Hutt City Council - Proposed District Plan

Noise and Vibration Review

Prepared For:

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1 Introduction

Hutt City Council ['Council'] is conducting a review of its current (operative) District Plan, including the noise and vibration provisions contained therein with a view to developing a new Proposed District Plan, in accordance with the relevant statutory requirements and processes.

Under the Resource Management Act 1991 (RMA) Council has an obligation (Section 31(1)(d)) to "*control the emission of noise and the mitigation of the effects of noise*" within its territory. In planning terms, the District is the key instrument Council uses to manage the effects of noise. Whilst the RMA defines "noise" as unwanted sound, this broad definition does not mean all sound can or should be controlled under RMA procedures. Some sound is acceptable and indeed, necessary, for communication purposes. Thresholds for "adverse effects" are usually set well above levels at which sound may be detected. Thus, the RMA does not provide support for regulating low levels of sound in the environment, sounds we may consider a normal part of our environment - unless it can be shown via assessment in accordance with relevant guidelines and Standards that received sound levels exceed a threshold where mitigation should be applied.

As described below, the operative Hutt City district plan sets out a reasonable approach to land use planning measures to deal with the potential adverse effects of environmental noise in the district, Council's review provides an opportunity to check and revise current District Plan approaches particularly with respect to their effectiveness and efficiency.

2 District Plan Review

Section 79(1)(c) of the RMA requires local authorities to commence a review of a provision of a district plan if the provision has not been a subject of a review or change in the previous 10 years. Section 79(4) provides scope for local authorities to commence a full review of a district plan. All sections and changes must be reviewed and then the plan be publicly notified (79(6)&(7)).

The review of district plan noise and vibration controls allows for adopting more up to date versions of the relevant New Zealand Standards. The review also provides an opportunity to include emerging issues not foreseen within the operative District Plan. As below, noise-related requirements of various statutes including a relevant National Environment Standard and National Planning Standards which need to be incorporated into the proposed plan.

An important development since the operative plan was developed is the National Planning Standards (NPS) which set out standards with which every district plan must comply. Chapter 7 of the NPS requires Local Authorities to either amend their plan or notify a proposed plan within 5 years of the planning standards coming into effect (April 2024). NPS implications for this review are further discussed in Section 7.4 below.

As a tier one territorial authority, Hutt City Council is required to give effect to the intensification provisions of the National Policy Statement on Urban Development (NPSUD) by notifying a proposed plan change no later than August 2022

This review of District Plan noise and vibration provisions is intended to form and, in part, a section 32-type evaluation which is a process for evaluating alternatives, benefits and costs of any proposed district plan as specified by section 32 of the RMA. Undertaking a section 32 evaluation helps to determine why changes to existing Plan provisions may be needed and formalises a process for working out how best to deal with resource management issues.

This review of the noise provisions and recommendations for the development of the operative District Plan in to a Proposed District Plan aims to:

- Strengthen strategic noise policies.
- Reduce the need for 'unnecessary' resource consents.
- Improve the effectiveness of standards at achieving the outcome intended.
- Introduce some new standards to resolve issues that are new or have become more serious since the last Plan was developed.
- Improve general Plan usability and clarity, including strengthening policies and Plan provisions to provide clearer guidance on the assessment of resource consent applications and the outcomes intended.

3 Supporting Documents

This acoustic review is not zero-based. The review has considered a number of existing background documents and supporting reviews including but not limited to the following list of background publications;

- Existing Operative Hutt City District Plan including maps;
- *Guidelines for Community Noise* edited by Birgitta Berglund, Thomas Lindvall, Dietrich H Schwela. World Health Organization 1999
- *Environmental noise in Europe — 2020,* European Environment Agency. EEA Report No 22/2019
- *Guidelines for Night Noise Guidelines for Europe* [NNGfE]. World Health Organization Regional Europe Office. World Health Organization Regional Europe Office 2009
- *Annoyance from transportation noise: relationships with exposure metrics DNL and DENL and their confidence intervals*, Miedema, H. M. and Oudshoorn, C. G., 2001. Environmental Health Perspectives 109(4), pp. 409-416.
- World Health Organization *Burden Of Disease From Environmental Noise - Quantification Of Healthy Life Years Lost In Europe*. 2011 World Health Organisation.
- *Noise Exposure and Public Health* Willy Passchier-Vermeer and Wim F. Passchier, Environmental Health Perspectives, Vol 108, Supplement l, March 2000;
- *Noise Exposure And Public Health* Passchier-Vermeer W, Passchier WF [2000]. Environ. Health Perspect. 108 Suppl 1: 123–31;
- *Exposure-response relationships for transportation noise* Miedema HM, Vos H. J Acoust Soc Am. 1998 Dec;104[6]:3432–3445;
- *Noise sensitivity as a factor influencing human reaction to noise*. Job RF Soames. Noise & Health. 1999;1[3]:57–68;
- Standards New Zealand – Acoustic standards [various, as discussed further below].

Our review has also considered the content of the following relevant documents;

- National Policy Statement on Urban Development (NPS-UD)
- National Policy Statement on Electricity Transmission (NPS-ET)
- National Policy Statement on Renewable Energy Generation (NPS-REG)
- National Environmental Standard on Telecommunication Facilities
- National Environmental Standards on Electricity Transmission Activities
- HCC Officer Report - Urban Form and Development – Intensification Areas. Report to District Plan Review Subcommittee 23 April 2021. File: (21/649) Report no: DPRS2021/2/107.
- HCC Officer Report – Transport – Report to District Plan Review Subcommittee. 27 April 2021. File: (21/50) Report no: DPRS2021/2/111

4 Limitations

This review is based on information set out within related documents, standards and guidelines referred to, and on best practice examples from other Council's, case law and professional experience of Council's officers with the existing District Plan.

This review does not include the results of any specific consultation or communications with any stakeholder party or potential submitter. This review does not intend to replace the input provided by others, including other technical experts within the planning process once the public submission process commences. This review presents recommendations for HCC to consider in terms of concepts and approaches, thus detailed wording of policies or rules is not provided.

This report sets out the results of a review of the existing District Plan noise provisions, specifically assessing whether existing approaches are still valid for supporting the District's social, economic and environmental vision, and to ensure that adverse impacts are avoided, or appropriately mitigated. This includes seeking to minimise impacts on parties potentially affected by noise and those who may be indirectly affected by people's reaction to noise [reverse sensitivity effects].

We understand this noise and vibration review is being undertaken within the context of Council's statutory responsibilities which includes stewardship and protection of the environmental, social, economic and cultural wellbeing of present and future generations within the District, with statutory responsibilities to have regard to the Treaty of Waitangi and effects on tāngata whenua.

Under the RMA Council has the powers to control noise effects through non-district plan methods such methods as;

- Conditions attached to resource consents;
- Enforcement proceedings including: Abatement notices, enforcement orders and; excessive noise direction notices.

5 The Operative District Plan

Chapter 14C of the operative District Plan sets out environmental noise requirements in terms of policies, objectives and rules. The key players in the management of noise under the District are:

- Noise producers;
- Regulatory authorities, in this case Hutt City Council;
- The noise receivers;

All areas of the City are currently zoned. Within each zone, activities are managed on the basis of the effects of those activities. Chapter 14C of the operative district plan sets out limitations noise emissions from permitted land use activities. The focus of the policies and objectives set out in Chapter 14C.1.1 is on maintaining or enhancing

health and amenity values. The Operative Hutt City District provides for zoning of land use activities within 'activity areas' summarised as follows;

Residential Activity Areas
- General Residential Activity Area
- Medium Density Residential Activity Area
- Special Residential Activity Area
- Historic Residential Activity Area
- Hill Residential Activity Area

Commercial Activity Areas
- Central Commercial Activity Area
- Petone Commercial Activity Area
- Suburban Commercial Activity Area
- Special Commercial Activity Area
- Suburban Mixed Use Activity Area

Business Activity Areas
- General Business Activity Area
- Special Business Activity Area
- Avalon Business Activity Area
- Extraction Activity Area

Recreation Activity Areas
- General Recreation Activity Area
- Special Recreation Activity Area
- River Recreation Activity Area
- Passive Recreation Activity Area

Rural Activity Areas
- Rural Residential Activity Area
- General Rural Activity Area

The results of our review of the noise and vibration provisions of the operative district plan is set out in Section 10 and 11 below. The review covers noise matters set out in Chapter 14C of the plan in addition to reverse sensitivity noise and vibration matters covered within the acoustic insulation requirements of Chapter 5 (5A Central Commercial Activity Area, and 5B Petone Commercial Activity Area) and within Standard 6 (Development within the State Highway and Railway Corridor Buffer Overlays) attached to Chapter 14A Transport.

The review, in summary, recommends;

- Replacing and updating references to relevant NZ Standards.
- Setting out the noise chapter in a more conventional format as per the requirements of the National Planning Standards which entails applying zone noise emission standards in each zone. This would remove any reference to 'Noise Areas' and site-specific noise limits currently referred to in the operative Plan.
- Strengthening reverse sensitivity measures to address noise impacts, including within more densely populated areas near transport corridors and within the city centre.
- Re-assessing whether it is necessary to include specific vibration performance standards in the district plan, as may require expert measurement and assessment, beyond what a Council staff member could be expected to undertake.
- Addressing technical differences in the way the district plan currently specifies acoustic insulation (where this is required in a rule to address reverse sensitivity noise effects). The operative plan refers to two different methods for prescribing acoustic insulation within Chapter 14A and Chapter 5. Recommendations to address this reflect the desire for a common, easily understood and used unified district plan approach to specifying acoustic insulation requirements with a focus on being transparent and user-friendly.

6 Effects of Noise

6.1 Effects Summary

Research into the effects of environmental noise has focused on the annoyance such sound causes to humans, or the extent to which it disturbs various activities undertaken by people. This is because annoyance is the most commonly expressed reaction by those exposed to intrusive sound in the environment.

At a biological level, noise is considered a non-specific stressor that may cause adverse health effects on humans in the long term. Epidemiological studies suggest a higher risk of cardiovascular diseases, including high blood pressure and myocardial infarction [heart attacks], in people chronically exposed to high levels of road or air traffic noise[1]. In many cases noise occurring in the environment is simply intrusive, interfering with listening to television or radio or affecting the enjoyment of quiet outdoor areas around in the home or in parks or reserves.

The effects of environmental noise are usually expressed in terms of:

- Annoyance;
- Speech interference - high levels of noise can make normal speech difficult to hear
- Performance - some noises can make concentration difficult and interfere with tasks such as learning, checking fine details [such as any job with a large mathematical component or where the meaning of words is critical] or work where small, precise, movements or intense concentration is required;
- Mental health issues [including noise-induced stress-related effects];
- Sleep disturbance - in addition to fatigue and mental health effects, disrupted sleep patterns can leave people irritable, change their behaviour, and reduce their ability to work or perform tasks.

There is sufficient scientific evidence to reasonably demonstrate the linkage between exposure to environmental noise and hypertension and ischemic heart disease, annoyance, sleep disturbance, and decreased learning performance in the classroom. However for effects such as changes in the immune system and birth defects, the evidence is limited [WHO 1999].

There have been no new findings in respect of the threat that environmental noise poses to human health and welfare since the District Plan was first published. Most public health impacts of environmental noise were identified as far back as the 1960's with research in more recent times concentrating on the elucidation of the mechanisms underlying the known effects, such as noise induced cardiovascular disorders and the relationship of noise with annoyance and non- acoustical factors modifying health outcomes[2].

The Ministry of Health monitors protection of public health from environmental noise through reporting by *National Environmental Noise Service* [NENS] which it funds. NENS has been closely involved in developing and revising various New Zealand acoustic standards, including NZS 6802, a key Standard guiding on the assessment of noise referred to within the District Plan, and within the discussion below. Thus to reasonably provide for the protection of health and amenity, recommendations for managing environmental noise should adhere to the guidance set out within NZS6802.

6.2 Health Effects

Standards of acceptable levels of environmental noise are essentially derived from observations and studies on the effects of noise on "normal" or "average" populations. The participants of these investigations and studies are usually selected from the general population. Vulnerable groups of people are typically underrepresented in such studies [WHO 1999] including but not limited to;

- People with decreased personal abilities [old, ill, or depressed people];
- People with particular diseases or medical problems;
- People dealing with complex cognitive tasks, such as reading acquisition;

[1] *WHO Burden Of Disease From Environmental Noise - Quantification Of Healthy Life Years Lost In Europe.* World Health Organisation, Geneva, 2011.

[2] *Noise Exposure and Public Health* Willy Passchier-Vermeer and Wim F. Passchier, Environmental Health Perspectives, Vol 108, Supplement l, March 2000.

- Young children.

It is for this reason that noise rules and guidelines designed to protect against the adverse effects of noise on people should cater for both the young and old, as well as typical residences which are traditionally the places where people live, rest and relax. Hospitals, aged-care facilities, pre-schools, schools, universities and polytechs fall within the definition of noise sensitive land uses identified for protection within NZS6802:2008 *Acoustics – Assessment of Environmental Noise*.

6.3 Sleep Effects

The available evidence confirms disturbed sleep is associated with a number of health problems. Noise can disturb sleep by a number of direct and indirect pathways. It has been shown that awakening reactions are relatively rare, occurring at a much higher level than the physiological reactions.

WHO *Night Noise Guidelines For Europe* (2009) and EU Noise Directive (2002/49/EC) recommend Lnight,outside of 40 dB as a night noise guideline to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. However, this is an aspirational goal which may or may not be achievable.

The issue of adjusting downwards [lowering] district-wide noise limits in order to cater for vulnerable subgroups in the general population have been investigated. In setting the balance for sustainable management of noise in the environment there is a need to focus on the average response to noise of the average person. To impose a restrictive standard in order that the most vulnerable groups are protected to a high standard will impose costs and restrictions on the community who would otherwise be adequately protected at levels suited to the majority of the population.

Night time noise limits in most New Zealand District Plans are based on the units;

- Energy average sound level - LAeq(15 min) and
- Single event LAFmax

The most common approach is for district plans to limit 15 minute average sound levels to LAeq 40 or 45 dB during night time hours. Setting noise limits at sensitive receiver sites below 40 dB would make compliance difficult to measure except during the quietest night time period. At the other end of the scale, there is insufficient evidence that the adverse effects would be observed during night time where noise from adjacent sites does not exceed 40 dB outside buildings housing noise sensitive activities. See Section 10.7 below regarding the inadvisability of setting of night time noise for daytime periods on Sundays.

7 New Zealand Standards

The current Operative District Plan makes reference to a number of acoustic standards for the assessment and measurement of general environmental noise. Such standards ensure a repeatable and reliable result when assessing compliance, and are key to Council's ability to monitor and enforce noise standards in the District Plan.

The recommendations below refer to adopting the most recent versions of the relevant acoustic Standards reflecting the requirements of Part 3 of the RMA which covers the incorporation of documents "by reference: in District Plans. This ensures all material correctly incorporated by reference into a plan, has legal effect as if it were part of that plan.

As below, the NZ National Planning Standard is that the most recent New Zealand acoustic standards be adopted as the basis of the noise provisions of the Proposed District Plan.

7.1 Current New Zealand Acoustic Standards

The following eight New Zealand standards are considered to be most recent and technically appropriate standards for environmental acoustics in New Zealand:

NZS 6801:2008 Acoustics –Measurement of Environmental Sound NZS 6802:2008 Acoustics –Environmental Noise
NZS 6803:1999 Acoustics – Construction Noise
NZS 6805:1992 Airport Noise Management and Land Use Planning
NZS 6806:2010 Acoustics – Road Traffic Noise – New and Altered Roads
NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas
NZS 6808:2010 Acoustics –Wind Farm Noise
NZS 6809:1999 Acoustics – Port Noise Management and Land Use Planning

7.2 International Standards

Standards New Zealand represents New Zealand as members of the International Organization for Standardisation [ISO] and the International Electro Technical Commission [IEC]. Through New Zealand's membership of these organisations we are able to share our expertise and knowledge in a number of areas, and ensure that New Zealand interests are considered. Where possible, New Zealand standards are based on international standards. Utilising the current New Zealand acoustic standards for environmental noise takes account of relevant areas of international standards, that is international standards have been researched and where relevant included or referenced within current New Zealand acoustic standards.

7.3 National Environmental Standards

The proposed District Plan must give effect to, and cannot be inconsistent with, the provisions of a 'National Environmental Standard' [NES]. NES are specific regulations issued under Sections 43 and 44 of the RMA and apply nationally providing methodologies or requirements on environmental matters, although they may prescribe technical standards where appropriate.

An NES should not be confused with a 'New Zealand Standard' although at one level both provide a consistent approach and process throughout New Zealand – the key difference is that NES's have must be implemented and regional, city or district council must enforce the same standard without variation, whereas New Zealand Standards can be adopted in whole or in part, and can vary between regulators. In planning terms, a New Zealand Standard only has the force of law when it is referred to in a district plan.

At the time of preparation, there is only one NES relating to noise but in the specific context of telecommunications facilities. NZS 6801:2008 and NZS 6802:2008 are both cited in Clause 9[4] of the Resource Management Act [National Environmental Standards for Telecommunication Facilities] Regulations 2008. The Proposed Plan will be required to follow the NES when specifying limits on noise from telecommunication facilities.

7.4 National Planning Standards

The *National Planning Standards*[3] which sets out requirements for district plans to adopt standardised noise and vibration metrics. The stated purpose of the NPS is to improve the efficiency and effectiveness of the planning system by providing, among other things, nationally consistent noise and vibration metrics.
NPS Standard 15 states;

1. *Any plan rule to manage noise emissions must be in accordance with the mandatory noise measurement methods and symbols in the applicable New Zealand Standards incorporated by reference into the planning standards and listed below:*

   New Zealand Standard 6801:2008 *Acoustics – Measurement of environmental sound*
   New Zealand Standard 6802:2008 *Acoustics – Environmental noise*

[3] Ministry for the Environment. 2019. *National Planning Standards*. Wellington: Ministry for the Environment.

