MARSHALL DAY Acoustics

PORT OF NAPIER WHAKATU SITE NOISE ASSESSMENT

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Project: **PORT OF NAPIER WHAKATU SITE**

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SUMMARY

MDA has undertaken an acoustic assessment of the proposed Port of Napier Whakatu site.

In summary:

- Activities are predicted to comply with the Hastings District Plan noise limits
- The proposed activities are predicted to have a negligible adverse effect on residential amenity
- There is potential for future noise sensitive activities to establish slightly closer on Groome Place which could bring the compliance location closer. This potential future reverse sensitivity effect could be alleviated by date stamping the notional boundary requirement to ensure the limits apply to existing dwellings at the time of consent.

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1.0 INTRODUCTION

1.1 Overview

Marshall Day Acoustics (MDA) has been engaged by Port of Napier to carry out an assessment of noise effects for a proposed inland freight hub at Whakatu.

The following report presents findings from a survey of the existing noise environment, summarises the relevant performance standards, predicts noise emissions for each development option for compliance and effects assessment purposes, and proposes conditions for any consent granted. A glossary of technical terms is included in Appendix A.

1.2 The site

An aerial image of the area is shown in Figure 1 (overleaf). Zoning categories are overlaid to provide planning context. The site is a former orchard located in the Whakatu industrial area with road access from Anderson Road (north) and Groome Place (east). The site's potential as a freight hub is linked to the proximity to significant transport infrastructure, including the Palmerston North–Gisborne rail Line (PNGL) on the north boundary State Highway 2 (SH2) to the west and SH51 to the east.

The site is bordered by other established industrial properties in the General Industrial Zone, with the remaining undeveloped sites used for horticultural purposes. Dwellings in the neighbouring Rural Plains Production Zone are the primary noise sensitive receivers of interest. The closest dwellings are listed as follows:

- 31 Groome Place, approximately 200m southeast
- 7 Groome Place, approximately 400m east
- Various Station Road residential area, approximately 500m east
- Various dwellings adjacent to SH2, approximately 500m southeast

1.3 The development

One development scenario is included in Figure 2 (overleaf). The development would feature large areas of pavement for container and reefer storage and potentially warehouse facilities. The development of the paved areas would extend south in a staged manner to match growth in throughput volume.

The facility would be served by trucks via Anderson Road and trains via a new onsite siding. Yard activities undertaken by a reach stacker, combi-lift or similar.

Figure 1: Site zoning map (Hastings District Council Maps) and monitoring locations

