



COUNTDOWN POKENO  
ASSESSMENT OF ENVIRONMENTAL NOISE  
EFFECTS

Rp 001 r03 20190205 | 30 April 2019

**Project:** COUNTDOWN POKENO

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**Report No.:** Rp 001 r03 20190205

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<b>Status:</b>	<b>Rev:</b>	<b>Comments</b>	<b>Date:</b>	<b>Author:</b>	<b>Reviewer:</b>
Draft	-	For client review	8 Apr. 19	P Thaker	C Robinson
Draft	r01	Client feedback	9 Apr. 19	P Thaker	-
Approved	r02	Client feedback	15 Apr. 19	P Thaker	-
Approved	r03	Council feedback	30 Apr. 19	P Thaker	C Robinson

## TABLE OF CONTENTS

1.0	INTRODUCTION .....	4
2.0	APPLICATION SITE AND ACTIVITY DESCRIPTION .....	4
2.1	Location .....	4
2.2	Existing Ambient Acoustic Environment .....	5
2.3	Proposed Activities .....	6
3.0	DISTRICT PLAN NOISE RULES .....	6
3.1	Operational Noise .....	6
3.2	Construction Noise .....	7
4.0	ACOUSTIC MITIGATION.....	7
5.0	NOISE ASSESSMENT .....	7
5.1	Overview .....	7
5.2	Site Vehicle Movements .....	7
5.3	Mechanical Plant .....	8
5.4	Predicted Noise Levels .....	8
5.5	Construction Noise .....	9
6.0	DISCUSSION.....	9
6.1	Daytime Noise Effects .....	9
6.2	Night-time Noise Effects .....	10
6.3	Construction Noise Effects.....	10
7.0	CONCLUSION.....	10

APPENDIX A GLOSSARY OF TERMINOLOGY

APPENDIX B PROPOSED SITE PLAN

## 1.0 INTRODUCTION

Marshall Day Acoustics (MDA) has been engaged by Woolworths NZ Ltd to assess the construction and operational noise effects of a proposed new Countdown supermarket on Great South Road, Pokeno.

A 3000m<sup>2</sup> supermarket, including 200m<sup>2</sup> office and 100m<sup>2</sup> plantroom, is proposed as generally described in the application plans and documentation. Operational noise matters relate to goods deliveries, customer car park movements, and mechanical services plant servicing the buildings. Construction noise has also been considered.

This report summarises the Operative Waikato District Plan (Franklin Section) noise rules, predicts the noise levels from the proposed activities to the nearest sensitive receivers and provides an assessment of noise compliance and effects.

A Glossary of Terminology is provided in Appendix A.

