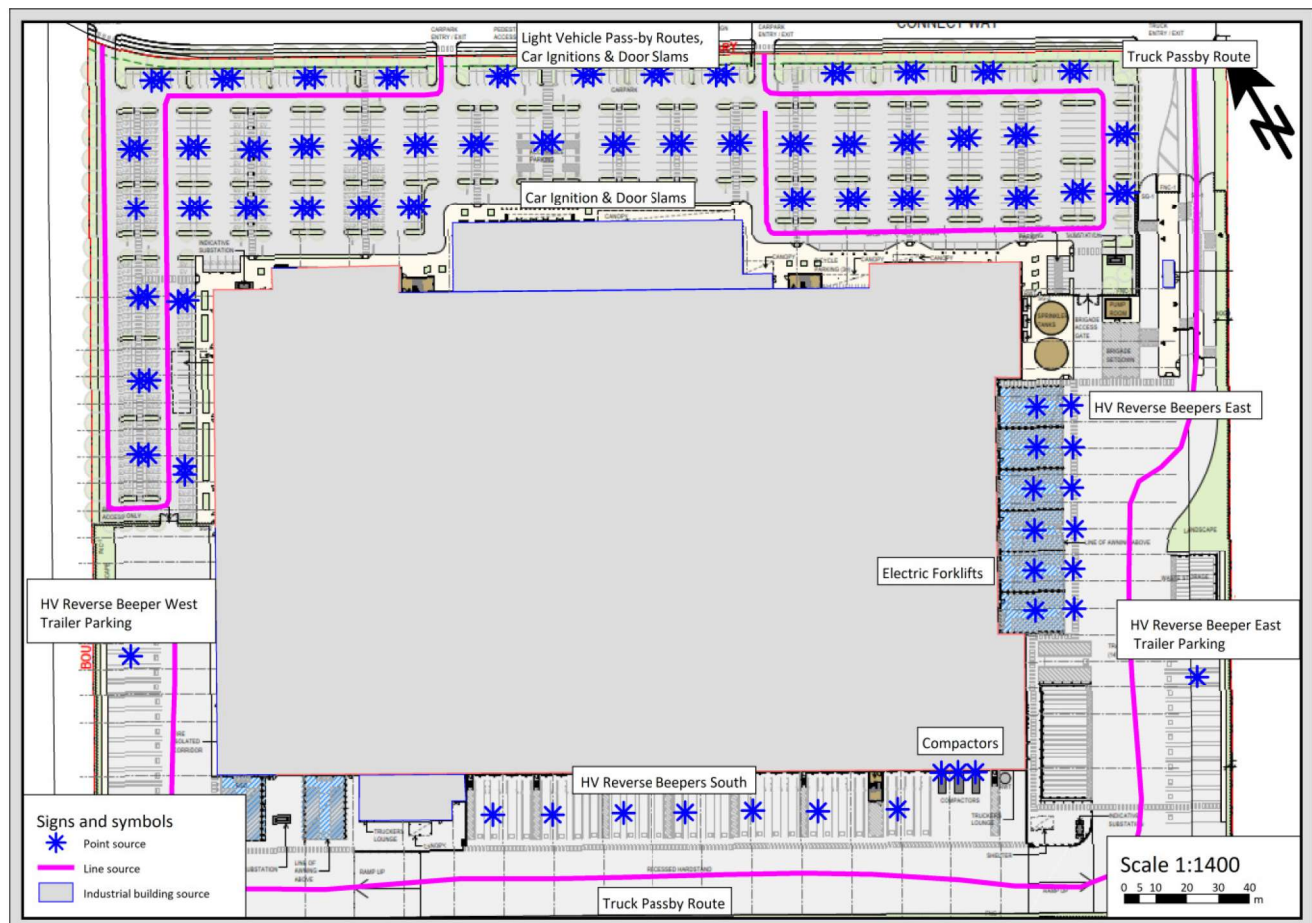


Figure 6-2 - Modelled Noise Source Locations

7 Results

7.1 Predicted Noise Levels at the NSRs

Worst case predicted cumulative noise emissions from the project have been compared against the noise criteria outlined in Section 5. The assessment has calculated cumulative noise emissions **to the nearest property** boundary (inclusive of indicative mechanical plant noise emissions detailed in Section 7.2). The predicted noise levels at the property boundary are shown in Table 7-1. Noise contour maps showing predicted noise level contour lines across the development have been included in Appendix A. A noise source contribution sample at the most exposed NSR has also been included in Appendix B.