New Zealand Standard 6803:1999 *Acoustics – Construction noise*
New Zealand Standard 6805:1992 *Airport noise management and land use planning* – measurement only.
New Zealand Standard 6806:2010 *Acoustics – Road-traffic noise – New and altered roads*
New Zealand Standard 6807:1994 – *Noise Management and Land Use Planning for Helicopter Landing Areas*- excluding 4.3 Averaging
New Zealand Standard 6808:2010 *Acoustics – Wind farm noise*
New Zealand Standard 6809:1999 *Acoustics – Port noise management and land use planning*

2. *Any plan rule to manage noise emissions must be consistent with the mandatory assessment methods in section 6 Rating Level and section 7 LAMAX of New Zealand Standard 6802:2008 Acoustics – Environmental Noise (incorporated by reference into the planning standards), provided the type of noise emitted is within the scope of New Zealand Standard 6802:2008.*
3. *Any plan rule to manage damage to structures from construction vibration must be consistent with the metrics for peak particle velocity (ppv) in ISO-4866:2010 – Mechanical vibration and shock, incorporated by reference into the planning standards*

Under the NPS, noise is to be handled as a stand-alone chapter under the heading of 'District Wide Matters'. The NPS stipulates he following requirements to be followed when deciding how the "noise Chapter' is to be set out and structured;

33. *If provisions for managing noise are addressed, they must be located in the Noise chapter. These provisions may include:*
    a. *noise provisions (including noise limits) for zones, receiving environments or other spatially defined area*
    b. *requirements for common significant noise generating activities*
    c. *sound insulation requirements for sensitive activities and limits to the location of those activities relative to noise generating activities.*
34. *Any noise-related metrics and noise measurement methods must be consistent with the 15. Noise and vibrations metrics Standard.*
35. *The Noise chapter must include cross-references to any relevant noise provisions under the Energy, infrastructure, and transport heading.*
37. *If provisions to manage temporary activities, buildings and events are addressed, they must be located in the Temporary activities chapter.*

NPS Standard 14 sets out the "Definitions" Standards. Local authorities must use the definition as defined in the *Definitions List* in district plans. There is a requirement that, where terms used in district plans are defined in the *Definitions List* of the Standard, that the term is used in the district plan must be in the same context as the definition. Compliance with the NZ National Planning Standard is mandatory – this will require adopting all relevant NZ acoustic standards listed above. This is a core recommendation of the current review and recommendations for the Proposed Plan.

8 2021 District Wide Noise Survey

RMA s35[2] requires the Council to monitor the state of the City's environment and to monitor the efficiency and effectiveness of policies, rules, or other methods in the District Plan. The monitoring summarised in this report sets out existing ambient noise levels, allowing for observations to be made around effectiveness of existing District Plan noise policies and rules (noting transport noise, being the most predominant noise source found in the district, is not subject to control via the district plan).

8.1 Survey Method & Equipment

The method of investigation has been to measure ambient sound levels at 19 selected sites in the district to gather daytime and night time sound level readings using automated monitoring equipment over at least a 24 hour

periods, with the microphone located outdoors away from any obvious dominant noise source. The sound level meter was set to automatically log LAmax, LA10, LAeq and L_{95} values every 15 minutes. Data files from the sound level meter were downloaded into spreadsheets. The data for each site includes summary day/evening/night time, levels plus a graph of time-varying sound levels produced using the logged data.
Measurement set up for the two sound level meters were:

- A weighting (dBA), Fast response.
- Measurement periods: 15 minutes
- Measurement Metrics: L_{AI0}, L_{AMax}, L_{Aeq}, L_{A90}

Sound level monitoring was carried out in accordance with the procedures set down in the New Zealand Standard, NZS6801:2008 *Acoustics - Measurement of Environmental Sound*. This Standard provides guidance on the technical aspects of noise measurement. All measurements were carried out using a Type 1 Sound Level Meter - Acoustic Research Laboratory '*EL316 Environmental Data Logger*' Serial No. 16-707-005. Field calibration was checked before and after measurements.

Sites were selected to be representative of the following land use areas;

- Industrial
- Suburban Mixed
- Residential
- Rural
- CBD
- Railway Corridor

Measurements were conducted at the following sites;

	Industrial
1	93 Eastern Hutt Road, Taita
2	14 Marine Parade, Petone
3	17 Wareham Place, Seaview (Treatment Plant)
	Suburban Mixed
4	794 High Street Boulcott (Brewery)
5	21 Rimu Street Eastbourne
6	362-364 Jackson Street, Petone (Ist floor balcony)
6A	Level 1, 1 Jackson Street Petone (1st floor deck)
	Residential
7	4-6 Heretaunga Street, Petone
8	63 Hay Street Naenae
9	57 Queens Grove, CBD
10	57A Cypress Drive Maungaraki
11	2/25B Norfolk Street Belmont
12	26A Kotari Road Days Bay
13	27 Bull Avenue, Wainuomata
14	177A Stokes Valley Road, Stokes Valley
14A	22 Harrison Grove, Avalon
	Rural
15	1090 Coast Road Wainuiomata
16	Upper Moores Valley Road
	CBD
17	Level 1, 21-23 Andrews Avenue, Central Hutt
	Railway Corridor
18	Ava Park, Adj. Water Treatment Plant
19	3/86 North Street, Ava, Petone
14B	86 Cambridge Terrace, Waterloo

The measurement locations were generally away from any specific noise source, such as heat pumps. The selection of sites aimed to quantify typically expected ambient sound levels expected for that land use category. The exception is transportation noise. Three survey sites were selected to purposefully quantify rail transportation noise at residential sites adjacent to the Railway corridor.

In addition, results of measurements of 24 hour traffic noise at four selected sites carried out in 2020 in Lower Hutt (undertaken as part of the *RiverLink Project*[4]) have been included in the evaluation of the reverse sensitivity noise mitigation associated with the operative district plan's "*State Highway & Rail Corridor Buffer Overlay*" implemented via District Plan Transportation Standard 6 to Chapter 14A *Transportation*. Discussions and recommendation for transport noise overlays are discussed in Sections 10.11.3 and 11.5 below.

8.2 Summary Results

The focus has been on reporting measured average, minimum and maximum levels of outdoor sound quantified in a consistent manner for each site in units $L_{A!0}$, L_{AMax}, L_{Aeq}, L_{A90}..In addition, an overall summary 24 hour overall average sound level is provided for each site and average per land use category.

The existing noise environment is described in detail within the reported statistics for $L_{A!0}$, L_{AMax}, L_{Aeq}, LA90. Averages referred to generally are arithmetic averages, this is apart from logathrmic averaging required for (1) calculating the overall LAeq(24 hour) value for each site, and (2) the averaging within each 15 minute period inherent within the calculation of LAeq(15 min).

Data collected during periods of elevated winds or times of high rainfall have been excluded from the summary statistics reported below.

8.2.1 Day/Evening/Night Time LAeq(15 min) Results

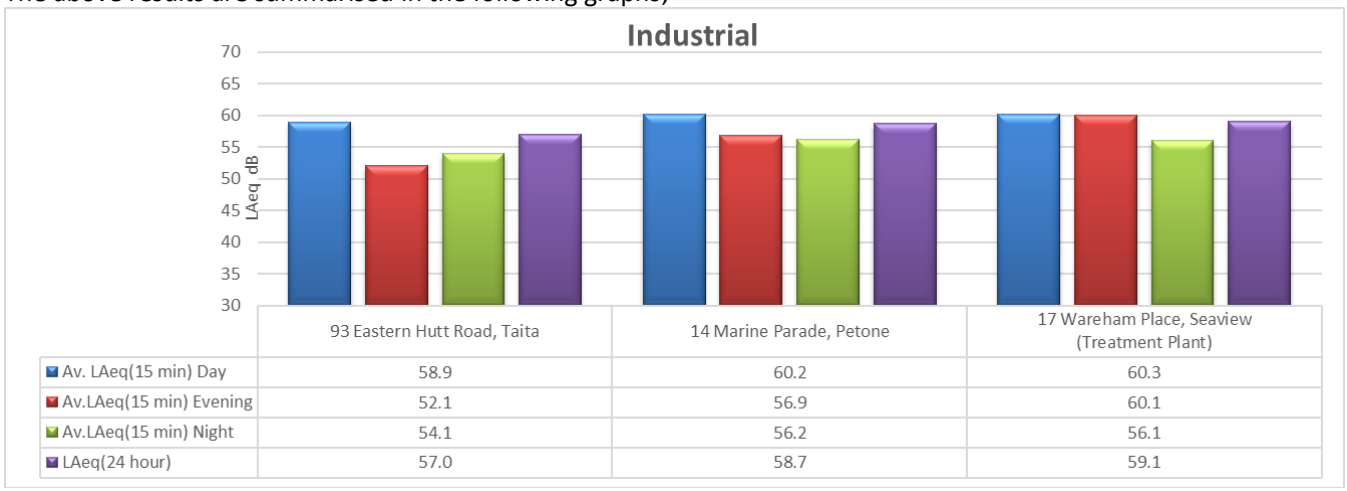
The following table and graphs provide summary statistics on daytime/evening/night time average LAeq(15min) levels, as well as overall LAeq(24 hour) average sound levels.

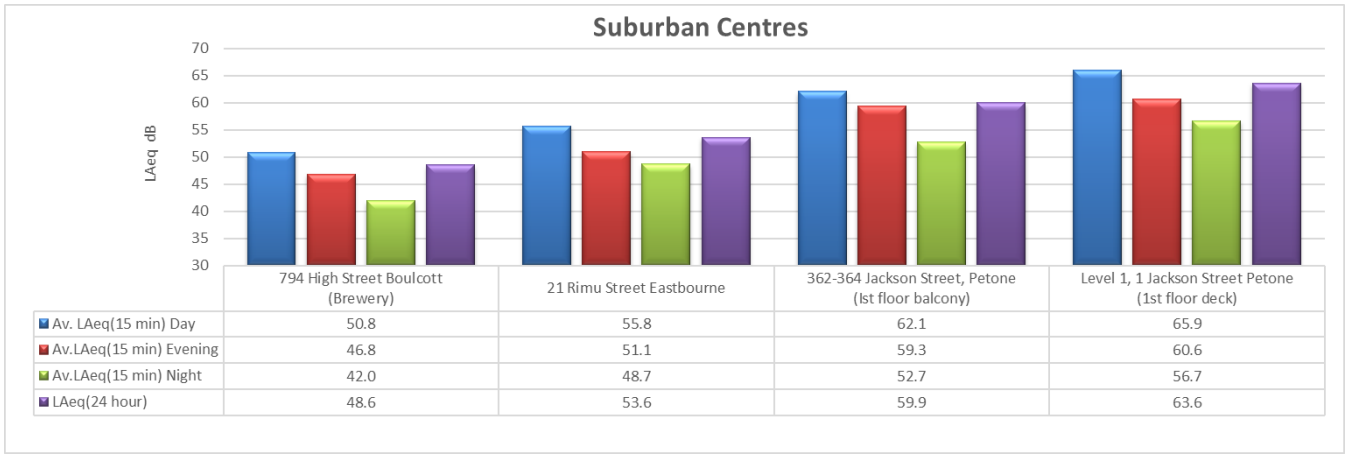
	Industrial		**LAeq Av. Day**	**LAeq Av. Evening**	**LAeq Av.Night**
1	93 Eastern Hutt Road, Taita		58.9	52.1	54.1
2	14 Marine Parade, Petone		60.2	56.9	56.2
3	17 Wareham Place, Seaview (Treatment Plant)		60.3	60.1	56.1
		Average	59.8	56.3	55.5
	Suburban Centres				
4	794 High Street Boulcott (Brewery)		50.8	46.8	42.0
5	21 Rimu Street Eastbourne		55.8	51.1	48.7
6	362-364 Jackson Street, Petone (Ist floor balcony)		62.1	59.3	52.7
6A	Level 1, 1 Jackson Street Petone (1st floor deck)		65.9	60.6	56.7
		Average	58.6	54.5	50.0
	Residential		**LAeq Av. Day**	**LAeq Av. Evening**	**LAeq Av.Night**
7	4-6 Heretaunga Street, Petone		46.6	44.0	39.5
8	63 Hay Street Naenae		55.0	49.4	42.3
9	57 Queens Grove, CBD		48.3	44.4	40.2

[4] *RiverLink* is a partnership between Hutt City Council, Greater Wellington Regional Council (Greater Wellington) and Waka Kotahi NZ Transport Agency (Waka Kotahi) with Mana Whenua to deliver three separate but interdependent projects: Flood protection, the Making Places Urban Development Plan, and Melling transport improvements.

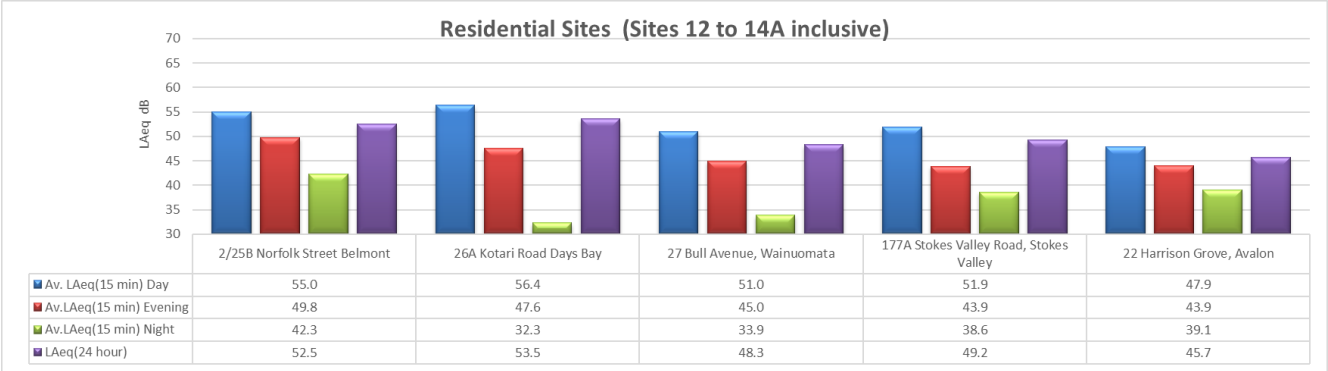
10	57A Cypress Drive Maungaraki		45.4	43.0	34.0
11	2/25B Norfolk Street Belmont		55.0	49.8	42.3
12	26A Kotari Road Days Bay		56.4	47.6	32.3
13	27 Bull Avenue, Wainuomata		51.0	45.0	33.9
14	177A Stokes Valley Road, Stokes Valley		51.9	43.9	38.6
14A	22 Harrison Grove, Avalon		47.9	43.9	39.1
		Average	50.8	45.6	38.0
	CBD				
17	Level 1, 21-23 Andrews Avenue, Central Hutt		54.8	47.7	40.5
	Raiway Corridor				
14B	86 Cambridge Terrace, Waterloo		60.2	55.1	50.6
18	Ava Park, Adj. Water Treatment Plant		62.3	51.7	46.3
19	3/86 North Street, Ava, Petone		54.0	49.2	45.7
		Average	58.8	52.0	47.5

The above results are summarised in the following graphs;

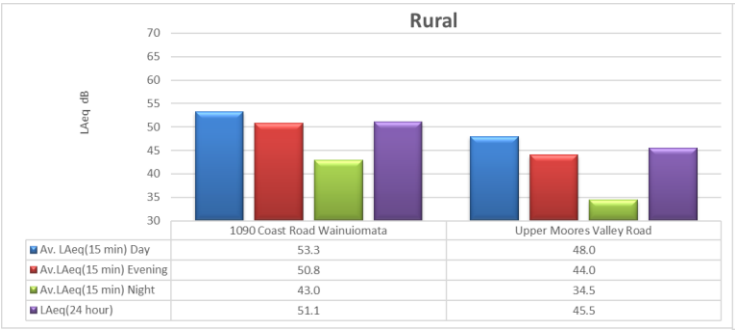




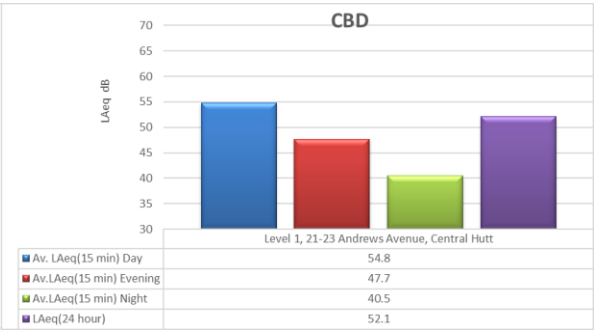
	4-6 Heretaunga Street, Petone	63 Hay Street Naenae	57 Queens Grove, CBD	57A Cypress Drive Maungaraki
Av. LAeq(15 min) Day	46.6	55.0	48.3	45.4
Av.LAeq(15 min) Evening	44.0	49.4	44.4	43.0
Av.LAeq(15 min) Night	39.5	42.3	40.2	34.0
LAeq(24 hour)	44.7	52.5	46.2	43.2



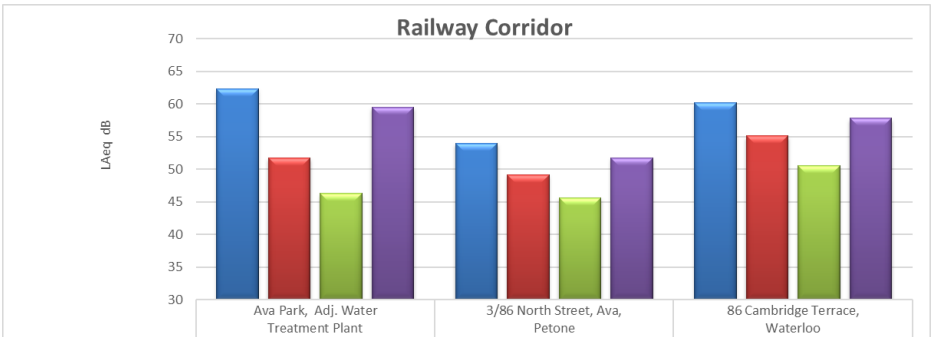
	2/25B Norfolk Street Belmont	26A Kotari Road Days Bay	27 Bull Avenue, Wainuomata	177A Stokes Valley Road, Stokes Valley	22 Harrison Grove, Avalon
Av. LAeq(15 min) Day	55.0	56.4	51.0	51.9	47.9
Av.LAeq(15 min) Evening	49.8	47.6	45.0	43.9	43.9
Av.LAeq(15 min) Night	42.3	32.3	33.9	38.6	39.1
LAeq(24 hour)	52.5	53.5	48.3	49.2	45.7



	1090 Coast Road Wainuiomata	Upper Moores Valley Road
Av. LAeq(15 min) Day	53.3	48.0
Av.LAeq(15 min) Evening	50.8	44.0
Av.LAeq(15 min) Night	43.0	34.5
LAeq(24 hour)	51.1	45.5



	Level 1, 21-23 Andrews Avenue, Central Hutt
Av. LAeq(15 min) Day	54.8
Av.LAeq(15 min) Evening	47.7
Av.LAeq(15 min) Night	40.5
LAeq(24 hour)	52.1



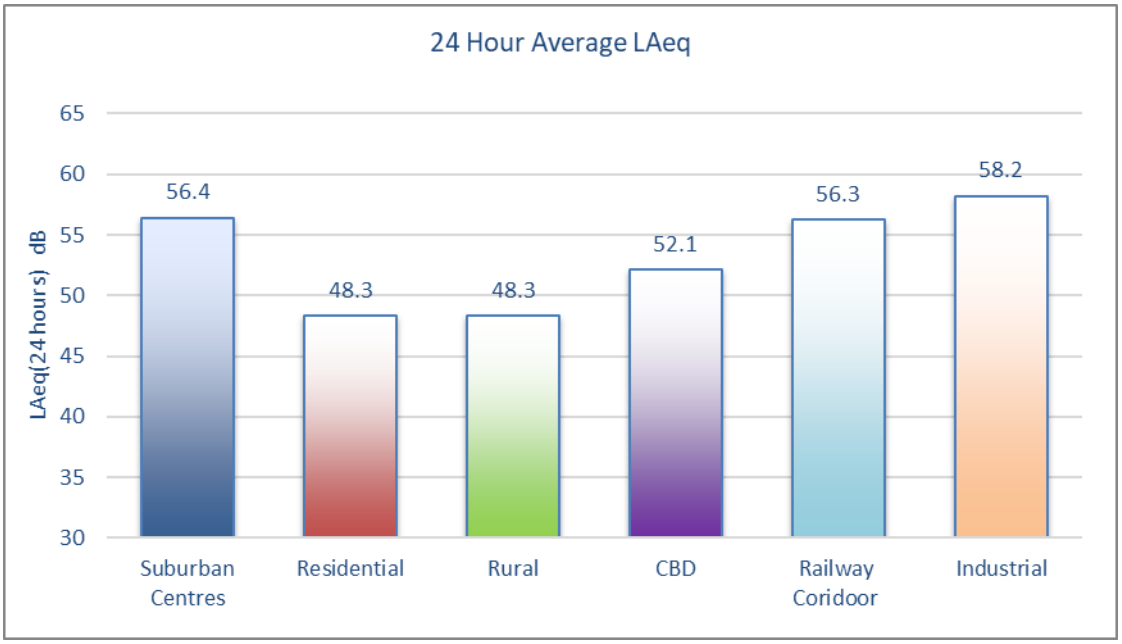
	Ava Park, Adj. Water Treatment Plant	3/86 North Street, Ava, Petone	86 Cambridge Terrace, Waterloo
Av. LAeq(15 min) Day	62.3	54.0	60.2
Av.LAeq(15 min) Evening	51.7	49.2	55.1
Av.LAeq(15 min) Night	46.3	45.7	50.6
LAeq(24 hour)	59.5	51.7	57.8

8.2.2 Results By Land Use Category

As a general observation, ambient levels were found to lower within residentially zoned areas, with lower night

time noise levels in particular – around 90% of residential sites measured at less than 40 dB average LAeq(15min) between 10pm and 7am, with the results also showing minimum average 15 minute sound levels at night time often as low as 35 dB or less. Low ambient sound levels were also measured at the two rural sites, although passing traffic and cicada noise affected some readings. Higher ambient sound levels are naturally expected Industrial, Suburban Centres and Railway Corridor areas.