## 2.0 APPLICATION SITE AND ACTIVITY DESCRIPTION

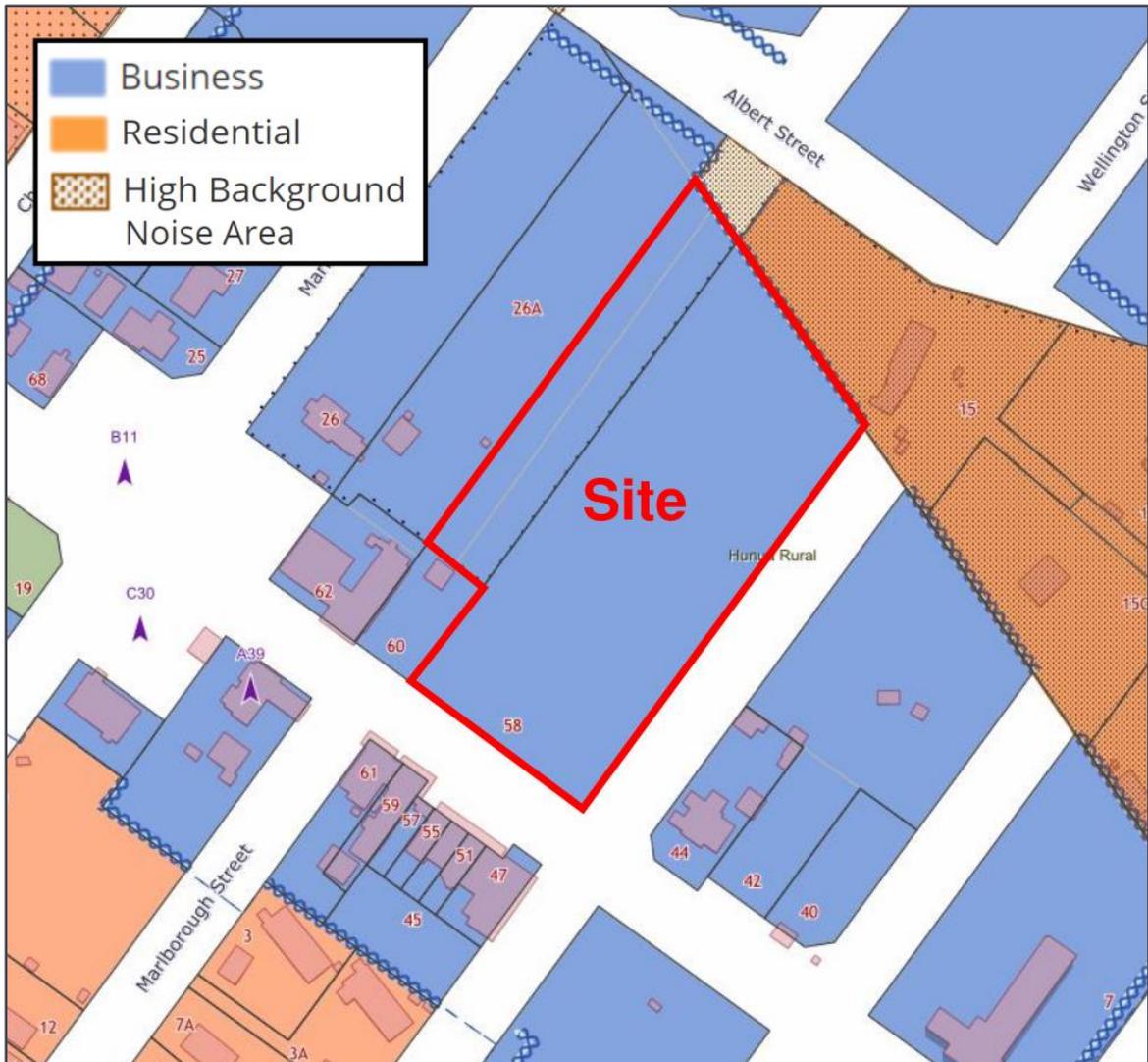
### 2.1 Location

The proposed supermarket will be located along the main street of Pokeno, on the corner of Great South Road and Wellington Street (a paper road on the eastern boundary). The proposed site plan is included in Appendix B. An aerial photo of the site (including the nearest relevant receivers) is provided in Figure 1 and a zoning map in Figure 2, with the site outlined in red in both figures.

Figure 1: Site aerial



Figure 2: Site zoning



The applicant site and adjacent sites to the east, south, and some to the west are zoned “Business” in the District Plan. The site adjacent to the north is zoned “Residential”. However, this site is within the “High Background Noise Area”, and has relaxed noise limits as it is near State Highway 1, a major source of noise throughout the day.

The adjacent sites are used for commercial (G.A.S Station) or residential (15 Selby Street, 26 Market Road, 44 Great South Road). No dwellings are known to be located at 42 Great South Road, and the use of the site could not be determined. It is considered that levels received at 42 Great South Road would be similar to those predicted for 44 Great South Road in this assessment.

It is understood Wellington Street (given in green in Figure 1) will be developed as part of the proposal, but it will be vested in the Waikato District Council i.e. the Council will own and maintain it.

The Measurement Positions (MPs) provided in Figure 1 are detailed below.

## 2.2 Existing Ambient Acoustic Environment

A site visit was undertaken between approximately 12pm and 1pm on 12 March 2019 to measure the ambient noise levels in the area. Four on-site Measurement Positions (MPs) were used; MP1 representing 44 Great South Road, MP2 representing both 26 Market Street and the G.A.S Station, MP3 representing 15 Selby Street, and MP4 near the centre of the application site. These positions are shown in Figure 1. Table 1 provides the measured noise levels.

**Table 1: Measured ambient noise levels**

Position	Representative Location	Noise Level (dB LAeq)
MP1	44 Great South Rd	53
MP2	26 Market St, G.A.S Station	52
MP3	15 Selby St	48
MP4	Applicant site	50

### 2.3 Proposed Activities

The proposed daily operating hours are between 6am and midnight.