Table 7-1 - Predicted L_{Aeq} Noise Emissions

NSR	Predicted Noise Levels, L_{Aeq}			
	Day	Evening	Night	
Criteria	47dB(A)	46dB(A)	40dB(A)	60dB(A) L_{Amax}
1-23 Stanley Court	27	27	26	33
2-10 Stanley Court	27	27	26	33
51-59 Crowson Lane	28	28	27	34
61-69 Crowson Lane	28	28	27	35
71-79 Crowson Lane	28	28	28	35
81-89 Crowson Lane	28	28	28	35
91-99 Crowson Lane	28	28	28	35
101-109 Crowson Lane	28	28	28	31
141-147 Rosina Road	41	41	40	55
142-148 Rosina Road	34	34	33	43
142-152 Crowson Lane	30	30	30	36
4524-4534 Mount Lindesay Highway	27	27	27	35
4536-4542 Mount Lindesay Highway	27	27	26	34
4544-4554 Mount Lindesay Highway	28	28	27	35
4556-4564 Mount Lindesay Highway	29	28	28	36
4566-4574 Mount Lindesay Highway	29	29	29	38
4576-4584 Mount Lindesay Highway	30	30	30	39
4586-4600 Mount Lindesay Highway	32	32	31	41
4602-4622 Mount Lindesay Highway	33	33	32	41
4624-4632 Mount Lindesay Highway	34	34	33	42
4634-4642 Mount Lindesay Highway	34	34	33	41
4644-4652 Mount Lindesay Highway	34	34	33	41

Cumulative noise levels are predicted to comply during all time periods without the need for acoustic mitigation.

7.2 Preliminary Mechanical Plant Noise Assessment

An indicative mechanical plant assessment has been incorporated into the total cumulative noise source results at the receptors as shown in Table 7-1. Current plans show mechanical plant is located within numerous plant decks on the roof of the warehouse and associated office. Consequently, Figure 7-1 details the modelled mechanical plant decks utilising a point source for each plant deck.



Figure 7-1 - Mechanical Plant Source Locations

An indicative sound power level of 90dB(A) was utilised at each mechanical plant location to establish a compliant benchmark without incorporation of acoustic treatment of mechanical plant decks.

Considering the results in Table 7-1 demonstrate predicted compliance with each plant deck SWL no greater than 90dB(A), as a guide, **mechanical plant should be designed so that each plant deck does not exceed 90dB(A) in the first instance.**

Given the large amount of mechanical plant proposed for this site, a detailed assessment during the detailed design stage is strongly recommended, as it is expected that acoustic mitigation will be required for some, if not all mechanical plant deck locations in order to comply with the nighttime criteria.

Acoustic treatment/screening of mechanical plant may result in higher allowable noise source levels. A detailed mechanical plant assessment should be conducted prior to the final selection of plant equipment. Compliance with the noise limits should then be checked once plant selections are finalised.

8 Recommendations

Noise generated by the proposed development has been assessed for compliance at the nearest property boundaries. The recommendations detailed below specify the treatment requirements for best practice management measures to ensure the potential for nuisance is minimised.

8.1 Mechanical Plant Noise

Because detailed plant selections are not available at this stage, it is not possible to carry out a detailed examination of the noise control measures that may be required to achieve the noise targets for mechanical plant.

Plant will likely need to be acoustically treated to achieve the criteria detailed in Section 5 to prevent noise emissions from adversely impacting the surrounding properties. This may include selecting the quietest plant possible, or treating the plant equipment with enclosures, barriers, duct lining, silencers, etc.

A mechanical plant noise assessment should be conducted by a suitably qualified acoustic consultant once plant selections are finalised.

9 Conclusion

Vipac has conducted a noise impact assessment for the proposed fulfilment centre within the Flagstone Industrial Estate in North Maclean. Potential noise emissions from the development were predicted to the nearest sensitive receptor locations and compared against the noise criteria as Section 5.

Noise levels are predicted to comply with the noise criteria with the implementation of the recommendations outlined in this report.