A comparison between the sampled land use categories is provided in the graph below of average daily (LAeq(24 hour) sound levels. The results show as averages for individual sites sharing the same land use classification. Noise levels are quantified using LAeq(24 hr) which represents daily average sound levels;

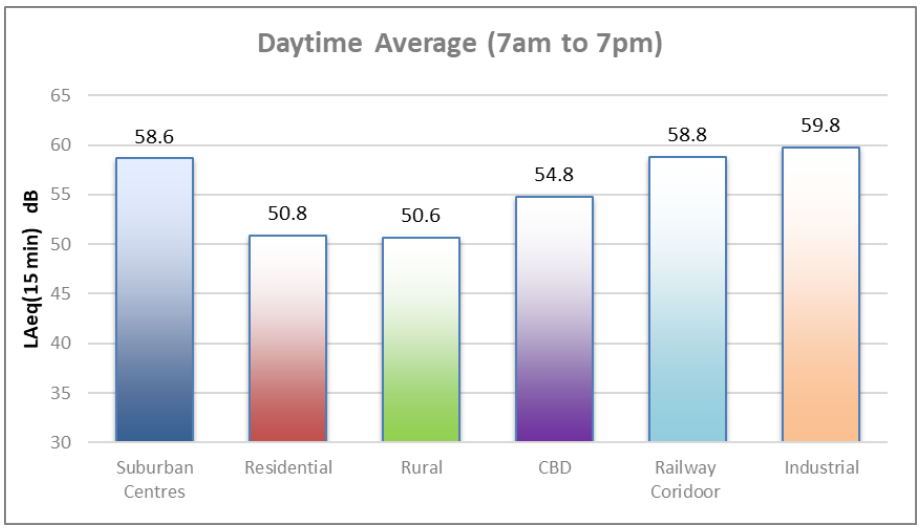


This above comparison reflects the expected picture whereby commercial and business areas exhibit elevated average sound levels due to the intensity of activity taking place in these areas. Sites at which residential or rural activities take place have been found to measure at lower levels and will correspondingly represent areas with higher amenity values.

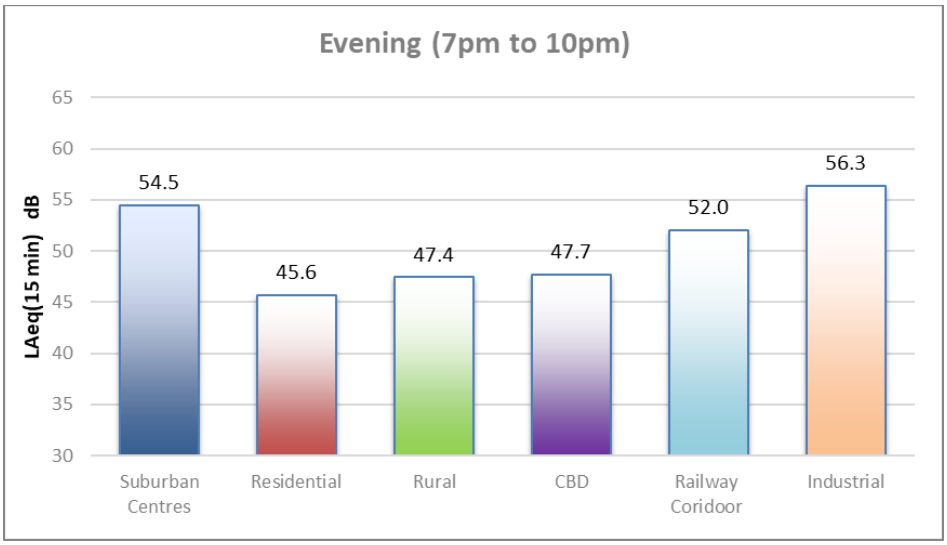
According to the measurements taken, and the above criteria, ambient environmental noise is being received within sensitive receiving environments in Lower Hutt are generally suitable for residential use. Situations where sensitive uses establish within areas experiencing ambient sound levels above guideline values are addressed within this review of the operative plan, principally via improved acoustic insulation (and associate ventilation) recommendations (as set out in Sections 10 & 11 below) which is the widely accepted method for district plans to address potential reverse sensitivity noise effects.

8.2.3 Results By Time Of Day

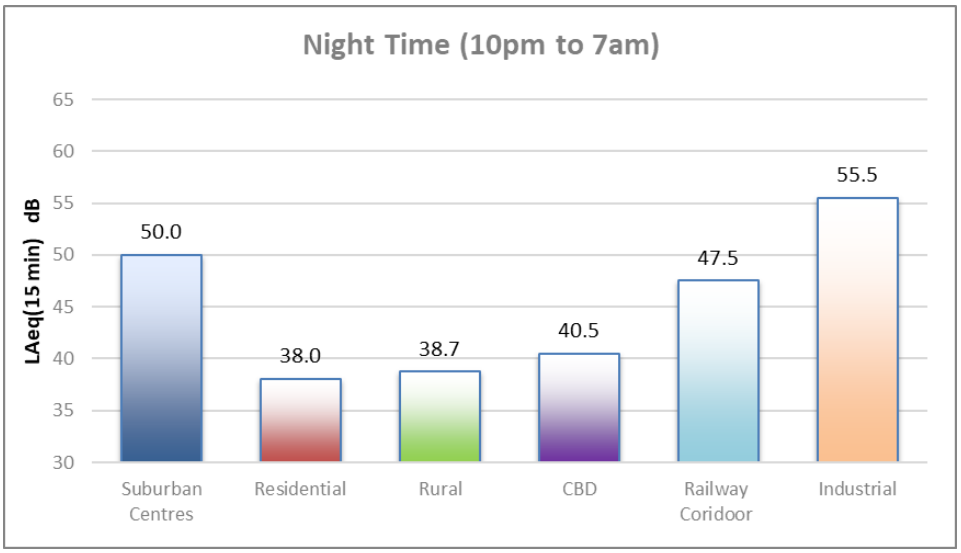
The average LAeq(15 min) sound levels measured within each land use category across different periods of the day (daytime 7am to 7pm, evening 7pm to 10pm and night time 10pm to 7am) are set out as follows;



Ambient sound levels measured during the evening time (7pm to 10pm) exhibit a similar pattern to average daytime time levels, but with the readings reduced across all sites by 3 to 7 dB.



Reasonably low average ambient levels during night time (10pm to 7am), as shown in the following graph;



Night time average LAeq levels measured at rural and residential sites did not, on average, measure above 40 dB signalling the suitability of these areas of the existing night time environment for noise sensitive activities. This

compares favourably with *European Night Noise Guidelines*[5] which set out that outdoor levels averaging 40 dB or less meets or exceeds the precautions necessary to protect the public, including most of the vulnerable groups such as children, the chronically ill and the elderly, from the adverse health effects of night noise.

Under these European guidelines, it is interesting to note measures to control outdoor noise levels to LAeq 55 dB is only recommended as an interim target for the countries where the 40 dB target cannot be achieved.

Due to increased activity during daytime hours, outdoor ambient sound levels measure at levels significantly above typical evening and night time noise levels. This is consistent with known patterns of environmental noise variations throughout the day.

Regarding the range of daytime measured noise levels shown above, daytime average sound levels mostly measure below LAeq 55 dB during daytime in noise-sensitive areas such as rural and residentially zoned sites. Business, commercial and rail-noise affected sites receive, on average, ambient sound levels above LAeq 55 dB.

The 1999 World Health Organisation guidelines in Chapter 4 "Guideline Values"[6] recommend average daytime outdoor sound levels measuring 55 dB LAeq or less would be sufficient to protect the majority of people from being highly annoyed during the daytime.

The above results to confirm that measured outdoor ambient sound levels measure 48 to 58 dB LAeq(24 hr), a level generally compatible with residential and noise sensitive activities as shown within this summary of WHO recommended indoor and outdoor noise levels[7] in areas where activities sensitive to noise take place;

Specific Environment	Critical health effect(s)	dB L_{Aeq}
Outdoor living area	Serious annoyance, daytime & evening.	55
	Moderate annoyance, daytime & evening.	50
Dwellings, indoors Inside bedrooms	Speech Intelligibility and moderate annoyance, daytime & evening.	35
	Sleep disturbance, night-time.	30
Outside bedrooms	Sleep disturbance, window open (outdoor values) night-time.	45

The presence of outdoor sound levels above 55 dB signals a need for the district plan to promote acoustic insulation requirements to protect sound levels experienced indoors within new and altered habitable rooms in affected areas. The measures to address reverse sensitivity recommended in Sections 10 and 11 below are aimed at ensuring the proposed district plan implements suitable acoustic insulation (and associated ventilation requirements) as a means of managing reverse sensitivity noise effects in commercial, business and industrial areas, also within transport-noise affected corridors alongside the state highway and rail tracks that pass through the district.

9 Noise Complaints

Apart from managing the effects of environmental noise via noise emission limits within the District Plan (or within conditions attached to resource consents), Council also manages the effects of environmental noise via staff or contractor investigations following complaints received, including operating an all-hours noise control service call-out service to investigate after hours noise complaints.

[5] *Night Noise Guidelines For Europe* World Health Organization 2009. ISBN 978 92 890 4173 7
[6] World Health Organisation 'Community Noise Guidelines" 1999 https://www.who.int/docstore/peh/noise/Comnoise-4.pdf
[7] WHO 1999 Community Noise Criteria

Generally there two 'types' of noise complaints are received and acted upon by Council, being a temporary 'excessive' noise situation requiring action or complaints of 'unreasonable' noise which often involve commercial or industrial activities on sites bear to noise sensitive areas.

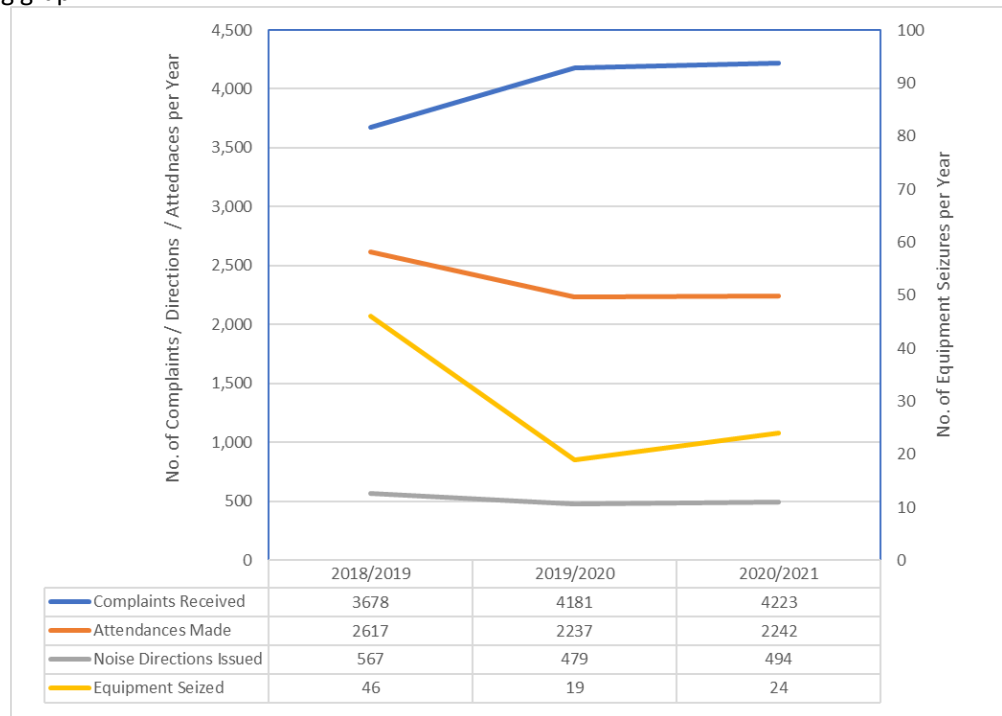
9.1 Excessive Noise

Complaints of 'excessive' noise, often during night time, made by members of the public to Council frequently due to amplified sound associated with house parties or noisy activities undertaken at commercial premises. The term "excessive noise" is defined as noise that unreasonably interferes with the peace, comfort and convenience of other people.

Complaints 'excessive noise' are typically received on the afterhours call line. Once the validity of the complaint is established (often requiring a call-back) a delegated officer may visit the premises where the sound is emanating to investigate. They key decision for the officer is whether the noise is excessive under the circumstances. No sound level measurements are needed as this is a subjective assessment made at the time. It is therefore quite often found that sound deemed "excessive" in one situation can be acceptable at other times of the day and in other circumstances.

If necessary, the delegated Council officer may issue an "Excessive Noise Direction Notice" to require the immediate abatement of the noise nuisance. Furthermore, under some circumstances where repeat warnings are ignored, the officer may confiscate the offending sound system or controller.

Council records[8] of investigations into complaints from residents of the district complaining of excessive noise over the period to 30th June 2018 to 30th June 2021 reveal Council receives around 70 noise complaints per week. A breakdown of the numbers of complaints received and complaints requiring further action are summarised in the following graph



	2018/2019	2019/2020	2020/2021
Complaints Received	3678	4181	4223
Attendances Made	2617	2237	2242
Noise Directions Issued	567	479	494
Equipment Seized	46	19	24

Although the many complaints received in this 2018 to 2021 sample are related to activities taking place in Business or Commercial areas, the majority of complaints of excessive noise arise from residentially zoned sites.

9.2 Investigations of 'Unreasonable' Noise

This is where the noise complained of is frequently experienced, possibly due to a residence causing persistent noise emissions or possible a commercial operation or venue. Often the effects are aggravated during night time hours when ambient sound levels in the receiving environment reduce, and where people generally become more

[8] Council's Environmental Health Manager *pers comm*

noise-sensitive (e.g. after 10 pm). A list of historical investigations into complaints of "unreasonable noise" carried out by Council since 2010, their location, type of noise and 'outcome' comments are attached as APPENDIX B.

Investigating complaints of unreasonable noise requires Council's environmental officers to visit and investigate the issue, often requiring a technical solution to ensure mitigation sufficient to resolve the problem complained of. The investigations may involve noise measurements to determine compliance with district plan permitted activity standards, or other guidelines.

In some situations enforcement action using abatement notices and enforcement orders is necessary to abate the noise effects, where these are tangible and on-going. Such mechanisms are intended to allow sufficient time to carry out measures to mitigate or remedy the noise problem, whereas excessive noise provisions of the Act are intended to deal with situations where immediate mitigation is both necessary and feasible.

As an enforcement tool, abatement notices are sometimes issued by Hutt City Council under s322 of the Act to enforce noise control measures where necessary. Abatement notices require certain noise control actions to be taken (including requiring the noisemaker to obtain technical advice) within specified time frames and are enforceable at the Environmental Court. We understand there are about twenty noise-related abatement notices in force at present (July 2021). Typically, abatement notices are issued to residential properties regarding frequent emissions of loud amplified sound although fixed plant such as heat pumps are commonly involved.

Council records of noise complaints received show some growth in complaints received but not necessarily growth in the enforcement actions such as issuing of notices or equipment seizure needing to take place.

There are a wide range of factors that affect whether or not a person lodges a noise complaint[9]. Compared to 'unreasonable' noise, complaints of excessive noise occur more frequently within the historical noise complaint record. Steps taken by Council to address excessive noise may have effectively addressed the source at the time however, to reduce complaint numbers in the future to any large degree will require sociological and societal changes not readily apparent, possibly involving a more tolerable community.

While most complaints received are related to 'excessive' noise, District Plan noise provisions are important within the steps taken by Council to address and mitigate environmental noise causing complaints. The district plan establishes permissible noise levels often referred to within abatement notices and enforcements orders, these being among the more forceful tools available to Council to address adverse effects of environmental noise in the district.

10 Review Of Operative Plan Noise Provisions

10.1 Chapter 14C

Chapter 14C 1.1 sets out the noise policies of the district plan which are;

a) To recognise that background noise levels are markedly different throughout the City.
b) To recognise that acceptable noise levels will vary according to the nature of the principal activities occurring within activity areas.
c) To ensure that residential activity areas are protected by establishing appropriate noise levels at the interface between residential activity areas and non-residential activity areas.
d) That maximum noise levels are established within each activity area to ensure that amenity values are protected.
e) To make provision for those situations where there has already been considerable history to the establishment of specified noise conditions.
f) To recognise that noise levels may be different through a construction phase.