Vehicles from Great South Road would enter and exit the site from the southeast corner of the site via the newly formed Wellington Street. The customer carpark is primarily to the south of the supermarket but also extends along Wellington Street to the east of the supermarket, which is where the offices, courier delivery, and goods pick up is located. The main store goods deliveries will take place in the loading bay to the north of the supermarket.

Goods deliveries would involve courier vehicles, fixed-axle heavy goods vehicles (HGVs), and 'B-Train' articulated trucks. It is understood deliveries and servicing of the store is intended to occur during the daytime period (i.e. 7am – 10pm).

Mechanical services plant would be installed to provide heating, ventilation, air-conditioning, and refrigeration services to the supermarket. The majority of plant, such as outdoor air-handlers and condenser banks are expected to be located on a rooftop plant platform. Rooftop extract and ventilation fans would be located at roof level.

### 3.0 DISTRICT PLAN NOISE RULES

#### 3.1 Operational Noise

The site is located within the "Business" zone. The noise limits for activities in this zone are given in Operative Waikato District Plan (Franklin Section) Rule 29.6.1.B

The adjacent residential zoned site to the north is within the "High Background Noise Area". The relevant noise limits have been reproduced in Table 2.

**Table 2: Noise limit within the boundary of a receiver site**

Receiver Site Zone	Period	Noise Limit
Residential (within High Background Noise Area)	7am - 10pm	55 dB LAeq
	10pm - 7am	45 dB LAeq, 75 dB LAmax
Business	7am – 10pm	60 dB LAeq
	10pm – 7am	50 dB LAeq, 75 dB LAmax

NZS 6802:2008 allows for up to a 5 decibel averaging provision for activities that are not present throughout the whole daytime assessment time frame, in this case 7am – 10pm. Therefore, for short durations (e.g. the peak one hour period) the daytime noise limit is 60 dB LAeq for "Residential" zoned sites, and 65 dB LAeq for "Business" zoned sites provided that the noise level averaged across the whole daytime period does not exceed the limits in Table 2.

Based on the existing ambient environmental sound levels, the noise limits are considered to be appropriate for the site.

### 3.2 Construction Noise

The Operational Waikato District Plan (Franklin Section) does not provide noise limits for construction activities. However, within *Part 50 Definitions* of the District Plan, the definition for “Noise” states:

*‘Construction Noise’: where a condition of resource consent requires a standard for construction Noise to be set, the following should be used:*

*Construction Noise shall meet the limits recommended in Table 1 of NZS 6803:1999. The Measurement and Assessment of Noise from Construction, Maintenance, and Demolition work, shall be measured and assessed in accordance with NZS 6803:1999. Adjustments provided in clause 6.1 of NZS 6803:1999 shall apply, and references in the Tables of NZS 6803:1999 to “NZS 6802” shall be read as references to clause 4.2.2 of NZS 6802:1991.*

It is believed the definition intended to reference Table 2 of NZS 6803:1999 as Table 1 does not provide recommended limits. The limits recommended in NZS 6803:1999 are **70 dB L<sub>Aeq</sub>** and **85 dB L<sub>Amax</sub>** 7:30am – 6pm Monday to Saturday (assuming construction duration exceeds 20 weeks). This is assessed at 1m from the façade of any building in both Business and Residential zones.

More stringent noise limits typically preclude external construction works at night and during the day on Sundays and public holidays.

### 4.0 ACOUSTIC MITIGATION

It is recommended the following acoustic mitigation measures are incorporated into the design:

- Goods delivery, loading dock use, and waste collection limited to 7am to 10pm
- Use of LPG or electric forklifts and lift stackers
- Use of broadband reversing alarms
- Mechanical plant L<sub>w</sub> and location as detailed in Section 5.3
- Acoustic screening as depicted in Appendix B. Screening shall be 2m tall and constructed of close-boarded timber with a minimum surface mass of 10 kg/m<sup>2</sup>, such as 20-25mm thick timber palings or 17mm plywood.

### 5.0 NOISE ASSESSMENT

#### 5.1 Overview

The overall noise level at the nearby receivers has been predicted based on the contribution from each of the following sources:

- Customer vehicles
- Delivery vehicles
- Loading dock activities
- Rooftop mechanical plant

The methodology of predicting each contribution at any receiver point is detailed in the following sections.

#### 5.2 Site Vehicle Movements

The District Plan noise limits apply to vehicle movements on the applicant site. Noise from vehicle movements on the public road network (including Wellington Street and Great South Road) are not covered by the District Plan.