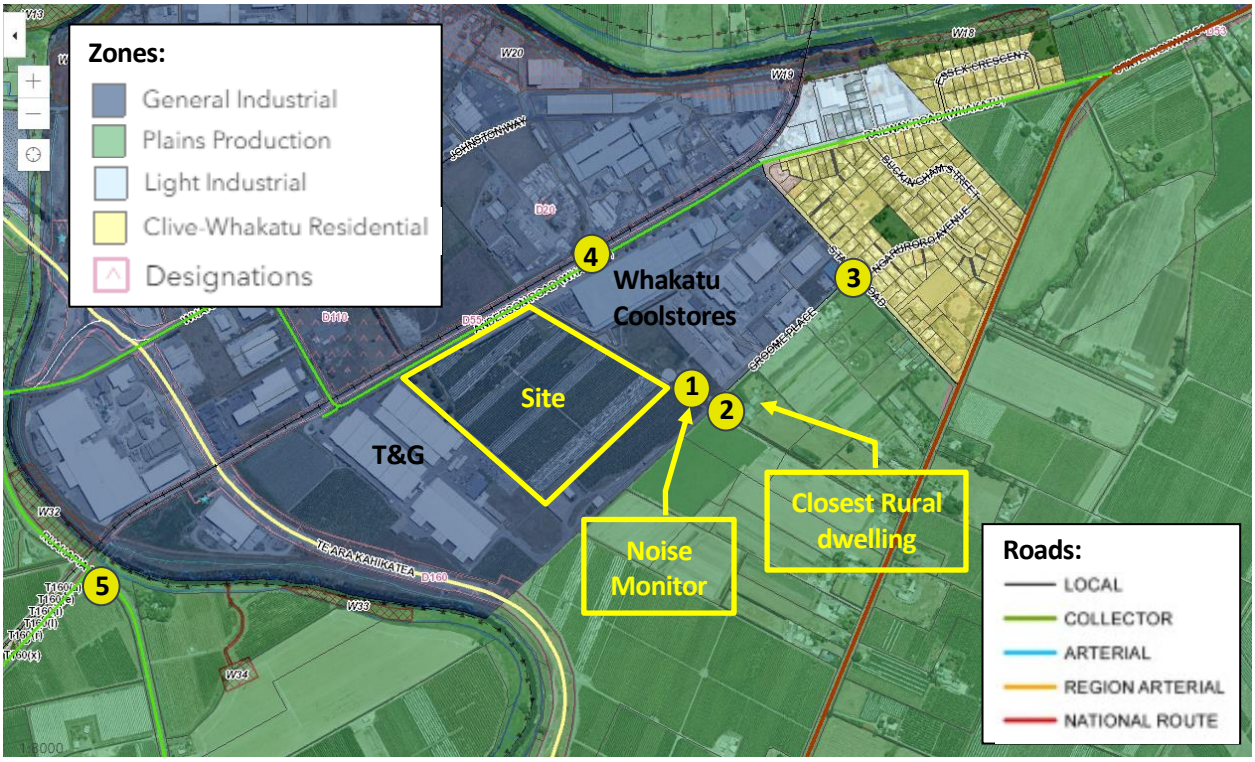
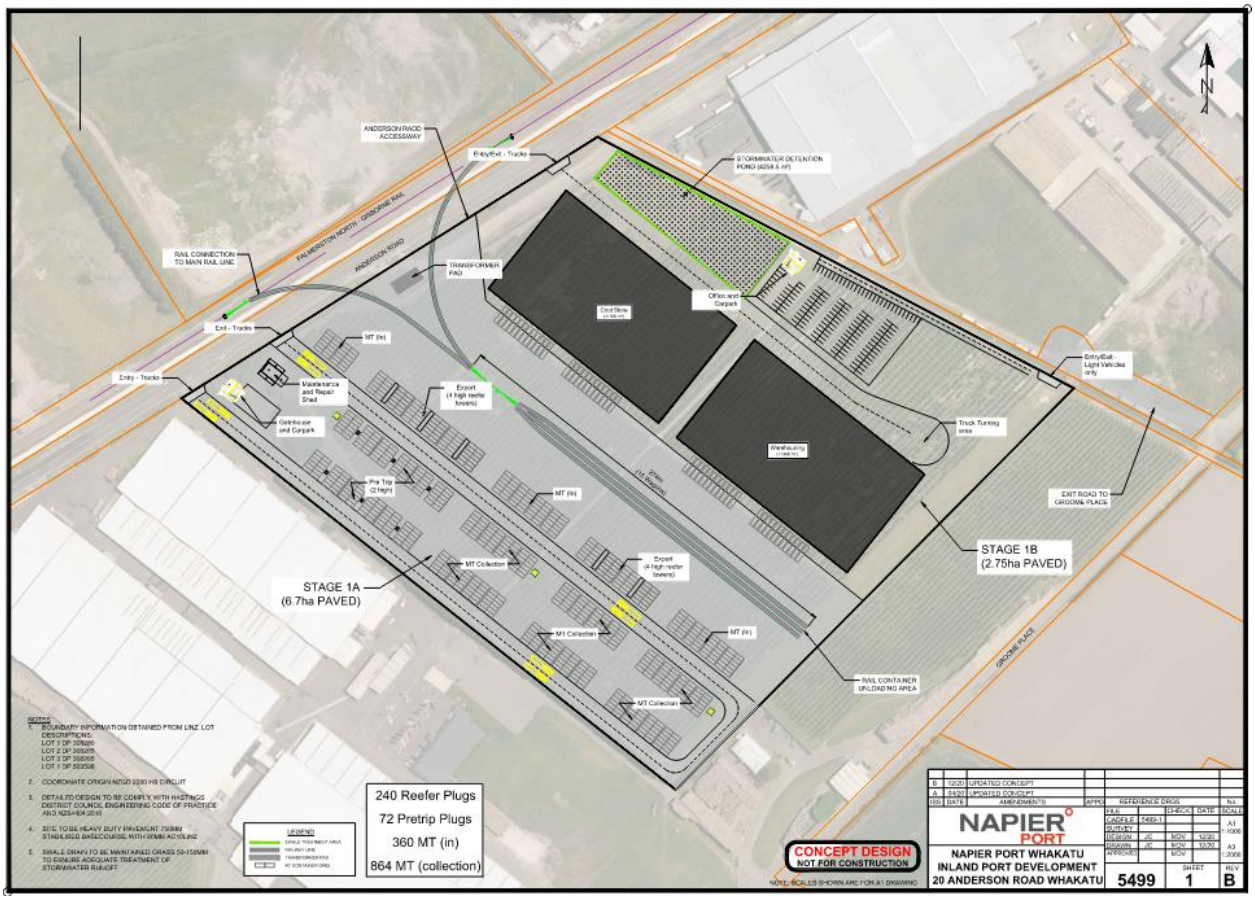