[9] Nivison, M.E., Endresen, I.M. *An analysis of relationships among environmental noise, annoyance and sensitivity to noise, and the consequences for health and sleep.* J Behav Med 16, 257–276 (1993).

g) To recognise that Noise Management Plans may be appropriate to manage matters beyond those addressed in this District Plan.

Chapter 14C sets out permitted activity noise standards within the following noise rules;

District Plan Rule	Noise Limits For Specified Activity Areas
14C 2.1.1	All Residential Activity Areas Noise Areas 1 Noise Areas 2 Noise Areas 3 Noise Areas 4 Noise from specific sites: Bellevue Hotel Oxford Terrace/Waterloo Road (Ambulance Station) Stokes Valley Bus Depot Wainuiomata Bus Depot Waterloo Bus Depot
14C 2.1.2	Central Commercial Activity Area & Petone Commercial Activity Areas 1 & 2
14C 2.1.3	Suburban Commercial Activity Area and Suburban Mixed Use Activity Area
14C 2.1.4	Special Commercial Activity Area
14C 2.1.5	General Business Activity Area
14C 2.1.6	Special Business Activity Area
14C 2.1.7	Avalon Business Activity Area
14C 2.1.8	Extraction Activity Area
14C 2.1.9	Rural Residential Activity Area
14C 2.1.10	General Rural Activity Area
14C 2.1.11	Community Health Activity Area
14C 2.1.12	Community Iwi Activity Area 1 - Marae
14C 2.1.13	Community Iwi Activity Area 3 - Kokiri Centres

The following observations and recommendations have arisen from our review of the noise provisions of the Operative District Plan;

10.2 Noise Chapter Structure

As the structure of the noise chapter of the Proposed District Plan will need to conform with the format required by the Part 4 of the National Planning Standards (discussed at section 6.7 above). Part 7 of the National Planning Standard sets out that noise matters will need to be addressed as a "District Wide Matter". The Standard requires that, if provisions for managing noise are to be addressed (which is the case recommended by this review) then they must be located in the Noise chapter and include:

a) noise provisions (including noise limits) for zones, receiving environments or other spatially defined area
b) requirements for common significant noise generating activities
c) sound insulation requirements for sensitive activities and limits to the location of those activities relative to noise generating activities.

To conform with the National Planning Standard it will be necessary to revise the number of "Activity Areas" of the operative plan with adjustment to the number of different noise rules currently set out within Rules 14C2.1.1 to 14C2.1.13.

Recommendation:
It is recommended the Proposed Plan noise provisions be included as a standalone chapter, with contents and structure to be in accordance with National Planning Standards for district plans.

10.3 Noise Maps

The Operative District Plan adopts a rather novel approach to describe the decibel noise limits. For residential areas the operative District Plan sets out "Noise Areas" independently from land zoning. There is a complex relationship between zoning maps and the mapped areas within which different noise limits apply. There are 63 separate site/activity specific noise rules making the noise chapter quite complex and difficult to navigate.

Although the site specific noise limits and related noise maps are designed to achieve a sustainable noise environment compatible with the policies and objectives of the District Plan, we do not consider the existing complex approach offers any significant advantage to using typical "Zone Rules" to demarcate areas where different noise limits should apply. We see the "Noise Maps" approach as potentially working against establishing a strong linkage between the Plan policies and objectives and the control over noise effects where there are geographical differences between the zoning maps and the maps depicting where the different noise limits are to apply.

Recommendation:
It is recommended the Proposed Plan noise provisions be based on noise rules applying within each zoned (mapped) area in accordance with National Planning Standards for district plans, as opposed to the operative plan approach whereby noise rules rely on a separate series of maps or site-specific noise limits.

10.4 NZ Standards

Chapter 14C sets out the basis of the Operative District Plan noise limits and controls. Rule states that noise within the District Plan is intended to be measured and assessed in accordance with New Zealand Standard 6801:1991 *Measurement of Sound*, New Zealand Standard 6802:1991 Assessment *of Environmental Sound*. Both these 1991 Standards have been superseded and should be replaced with reference to the latest (2008) versions.

Recommendation:
As required by National Planning Standards (discussed at section 6.7 above) it is recommended the Proposed District Plan include reference to the latest versions of the relevant NZ Standards that deal with noise-related matters.

10.5 Sound Level Descriptors L_{Aeq} and L_{AFmax}

One of the main consequences of updating NZS 6801 and NZS 6802 to 2008 standards is a change in measurement descriptors or noise metrics. Background sound level [previously L_{A95}] was changed to L_{A90} in the 1999 version. The change was an update consistent with international usage in BS4142:1997[10] and ISO 1996-2:2007. The 1999 revision replaced the LA10 descriptor with L_{Aeq}, technically referred to in the 1999 and 2008 versions as the 'time average sound level', being denoted as $L_{Aeq[t]]}$. What is vital about the $L_{Aeq[t]}$ is the measurement or assessment period [t] is required by both the 1999 and 2008 versions to be stated.

The current LA10 descriptor was originally adopted as it was demonstrated to have a reasonably good correlation with the degree of annoyance experienced by a typical person and was easy to calculate. Furthermore LA10 could be determined from analogue sound level meters by the visual mean maxima estimation method acceptable at the time.

[10] BS 4142:1997 -- Method for rating industrial noise affecting mixed residential and industrial areas

The introduction of L_{Aeq} in the 1999 and now 2008 standard is considered to be on a 'firmer foundation' and appropriate as international research had shown that the L_{Aeq} descriptor has a greater degree of correlation to noise annoyance than LA10, and for this reason was widely accepted as being the preferred noise descriptor for use in environmental noise standards and noise limits. Furthermore the L_{Aeq} level, being unrelated to the statistical variation in sound levels, is more readily predicted, which is a considerable advantage over L_{A10}. As noted above, by its very nature, L_{Aeq}, is related to a specific time interval and will only provide a valid description of a sound environment if the measurements cover the range and variability of that sound environment.

It is generally accepted that this difference is typically be 2-3 dB for "common" sounds but may be larger for some specific situations. In the case of simple constant sound sources with a fixed spectrum, such as mechanical plant, all descriptors would measure at the same level, that is LA10 = LAeq = LA90 = LAmax. For more complex variable sound sources such as noise from passing road traffic, the difference between L_{Aeq} and L_{A90} for the same reference time interval is typically around 2.5 dB at receiver locations.

The 2008 version of NZS6802:2008 standardises the reference time interval of 15 minutes. This allows limited averaging over 15 minutes. This allows a slight relaxation in allowable levels for sounds that are only present in for short periods. In addition to 15 minute L_{Aeq} sound levels, for night time NZS6802:2008 recommends District Plan noise limits include a "single event" noise control in the form of a limit measured L_{Amax} sound levels received at sensitive sites. This is denoted as L_{Amax} which is the maximum A-frequency weighted, Fast-time weighted, sound pressure level in decibels. L_{AFmax} criteria is set for night-time hours only as it is used to protect sleep from disturbance, which needs to be in place over periods such as 9 hours so as to protect during both the onset of sleep and to protect awakening during the night.

L_{Amax} limits should not be applied through rules or performance standards to sounds received at sensitive receiver sites during day time. The typical sound environment experienced in sensitive residential settings for example, during daytime will typically exceed L_{AFmax} criteria adopted for sleep protection, mostly without any adverse effect.

Recommendation:
Adopt L_{Aeq} and L_{Amax} as the main noise descriptors of the Proposed District Plan.
Adopt recommended convention when stating noise limits – this being 'value-unit-descriptor' e.g. **55 dB $L_{Aeq[15\ min]}$, 45 dB $L_{Aeq[15\ min]}$** and **70 dB L_{AFmax}.**

10.6 Time of day

District Plan noise limits are usually set lower for a defined 'night time' period reflecting people's increased sensitivity to noise during these hours. Whereas the operative plan applies noise limits separately for daytime (7am to 10pm) and night time (10pm to 7am), it is a recommendation of NZS6802:2008 to consider the application of a 'evening' noise limit to cover a period of time when activity and outdoor noise levels are lowering (increasing the intrusive of noise that annoys) yet the increase in sensitivity is limited compared to night time (after 10pm) when most people would go to bed. Applying a limit set mid-way between the daytime and night time noise limits is considered best practice as it matches the control of adverse noise effects in a manner that takes account of the environment occurring at the time. It is interesting to note the results of recent (2021) ambient sound level monitoring in the district indicated sound levels do typically taper off after early evening peaks and reduce towards 10pm in the evening. Thus recommendations are made below for future noise rules to be formatted so that there are separate noise limits for daytime (7am to 7pm), <u>evening</u> (7pm to 10pm) and night time (10pm to 7am).

Recommendation:
We recommend separate daytime/shoulder/ night time noise limits, adopting a widely adopted definitions as daytime (7am to 7pm), evening (7pm to 10pm) and night time (10pm to 7am).

10.7 Day Of Week

Current District Plan noise limits are for night time generally apply between 10pm and 7am (with some exceptions). However, Rule 14C 2.1(d) states that the lower night time apply "….*between the commencement of the lower level on a Saturday evening and Monday morning, and Public Holidays*". Thus, the operative plan

requires the lower, more restrictive 'night time' noise limits to apply during Daytime on Sundays (and during daytime on public holidays). This attempt to provide for 'quiet Sundays' is not a recommendation of any Standard or guideline, but rather is seen as an artefact of a desire to achieve quieter living conditions for religious or cultural reasons. Typical daytime sound levels measured on Sundays within residential areas in the Hutt district are not noticeably quieter than other days of the week. A series of recent traffic noise readings taken in 2020 in Lower Hutt (see Section 10.9.1 below) indicates 24 hour average traffic noise levels are remarkably consistent at each site across different days of the week. Sundays measured only 1 to 2 dB below noise levels found on other days of the week.

In our experience, there are difficulties with applying a night time noise limit to control noise from activities taking place during daytime on Sundays and statutory holidays. Often it is not possible to monitor compliance with this artificially low noise limit due to elevated ambient noise levels during daytime on these days.

From our research we find there are no policies or guidelines that recommend applying night time noise limits during the daytime on Sundays and public holidays in New Zealand.

The relevant NZ Standard (NZS6802:2008) recommends that if a Sunday daytime noise limit is necessary, this be set as a 'daytime' limit and does not recommend using night time limits for assessing daytime noise on Sundays. As the results of noise monitoring carried out in 2021 in the Hutt district did not show evidence of lower ambient sound levels on Sundays during daytime at residential sites, recommendations below set out noise limits that apply equally across all days of the week.

Recommendation:
We recommend separate daytime/shoulder/ night time noise limits be apply consistently across all days of the week.

10.8 Noise Assessment Location

There is some inconsistency with <u>where</u> compliance with the stated noise limits within the Operative Plan are to be determined. For example, Rule 14C 2.1.10 (Noise limits For General Rural Activity Area) limits noise received for all neighbouring sites:

> *All non-residential activities must not exceed the conditions as specified<u>, measured anywhere beyond the site on which the activity takes place</u> -*
>
> *Maximum 50dBA 7.00am - 10.00pm*
>
> *Maximum 40dBA 10.00pm - 7.00am*
>
> [*Emphasis added*]

In addition, Rule 14C 2.1.8 governing noise from activities within defined Extraction Activity Areas applies site boundary noise limits to quarrying activities.

The approach of Rules 14C 2.1.10 and 14C 2.1.18 means that noise due to rural and quarry activities are controlled to the stated noise limits measured anywhere within another site, even at sites remote from any dwelling. While Chapter 8 of the operative plan seeks to control effects of activities which be detrimental to the existing rural character and amenity values of the zone, the key policy in this regard (Policy 8A 1.1.1(b)) is only concerned with rural character and amenity values in relation to rural residential sites. This seems inconsistent with rules requiring activities to meet residential type noise limits at any point within rural lots which can be quite large with dwellings not normally located near to site boundaries. The assessment location for assessing compliance with noise limits in the rural zone specified by Rule 14C 2.1.10 can cause compliance difficulties as the site boundary can be some distance from the dwelling in rural areas, meaning that noise levels complying at the site boundary may be needlessly protect areas of vacant land. In addition, noise non-compliance at the site boundary may cause planning complications[11] yet noise experienced around the dwelling could be quite acceptable.

[11] An activity may be assessed as non-compliant with site boundary noise limits but, due to the distances involved, would have a *di minimis* effect in terms of noise experienced at or around the dwelling.

Best practice in terms of noise compliance assessment locations for use in rural areas (and the approach adopted within NZS6802:2008) is to apply limits on noise received within any parts of sites zoned residential (to ensure the whole site is adequately protected) however in the Rural zones noise compliance with 'residential' type noise limits are best assessed within the 'notional boundary'[12] to any existing dwelling on any other rurally zoned site, or at any location within any site zoned for residential purposes. If site boundary noise limits are contemplated in rural zones, it is considered more reasonable to set a higher noise limit (say 60 dB).

Clause 8.4.6 of NZ Standard NZS6802:2008 makes it clear that unless special planning reasons exist to justify using the site boundary approach *"…. the appropriate location for assessment of noise in rural character areas with large lot sizes, should be 'at any point within the notional boundary of a dwelling' and this may include some rural-residential areas"*.

Although the recommendations of NZ Standard NZS6802:2008 do not rule out the 'site boundary' approach in noise rules, the notional boundary approach to noise management in rural zones is widely adopted within district plans in New Zealand and is considered best practice. The operative plan 'site boundary' approach could be difficult to justify as an effects-based approach to managing noise in the rural zone where policies dealing with rural amenity are based around amenity experienced around rural residential sites, which appears to be the focus of the operative plan.

Recommendation:
We recommend adopting the notional boundary approach to the control of noise in rural areas. This should be defined consistent with the National Planning Standards which defines the notional boundary as recommends "*a line 20 metres from any side of a residential unit or other building used for a noise sensitive activity, or the legal boundary where this is closer to such a building*". The applicable noise limits recommended to apply at these locations is discussed in Section 11.2 below.

10.9 Noise Character

Reference to NZS6802:1991 in the operative plan ensures the operative plan appropriately assesses sounds containing "special audible characteristics" when assessing compliance with noise limits. This approach suitably deals with added annoyance such sounds may cause - sounds such as those that are highly tonal or impulsive sounds.

Like its 1999 predecessor, NZS6802:2008 also implies that the intrusiveness of a sound is not just a function of its sound level but is also affected by its character such as tonality or impulsiveness. The procedures of NZS6802:2008 require that, if justified, received LAeq sound levels are adjusted upwards (penalised) to account for the additionally annoying character of the sound. The penalty is applied by adding 5 dB to the measured sound level before determining compliance with the stated noise limit.

The recommendation is to adopt NZS6802:2008 reflecting the generally held position that such penalties should continue to be applied (where justified) to protect against effects of sound possessing special audible characteristics in all parts of the district.

Recommendation:
We recommend the full provisions of NZS6802:2008 across the whole district. This means ensuring each rule stipulating decibel limits are accompanied by words to the effect "Sound levels shall be measured in accordance with NZS6801:2008 *Acoustics - Measurement of Environmental Sound* and assessed in accordance with NZS6802:2008 *Acoustics – Environmental Noise*. "

[12] The notional boundary is defined within NZS6802:2008 however we recommend the slightly nuanced wording required to be adopted by the National Planning Standards which recommends "*a line 20 metres from any side of a residential unit or other building used for a noise sensitive activity, or the legal boundary where this is closer to such a building*".

10.10 Noise From Coastal Activities

10.10.1 Coastal Areas

The Hutt district has a significant length of coastline. Responsibility for managing the effects of noise under the RMA apply to all activities located on the landward side of 'mean high water springs' located along the coast. Our review has found no major adjustments to operative District Plan noise controls are necessary to control noise effects likely to be experienced within the Coastal Marine Area (CMA) which is the area between mean high water springs and a line nautical twelve miles out to sea.

Noise received on land from noise sources located within the CMA are managed by the Wellington Regional Council which has responsibility for noise received on land, from sources located in the CMA. This is achieved by the Wellington Regional Plan which sets out rules to limit the emission of noise from permitted activities[13] taking place in the CMA. For the purposes of noise control, the Regional Plan has noise limit controls for noise emitted from within 'Commercial Port Areas' separately applying alternative noise limits for noise sources located in all other coastal areas.

The Seaview Wharf and pipeline in Lower Hutt operated by CentrePort Limited Group enables over 1 million litres per year of petrol, diesel and jet fuel to be bought ashore from ships to holding tanks to be stored and distributed from the Seaview industrial area. Significant investment has recently been made to improve earthquake resilience of this system[14].

Rule 5.7.2(q) is a coastal management 'general condition' which limits noise from activities taking place within the Commercial Port Area (as shown below) to comply with the following noise limits when measured at any point 'on' the nearest Residential Area boundary;

Time (any day) Limits	*LAeq*	*LAmax*
7am – 11pm	***60 dB***	-
11pm – 7am	*45 dB*	*75 dB*

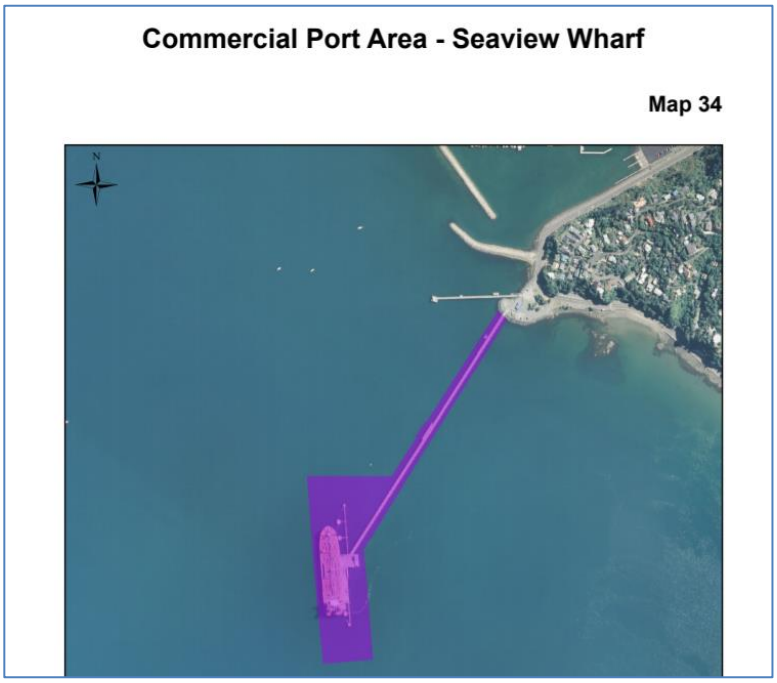
This rule limits noise from activities within the port. A companion rule (Rule 5.7.2(p)) applies to noise generated by activities in the CMA but are located outside the port operational area shown in 'Map 34'. This rule limits noise measured at any point on the nearest Residential Area boundary;

Time (any day) Limits	*LAeq*	*LAmax*
7am – 11pm	***55 dB***	-
11pm – 7am	*45 dB*	*75 dB*

[emphasis added].