Table 3 provides the vehicles movements used in this assessment, based on traffic data provided by Stantec (traffic engineers). It also provides the sound power levels ( $L_w$ ) used which are based on internal MDA measurement data. All vehicles are assumed to move at 10 km/h. Car park activities that occur throughout the day are located at the front of the site adjacent to commercial tenancies and away from the residential dwelling to the rear.

**Table 3: Vehicle movements assessed**

	Vehicle Movements			
	Customer vehicles (86 dB $L_w$ )	Courier/small truck deliveries (86 dB $L_w$ )	HGVs (103 dB $L_w$ )	B-Trains (105 dB $L_w$ )
Peak Hour	318	6	3	1
Daily Average (7am – 10pm)	2800	20	11	4

As store deliveries are only intended during the daytime period, the only vehicle movements modelled during the night-time were customer vehicles at a rate of 50 per hour from 10pm to 12am and 6am to 7am.

Delivery vehicles are potentially the most significant source of noise associate with any supermarket development. Calculations of delivery noise are based on the type and number of vehicles that are expected to service the development. It is noted that unloading activities occur for only brief periods throughout th day time period.

### 5.3 Mechanical Plant

The design of the mechanical plant has not yet been undertaken for this site. However, it is understood that the system will be of a similar design to that used in other comparably sized supermarket premises.

Plant should be located on the rooftop and placed approximately near the orange dot shown in Appendix B. The maximum cumulative sound power level ( $L_w$ ) of all rooftop plant should be no more than 105 dB  $L_w$  during the daytime (7am – 10pm) and 100 dB  $L_w$  during the night-time (10pm – 7am).

With appropriately designed noise attenuation, it is predicted that noise from all mechanical plant would readily comply with the day and night-time noise limits. It is recommended that the design and location of any mechanical plant be reviewed by a suitably qualified acoustical consultant at the detailed design stage.

### 5.4 Predicted Noise Levels

Table 4 provides the predicted cumulative noise levels at the nearest receivers.

**Table 4: Predicted noise levels at nearest receivers**

		Predicted Noise Levels		
		Daytime Average	Daytime Peak hour	Night-time
<b>Residential zone</b>	15 Shelby St	53 dB $L_{Aeq}$	58 dB $L_{Aeq}$	44 dB $L_{Aeq}$
Limits:				
55 dB $L_{Aeq}$ daytime average				
60 dB $L_{Aeq}$ daytime peak				
45 dB $L_{Aeq}$ night-time				

		Predicted Noise Levels		
		Daytime Average	Daytime Peak hour	Night-time
<b>Business zone</b>	44 Great South Rd	53 dB L <sub>Aeq</sub>	56 dB L <sub>Aeq</sub>	48 dB L <sub>Aeq</sub>
Limits:	G.A.S Station	59 dB L <sub>Aeq</sub>	61 dB L <sub>Aeq</sub>	49 dB L <sub>Aeq</sub>
60 dB L <sub>Aeq</sub> daytime average	26 Market St	56 dB L <sub>Aeq</sub>	58 dB L <sub>Aeq</sub>	47 dB L <sub>Aeq</sub>
65 dB L <sub>Aeq</sub> daytime peak				
50 dB L <sub>Aeq</sub> night-time				

Table 4 shows the proposal is predicted to comply with the relevant noise limits at all times. This is under the proviso that mechanical services plant noise emissions are controlled appropriately, and the mitigation detailed in Section 4.0 is implemented.

The vehicles on site are predicted to comply with the night-time maximum noise limit of 75 dB L<sub>Amax</sub>.

## 5.5 Construction Noise

It is understood the total construction duration is expected to be approximately 12 months. Initial site establishment would take two weeks, followed by four months of earthworks for both the application site and Wellington Street. Once this is complete, construction, landscaping, and site works for the supermarket can begin and is expected to take approximately eight months, with the supermarket closed in within four months of these works. Where practicable, construction noise shall not exceed the noise limits in Table 2 of NZS 6803: 1999.

It is expected that construction activities can generally comply with these noise limits, with reasonable planning and care given to noise emissions.

## 6.0 DISCUSSION

As discussed in Section 5.4, the proposal is predicted to comply with the relevant noise limits at all times. However, as the noise limits do not apply to vehicles on the road, and Wellington Street is not part of the applicant site, the predicted levels provided in Table 4 do not include noise emission from vehicles on Wellington Street. Yet as Wellington Street is still part of the application, noise emissions from vehicles on Wellington Street must be considered for noise effects.