Figure 2: Concept site layout option



2.0 PERFORMANCE STANDARDS

2.1 Operations Noise

The Hastings District Plan permitted activity noise rules are reproduced-in-part in Appendix B.

In summary:

- Road traffic and industrial noise should be anticipated in or near Whakatu during both day and night-time periods.
- The objectives and policies seek to enable high noise activities located in industrial areas.
- The following noise limits applying at the notional boundary of dwellings, with the 45 dB L_{Aeq} night-time noise limit anticipated to be the most relevant for compliance purposes:
  - Day (0700 – 1900 hrs) 55 dB L_{Aeq}
  - Evening (1900 – 2200 hrs) 50 dB L_{Aeq}
  - Night (2200 – 0700 hrs) **45 dB L_{Aeq}** and 75 dB L_{AFmax}
- Vehicles on public roads or trains within the PNGL corridor are exempt from the noise limits.

There is potential for future noise sensitive activities to establish slightly closer on Groome Place which could bring the compliance location closer. This potential future reverse sensitivity effect could be alleviated by date stamping the notional boundary requirement to ensure the limits apply to existing dwellings at the time of consent.

2.2 Construction Noise

Rule 25.1.6CI of the Hastings District Plan requires that construction noise is measured assessed and comply with NZS6803:1999 Acoustics - Construction Noise. The duration of the earthworks is assumed to exceed 20 weeks. Therefore, the applicable long duration noise limits are as summarised in Table 1. Construction noise is assessed at 1 m from the façade of an occupied building.

Table 1: Construction noise limits

Time	Weekdays		Saturdays		Sundays and Public Holidays	
	dB L_{Aeq}	dB L_{AFmax}	dB L_{Aeq}	dB L_{AFmax}	dB L_{Aeq}	dB L_{AFmax}
0630 – 0730	55	75	45	75	45	75
0730 – 1800	70	85	70	85	55	85
1800 – 0630	45	75	45	75	45	75

Assuming construction is undertaken during normal daytime hours of 0730 – 1800, Monday – Saturday, all earthworks and construction activities are predicted to readily comply with the limits in Table 1. Nonetheless, construction noise should be managed using the methods set out in section 8 and Annex E of NZS6803:1999 Acoustics Construction Noise.

Construction Noise is not considered further in this assessment report.