[13] Proposed *Natural Resources Plan For The Wellington Region* - Appeals Version (2019)

[14] https://www.stuff.co.nz/national/125558087/80m-quakeresilience-upgrade-for-lower-north-islands-fuel-supply-line-in-lower-hutt



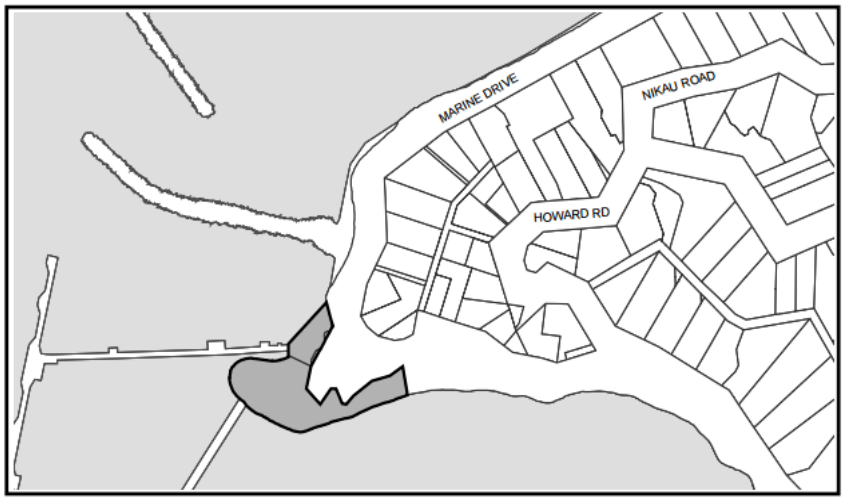
Both of the above rule requirements;

- Exempt noise generated by navigational aids, safety signals, warning devices, or in emergency circumstances.
- Compliance to be based on measurements taken in accordance with NZS6801:2008 with results assessed in accordance with NZS6802:2008.

Recommendation
Noise from activities taking place within the CMA, adjacent to the Hutt district boundary, is considered to be reasonably controlled under Wellington Regional Plan requirements. Council has no jurisdiction to control nosie generated by activities taking place in CMA. In any event, it would not be appropriate for the Proposed District Plan to include a second set of limits on noise from port or other activities taking place in the CMA.

10.10.2 Point Howard Business Activity Area

Assessing the effectiveness of noise provisions applying to activities taking place on the Seaview wharf needs to also consider the noise standards requirements of district plan Chapter 14C 2.1.5 (b) 31 which apply to activities taking place within the General Business Activity Area shown below which lies on the landward side of mean high water springs.



Limits on noise due to activities taking place in the General Business Activity Area received within any site zoned residential or recreation activity area, are summarised as

LA10 60 dB	7.00am - 11.00pm
LA10 45 dB	11.00pm - 7.00am
LAMax 75 dB	10pm to 7am

A daytime noise limit of LA10 60 dB exceeds the generally accepted maximum recommended outdoor noise levels for adequate protection of residential sites (LAeq 55 dB as per NZS6802:2008) by 2 to 3 dB taking into account differences in LA10 and LAeq units.

Recommendation
Regardless of the change in noise unit (LA10 to LAeq) setting noise limits within the Proposed Plan may, in places, require noise limits to be justified which exceed available guidance on maximum daytime noise received within residential sites (e.g. LAeq 57 or 58 dB).

10.11 Managing Reverse Sensitivity Effects

Reverse sensitivity is the vulnerability of an established land use to complaint from a new land use. In practice such complaints can compromise the established land use. The operative district plan includes

The use of acoustic insulation as a means of managing reverse sensitivity noise effects in district plans is supported because;

a) Given what is known of elevated daytime and night time ambient noise levels in some parts of the Hutt district (and their expected growth over time) and what is known of typical reductions in external sound achieved within typical NZ dwellings, requiring acoustic insulation for new buildings housing noise-sensitive activities in business and commercial areas will protect the health and well being of the future residents, as well as providing a measure to reduce reverse sensitivity for commercial operators of noisy activities.

b) It is not difficult or expensive to reduce the level of exterior noise entering a building. The costs of incorporating the acoustic insulation methods adopted in 2004 into the Wellington City District Plan was found to be 5% to 8% of the capital cost of the dwelling. For inner city apartments this a lower figure was found as there are proportionately less external wall areas and roof areas requiring treatment.

c) There are no legal barriers as the High Court has indicated *(Building Industry Authority and Christchurch International Airport v Christchurch City Council AP 78/96*) that it is within the powers of Local Authorities under the Resource Management Act to specify a certain level of acoustic insulation in plan rules and consent conditions, and that doing so would not conflict with the Building Act.

A discussion of matters relevant to the development of district plan rules requiring acoustic insulation of buildings housing noise sensitive activities within specified noisy areas are set out as follows;

10.11.1 Noise Sensitive Activities

The term “Noise Sensitive Activity” defines those activities to which reverse sensitivity actions are addressed in the Plan. Activities sensitive to noise need to be specifically provided for within rules and performance standards of the Proposed Plan to ensure land use compatibility and to enhance sustainable communities.

The operative District Plan currently defines this term as;

Noise Sensitive Activity means any:

- *residential activity;*
- *visitor accommodation, boarding house or other premises where residential accommodation for five or more travellers is offered at a daily tariff or other specified time; or*
- *childcare facility.*

This definition is considered too narrow as it does not include sensitive uses such as schools or marae, both of which include rooms with what could be termed 'critical listening environments'[15].

It is recommended to re-examine and broaden this definition to ensure the effectiveness of the Plan's reverse sensitivity provisions. It is noted that no definition of "noise sensitive activity" is provided within the NZ National Planning Standard however the proposed definition below is based on the recommendations of NZS6806:2010 *Acoustics - Traffic Noise – New & Altered Roads*.

Recommendation
To preserve and enhance the effectiveness of the reverse sensitivity provisions of the proposed District Plan we recommend re-defining the term Noise Sensitive Activity more broadly as follows;

Noise Sensitive Activity means any activity sensitive to the effects of noise and vibration carried out within any:

- residential dwelling
- buildings used for visitor accommodation
- residential care facilities
- education and childcare facilities
- hospitals and healthcare facilities
- marae

10.11.2 Managing Effects on Noise Sensitive Activities

The operative District Plan applies a noise limit of LA10 65 dB daytime and 60 dB night time between sites in the Central Commercial Activity Area & Petone Commercial Activity Areas 1 & 2. The operative District Plan sets out acoustic insulation requirements apply to new or altered buildings housing noise sensitive activities establishing in these activity areas.

However, other zones where operative Plan provisions allow for noise to be emitted exceeding 55 dBA daytime and 45 dBA night time. In these areas ambient sound levels are likely to be elevated to such an extent that these areas would, at times, be unsuitable for noise sensitive activities establishing in these areas. This is because;

i. A typical modern dwelling or apartment will reduce outdoor sound by 20 dBA, maybe up to 30 dBA, that is with windows closed. A reduction of 10 to 15 dBA occurs when windows are open. According to the readings taken, sensitive uses establishing in these area may receive outdoor sound levels of such magnitude that sound levels received within habitable rooms (windows closed) of up to LAeq 50 dB and LAmax 60 dB night time. This is with windows closed. Higher levels are likely indoors when windows are opened for ventilation purposes.

ii. Maximum acceptable levels of sound within habitable rooms due to external sources should not generally indoors at levels above 35 dB for adequate protection of sleep. According to the World Health Organization (WHO) recommend indoor noise levels at night of no more than LAeq 30 dB and LAmax 45 dB for the avoidance of sleep disturbance. Satisfactory and maximum values are also included in AS/NZ 2107:*2000 Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors*. The standard prescribes slightly higher levels of 30 to 40dBA LAeq (8-hr) for sleeping areas on 'major' roads compared with 30 to 35dBA LAeq (8-hr) in bedrooms near 'minor' roads.

Chapter 5 acoustic insulation requirements to deal with noise from commercial activities are required within the Central Commercial Activity Area and Petone Commercial Activity Area.

Chapter 5 Commercial Activity Area Rule 5A 2.2.2 (b) and Rule 5B 2.2.1.1 (g)) set out sound insulation requirements for habitable rooms in new or altered buildings housing noise sensitive activities establishing in these zones. Sound insulation (outdoor to indoor) is stipulated to achieve a certain rating (Dtr,2m, nTw) which is concerned with quantifying the sound transmission qualities of building elements to sound on the outside wall of the room, with the reported decibel rating being dependent upon the frequency content of sound received within the habitable room. Operative District Plan Residential Objectives, such as Objective 4F 2.2 which encourages medium

[15] As an example, the Queenstown Lakes District Plan defines 'critical listening environments' as any space that is regularly used for high quality listening or communication for example principle living areas, bedrooms and classrooms but excludes non-critical listening environments.

density residential development within Suburban Mixed Use and Central Commercial Activity Areas close to the public transport network. Effective and efficient district Plan rules to protect habitable rooms housing noise sensitive activities from noise will be important going forward.

Acoustic isolation requirements of Chapter 5 require protection from noise from outside the building by ensuring the external sound insulation level of habitable room meets the requirement of Dtr,2m, nTw > 30 dB[16]. This type of rule requires the external building envelope to resist outdoor sound by a stated amount (in this case > 30 dB).

Acoustic insulation rules which specify the performance of the building envelope in this manner differ markedly to the alternative 'indoor noise limit' type insulation rules as they base compliance on achieving specified maximum indoor level of sound due to outdoor sources rather than the acoustic qualities of the building construction. Acoustic insulation against state highway and rail noise within specified noise-affected areas within Standard 6 of Chapter 14 A Transportation of the operative District Plan[17] is based on the 'indoor sound limit' approach. This approach has been found to be difficult for Council's to implement and monitor when adopted within district plan reverse sensitivity acoustic insulation rules and can lead to an inconsistent design approach as different designers may assume (unwittingly) differing levels of outdoor sound[18]. The following formula extracted the NZTA guidance on insulation against traffic noise indicates the complexity involved when attempting to establish the outdoor traffic noise level;

$$d = K \times AADT \times \underbrace{\left(V + 40 + \frac{500}{V}\right)^{3.3}}_{\text{Traffic speed}} \times \underbrace{\left[\left(1 - \frac{p}{100}\right) \times 10^{\left(\frac{R_c}{10}\right)} + \left(\frac{p}{100} + \frac{5p}{V}\right) \times 10^{\left(\frac{R_t}{10}\right)}\right]}_{\text{Road surface (and traffic speed and composition)}}$$

Where:

d	Distance (m)
K	Constant factor related to noise level (1.82×10^{-10} for buffer area, 9.13×10^{-10} for effects area)
AADT	Annual average daily traffic (vpd)[19, 20]
V	Traffic speed (km/h)
p	Percentage of heavy vehicles (percentage points, eg for 12 %HV, p = 12)[19, 20]
R_c	Surface correction[13] for cars (dB)
R_t	Surface correction[13] for trucks (dB)

Formula for calculation of outdoor traffic noise levels extracted from page 9 of NZTA reversed sensitivity guidelines.

As there can be major uncertainties in designing the necessary level of acoustic insulation based on incorrect assumptions when calculating outdoor sound levels against which the insulation needs to act (including the ineffectiveness with which "A Frequency weighted" indoor sound levels account for low frequency sound insulation rules based around 'external sound insulation level' (Dtr,2m, nTw) are preferred as not only are the above problems avoided, but post-construction compliance can be checked by conducting field tests in accordance with ISO 140-5:1998 and ISO 717-1: 2013 *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation*.

The most compelling evidence supporting the external sound insulation level (Dtr,2m, nTw) method is found within NZS6802:2008 *Acoustics – Environmental Noise*, Clause 8.6.9 which refers to acoustic insulation of buildings using methods verified using ISO 140-5:1998 and ISO 717.

Further evidence in support of adopting sound insulation rules based on the 'external sound insulation level' (Dtr,2m, nTw) method comes from NZS6806:2010 *Acoustics – Traffic Noise – Noise From New or Altered Roads.*

[16] Dtr,2m, nTw is the standardised level difference (outdoor to indoor) and is a measure of the airborne sound insulation provided by the external building envelope (including windows, walls, ceilings and floors where appropriate). It is calculated using Acoustic insulation must be assessed in accordance with ISO 717-1:2020 *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation*.

[17] Expert advice received Council received on this topic (Plan Change 39 Marshall Day Acoustics report to Council officers) recommended district plan reverse sensitivity acoustic insulation rules based around specifying building performance (i.e. the Dtr,2m, nTw method).

[18] *Managing Reverse Sensitivity Noise & Vibration Effects Of Rail and Road Transport in New Zealand*. New Zealand Acoustics - Journal of the NZ Acoustical Society, Vol. 28 / # 3, 2015.

This Standard recommends that where acoustic insulation against traffic noise is required as a mitigation measure under the Standard, clause 5.2.3.2 specifies that acoustic insulation performance of buildings be rated using the 'standardised level difference' method (Dtr,2m, nTw).

Recommendations

- Retain the existing approach of the Operative District Plan for stipulating sound insulation (outdoor to indoor) using the external sound insulation level method (Dtr,2m, nTw) in preference to insulation rules relying on 'indoor sound limits' measured suing dBA.
- Retain and enhance existing reverse sensitivity requirements set out within Chapter 5 of the Operative District Plan that require sound insulation for habitable rooms in new or altered buildings housing noise sensitive activities. We recommend that these existing acoustic insulation requirements be adopted for all sites within the Mixed Use, Commercial Activity areas and within Business type zones and any other activity areas where district plan permitted activity noise standards allow for noise levels to be received at levels exceeding 55 dB LAeq[15 min] daytime or night time limits exceeding 45 dB LAeq[15 min] .

10.11.3 Managing Effects on Sensitive Activities Along Transport Noise Corridors

With significant road, rail and sea port operations passing through and servicing the district, Hutt City is characterised by environmental noise 'corridors' reflective of the layout of the road and rail network.

The Hutt roading network (see diagram below) generally has a north-south grid structure parallel to the Hutt River. North-south corridors through the centre intersected by east-west road connections perpendicular to the river provide local access and connectivity to the state highway (SH2). This diagram classifies roads under the One Network Road Classification (ONRC) system described in the Central City Transformation Plan (February 2019) and are listed in Appendix Transport 3 of the District Plan.

In the operative District Plan, SH2 is classified a 'Regional Road' and is classified as making a major contribution to the social and economic wellbeing of a region and connect to regionally significant places, industries, ports and airports. NZTA Waka Kotahi are responsible for the state highway and have developed guidelines recommended to be included in district plans which seek to avoid reverse sensitivity noise and vibration effects within defined corridors alongside the highway[19].

There are no similar recommendations for protecting the local authority roading network from reverse sensitivity noise effects yet the importance of protecting infrastructure and facilities from inappropriate development on adjacent sites is signalled within existing provisions of the District Plan and within the recommendations of relevant NZ Standards for transport noise. HCC acted to strengthen reverse sensitivity measures related to transport noise and vibration effects within Plan Change 39 to the district plan[20].

Plan Change 39 (operative March 2018) introduced "Standard 6 - Development within the State Highway and Railway Corridor Buffer Overlays" into the plan as a means of managing potential reverse sensitivity effects from noise sensitive activities establishing near to the state highway or railway corridors. Standard 6 addresses reverse sensitivity effects of the state highway or rail network by defining 'noise effects' areas and applying district rules to require acoustic insulation within any new buildings proposed to contain noise sensitive activities, or where existing buildings are to be re-used for new noise sensitive activities .

Recommendations for the Hutt City Proposed District Plan below to manage reverse sensitivity noise effects of the state highway and rail corridor are set out below in Section 11. The recommendations to address potential reverse sensitivity effects are based our rail and road traffic noise readings recently measured in the district. Recommendations regarding setback distances and areas where acoustic insulation is required for new or altered buildings housing noise sensitive activities (sections 11.9.1 "Noise From Existing roads" and 11.10 "Noise From Rail Corridor") include expectations of future increased noise within these corridors.

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[19] *Guide to the management of effects on noise sensitive land use near to the state highway network.* NZ Transport Agency Waka Kotahi . Published September 2015

[20] *http://www.huttcity.govt.nz/district-plan-change-39.*

Recommendations

- We recommend the proposed District Plan contain strong provisions that protect operators of the roading network and operators of the rail network due to potential adverse noise and vibration effects.
- We recommend this be achieved by requiring acoustic insulation of sensitive rooms in buildings located in corridors lying within proximal distance to the road or rail network and by non-acoustic methods including limitations on subdivision and development of land.
- We recommended the Hutt City District Plan use a single, technically appropriate acoustic insulation standard at all instances where this mitigation measure is stipulated in the plan.

11 Recommendations

This section sets out generic recommendations at ensuring the proposed District Plan noise provisions are in line with the current best practice. The focus is on noise rules being standardised within each zone, and providing noise provisions that are easy to interpret and implement for both Council and other users of the District Plan.

The recommendations are generic. We have not set out the final wording of the recommended noise rules at this stage. The recommendations below do not significantly depart from the overall approach of existing policies and rules, with recommendations based on conformance with the National Planning Standard whilst including technical enhancements based on the most appropriate national noise standards and best practice.

The recommendations below focus primarily on managing noise and vibration effect of activities to protect the health and safety of people and communities, and to effectively manage the potential for reverse sensitivity noise and vibration effects created by inappropriate development of adjoining land.

11.1 New Zealand Standards and Related Noise Metrics

The recommendation is to place the most recent measurement and assessment Standards at the heart of the Proposed District Plan noise provisions – this is the 2008 versions of Standards NZS6801:2008 and NZS6802:2008. These standards are viewed as technically superior and robust being based on methods and procedures adopted internationally for noise measurement and assessment. NZS 6801 describes procedures for the consistent measurement of sound. This states that the methods and procedures for sound measurement are intended to be applicable to all forms of environmental sound, individually or in combination.

NZS6802 sets out procedures for the consistent assessment of noise, for example, when assessing compliance with stated noise limits. This standard is not intended to be applied for assessing noise within the scope of other NZ acoustic standards. In particular assessment of specific sources of sound including road or rail transport, flight operations of fixed or rotary winged aircraft associated with airports or helicopter landing areas, construction, port noise, wind turbine generators, and impulsive sound (such as gunfire and blasting), requires special techniques that generally are outside the scope of NZS6802:2008. Thus, separate recommendations are set out below for managing the environmental effects of these types of noise.

