

APPENDIX K

Operational Noise Assessment –
Marshall Day Acoustics



MARSHALL DAY
Acoustics 

RYMAN HEALTHCARE RETIREMENT VILLAGE
KARORI
OPERATIONAL NOISE ASSESSMENT

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Project: **RYMAN HEALTHCARE RETIREMENT VILLAGE KARORI**

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APPENDIX A GLOSSARY OF TERMINOLOGY

1.0 INTRODUCTION

Ryman Healthcare Ltd ('Ryman') proposes to construct and operate a comprehensive care retirement village ('Proposed Village') to be located at Donald Street, Karori, Wellington (the 'Site').

This report assesses the operational noise effects arising from this proposal.

This assessment is based on the following information and drawings:

- Ryman Resource Consent Drawing Package "*RCT FULL SET August 2020*"; and
- Commute Transportation Consultants document "*Transportation Assessment Report 20 July 2020*";
- Woods document "*Infrastructure Assessment Report*" dated 25 August 2020;
- Tonkin & Taylor document "*Assessment of Geotechnical Effects*" dated August 2020;
- Sullivan Wall Landscapes drawing "*Indicative landscape Plan*" revised on 21 August 2020;

Further information regarding various aspects of the Proposed Village was obtained via correspondence with Mitchell Daysh, Commute Transportation Consultants, Ryman and Chapman Tripp.

Please note that the following comments and recommendations are for acoustical purposes only; they do not take into consideration any other applicable standards such as fire or safety. Please refer to the appropriate standards for direction.

A glossary of acoustic terms used in this report can be found in Appendix A.

2.0 SUBJECT SITE AND RECEIVING ENVIRONMENT

The Site is located in Karori, which is approximately 5 km from the Central Business District of Wellington. The area is predominantly residential in nature, with a range of commercial, community, recreational and educational activities servicing the suburb.

The Site is located close to a number of existing public facilities and schools - including Karori Mall, Karori Library, Karori Swimming Pool, Karori Normal School, Samuel Marsden Collegiate School and Ben Burn Park.

The Site is approximately 3.05 hectares in size, irregular in shape and varying in topography. It has two established accessways off Donald Street and one established accessway off Campbell Street.

Development adjoining the southern boundary of the Site, and to the east of Donald Street, consists mostly of single and two storey detached dwellings. While development to the west of Campbell Street is predominantly residential with single and two storey detached dwellings, there are also several Early Childhood Education Centres, including Karori Kids Inc which is located at 29 Campbell Street, adjoining the western boundary of the Site. Directly to the north of the Site is Karori Normal School and the Karori Swimming Pool complex.

2.1 Wellington City District Plan Zoning

The Site is zoned Outer Residential in the Wellington City District Plan ('District Plan'). Due to its former role, the Site is also subject to an Education Precinct overlay.

The surrounding properties are also zoned Outer Residential, with the exception of Karori Swimming Pool (22 Donald Street, immediately north of the Site) which is zoned Open Space A.

2.2 Closest Potentially Affected Receivers

The Site is surrounded by residential properties and activities that may be considered noise sensitive. The closest and therefore potentially most affected by noise include:

- 21 to 45 Donald Street (37 Donald Street is an Early Childhood Education Centre);