3.0 EXISTING NOISE ENVIRONMENT

3.1 Overview

An ambient noise survey focused on the industrial interface received at the closest dwelling in the rural area to the southeast. All measurements were undertaken generally in accordance with the relevant standards. The survey included both short-term (attended) and long-term (unattended) measurements surveys at the following locations identified in Figure 1:

- Short-term attended noise measurements were undertaken to supplement the long-term measurement data and provide additional context. The locations included:
  - At the Residential interface on Station Rd (450m east)
  - SH2 near other Rural residential interface positions (450m southeast)
- A long-term unattended noise monitor was installed near the southeast corner of the Port Napier site, shown as position 1. The position was approximately 25m from the edge of Groome Place, which is a similar setback to the Notional Boundary of the closest dwelling nearby. It measured consecutive 15-minute intervals over 7 full consecutive days between 10 and 16 December 2020.

3.2 Short-Term Survey Results

The results of the attended noise measurements are summarised in Table 2. Weather conditions during all short-term surveys were generally fine with a slight northerly wind (less than 2m/s).

Table 2: Short-term noise survey results

Location	Date, Time	Duration	Noise level (dB)			Description of noise sources
			L_{A90}	L_{Aeq}	L_{AFmax}	
1. Adjacent to Logger, 14 Groom Pl	9/12/2020 18:09	2 min	38	40	58	Birds, cicada, distant traffic, distant industrial fan
	9/12/2020 23:37	1 min	35	36	41	Industry fans to west, traffic to north
	10/12/2020 10:43	2 min	45	48	58	Distant traffic from north, saws and material handling noise next door, cicadas
2. front of Neighbour (31 Groome Pl) across from logger	9/12/2020 23:38	1 min	36	37	46	Industry to west, backup beeper 1km away, traffic to north
3. Corner Groome & Station	9/12/2020 18:19	2 min	43	47	57	Distant traffic from north, bird, occasional resident activity
	9/12/2020 23:44	90 sec	36	38	52	Industry to west, traffic to north
4. 48 Anderson Road	9/12/2020 23:51	14 sec	63	64	65	Noisy factory fans (Matheson Fabrication)
5. Ruahapia Road & Orene Rd	10/12/2020 0:01	26 sec	43	44	46	Industry & traffic from north

The background noise level was generally controlled by distant road traffic or industry activity. The daytime ambient noise level was generally controlled by traffic and industrial noise, but Groome Place locations included some contribution from construction activity at the cool store site.

3.3 Long-Term Survey Results

The results of the unattended noise monitor are included in Appendix C and summarised in Table 3. Reported weather conditions during the long-term surveys were generally fine with light wind (0mm precipitation reported).

Table 3: Long term noise survey average periods

Period		Noise level (dB)		
		L_{A90}	L_{Aeq}	L_{AFmax}
Day	(0700 – 1900 hrs)	50	61	73
Evening	(1900 – 2200 hrs)	38	43	59
Night	(2200 – 0700 hrs)	41	50	56

The background (L_{A90}) noise level was typically elevated between 3am and 6pm most days, presumably associated with existing industrial activities in the area. The ambient (L_{Aeq}) noise level appears to be controlled by local vehicle movements near the monitor each morning. The levels were regularly above the 45 dB L_{Aeq} night-time noise limit but may not represent the noise environment received at more distant dwellings in the area.

Noise events (L_{AFmax}) from industrial 'bangs and crashes' or regular vehicle pass-bys were generally below the 75 dB L_{AFmax} night-time noise limit.

3.4 Discussion

The noise environment at all sites is controlled by nearby roads and industrial activities.

Overall, the existing noise environment is higher than would normally be expected in a rural or outer residential area. This situation is common at a zone interface or near significant infrastructure. It is also anticipated by the District Plan (refer Section 2.1).

4.0 NOISE ASSESSMENT

4.1 Noise Modelling Methodology

A noise model has been prepared for proposed activities using SoundPLAN, an internationally recognised computer noise modelling programme.

SoundPLAN uses a digital topographical terrain map of the area as its base. Each noise source is located at the appropriate height above the digital map and the software calculates noise propagation in multiple directions, allowing for buildings, topography, shielding, reflections and meteorological conditions using the calculation algorithms of ISO 9613-2: 1996 '*Acoustics – Attenuation of noise during propagation outdoors – Part 2: General method of calculation*'. Its accuracy has been established by a number of field trials, including comparisons in New Zealand between predictions and measurements.