Recommendation:
Adopt NZS 6801:2008 *Acoustics –Measurement of Environmental Sound*
Adopt NZS 6802:2008 *Acoustics –Environmental Noise*

Remove any reference to superseded standards [including]:
NZS 6801:1991 *Measurement of Environmental Noise*
NZS 6802:1991 *Assessment of Environmental Noise*
New Zealand Standard 6801:1999 *Acoustics - Measurement of Environmental Sound*

11.2 Recommendations For Activity Zones

New Zealand Standard NZS6802:2008 provides guidance on levels of outdoor environmental noise adequate to protect health for use in protecting noise sensitive sites from the adverse effects of environmental noise.
Recommended noise limits are provided in NZS6802:2008 as guideline residential upper noise limit values (L_{AFmax} and L_{Aeq}) to provide "reasonable" protection of health and amenity. A note of caution is signalled within NZS6802:2008 against setting low noise limits within existing modest or high ambient sound levels (compliance with which cannot be properly measured) [refer NZS6802:2008 clause 8.6.3].

The 2008 version of the standard introduced an evening assessment time frame with limits applicable to this evening period set between the day and night limits. This has emerged as best practice in NZ, ensuring the decibel limit recognises the likely ambient sound climate in residential areas over the evening period. The following is an extract of the general guidance provided by NZS6802:2008 on setting noise limits for residential areas (ref. Section 6 of NZS6802:2008);

> ***8.6.2*** *As a guideline for the reasonable protection of health and amenity associated with use of land for residential purposes, the noise limits in table 3 should generally not be exceeded at any point within the boundary of a residential site, for example, at any point within the notional boundary of a rural dwelling.*
>
> ***Guideline residential upper noise limits***
>
> | | |
> |---|---|
> | *Daytime(1)* | *55 dB LAeq(15 min)* |
> | *Evening(1,2)* | *50 dB LAeq(15 min)* |
> | *Night-time(1)* | *45 dB LAeq(15 min)* |
> | *Night-time(1)* | *75 dB LAFmax* |
>
> *NOTE–*
> *(1) The definition of times of day are a matter for the relevant local authority and should recognise that a period of not less than 8 hours needs to be provided for sleep to ensure at least the minimum acceptable degree of health protection.*
>
> *(2) Inclusion of an evening period and its hours of application are a matter for the relevant local authority.*
>
> *(3) This clause is not framed as a consent condition, rule or national environmental standard and should not be quoted for those purposes.*

Thus, for the protection of residential sites within residential zones (and other sensitive sites0 the general approach in New Zealand is to set limits on noise received during daytime at 50 to 55 dB $L_{Aeq[15\ min]}$ with night time and evening limits set to between 40 to 50 dB $L_{Aeq[15\ min]}$. In addition, between 10pm and 7am it is recommended single event noise at sensitive sites be controlled to 70 to 75 dB L_{AFmax}.

Apart explicitly stating noise limits, noise rules need to include suitable reference to NZS 6801:2008 *Acoustics – Measurement of Environmental Sound* and NZS 6802:2008 *Acoustics –Environmental Noise* as these are the environmental noise standards necessary to ensure noise rules remain objective, repeatable and can be enforced when necessary.

We have made no specific recommendation for noise limits within each zone at this stage. Instead we make the following generic recommendation regarding wording of noise rules applying to permitted activities in each zone;

Recommendation:

The **Noise Emission Level** from any site shall not exceed the following levels when measured at any point within any residential site or at any point within the notional boundary of any residential unit or other building used for a noise sensitive activity located within a site in the Rural zone, other than any such building located on the same site, during the following time frames:

7am to 7pm.....w dB LAeq (15 min)
7pm to 10pm.....u dB LAeq (15 min)
10pm to 7am the following day.....y dB LAeq (15 min)
10pm to 7am the following day.....z dB LAFmax

'u', 'w', 'x', 'y', and 'z' are the numerical noise limits to be informed by the Operative plan LA10 and LAMax limits, in addition to a consideration of the policies and outcomes sought within the Proposed District Plan.

It is common practice to provide exemptions from district plan noise rules for certain types of noise sources which are either beyond the jurisdiction of a district plan (e.g. noise from rail or road vehicles travelling within defined (designated) transport corridors) or where it may be unreasonable to apply numerical noise limits (such as noise generated by normal residential activities such as mowing lawns or children playing outdoors). Noise arising from items of fixed plant operating on residential sites are generally not excluded from district plan control as it is feasible and practical for these sources to be designed, located or physically mitigated so that the noise effects can be controlled to acceptable levels. In addition, noise effects due to sports are usually temporary in nature and are a normal part of urban sound environment. The exemption would not be reasonable however to apply to events involving the use of amplified sound systems, motor vehicles, powered machinery, amplified music, or the use of firearms or explosives as these types of sound sources need to be controlled to reasonable levels to protect sensitive environments. Due to their function, it is not considered practical to require warning devices such as security alarms or fire station sirens to comply with district plan noise limits.

Finally, as compliance with district plan noise limits is based on assessment using NZS6802:2008 it is also not appropriate to apply this Standard to noise sources beyond the scope of this Standard. Section 1.2 of NZS6802:2008 refers to the scope of this this Standard and states it cannot be applied to the assessment of sound where the source is within the scope of, and subject to, the application of other New Zealand acoustical Standards. In particular, assessment of specific sources of sound including road or rail transport, flight operations of fixed or rotary winged aircraft associated with airports or helicopter landing areas, construction, port noise, wind turbine generators, and impulsive sound (such as gunfire and blasting), requires special techniques that generally are outside the scope of this Standard.

Recommendation:

The "Definitions" section of the Proposed District Plan should define **Noise Emission Level** as meaning:

Noise Emission Level means a sound level measured in accordance with NZS *6801:2008 Acoustics – Measurement of environmental sound* and assessed in accordance with the provisions of NZS 6802:2008 *Acoustics – Environmental noise* excluding;

1. Noise generated as part of normal residential activities, apart from noise arising from items of fixed plant.
2. Sports events not involving the use of amplified sound systems, motor vehicles, powered machinery, amplified music, use of firearms or explosives.
3. Vehicles operating on public roads or trains on rail lines (including at railway yards, railway sidings or stations and level crossing warning devices).
4. Any warning device used by emergency services for emergency purposes.
5. Any noise source identified in Section 1.2 of NZS6802:2008 as outside the scope of that Standard which includes;
   - Aircraft noise

- Noise associated with port activities outside the district boundary
- Noise from helicopters in the vicinity of a helicopter landing area
- Construction noise
- Wind turbine noise except noise due to small scale domestic wind turbines.

11.3 Two Teir Night Time LAeq(15 min) Limits For Residential Sites

The 2021 ambient noise survey reveals that night time noise levels at sites in the vicinity of the Wairarapa Railway corridor or arterial or regional roads measured at higher levels than readings taken at more distant sites. Elevated levels of ambient sound present in an area will affect the 'intrusiveness' of new noise or noise being complained of. In addition, elevated levels of ambient sound will affect the ease with which noise readings taken outdoors to confirm compliance with stated night time noise limits.

In response to these two artefacts of elevated ambient noise typically found within 50 metres of any arterial route or regional road, it is recommended that where a night time noise limit of LAeq(15 min) 40 dB apply to noise received at any residential site (or at any point within the notional boundary of any residential unit or other building used for a noise sensitive activity located within a site in the Rural zone, other than any building located on the same site) the compliance limit be raised to 45 dB LAeq(15 min). A night time limit of 45 dB remains within available guidelines regarding limits on outdoor noise levels requisite to protect health and amenity at residential sites, but within sites experiencing night time noise from roads would be more reasonable and practical to enforce compared to 40 dB LAeq(15 min). A similar recommendation for night time noise limits applying within residential areas adjacent to the Wairarapa Railway line which passes though the Hutt district is not recommend owing to the relatively few trains using the line between 10pm and 7am (and hence lack of elevated night time noise in these areas).

Recommendation:

In consideration of the policies and outcomes sought within the Proposed District Plan it is recommended night time (10pm to 7am) noise emission limits applying to noise from land use activities received within any residential site (or at any point within the notional boundary of any residential unit or other building used for a noise sensitive activity located within a site in the Rural zone, other than any such building located on the same site) are recommended to be set at **40 dB** LAeq(15 min) unless the residential noise assessment position is located not less than 50 metres from any arterial route or regional road in which case the recommended night time noise limit should be **45 dB** LAeq(15 min).

11.4 Noise From Fixed Plant

"Fixed Plant" is defined as equipment such as heat pumps, air handling systems, water pumps which are common sources of ambient sound, particularly in urban area. Being fixed noise sources, these sources of sound are amenable to being appropriately located, enclosed or otherwise treated to achieve a higher standard of noise control compared to mobile sound sources (e.g. delivery vehicles on site).

Mobile sound sources operating on a site naturally have lesser ability to accommodate noise control measures but are nonetheless required to achieve compliance with slightly higher noise limits (unless exempted under the rules).

The recommendation is for the proposed District Plan to regulate noise emissions from fixed plant located in residential and commercial/business areas as follows;

Recommendation
Within all mixed use, commercial, industrial and business zones, night time LAeq(15 min) performance standards for noise due to "Fixed Plant" received within any residentially zoned site should be set at a limit 5 dB below the night time limit applying to all other sources (but not less than 40 dB LAeq(15 min); and

Within Residential Activity Areas, avoid rules that place any limits on noise generated as part of normal residential

activities, however the applicable rules should impose a limit for noise from fixed plant at levels not more than 40 dB LAeq(15 min) when measured within any other residential site.

11.5 Acoustic Insulation Of Habitable Spaces

New or altered habitable rooms accommodating Noise Sensitivity Activities located within most busy urban centres or within commercial areas or within areas affected by noise from existing roads or rail lines in New Zealand are required by the relevant District Plan provisions to be acoustically insulated.

Because the effective reduction of sound within habitable rooms relies on keeping windows closed, there is also a requirement for ventilation to be provided so that the minimum requirements of the Building Code (G4) for natural ventilation are achieved.

As discussed in Section 10.11.2 above, the recommendation is to unify the type of district plan methods currently adopted for specifying acoustic insulation – currently there is the 'indoor sound level' approach of Chapter 14A Standard 6 and the 'standardised level difference' method (Dtr,2m, nTw) of Chapter 5. As above, the recommendation is to adopt only the Dtr,2m, nTw method due to the advantages in ease of design, verifying and checking compliance that of this type of insulation rule.

Based on best practice (and the approach of the operative Plan) it is recommended TWO possible pathways be offered within the proposed Plan for achieving compliance, as follows;

a) Use of a "Minimum Construction Schedule" as a default minimum construction that, if followed, would result in the habitable room receiving the requite minimum level of acoustic insulation (e.g. Dtr,2m, nTw > 30). If necessary, conformance with this schedule can be verified when building plans are submitted to Council for building consent; OR
b) An expert report is submitted to Council in the form of an acoustic design certificate signed by a suitably qualified acoustic engineer stating the design of the habitable room as proposed will achieve compliance with the stated performance standard.

This the current approach of the operative District Plan in relation to;

- Insulation requirements of Chapter 5 Commercial Activity Area Rule 5A 2.2.2 (b) and Rule 5B 2.2.1.1 (g)) which specifies minimum construction standards in "*Appendix Central Commercial 7 – Noise insulation Construction Schedule*"
- Insulation requirements of Chapter 14A Transportation – Standard 6 which specifies compliance with "*Appendix Transport 4 - Noise and Vibration Construction Schedule*".

This 'two option' method for achieving compliance with district plan acoustic insulation requirements is recommended to be continued as it allows for buildings of simple design, using common materials, to be easily assessed as meeting the necessary acoustic insulation standard.

Acoustic insulation rules for habitable rooms are almost always accompanied by a companion ventilation requirement, it being necessary to keep windows closed to enjoy the benefits of an acoustically insulated habitable room. It is worth noting that the ventilation standard accompanying the Chapter 5 insulation requirement is based on (a) Ventilation is only being required in bedrooms, not other types of habitable rooms (b) the supplementary source of air is to achieve a minimum of 7.5 litres per second per person. This contrasts with the insulation requirements of Chapter 14A – Appendix Standard 6 which requires (a) ventilation to be provided to ALL qualifying habitable rooms and (b) the amount of ventilation must fully meet clause G4 of the Building Code (Schedule 1 of the Building Regulations 1992) which requires a considerable sized ventilation system. Given that habitable rooms required to be acoustically insulated are mostly fitted with openable windows sufficient to ventilate the room to G4 standards, it seems inefficient to require artificial ventilation to achieve the high flow volume ventilation requirements of G4. It is considered that, on balance, the purpose and principles of the RMA may be achieved more efficiently within the proposed District Plan by adopting the requirements for ventilation from the Chapter 5 requirements of the operative District Plan (ventilation provided to bedrooms only, at a minimum flow rate of 7.5 litres per second per person).

The sound experienced within the habitable room due to the operation of the ventilation system is a matter

referred to in the Standard 6 ventilation requirements but not the Chapter 5 ventilation requirements. These rules state sound due to operation of the ventilation system must not exceed 30dB LAeq(30s) when measured 1m away from any internal grille or diffuser. This requirement for low-noise ventilation into habitable rooms is supported on an effects basis and is recommended to be incorporated into the proposed District Plan.

Recommendation:
To unify methods to specify acoustic insulation in the district plan. Adopt only the Dtr,2m, nTw method due to the advantages in ease of design, verifying and checking compliance that of this type of insulation rule.

Require the rules to provide TWO options for demonstrating compliance with the Dtr,2m, nTw > 30 requirement, this being either;

a) An acoustic design certificate signed by a suitably qualified acoustic engineer stating that the design as proposed will achieve compliance with the minimum performance standard: or
b) Compliance is demonstrated within the plans submitted for building consent indicating habitable rooms are designed and constructed in a manner that accords with the following **minimum schedule of building construction**.

Insulation requirements should be accompanied by a companion ventilation requirement so that openable windows are not needed to be used for thermal comfort reasons. It is recommended that ventilation be required in the form of a positive supplementary source of fresh air ducted from outside for any bedroom or any room intended to be used for sleeping. The supplementary source of air is to achieve a minimum of 7.5 litres per second per person. Sound due to operation of the ventilation system must not exceed 30dB LAeq(30s) when measured 1m away from any internal grille or diffuser.

11.6 Construction Noise

Chapter 14C of the district plan at standard 2.1(f) which states all construction, demolition, and maintenance work shall comply with NZS 6803P *Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work*.

NZS 6803:1999 *Acoustics – Construction Noise* is the current and most technically appropriate standard for construction noise assessment. This standard uses L_{Aeq} noise descriptors. The scope of NZS 6803 does not apply to vibration or blasting, noise induced hearing loss, or effects of noise upon wildlife, stock, or domestic animals. NZS 6803 also does not apply to 'emergency works' as defined in the Resource Management Act 1991.

Recommendation:
Adopt NZS 6803:1999 *Acoustics – Construction Noise* for the assessment of construction noise
Remove any reference to superseded standards New Zealand Standard 6803 P:1984 *The Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work*.

11.7 Vibration

It is noted that the RMA defines noise as including vibration. Vibration effects are controlled in the operative District Plan using rules such as Rule 4A 4.1.10(a) for Residential Activity Areas which requires activities that cause vibration are permitted activities provided "*the activity is managed and controlled in such a way that no vibration from the activity is discernible beyond the boundary of the site".* An accompanying rule states that activities that do not meet the above permitted development standard are restricted discretionary activities with discretion restricted to "effects on the amenity of the surrounding area". This approach is also taken within permitted activity standards applying in Chapter 6 (Business), Chapter 8 (Rual) and Chapter 9 (Community Health).

The National Planning Standards does not require numerical vibration limits to be stated in district plans. The NZPS only refers to managing damage to structures from construction vibration. No other vibration sources are covered. The NZPS states that if rules of this nature are to be included in district plans, rules must be consistent with the metrics for peak particle velocity (ppv) in ISO-4866:2010 – *Mechanical vibration and shock*.

It is noted there are no relevant NZ Standards setting out suitable vibration criteria or measurement or compliance assessment methods for assessing ground vibration as an environmental effect.

On the basis of the above, the recommendation for the proposed District Plan is to continue to adopt policies and rules around limiting discernible vibration occurring on adjacent sites. This is considered consistent with the NZPS and would address concerns that applying numerical limits on vibration within permitted activity site standards would place a duty on Council to monitor vibration levels at receiver sites to determine compliance – a highly specialised and technically challenging procedure.

Recommendation:
Rules to address vibration effects should continue to be based around "that no vibration from the activity is discernible beyond the boundary of the site". Consideration should be given to confining the scope of any such rules to vibration received within any residential site (or at any point within the notional boundary of any residential unit or other building used for a noise sensitive activity located within a site in the Rural zone, other than any such building located on the same site). This would be more consistent with the approach taken to managing the effects of noise in sensitive areas.

Road and Rail Vibration Reverse Sensitivity Measures:
Effective control of vibration effects can only sensibly be carried out by addressing the vibration at source.

Chapter 14A – Standard 6 sets out to manage reverse sensitivity vibration effects based around requiring the owner of new buildings establishing within road or rail buffer areas to design and construction any buildings housing sensitive activities to comply with class C of Norwegian Standard 8176 E:2005 (*Vibration and Shock - Measurement of Vibration in Buildings from Land based Transport and Guidance to Evaluation of Its Effect on Human Beings*). We do not recommend adopting reverse sensitivity vibration rule because;

- It is not feasible to design buildings to reduce vibration from road or rail sources.
- The Norwegian Standard referred to is intended to be used as a means of assessing vibration performance of new roads, not as a reverse sensitivity measure.

Should there be evidence of adverse vibration effects which require the building to mitigate the effect, we consider the purpose and principles of the RMA are better met by control at source in accordance with s.16 RMA whether or not the design of the proposed building would play a role in transmitting or amplifying ground vibrations. We recommend the reverse sensitivity effects of road or rail vibration be dealt with via the use of setbacks for new or altered buildings housing sensitive activities

11.8 Noise from Temporary Military Training

The nature and diversity of military training exercises mean these activities will not always be able to comply with noise limits for permitted activities set out in the District Plan. These activities are usually short lived on any site. Although the organisers of temporary military training (NZ Defence) need to make the case concerning benefits of allowing activities in the Hutt district that would temporarily breach the noise rules, these activities are exempted in NZ many district plans from complying with the normally applied district plan noise emission limits.

A simple approach is to exempt the noise generated by temporary military training where this takes place on a site for 72 hours or less. Noise effects over such constrained time periods are not likely to give rise to serious adverse effects, although annoyance and complaints may arise.