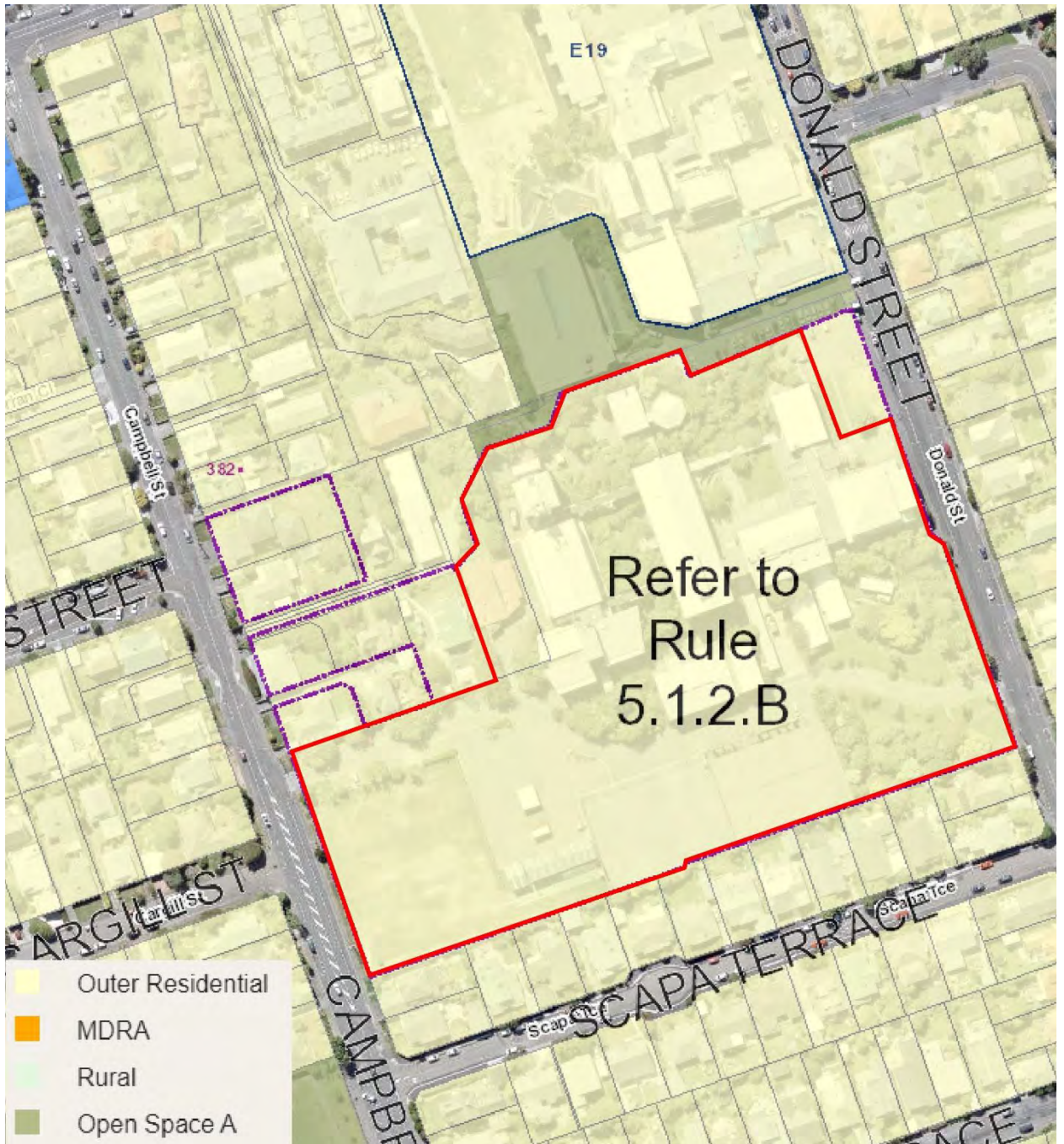


Figure 2: Approximate location of the Site (outlined in red) and surrounds zoning within the Wellington City District Plan (Base Image: WCC GIS)

3.0 NOISE PERFORMANCE STANDARDS - WELLINGTON CITY DISTRICT PLAN

From communication with Mitchell Daysh we understand the Proposed Village is to be assessed as a residential activity under the District Plan. Rule 5.1.1 of the District Plan notes that residential activities are Permitted Activities, provided that they comply with the standards specified in Section 5.6.1.

The operational noise sources for the Proposed Village would primarily include:

- Servicing vehicles; and
- Fixed plant, including a waste compactor and a 500 kVA emergency generator.

3.1 Servicing vehicles

The District Plan does not provide noise standards for a residential activity. Accordingly, although the on-site movement of service vehicles, specifically rubbish trucks and catering vehicles, are part of this residential activity, we have assessed the noise effects from those vehicles against the noise standards for a non-residential activity.

Standard 5.6.1.1.1 of the District Plan states:

“Noise emission levels from any non-residential activity occurring within a Residential Area, when measured at or within the boundary of any site, other than the site from which the noise is emitted in Residential and Rural Areas, must not exceed the following noise limits:

...

Outer Residential Area	
Monday to Sunday 7am to 7pm	50 dB L _{Aeq} (15 min)
Monday to Sunday 7pm to 10pm	45 dB L _{Aeq} (15 min)
Monday to Sunday 10pm to 7am	40 dB L _{Aeq} (15 min)
Monday to Sunday 10pm to 7am	70 dB L _{AFmax}

3.2 Fixed Plant Noise

Standard 5.6.1.2.1 of the District Plan applies to residential activities that are permitted under Rule 5.1.1. It states:

“Noise emission levels from any residential or non-residential activities occurring within a Residential Area resulting from noise associated with power generation, heating, ventilation of air conditioning systems, or water or sewage pumping/treatment systems of other similar domestic installations, when measured at or within the boundary of any site, other than the site from which the noise is emitted in Residential and Rural Areas shall not exceed the following noise limits:

...