The site will potentially operate 24 hours a day, seven days per week. Therefore, we have focused on night-time compliance, when the relevant noise limits are lower, other background noise is lower and community sensitivity is high. We have assessed a representative 'peak night' scenario, reflecting a fully developed site.

The noise source levels in the model are based on MDA's extensive database of noise measurements of equipment at other port facilities. The model also uses the following geo referenced base data from LINZ (Dec 2020):

- Cadastral boundaries
- Aerial imagery
- Regional topographical contours
- Building footprints. Note in the absence of building height data, all buildings have conservatively been assumed to be 4.5m high (typical of a single level dwelling)

The modelling assumptions in below have been prepared for the forecast peak periods in liaison with Port of Napier. They include a source description, the number of, and an equivalent 'on-time' description for each noise source. In summary:

- Trains: 1 siding movement per hour to/from the PNGL
- Container Trucks: 10 movements per hour to/from Anderson Rd (e.g. 5 in and 5 out of the site)
- Warehouse trucks: 10 movements per hour to/from Anderson Rd
- Reach Stackers: 4 units operating 50% on-time
- Reefer Towers: 240 units with compressor operating at 50% on-time
- Reefer Pre-trip: 76 units with compressor operating at 50% on-time

The model ignores noise contributions from the following sources:

- Vehicle movements on public roads
- Train movements within the PNGL
- Other ancillary site activities, including light vehicles accessing the site from Groome Place, because the noise emissions are predicted to not be material to the compliance assessment

4.2 Site Activity

Predicted noise contours for each operational scenario are included in Appendix D. The SoundPLAN noise contours are calculated by interpolation between calculated grid points at 10m intervals, 1.5m above ground level. The contours have an interpolation accuracy of +/- 1.5dB. The contours enable comparison with noise survey measurements undertaken in accordance with New Zealand Standard NZS 6801:2008 *"Acoustics – Measurement of environmental sound".*

The predicted forecast peak operations noise levels received at representative dwellings are:

- 31 Groome Place (Plains Production interface east) 43 dB L_{Aeq}
- 7 Groome Place (Plains Production interface east) 40 dB L_{Aeq}
- 5 Station Road (Clive Whakatu Residential interface east) 40 dB L_{Aeq}
- 2 Ngaruroro Avenue (Clive Whakatu Residential interface east) 37 dB L_{Aeq}
- 378 SH51 (Plains Production interface south near SH51) 44 dB L_{Aeq}
- Ruahapia Road (Plains Production interface west) 37 dB L_{Aeq}

The most stringent noise limit is 45 dB L_{Aeq}. Therefore, forecast operations are predicted to comply with all District Plan noise limits.

5.0 CONCLUSIONS

The site noise levels are predicted to comply with all District Plan noise limits.

The contributions received at existing dwellings are predicted to result in an imperceptible change in noise level and have similar character to the existing environment. Therefore, the proposed activities are predicted to have a negligible adverse effect on residential amenity.

There is potential for future noise sensitive activities to establish slightly closer on Groome Place which could bring the compliance location closer. This potential future reverse sensitivity effect could be alleviated by date stamping the notional boundary requirement to ensure the limits apply to existing dwellings at the time of consent.

APPENDIX A GLOSSARY OF TERMINOLOGY

Ambient	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.
dB	Decibel. The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 μPa i.e. dB = 20 x log(P/Pr)
dBA	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.
Frequency	The number of pressure fluctuation cycles per second of a sound wave. Measured in units of Hertz (Hz).
Hertz (Hz)	Hertz is the unit of frequency. One hertz is one cycle per second. One thousand hertz is a kilohertz (kHz).
$L_{Aeq\,(t)}$	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. (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.
$L_{A90\,(t)}$	The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
Noise	A sound that is unwanted by, or distracting to, the receiver.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 *"Acoustics – Measurement of environmental sound"*
NZS 6802:2008	New Zealand Standard NZS 6802:2008 *"Acoustics – Environmental Noise"*
Special Audible Characteristics	Distinctive characteristics of a sound which are likely to subjectively cause adverse community response at lower levels than a sound without such characteristics. Examples are tonality (e.g. a hum or a whine) and impulsiveness (e.g. bangs or thumps). In this case, the relevant noise limits are set specifically for industrial noise received at the residential interface. Therefore, the character of industrial noise would be reasonably expected and may not 'special'.