Appendix A Noise Contour Maps



Figure A 1 - Predicted Daytime Noise Levels



Figure A 2 - Predicted Evening Noise Levels



Figure A 3 Predicted Night-time Noise Levels

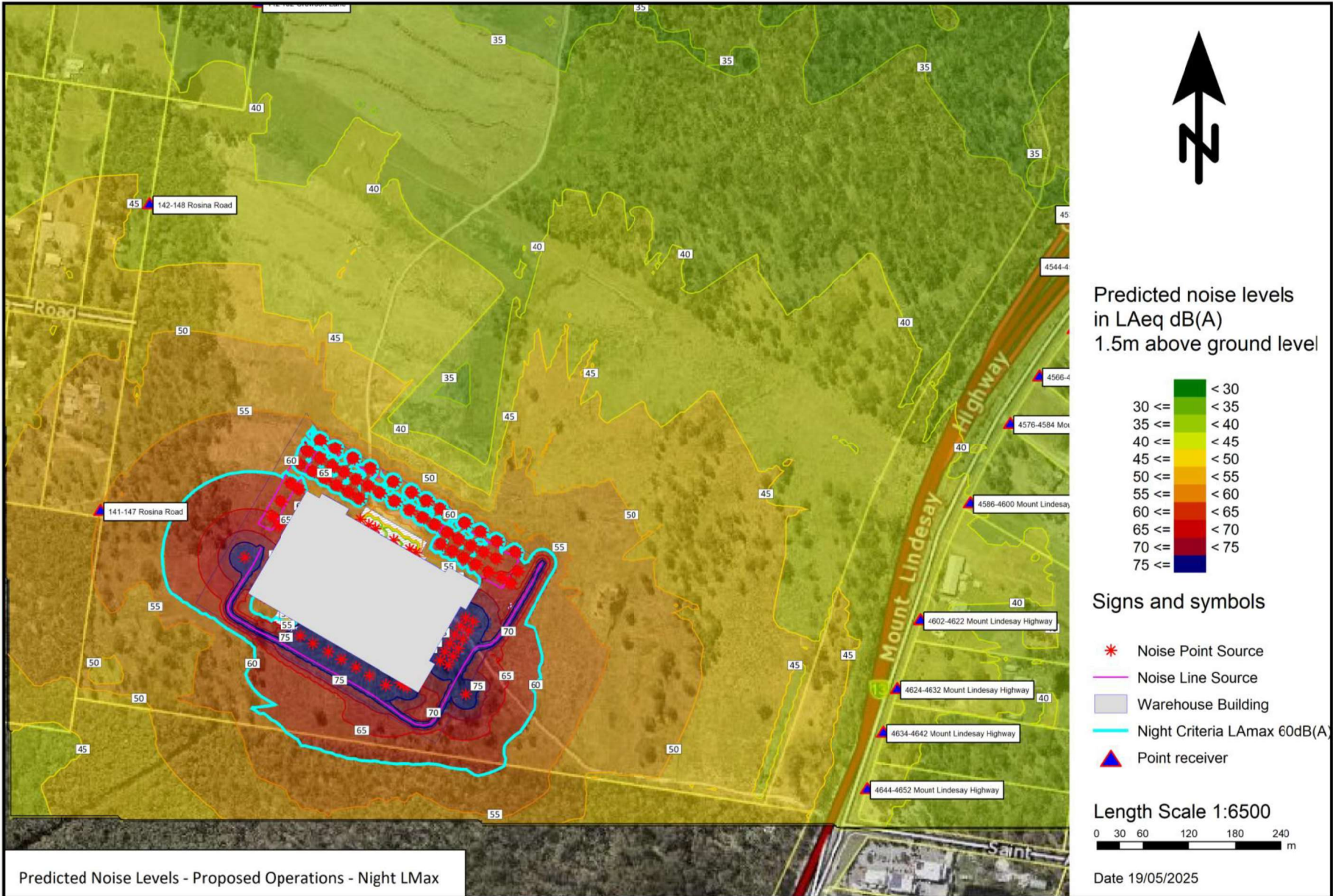


Figure A 4 - Predicted Night-time Noise Levels (Lmax)