Outer Residential Area	
Monday to Sunday 7am to 10pm	45 dB L _{Aeq} (15 min)
Monday to Sunday 10pm to 7am	40 dB L _{Aeq} (15 min)
Monday to Sunday 10pm to 7am	65 dB L _{AFmax}

We understand from Mitchell Daysh that resource consent is required under Rule 5.3.1 of the District Plan (Discretionary Activities (Restricted)) for the residential activity due to parking and site access standards. District Plan Rule 5.3.1.4 notes that for a Restricted Discretionary Activity, noise emission levels under standard 5.6.1.2 (fixed plant noise) shall not be exceeded by more than 5 dB.

3.3 Emergency Generator

There do not appear to be any District Plan Outer Residential noise standards specifically applicable for the use of emergency plant during maintenance or emergency situations.

The District Plan Centres Standard 7.6.1.2.4 notes that fixed plant used solely for emergency purposes is exempt from noise limits, provided that it only operates for maintenance between 8am and 5pm weekdays, and can comply with the applicable noise standards during the maintenance operations. These requirements are also reflected in the Central Area rule 13.6.1.1.2.

Although there is no such exemption for emergency generators in the Outer Residential zone, we consider it reasonable to assess the emergency generator noise against the Fixed Plant Noise daytime activity noise limit referred to above.

4.0 OPERATIONAL NOISE ASSESSMENT

4.1 Noise Prediction Methodology

Operational noise has been predicted in accordance with ISO 9613-2:1996¹ as implemented in SoundPLAN® environmental noise modelling software.

ISO 9613-2:1996 considers a range of frequency dependent attenuation factors, including spherical spreading, atmospheric absorption, and ground effect.

4.2 Service Vehicles

Commute Transportation Consultants has informed us that the Site would be visited by up to two rubbish trucks per week and up to two catering vehicles per week. We understand from Ryman that these vehicles would access the Site during the daytime hours of 7 am to 7 pm only.

Our calculations for the service vehicle routes are based on the vehicle tracking drawings provided in Appendix A of the Commute Transportation Consultants document "*Transportation Assessment Report 20 July 2020*".

4.2.1 Predicted Rubbish Truck Noise Levels

Rubbish trucks would traverse the Site, from the Site access on Donald Street to the waste compactor, via the western Site boundary, and return. These vehicles would visit the Site only twice a week, with each visit potentially being one event over any 15 minute period on any given day. The District Plan requires that noise is assessed in accordance with New Zealand Standard NZS 6802:2008 "*Acoustics - Environmental Noise*". Section 6.4 of NZS 6802:2008 notes that if a sound is not continuously present, it is likely to create lesser annoyance than if it was. For sound with a duration of less than 30% of the prescribed time frame, an adjustment of 5 dB can be subtracted from the representative sound level. In this case, the prescribed time frame is 12 hours (7am to 7pm). The time taken for the rubbish truck to pass by any receiver point would be comfortably less than 30% of this time. For the rubbish trucks, we have therefore applied this 5 dB correction.

When assessed in accordance with NZS 6802:2008, the noise from rubbish trucks is predicted to comply with the 50 dB $L_{Aeq(15\text{ min})}$ District Plan daytime limit for non-residential activities at all

¹ ISO 9613-2: 1996 "*Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*"

assessment locations, with the exception of the 29 Campbell Street Early Childhood Education (ECE) facility. At this location, a 3 dB exceedance has been predicted.

Table 3 sets out the noise predicted, resulting from the twice weekly rubbish truck movements.

Table 3: Noise Levels Predicted for Rubbish Truck Movements

Receiver Location	Predicted Noise Level dB, $L_{Aeq(15\text{ min})}$
21-45 Donald St	<30 to 47
25-51 Campbell St	<30 to 53*
6-26 Scapa St	<30 to 43
221A & 221B Karori Rd	47 to 50

Note: * This non-compliance is predicted for the 29 Campbell Street ECE only.

4.2.2 Predicted Catering Vehicle Noise Levels

The catering vehicles would access the Site from Donald Street, circulating via the ramp to the Village Centre Entry, exiting back onto Donald Street.

The catering vehicles would visit the Site approximately two times per week. Each visit would likely consist of one event over any 15 minute period. In accordance with NZS 6802:2008 we have therefore applied a duration adjustment by subtracting 5 dB from the representative sound level.

Table 4 sets out the noise predicted, resulting from catering vehicle movements.

Table 4: Noise Levels Predicted for Catering Vehicle Movements

Receiver Location	Predicted Noise Level dB, $L_{Aeq(15\text{ min})}$
21-45 Donald St	<30 to 40
25-51 Campbell St	<30
6-26 Scapa St	<30 to 40
221A & 221B Karori Rd	<30

As can be seen in Table 4, when assessed in accordance with NZS 6802:2008, the noise from catering vehicles is predicted to comply with the 50 dB $L_{Aeq(15\text{ min})}$ District Plan daytime limit for non-residential activities at all assessment locations.