APPENDIX B HASTINGS DISTRICT PLAN NOISE RULES

Particularly relevant parts of the noise rules are reproduced in part below for reference.

25.1 NOISE

25.1.1 INTRODUCTION

As with many other districts, the noise climate in Hastings is dominated by two main environmental noise sources - road traffic and industrial and commercial activity which include agricultural and horticultural activities in the rural and plains areas can generate noise at varous times of day and night. Such noise is consistent with the rural character of the rural and plains production zones and should be anticipated in these areas. Generally speaking, the noise level drops as one moves away from these noise sources.

Industrial areas which generate, or have the potential to generate, significant noise include Omahu Road, Tomoana, Whakatu, Karamu, King Street (Wattie's) and Whirinaki. Some industry in these areas operate for a part of the night or on a continuous basis which impacts markedly on the night-time background noise levels which are otherwise fairly low.

25.1.2 ANTICIPATED OUTCOMES

NSA04 Noise producing activities will be able to take place without undue restriction in appropriately zoned areas.

25.1.3 OBJECTIVES AND POLICIES

POLICY NSP3 *Provide for areas where activities which generate higher levels of noise can operate effectively.*

Explanation
Noisy industrial and similar activities need to operate in appropriate locations of higher background noise level where the impact of such noise on the environment and its potential to cause adverse noise effects will be lessened.

25.1.6 GENERAL PERFORMANCE STANDARDS AND TERMS

25.1.6A MEASUREMENT

Unless stated by a Rule or Standard elsewhere in this Plan, noise shall be measured in accordance with New Zealand Standard 6801:2008 Acoustics - Measurement of Environmental Sound and assessed in accordance with New Zealand Standard 6802:2008 Acoustics - Environmental Noise.

25.1.6B EXEMPTIONS FROM MAXIMUM NOISE LIMITS

The Noise Standards in this Plan, unless specifically stated, will not apply to the following:

(d) To vehicles travelling on a road (this does not apply to stationary vehicles).

(e) To trains, other than when stationary or when on private sidings.

25.1.6F INDUSTRIAL ZONES

The following noise conditions shall apply to all land uses other than those exempted in Rule 25.1.6B within all Industrial Zones except the Whirinaki Industrial Zone:

Outcome
Noise emissions will not intrude to an unreasonable degree on Residential and Rural Zones

(a) The following noise limits shall not be exceeded at any point beyond the site boundary:

Control Hours	Noise Level
On any day at all times	70 dB $L_{Aeq\ (15\ min)}$
On any day at all times	85 dB L_{AFmax}

(b) Provided that, at any point within any Residential Zone or within the notional boundary of any noise sensitive activity in a Rural Zone, the following noise limits shall not be exceeded:

Control Hours	Noise Level
0700 to 1900 hours	55 dB $L_{Aeq\ (15\ min)}$
1900 to 2200 hours	50 dB $L_{Aeq\ (15\ min)}$
2200 to 0700 hours the following day	45 dB $L_{Aeq\ (15\ min)}$
2200 to 0700 hours the following day	75 dB L_{AFmax}

(c) 25.1.6F(b) does not apply to the Whirinaki Power Station (Lots 1 & 2 DP 23303 (1085 State Highway 2) provided that it continues to operate using no more than the three Pratt & Whitney twinpac FT8 units first commissioned in June 2004.