### 6.1 Daytime Noise Effects

Table 5 provides the predicted average daytime noise levels for the site including vehicle movements on Wellington Street, the measured levels from Table 1, and the cumulative noise levels (from the predictions and measurements).

**Table 5: Average predicted daytime (including Wellington Street) and measured daytime noise levels**

Receiver (Zone)	Noise Levels (dB L <sub>Aeq</sub> )		Cumulative
	Predicted	Measured	
15 Shelby St (Res)	48 to 55	53	54 to 57
44 Great South Rd (Bus)	59	52	60
G.A.S Station (Bus)	58	48	58
26 Market St (Bus)	57	50	58

Table 5 shows the average daytime level at the residentially zoned 15 Selby Street is predicted to increase by 4 decibels during an unloading period for a large delivery truck (B-train) which is expected to occur four times per day. The remaining day-time period is expected to change by no more than 3 decibels which is just perceptible. Overall the activity is predicted to be fully compliant with respect to noise within the residential boundary and, therefore, is considered appropriate in the context of the site.

The predicted increase at 44 Great South Road and 26 Market Street is 8 decibels, which is considered to be appreciable. However, as the site is zoned business, these levels are considered appropriate and to be expected in the zoning.

The ambient noise level is predicted to double at the G.A.S Station. It is understood that the G.A.S Station, like 44 Great South Road and 26 Market Street, has a dwelling on-site. However, it is the only commercial receiver near the project site and it is considered the increase in level is appropriate given the zoning and commercial use.

## 6.2 Night-time Noise Effects

As the proposed operating hours for the supermarket are between 6am – 12am, there are potentially three hours where the store will be open during the night-time period; 10pm – 12am and 6am – 7am. During these night-time hours, it is expected the site will generate similar volumes of traffic to what currently exists at night along Great South Road. Therefore, the site is expected to increase the ambient noise levels at night by approximately 3 decibels. This is considered just perceptible and therefore the increase in noise level is considered reasonable.

Furthermore, as stated in Section 5.4, the night-time noise is predicted to readily comply with the noise limits for both Residential and Business Zones.

## 6.3 Construction Noise Effects

As discussed in Section 5.5, construction is expected to comply with the relevant noise limits. It is considered, therefore, that construction noise would be adequately controlled, and construction noise effects would be reasonable.

A Construction Noise Management Plan (CNMP) has been recommended to provide clear outline and guidance to the successful contractor to enable compliance with the limits. Given the conventional construction methods anticipated and site separation, we anticipate compliance would be readily achieved.

## 7.0 CONCLUSION

Marshall Day Acoustics has undertaken an assessment of the potential noise effects for a proposed Countdown supermarket development in Pokeno.

The following noise mitigation measures are recommended:

- Goods delivery, loading dock use, and waste collection limited to 7am to 10pm
- Use of LPG or electric forklifts and lift stackers
- Use of broadband reversing alarms
- Mechanical plant  $L_w$  and location as detailed in Section 5.3
- Acoustic screening as depicted in Appendix B. Screening shall be 2m high and constructed of close-boarded timber with a minimum surface mass of 10 kg/m<sup>2</sup>, such as 20-25mm thick timber palings or 17mm plywood.