4.3 Fixed Plant

Most mechanical plant items (such as for air conditioning, ventilation, etc.) would operate 24 hours per day. Therefore, noise from mechanical plant must be assessed against the District Plan Permitted Activity night-time noise limit of 40 dB $L_{Aeq(15\text{ min})}$ within the property of another site.

Within the District Plan, the night-time noise limits are the most stringent for the Outer Residential zoning. Therefore, compliance with the night-time noise limits ensures compliance with the daytime noise limits, assuming operational conditions remain unchanged.

Mechanical plant selections are typically finalised at the detailed design stage and no information has been provided to us on either location, type or sizing of most plant. Design compliance advice will therefore need to be provided at a later stage in the Project. In our opinion, with appropriate location and the use of conventional noise control treatments (if required), noise from all mechanical

plant items can comply with the relevant District Plan noise limits. Plant items must not have special audible characteristics such as tonality or impulsiveness.

Some items of fixed plant that have been proposed at this stage are discussed below.

Waste Compactor

This is proposed to be installed in a specialised building, between buildings B01A and B01B. It would be operated for up to 30 minutes per day, and only during the daytime hours.

The Ryman drawing sheet A1-010 shows two of the building walls to be brick clad. The other two walls and the roof are steel clad. A roller door would be installed in one steel clad wall. A set of double doors is proposed for the other steel clad wall. One 2m x 0.6m louvre is proposed in the wall with the roller door. There are three 2m x 0.6m louvres proposed for each of the other three walls.

We have not been provided with acoustical data for this waste compactor. However, we have based our calculations on generic information and the size and design of the building shown in the drawings.

Transformers

A 1 MVA transformer, and a 500 kVA transformer, are proposed to be located in a service compound at the rear of the junction of Building 01A and Building 07. At this stage we have not been provided with noise data for these transformers. We have therefore based this assessment on previous noise measurements of similar sized transformers carried out by us.

Emergency Generator

A 500 kVA containerised emergency generator is proposed to be installed in a specialised enclosure and service building, also located at the rear of the junction of Building 01A and Building 07.

From various Ryman drawings (for instance, sheet RCA100 A0-401) the building appears to be brick clad, with three 1.8m x 1.2m louvres in its south wall. Double doors are proposed to be installed in the west wall.

We have not been provided with noise data for the generator. We have therefore based this assessment on noise measurements carried out by us, of similar generators.

4.3.1 Fixed Plant Noise Compliance

Our calculations indicate that with appropriate mitigation, the operational noise of the waste compactor, transformer and emergency generator of the Proposed Village can comply with the relevant District Plan noise limits at all assessment properties. From communication with Ryman, we understand that at Ryman Villages, items such as the waste compactor and generator are typically installed in enclosures which can be designed to provide the required sound insulation to enable compliance with the Permitted Activity District Plan noise limits. We further understand that this approach would also be implemented at the Karori Site.

Ryman has stated that other centralised plant equipment would also be treated with appropriate acoustic mitigation measures, where required to enable compliance with the relevant District Plan noise limits.

As noted, acoustical design for compliance with relevant noise limits will need to be provided at a later stage in the Project, where required.

5.0 CONCLUSIONS

We have carried out a noise assessment of the Proposed Village to be located in Karori, Wellington. We have referenced this assessment to the relevant noise criteria of the District Plan.

We conclude that with the use of conventional noise control treatments (if required), the operation of the Proposed Village would comply with the relevant Permitted Activity noise criteria at all assessment locations, with the exception of the occasional brief exceedance at 29 Campbell Street. This exceedance is due to the twice weekly rubbish truck pass-by adjacent to this property.

Note that compliance of fixed plant is dependent on the review of fixed mechanical plant items, and any required noise mitigation, following completion of design.

APPENDIX A GLOSSARY OF TERMINOLOGY

SPL or L_p	<u>Sound Pressure Level</u> A logarithmic ratio of a sound pressure measured at distance, relative to the threshold of hearing (20 μ Pa RMS) and expressed in decibels.
dB	<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. $\text{dB} = 20 \times \log(P/P_r)$
dB(A)	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.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
$L_{Aeq}(t)$	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. (24 h) would represent a period of 24 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 " <i>Acoustics – Measurement of environmental sound</i> "
NZS 6802:2008	New Zealand Standard NZS 6802:2008 " <i>Acoustics - Environmental Noise</i> "