Appendix B Source Contribution Sample at Most Exposed NSR

Fulfilment Centre, Flagstone
Contribution level - Fulfilment SPC

9

Source	Ld dB(A)	Le dB(A)	Ln dB(A)
Receiver 141-147 Rosina Road	Ld 40.8 dB(A)	Le 40.7 dB(A)	Ln 39.5 dB(A)
Heavy Vehicle Passby (60% South and West)	39.0	38.8	37.1
West Trailer Park Reverse Beeper	28.5	28.4	26.7
Mech Plant 21	25.2	25.2	25.2
Heavy Vehicle Passby (100% East)	26.8	26.7	24.9
Mech Plant 8	24.0	24.0	24.0
Compactor 1	23.5	23.5	23.5
Mech Plant 1	23.3	23.3	23.3
Compactor 3	23.2	23.2	23.2
Compactor 2	23.1	23.1	23.1
Mech Plant 9	22.4	22.4	22.4
Mech Plant 2	22.0	22.0	22.0
Mech Plant 10	21.1	21.1	21.1
Mech Plant 3	20.8	20.8	20.8
Mech Plant 11	20.0	20.0	20.0
Mech Plant 4	19.8	19.8	19.8
Mech Plant 12	19.0	19.0	19.0
Mech Plant 5	18.9	18.9	18.9
Heavy Vehicle Passby (100% East)	20.4	20.2	18.5
Mech Plant 13	18.3	18.3	18.3
Mech Plant 6	18.2	18.2	18.2
Mech Plant 14	17.7	17.7	17.7
Mech Plant 7	17.6	17.6	17.6
Mech Plant 22	17.2	17.2	17.2
Mechanical Plant 20 (Office)	15.6	15.6	15.6
Southern Loading Dock Reverse Beepers	13.6	13.5	12.1
Fulfilment Building as Source-South Facade	11.9	11.9	11.9
Southern Loading Dock Reverse Beepers	12.9	12.7	11.3
Southern Loading Dock Reverse Beepers	11.8	11.7	10.3
Car Passby West	7.6	9.4	9.6
Southern Loading Dock Reverse Beepers	10.8	10.6	9.2
Southern Loading Dock Reverse Beepers	9.8	9.6	8.2
Fulfilment Building as Source-West DG Facade	8.1	8.1	8.1
Southern Loading Dock Reverse Beepers	9.3	9.1	7.7
Southern Loading Dock Reverse Beepers	7.4	7.3	5.9
Mechanical Plant 19 (Office)	3.0	3.0	3.0
Mechanical Plant 18 (Office)	2.7	2.7	2.7
Car Door Slam x 20	0.1	1.9	2.1
Mechanical Plant 15 (Office)	1.9	1.9	1.9
Car Door Slam x 20	-0.4	1.4	1.6
Mechanical Plant 16 (Office)	1.3	1.3	1.3
Mechanical Plant 17 (Office)	1.1	1.1	1.1
Car Ignition x 20	-1.8	-0.1	0.1
Car Door Slam x 12	-2.5	-0.7	-0.5
Car Ignition x 20	-2.6	-0.8	-0.7

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SoundPLAN 8.2

Fulfilment Centre, Flagstone
Contribution level - Fulfilment SPC

9

Source	Ld dB(A)	Le dB(A)	Ln dB(A)
Car Door Slam x 20	-2.7	-0.9	-0.7
East Trailer Park Reverse Beeper	0.9	0.8	-0.9
Car Ignition x 12	-3.2	-1.4	-1.2
External Electric Forklift	-1.8	-1.8	-1.8
External Electric Forklift	-1.8	-1.8	-1.8
Car Door Slam x 10	-3.9	-2.1	-1.9
Car Ignition x 20	-3.9	-2.1	-1.9
External Electric Forklift	-2.1	-2.1	-2.1
External Electric Forklift	-2.1	-2.1	-2.1
External Electric Forklift	-2.1	-2.1	-2.1
External Electric Forklift	-2.1	-2.1	-2.1
Car Door Slam x 18	-4.8	-3.0	-2.8
Car Door Slam x 18	-5.2	-3.5	-3.3
Car Door Slam x 18	-5.3	-3.5	-3.3
Car Ignition x 10	-5.3	-3.5	-3.3
Car Door Slam x 18	-5.7	-4.0	-3.8
Car Ignition x 18	-6.0	-4.3	-4.1
Car Door Slam x 18	-6.2	-4.5	-4.3
Car Door Slam x 12	-6.2	-4.5	-4.3
Car Ignition x 18	-6.5	-4.8	-4.6
Car Door Slam x 12	-6.7	-4.9	-4.7
Car Ignition x 18	-7.0	-5.3	-5.1
Car Door Slam x 12	-7.2	-5.5	-5.3
Car Ignition x 12	-7.3	-5.5	-5.4
Eastern Loading Dock Reverse Beepers	-3.5	-3.7	-5.4
Eastern Loading Dock Reverse Beepers	-3.6	-3.7	-5.4
Eastern Loading Dock Reverse Beepers	-3.6	-3.8	-5.5
Car Ignition x 18	-7.5	-5.8	-5.6
Eastern Loading Dock Reverse Beepers	-3.7	-3.9	-5.6
Eastern Loading Dock Reverse Beepers	-3.8	-3.9	-5.6
Eastern Loading Dock Reverse Beepers	-3.8	-4.0	-5.7
Car Ignition x 12	-7.9	-6.1	-5.9
Car Ignition x 18	-7.9	-6.2	-6.0
Car Door Slam x 10	-8.2	-6.4	-6.3
Car Door Slam x 8	-8.7	-6.9	-6.7
Car Door Slam x 12	-8.8	-7.1	-6.9
Car Door Slam x 10	-8.9	-7.1	-6.9
Car Ignition x 10	-9.5	-7.7	-7.5
Car Ignition x 8	-9.9	-8.1	-7.9
Fulfilment Building as Source-Main East Facade	-7.9	-7.9	-7.9
Car Ignition x 10	-10.2	-8.4	-8.2
Car Ignition x 18	-10.4	-8.6	-8.4
Car Door Slam x 8	-10.5	-8.7	-8.5
Car Door Slam x 18	-10.5	-8.8	-8.6
Car Ignition x 12	-10.7	-8.9	-8.7