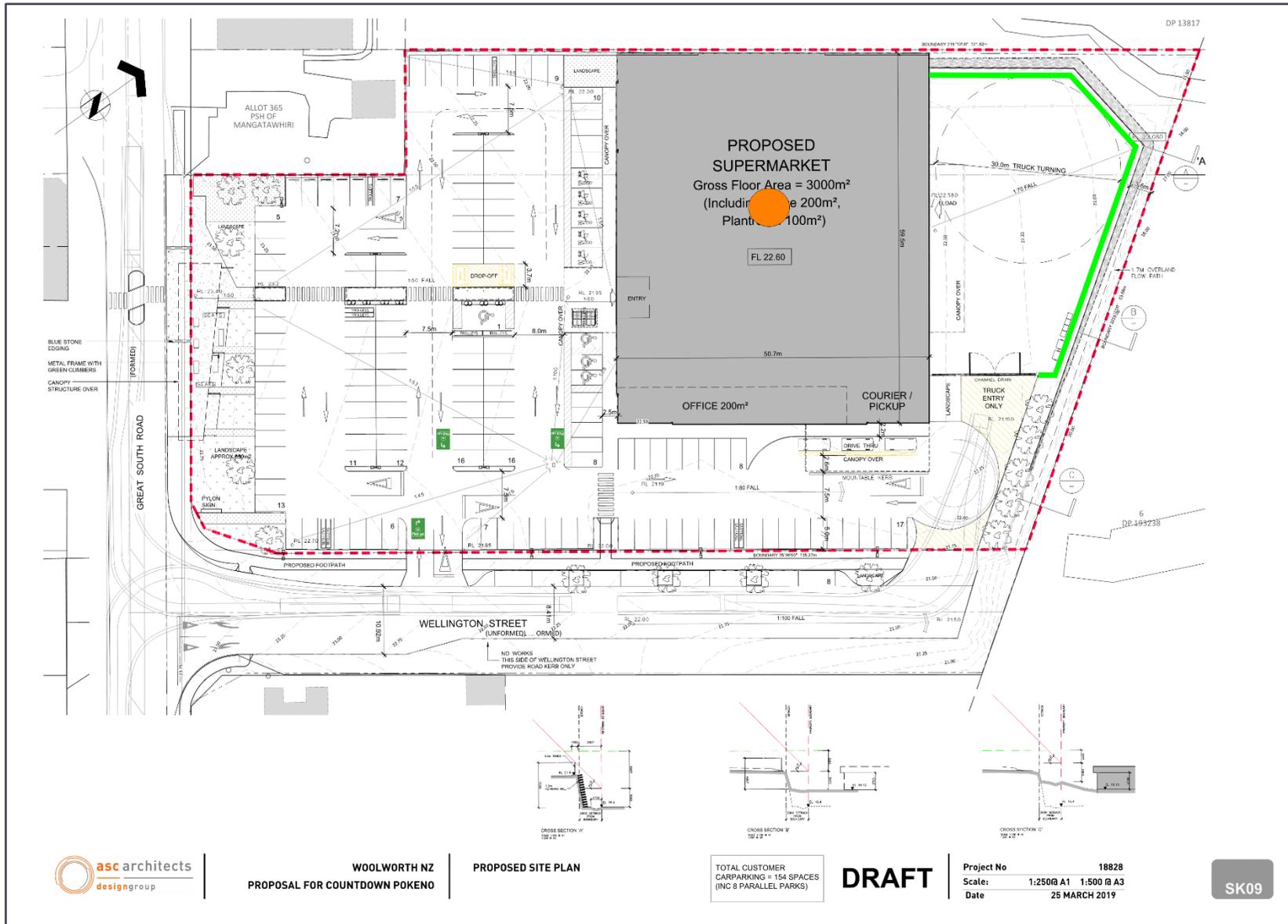
With appropriate mechanical plant design and equipment selection, operation of the proposed development is predicted to comply with the District Plan noise limits.

It is recommended that construction noise be measured and assessed in accordance with New Zealand Standard NZS 6803: 1999 “Acoustics - Construction Noise”. Where practicable, construction noise shall not exceed the noise limits in Table 2 of NZS 6803: 1999. Construction activity shall be managed through a Construction Noise Management Plan (CNMP).

**APPENDIX A GLOSSARY OF TERMINOLOGY**

<b>Ambient</b>	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
<b>dB</b>	<u>Decibel</u> , the unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r=20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$
<b>dBA</b>	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
<b>SPL or <math>L_p</math></b>	<u>Sound Pressure Level</u> A logarithmic ratio of a sound pressure measured at distance, relative to the threshold of hearing ( $20 \mu\text{Pa}$ RMS) and expressed in decibels.
<b><math>L_{Aeq}(t)</math></b>	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level.  The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
<b><math>L_{Amax}</math></b>	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
<b>Noise</b>	A sound that is unwanted by, or distracting to, the receiver.
<b>NZS 6801:2008</b>	New Zealand Standard NZS 6801:2008 " <i>Acoustics – Measurement of environmental sound</i> "
<b>NZS 6802:2008</b>	New Zealand Standard NZS 6802:2008 " <i>Acoustics – Environmental Noise</i> "
<b>NZS 6803:1999</b>	New Zealand Standard NZS 6803: 1999 " <i>Acoustics - Construction Noise</i> "

APPENDIX B PROPOSED SITE PLAN



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