An alternative approach would be to exempt noise generated by temporary military training where the noise arises from sites suitably remote from sensitive sites. It is believed NZ Defence are developing draft rules based on setback distances sufficient to ensure noise effects are reduced to negligible levels at sensitive receiver sites.

Recommendation:
Adopt a flexible approach to controlling noise generated by temporary military training by either ;

1. Noise from military training activities conducted on any site for not more than 72 hours within any six month

period are exempt from the permitted activity noise standards for each zone. Military training activities taking place on any site for longer time periods are required to comply with District Plan requirements for temporary activities; OR

2. Consider rules that permit noise generated by temporary military training where this noise is generated on sites sufficiently remote from sensitive receiver sites to ensure negligible effects on people and communities.

11.9 Traffic Noise

The operative District Plan focuses on ensuring the efficiency and safety of the transportation system. Rules in this section set out standards for parking, manoeuvring and loading vehicles, and for vehicle access. In addition, rules in the Transport chapter (14A) include "Standard 6 - Development within the State Highway and Railway Corridor Buffer Overlays" to manage potential reverse sensitivity effects from sensitive activities establishing near to the state highway or railway corridors. The district plan does not appear to place any requirements on road controlling authorities to assess or control noise from new or altered roads.

Noise from the existing network is best addressed as a Reverse Sensitivity issue within the District Plan, whereas noise from new or altered roads may be addressed using a relevant NZ Standard.

11.9.1 Noise From Existing roads

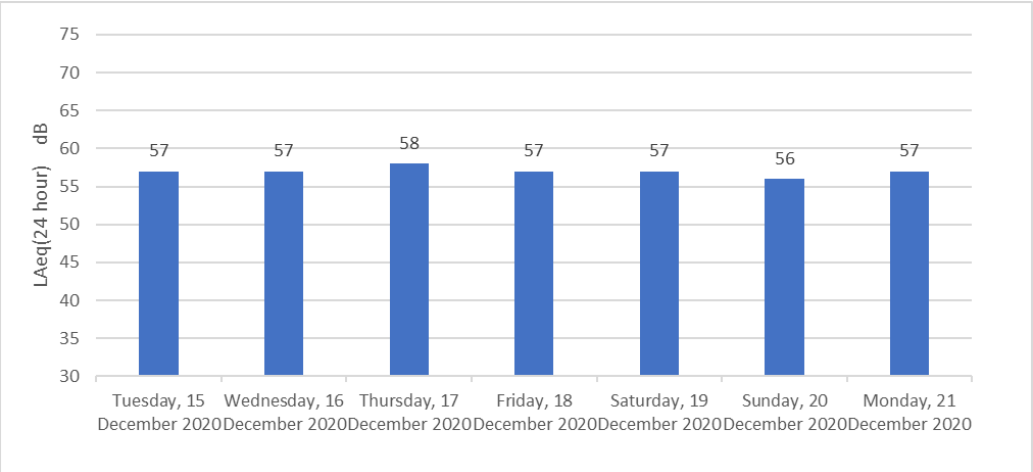
The operative plan sets out at Standard 6 of Chapter 14A methods to manage noise from the state highway which seeks to balance providing for a safe and efficient roading highway network with the need to provide for a reasonable quality of life and amenity values where noise sensitive land use activities establish near the highway.

Standard 6 requires that all new buildings containing noise sensitive activities, or existing buildings with new noise sensitive activities located within the 40-metre wide state highway 'Buffer Overlay' must be designed, constructed and maintained so that traffic noise within habitable rooms does not exceed 45dB LAeq(24h).

APPENDIX C (attached) sets out the results of 24 hour measurements taken at four sites as part of the RiverLink Project. These results have been made available to this review. Daily measured LAeq(24 hour) results are summarised for each site as follows;

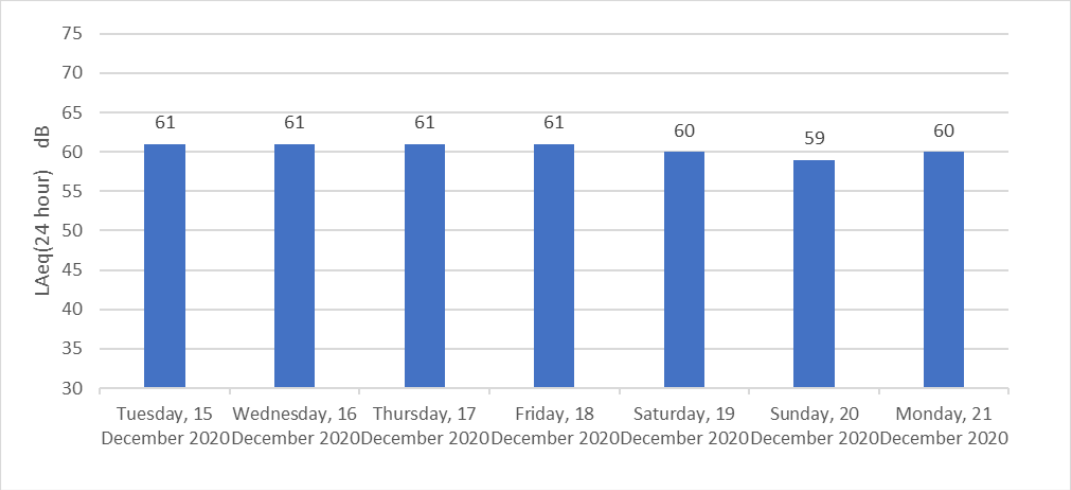
17 Tirohanga Road

40 metres From State Highway 2 (100 km/hr) **57 dB $L_{Aeq(24h)}$**



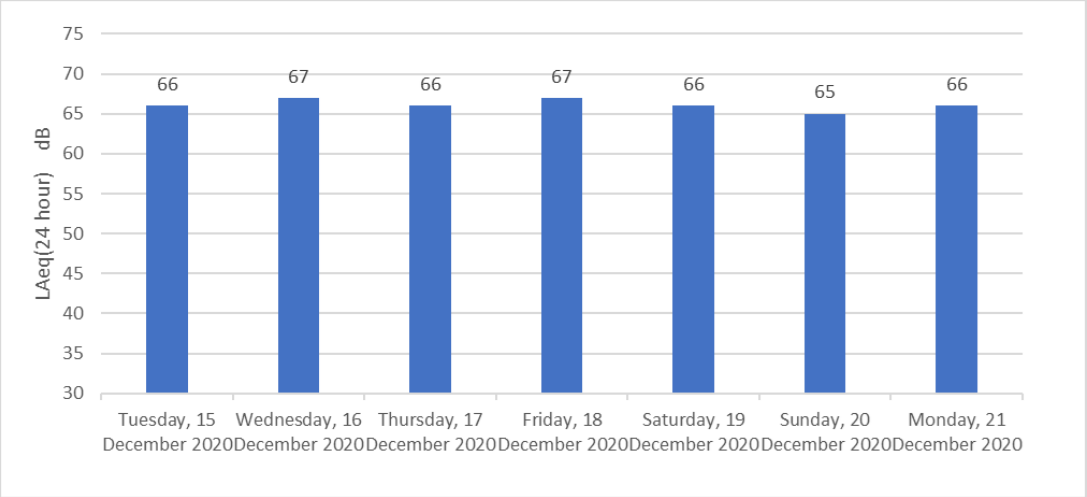
7 Harbour View Road

75 metres from State Highway 2 (100 km/hr) **61 dB $L_{Aeq(24h)}$**



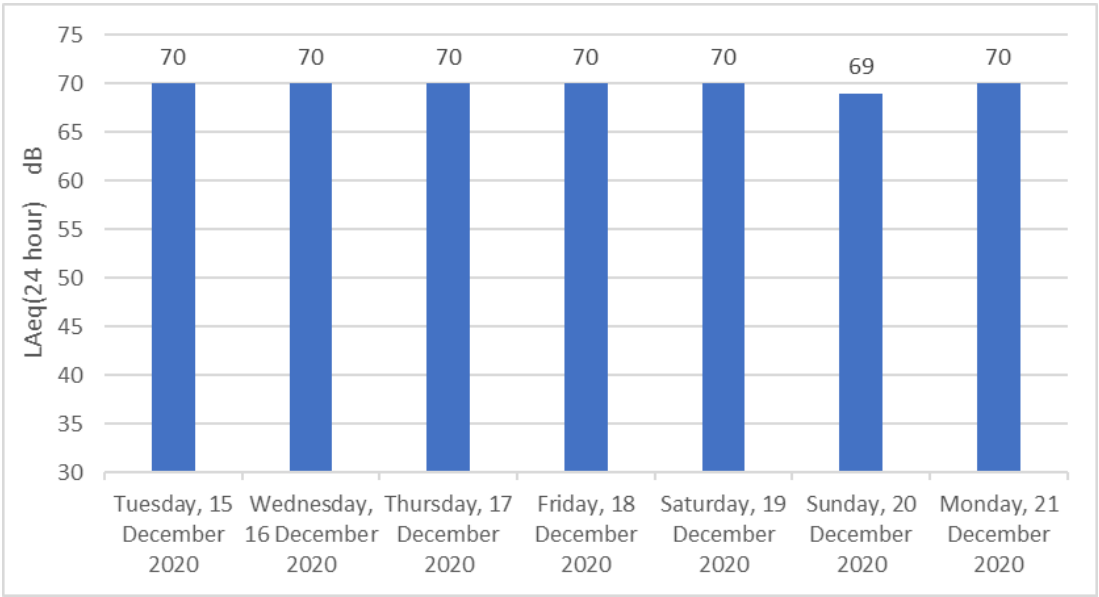
28 Rutherford Street

2 metres from Arterial Road **66 dB $L_{Aeq(24h)}$**



2 Pomare Road

30 metres from State Highway **70 dB $L_{Aeq(24h)}$**



The above results are summarised in the following table;

Address	Measured LAeq(24hr) dB	Location of Microphone	Shielded?	Barrier Effect (dB)	"True" Traffic Noise Level LAeq(24hr)
2 Pomare Road	70	38 metres From State Highway 2 (100 km/hr)	N	-	70
28 Rutherford Street	66	2 m from an arterial road (50 km/hr)	N	-	66
17 Tirohanga Road	57	40 metres From State Highway 2 (100 km/hr)	Y	10	67
7 Harbour View Road	61	3 metres to local street (50 km/hr) & 75 metres from State Highway 2 (100 km/hr)	Y	5	66

We have examined these traffic noise levels recently measured in the Hutt district. We have excluded the results measured at Harbourview Road as these noise levels were due to both traffic on a local street as well as the distant state highway. The remainder of the results indicate traffic noise levels measured within 40 metres of SH2 measure at or below 70 dB LAeq(24 hr).

Based on outdoor traffic noise levels measuring up to 70 dB LAeq(24 hr) within 40 metres of the state highway, the application of the proposal to insulate habitable rooms within the noise corridor to a achieve Dtr,2m, nTw >30 dB would result in an internal noise level of LAeq(24 hr) 40 dB. This is an acceptable indoor noise standard as, due to diurnal distribution of traffic flow, noise levels during the critical time period would measure 10 dB below the 24 hour average (i.e. 30 dB). It is noted that this outcome would be a 5 dB improvement compared to the 45 dBA indoor noise standard stipulated for habitable rooms located within the 40-metre wide State Highway and Railway Corridor Buffer Overlay under Chapter 14C – Appendix Standard 6.

Recommendation;
It is recommended that the proposed District Plan require any new or altered habitable room within buildings housing *Noise Sensitive Activities* that lie within 40 metres of a state highway designation boundary be insulated as per the recommendations of Section 11.5 above (achieve a minimum External Sound Insulation Level of the building envelope of Dtr,2m, nTw >30 dB) with an accompanying requirement for fresh air ventilation to be provided into the room. Certain exemptions to this requirement can justified as follows;

a. Where acoustic screening (such as provided by a solid barrier or fence) is present so that noise levels at the location of the building do not exceed LAeq(24 hour) 55 dB (measured outdoors) when assessed in accordance with NZS6806:2010. Council shall be provided with an acoustic design report by an appropriately experienced and qualified expert confirming this.
b. Where habitable rooms located further than 40 metres from the edge of the highway designation.

11.9.2 Noise From New & Altered Roads

We recommend implementing NZS 6806:2010 *Acoustics - Traffic Noise – Noise From New or Altered Roads* to manage traffic noise from new and altered roads. The Standard provides guidance and consistency on methods and criteria to measure, assess, and control the effects of noise from new or altered roads. The standard only applies to new and altered roads of scale such as state highways and are not recommended in the Standard to apply to low volume roads.

This Standard does not address noise from existing roads except in relation to situations where new or altered roading projects interact with existing roads

NZS 6806:2010 is recommended as it provides a framework for assessing when noise from new or altered roads should be mitigated, based on taking into account health issues associated with noise, the effects of noise on people and communities, and the potential benefits of new and altered roads to people and communities. NZS6806 is identified in the NZPS as the appropriate Standard for the assessment of noise from 'new or altered roads'

Recommendation:
Adopt *New Zealand Standard NZS6806:2010* for addressing noise from new and altered roads.

11.10 Noise From Rail Corridor

The Wairarapa Railway Line is a secondary railway line connecting Wellington with the Wairarapa district. The line ends at Woodville where it joins the Palmerston North - Gisborne Line.

The Wairarapa Line is a crucial part of the national rail network. There are possible reverse sensitivity issues regarding noise from rail traffic on the Wairarapa Line. It is important that the revised Plan recognise the importance of this key transport resource and ensure that its operation is not compromised through noise sensitive activities establishing in areas affected by high levels of rail noise.

Daily rail noise levels have also been recently measured at 3 sites in residential areas as part of the 2021 Ambient Noise Survey indicate moderate levels of noise measuring between LAeq(24 hr) 50 and 60 dB are experienced in residential areas alongside the Wairarapa Rail Line. Based on outdoor rail noise levels, it is recommended to require new or altered habitable rooms to be insulated within 40 metres of the rail corridor so that indoor sound levels in new habitable rooms are reduced by at least 30 dB (Dtr,2m, nTw > 30 dB), this is calculated to result in indoor rail noise levels of between LAeq(24 hr) 22 to 30 dB within treated rooms which is an acceptable level of indoor noise from rail transport.

The recommendation for the revised District Plan is to adopt an approach based on continuing the approach of operative District Plan for dealing with reverse sensitivity effects of rail noise.

Recommendation;

We recommend rules be developed that apply to new developments and new or altered habitable rooms within 40 metres of the Melling or Wairarapa rail corridor that require:

1. New or altered buildings housing noise sensitive activities shall achieve a minimum External Sound Insulation Level of Dtr,2m, nTw >30 dB of any habitable room within a building housing a Noise Sensitive activity.
2. An accompanying rule should be developed requiring fresh air ventilation be provided in the form of a positive supplementary source of fresh air ducted from outside for any bedroom or any room intended to be used for sleeping. The supplementary source of air should achieve a flow rate of a minimum of 7.5 litres per second per person based on normal room occupancy. The rule should stipulate sound due to operation of the ventilation system is not exceed 30dB LAeq(30s) when measured 1m away from any internal grille or diffuser.
3. The rule should be worded so that these requirements do not apply:
    a. Where an effective acoustic screen (such as a solid noise barrier fence) is in place so that noise levels at the location of the location of the new dwelling or building does not exceed LAeq(24 hour) 55 dB outdoors. In this case it would be appropriate for the rule to state that Council should be provided with an acoustic design report by an appropriately experienced and qualified expert to confirm this.
    b. For habitable rooms located further than 40 metres from the edge of the designation boundary or where the rail line does not yet exist.

11.11 Helicopter Landing Areas

NZS 6807:1994 *Helicopter Noise Management & Land Use Planning* provides guidance on control of noise from helicopter landing areas by way of Resource Consent or rules in District Plans under the RMA. The approach of NZS 6807:1994 is to assess helicopter noise on a 24 hour basis [using L_{dn}] with a separate consideration of the maximum levels due to any night time operations [using L_{AFmax}]. The standard allows for a relaxation of the limits by 5 dB where background sound levels [L_{95} under this standard] exceed threshold levels set in the standard, hence if this criteria is met a limit of 50 dB L_{dn} would be permitted to be relaxed by +5dB and becomes 55 dB $L_{dn.}$

NZS6807:1994 is recommended to be adopted within the revised plan as this Standard represents best practice for the control or noise from helicopter landing areas. NZPS recommends where this Standard is referred to within district plans for the control of noise from helicopter landing areas, the refence to this Standard exclude reference to section 4.3 (Averaging) of the Standard. With this proviso, NZS6807 is considered the most technically appropriate standard for the assessment of noise from helicopter landing areas affecting sites on which noise sensitive activities are established.

Recommendation:
In rural areas, establishing helicopter landing areas can lead to rural efficiencies and safety benefits. For non-noise reasons, it may be appropriate to provide at some level for helicopter landing areas in the rural zone, however that question is beyond the scope of this review.

If helicopter noise provisions are included in the proposed District Plan they should refer to NZS 6807:1994 *Helicopter Noise Management & Land Use Planning.* It may be appropriate to provide for landing sites as controlled activities provided they are able to demonstrate compliance with, and will be controlled to comply with, the noise criteria set out within NZS 6807:1994 which are considered reasonable and workable.

Any rules referring to the use of NZS 6807:1994 *Helicopter Noise Management & Land Use Planning* should specifically make reference to excluding the provisions of Clause 4.3 Averaging.

11.12 Wind Farm Noise

NZS 6808:2010 Acoustics Wind Farm Noise was developed specifically for the measurement and assessment of sound from wind turbine generators and wind farms in New Zealand conditions. NZS 6808 provides details on prediction, measurement and assessment with the stated purpose being to aid both wind farm development and Local Authority planning procedures by providing a suitable method for the measurement and assessment of sound from wind turbine generators.

The standard includes Wind Turbine Generators located on land or sea [both horizontal and vertical]. The standard does not cover small wind turbines less than this size as these are covered under NZS 6801 and NZS 6802.

NZS6808 is the most current and technically appropriate standard for the assessment of wind turbine generator and wind farm noise. The use of this Standard is consistent with the NZPS where district plan set out to manage the noise effects of wind turbine or wind farms. It should be noted, this Standard would not be appropriate to apply to noise from small scale domestic turbines. Small scale domestic installations fall within the scope of NZS 6801 and NZS 6802.

Recommendation:
Adopt reference to NZS 6808:2010 *Acoustics – Wind Farm Noise*

11.13 Temporary Events Noise

Temporary activities or events frequently occur within public open space [reserves], road reserves, and at community facilities such as churches, schools, or community halls. Examples include competitions, festivals, galas, carnivals, market days, entertainment events, promotional events, and other events of similar nature. These events are open to the public to attend.

In some cases, these events may have effects on the surrounding environment such as noise, light, structures, parking, road closures, and may last for more than one day. Temporary activities or events may require the construction of structures to facilitate the activities which may have effects on the amenity values of the surrounding environment.