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SoundPLAN 8.2

Fulfilment Centre, Flagstone
Contribution level - Fulfilment SPC

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Source	Ld dB(A)	Le dB(A)	Ln dB(A)
Car Door Slam x 9	-10.8	-9.0	-8.8
Fulfilment Building as Source-North Facade Small	-9.6	-9.6	-9.6
Car Passby East	-11.9	-10.1	-9.9
Fulfilment Building as Source-West Facade Small	-10.5	-10.5	-10.5
Fulfilment Building as Source-North West Bumpout Facade	-10.6	-10.6	-10.6
Car Ignition x 18	-13.1	-11.4	-11.2
Fulfilment Building as Source-North Facade Facing West	-11.3	-11.3	-11.3
Car Ignition x 9	-13.6	-11.8	-11.6
Fulfilment Building as Source-East Facade	-12.2	-12.2	-12.2
Car Ignition x 18	-14.3	-12.5	-12.3
Fulfilment Building as Source-North East Bumpout Facade	-12.4	-12.4	-12.4
Car Ignition x 8	-14.8	-13.1	-12.9
Fulfilment Building as Source-East Roller Door 3	-13.0	-13.0	-13.0
Car Ignition x 12	-15.0	-13.2	-13.0
Fulfilment Building as Source-East Roller Door 4	-13.1	-13.1	-13.1
Fulfilment Building as Source-East Roller Door 5	-13.6	-13.6	-13.6
Car Ignition x 9	-16.0	-14.2	-14.0
Fulfilment Building as Source-East Roller Door 2	-14.2	-14.2	-14.2
Fulfilment Building as Source-East Facade	-14.3	-14.3	-14.3
Fulfilment Building as Source-East Roller Door 6	-14.7	-14.7	-14.7
Car Door Slam x 18	-16.9	-15.1	-14.9
Car Ignition x 18	-17.0	-15.2	-15.1
Fulfilment Building as Source-East Roller Door 1	-15.1	-15.1	-15.1
Car Ignition x 8	-17.2	-15.4	-15.2
Car Ignition x 18	-17.3	-15.5	-15.3
Car Door Slam x 18	-17.8	-16.0	-15.8
Car Door Slam x 12	-18.1	-16.3	-16.1
Fulfilment Building as Source-East Facade Facing South	-16.3	-16.3	-16.3
Car Ignition x 10	-18.3	-16.5	-16.3
Car Ignition x 8	-18.5	-16.7	-16.6
Car Door Slam x 9	-18.5	-16.7	-16.6
Car Ignition x 6	-18.8	-17.0	-16.8
Car Ignition x 12	-18.9	-17.1	-16.9
Car Ignition x 10	-19.0	-17.2	-17.0
Car Ignition x 14	-19.2	-17.4	-17.2
Car Ignition x 10	-19.3	-17.6	-17.4
Car Ignition x 8	-19.4	-17.7	-17.5
Car Door Slam x 8	-19.7	-17.9	-17.7
Car Door Slam x 18	-20.6	-18.8	-18.6
Car Door Slam x 18	-20.7	-18.9	-18.7
Car Door Slam x 10	-21.1	-19.3	-19.1
Car Door Slam x 10	-21.1	-19.4	-19.2
Fulfilment Building as Source-North Facade Facing East	-19.2	-19.2	-19.2
Car Door Slam x 8	-21.8	-20.0	-19.8