25.1.6I CONSTRUCTION NOISE

(a) Any noise arising from construction, maintenance and demolition work in any Zone shall comply with NZS6803:1999 Acoustics - Construction Noise.

Outcome
Higher levels of noise over controlled durations will be accepted for construction purposes.

(b) Construction noise shall be measured and assessed in accordance with NZS6803:1999 Acoustics - Construction Noise.

APPENDIX C NOISE MONITORING RESULTS

Figure 3: Time trace (15-minute measurement intervals)

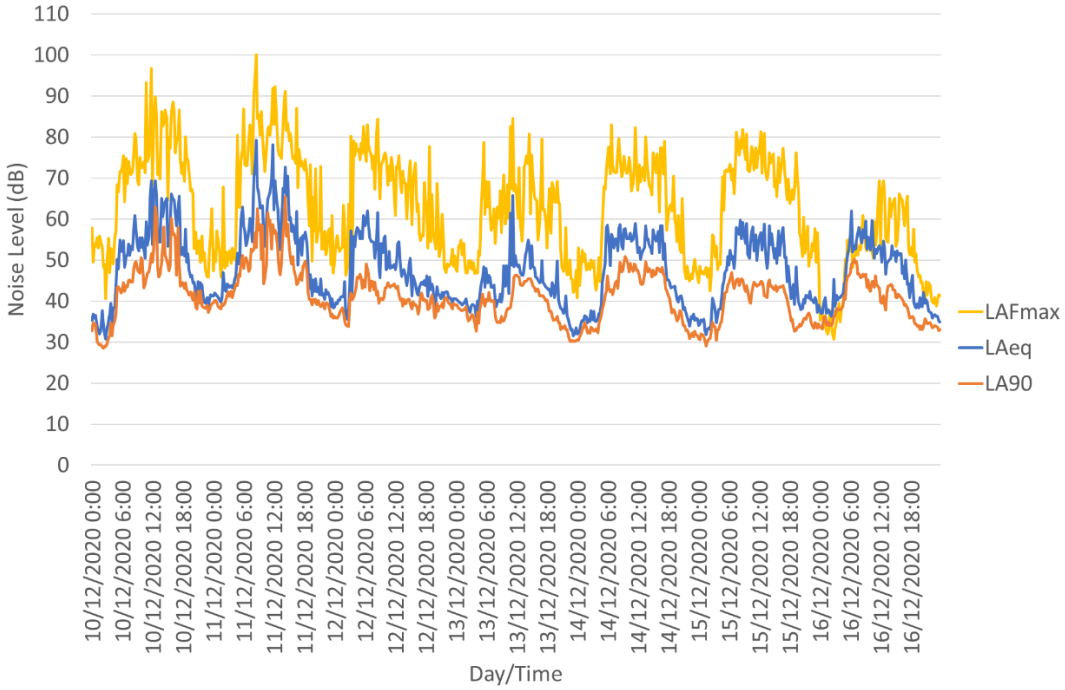


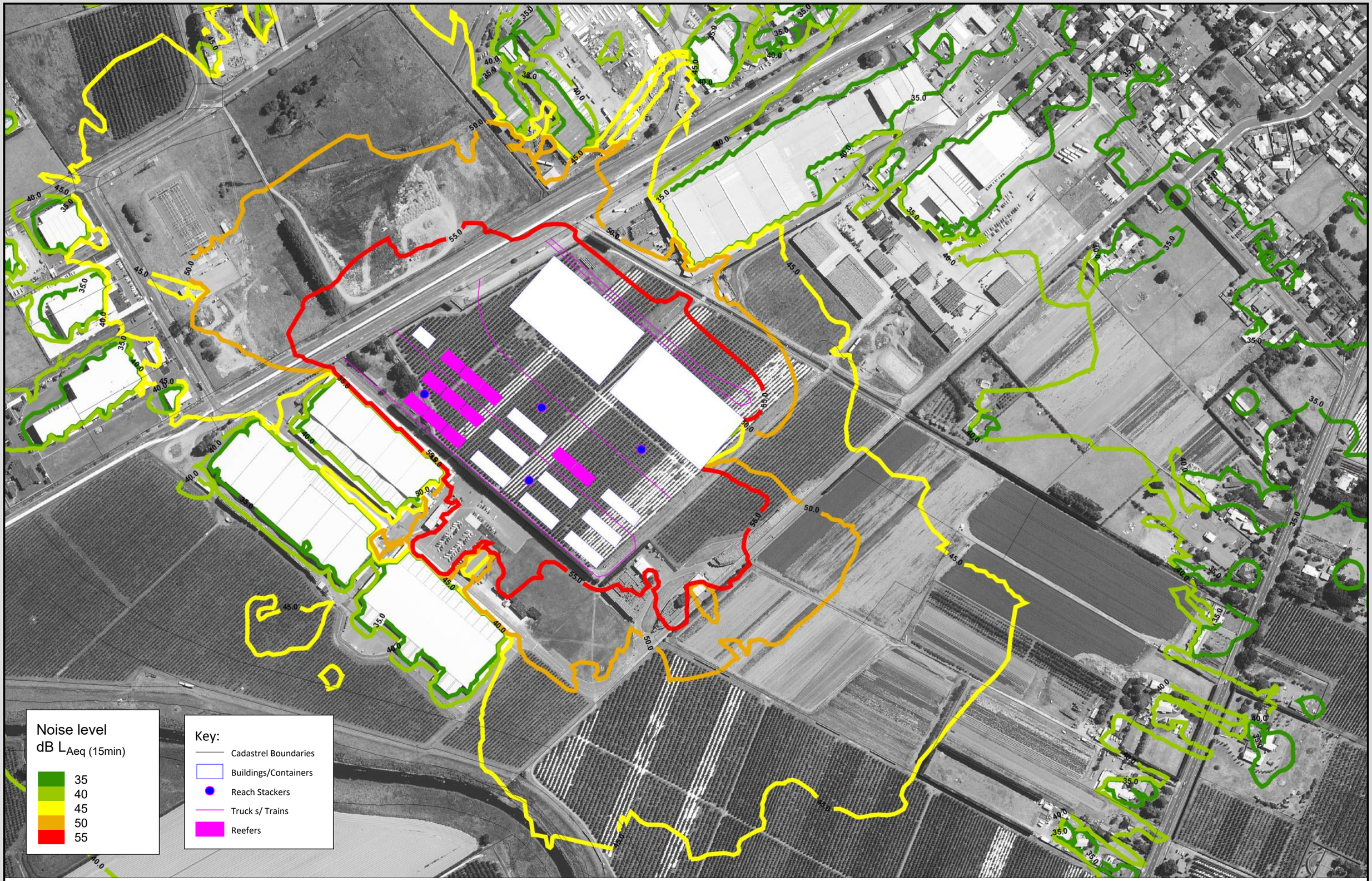
Figure 4: Average daily profile

Table 4: Average interval

Period		dB L_{A90}	dB L_{Aeq}	dB L_{AFmax}
Day	(0700 – 1900 hrs)	50	61	73
Evening	(1900 – 2200 hrs)	38	43	59
Night	(2200 – 0700 hrs)	41	50	56

APPENDIX D WHAKATU SITE NOISE CONTOURS

Figure 1 Fully Developed Site – Noise contours at 1.5m above ground



MARSHALL DAY Acoustics

Port of Napier Whakatu Fully Developed Site
Figure 1: Noise contours 1.5m above ground

Client: Port of Napier Ltd
Path: I:\JOBS\2020\20201054\04 Calculations\Sp001 Port Napier Whakatu
Filename: Figure 1 Noise Contours at 1.5m.SGS, Result file: RRLK0001.res, Prepared: cmf, Date: 25 Jan 2021
The noise contours in this Figure were obtained by computer interpolation between calculated grid points. There is an interpolation accuracy of +/- 1.5dB. For precise noise levels at specific location, refer to point receiver calculations.

Scale @ A3 1:4000
0 25 50 100 150 m
N