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SoundPLAN 8.2

Fulfilment Centre, Flagstone
Contribution level - Fulfilment SPC

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Source	Ld dB(A)	Le dB(A)	Ln dB(A)
Car Door Slam x 8	-21.8	-20.1	-19.9
Car Ignition x 8	-22.0	-20.2	-20.0
Fulfliment Building as Source-East Facade Facing North	-20.7	-20.7	-20.7
Car Door Slam x 6	-22.6	-20.9	-20.7
Car Door Slam x 14	-22.7	-20.9	-20.7
Car Door Slam x 12	-22.8	-21.0	-20.8
Car Ignition x 18	-23.6	-21.9	-21.7
Car Ignition x 18	-24.4	-22.7	-22.5
Car Ignition x 18	-24.7	-23.0	-22.8
Car Ignition x 18	-24.9	-23.2	-23.0
Car Ignition x 18	-25.0	-23.3	-23.1
Car Ignition x 18	-25.1	-23.3	-23.1
Car Door Slam x 8	-25.5	-23.8	-23.6
Car Ignition x 12	-28.3	-26.6	-26.4
Car Ignition x 12	-28.6	-26.8	-26.6
Car Door Slam x 18	-28.6	-26.8	-26.6
Car Ignition x 12	-28.7	-26.9	-26.7
Car Ignition x 12	-28.7	-26.9	-26.8
Car Door Slam x 18	-29.0	-27.2	-27.0
Car Ignition x 8	-29.2	-27.4	-27.2
Car Door Slam x 18	-29.3	-27.5	-27.3
Car Door Slam x 18	-29.6	-27.8	-27.6
Car Door Slam x 18	-29.8	-28.0	-27.8
Car Door Slam x 18	-29.9	-28.1	-27.9
Car Door Slam x 10	-30.8	-29.0	-28.8
Car Door Slam x 12	-32.5	-30.7	-30.5
Car Door Slam x 12	-32.7	-30.9	-30.7
Car Door Slam x 12	-32.9	-31.2	-31.0
Car Door Slam x 12	-33.2	-31.4	-31.2
Car Door Slam x 8	-33.8	-32.0	-31.8

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Appendix C 0.4BMT Sheet Metal R_w Prediction

Sound Insulation Prediction (v9.0.20)

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Margin of error is generally within $R_w \pm 3$ dB

Key No: 1709

Job Name:

Job No:

Date: 25/09/2023

File Name:

Initials: patrickd

Notes:



R_w	18 dB
C	0 dB
Ctr	-2 dB

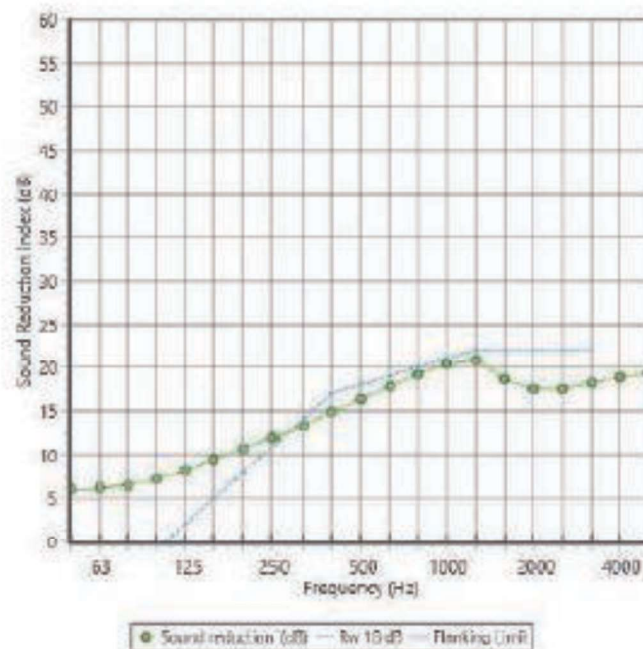
Panel Size = 0.7m x 4.0m

Partition surface mass = 0.12 kg/m²

System description

Panel 1: 1 x 0.4 mm Custom 0.6 (0.55mm)

freq (Hz)	R(dB)	R(dB)
50	6	
63	6	6
80	7	
100	7	
125	8	8
160	9	
200	11	
250	12	12
315	13	
400	15	
500	16	16
630	18	
800	19	
1000	20	20
1250	21	
1600	19	
2000	18	18
2500	18	
3150	18	
4000	19	19
5000	19	



Appendix D Development Plans