The operative District Plan deals with noise from “temporary activities” in Rule 14J 2.1.1 “Permitted Activities - Conditions for temporary activities in all activity areas” and requires that a noise limit of LA10 70 dB be complied with “within any other site in a Residential Activity Area and at any point within the notional boundary of any

dwelling in a Rural Activity Area" as well as at the boundary of any Commercial or Business Activity Area site other than the site of the temporary activity.

We recommend this type of reasonably liberal approach be taken to controlling temporary noise effects of Temporary Activities on the basis that the community can generally tolerate elevated noise levels. A key proviso is to limit the extent of noise from temporary activities during the more sensitive night time period from 10pm through the 7am.

Recommendation:
It is recommended a permitted activity standard apply to Temporary Events that allows elevated noise to occur for limited daytime, perhaps similar to the existing operative Plan provisions of noise from "temporary activities" in Rule 14J 2.1.1 but adapted to use the LAeq noise unit and refer to the 2008 versions of NZS6801 and NZS6802.

11.14 Telecommunications Equipment

Telecommunications systems consist of a core network for carrying signals between locations, and access networks linking the core to individual users and customers. As noted above a National Environmental Standard [NES] has been approved by the government to assist in the implementation of its telecommunication objectives. The NES includes controls over noise from telecommunications cabinets located in road reserves. This NES has been recommended to be included within the revised District Plan to ensure consistent standards are applied to these fixtures. Pursuant to s43B of the Resource Management Act 1991, no rule or resource consent shall be more stringent than the national environmental standards for telecommunications facilities.

It is mandatory to adopt the form of the noise rule consistent with the NES for telecommunications equipment within the proposed District Plan.

Recommendation:
Noise from telecommunications cabinets located in road reserves shall be a permitted activity provided that the noise emission levels comply with Clause 9 of the Resource Management [National Environmental Standards for Telecommunication Facilities] Regulations 2008**.**

12 Summary

The existing noise provisions of the operative Hutt City District Plan have been reviewed in light of the relevant noise Standards, published reports and based ambient sound level readings taken in the district in recent times. The aim has been to revise the existing District Plan noise provisions in a manner that supports rather than undermines the District's social, economic and environmental vision, and to enhance long term sustainability.

The key enhancements are the adoption of the more recent New Zealand Standards and enhancement of the existing District Plan noise provisions to cover the following additional matters;

- Clarify the definition of "Noise Sensitive Activities" to encompass a wider range of activities that are sensitive to the effects of noise.
- Standardise and where practical, simplify the specification of acoustic insulation of new or altered habitable rooms housing noise sensitive activities. In particular, unify wording of rules requiring acoustic insulation of habitable rooms in areas moderately to highly affected by noise due to transportation sources and/or land use activities.
- Improving acoustic insulation provisions within areas currently defined within *State Highway and Railway Corridor Buffer Overlays.*
- Enhance policies and rules around using 'discernible vibration' as a means of controlling potential effects

occurring on adjacent sites.

- Incorporating methods to deal with noise from new or altered roads, wind farms, helicopter landing areas
- Update the rules applying to noise from Temporary Events
- Ensure the NPS Standards for nosie are complied with, including NZ Standards referenced and definitions employed in the proposed District Plan.
- Add noise controls for Telecommunications Equipment as required by statute.

Implementing the above recommendations within provisions of the proposed District Plan will enhance the protection of the environmental, social, economic and cultural wellbeing of present and future generations living in Lower Hutt.

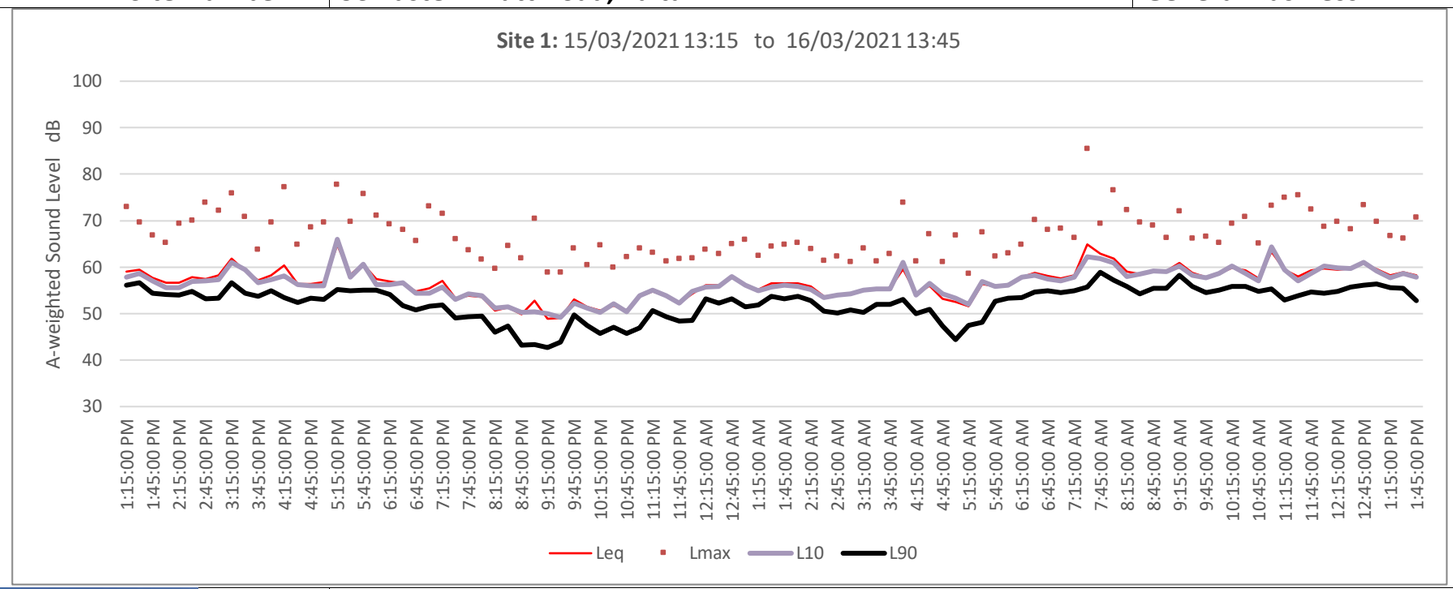
Malcolm Hunt
B.Sc., M.Eng(mech)
RSH Dip. Public Health, RSH Dip. Noise Control

APPENDIX A

2021 Ambient Noise Survey

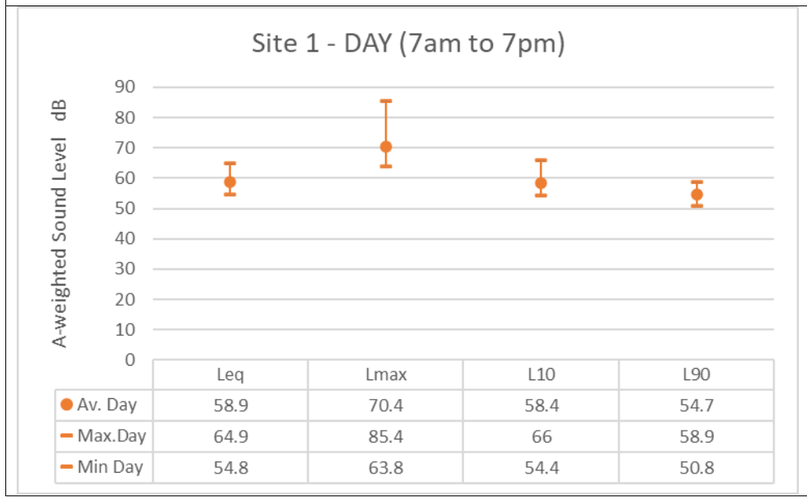
Site Readings and Summary Results

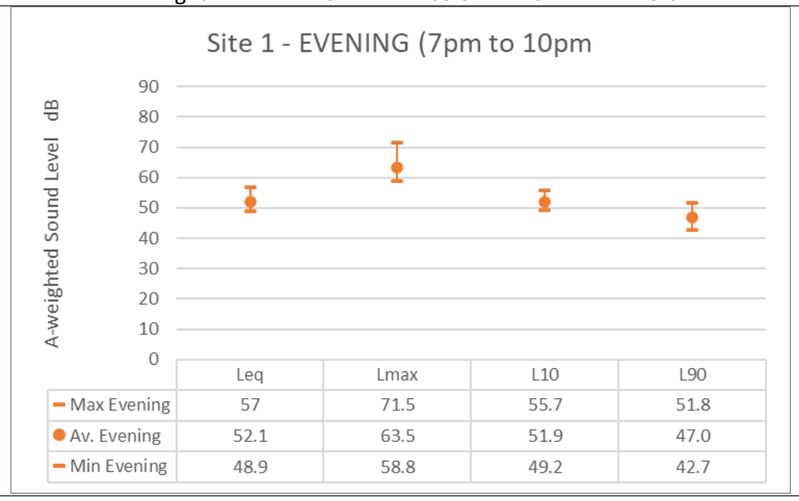
Site Number: 1	93 Eastern Hutt Road, Taita	General Business

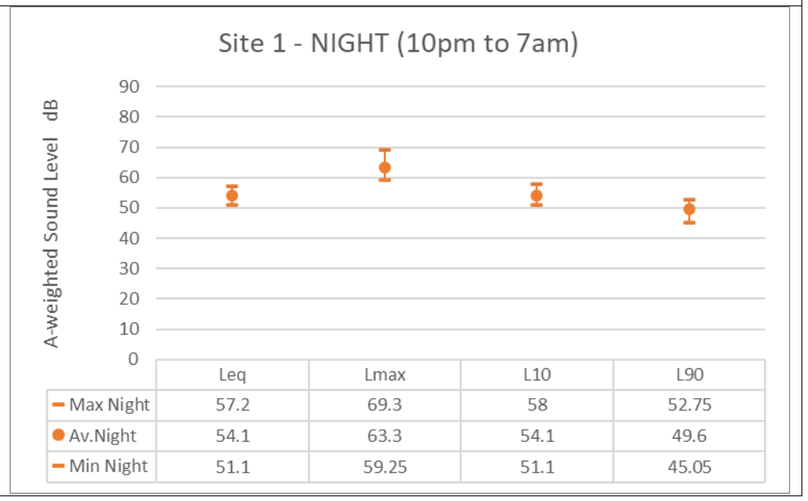


Summary Stats:

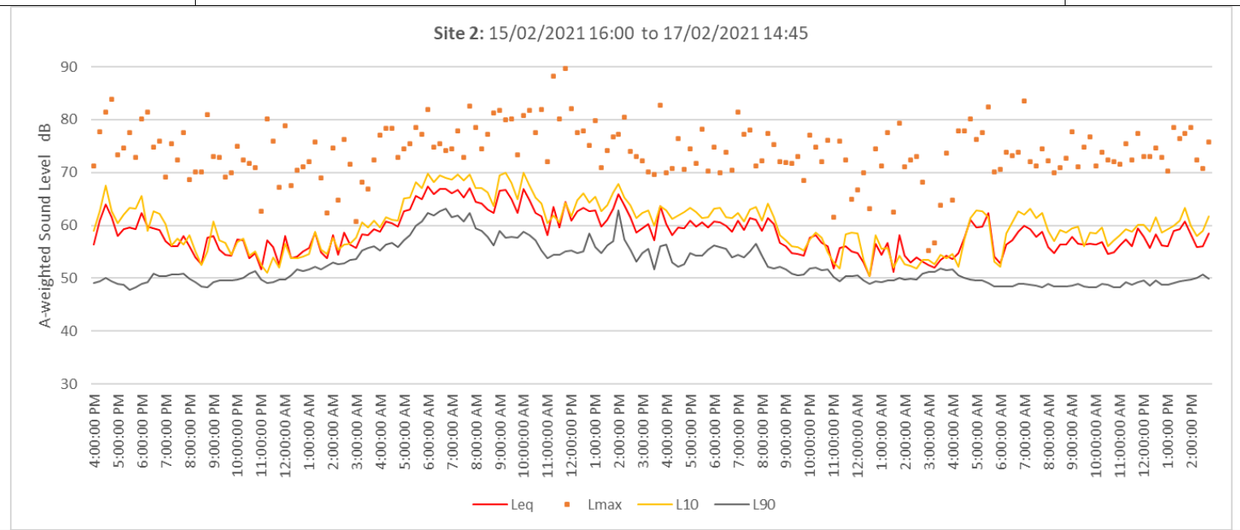
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	64.9	85.4	66	58.9
	Min Day	54.8	63.8	54.4	50.8
	Av. Day	58.9	70.4	58.4	54.7
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	57	71.5	55.7	51.8
	Min Evening	48.9	58.8	49.2	42.7
	Av. Evening	52.1	63.5	51.9	47.0
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	57.2	69.3	58	52.75
	Min Night	51.1	59.25	51.1	45.05
	Av.Night	54.1	63.3	54.1	49.6





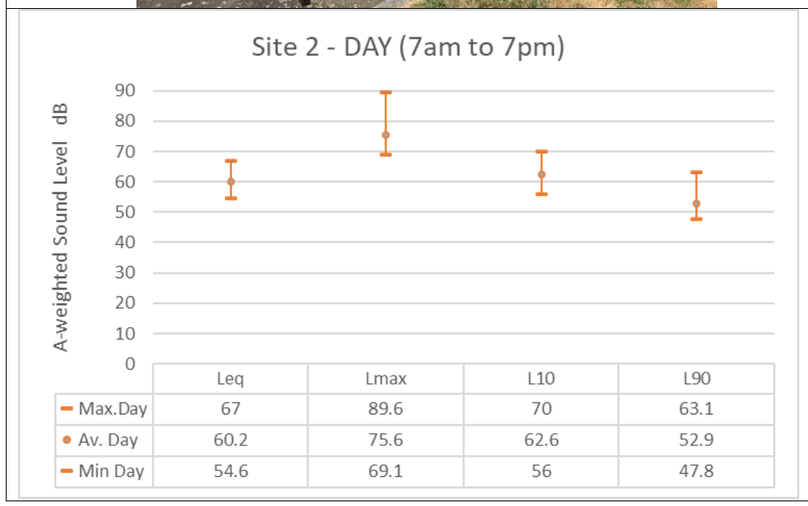


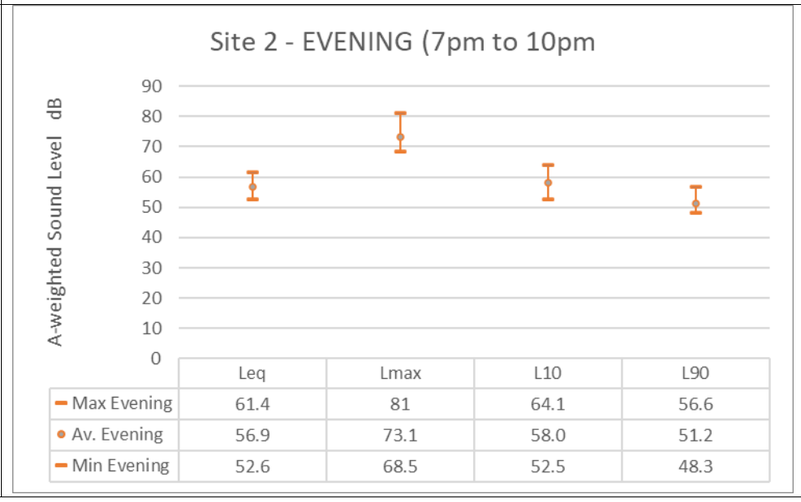
Site Number: 2	14 Marine Parade, Petone	General Business

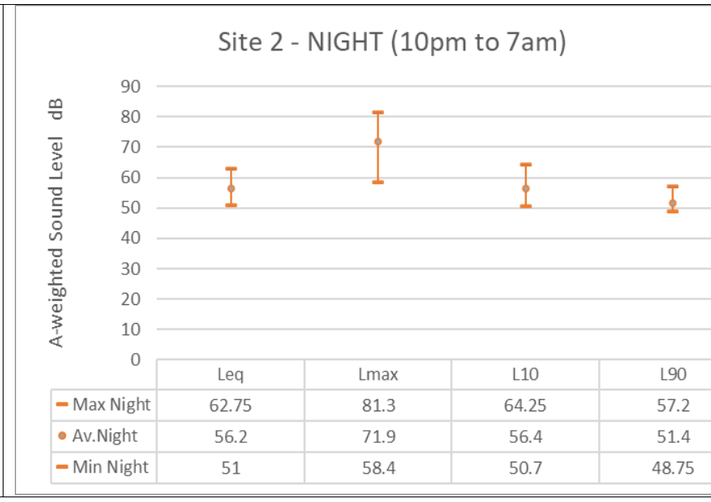


Summary Stats:

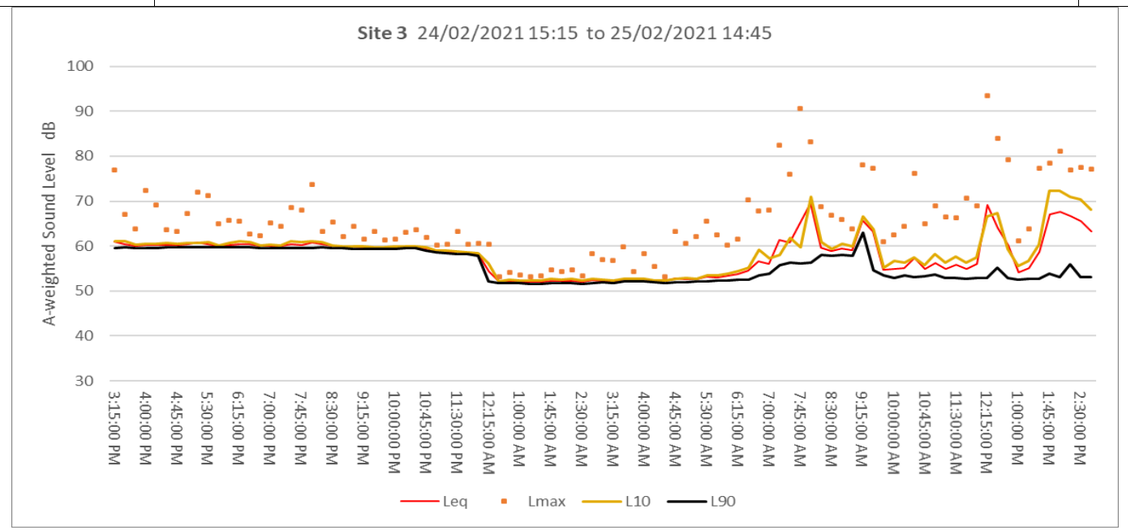
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	67	89.6	70	63.1
	Min Day	54.6	69.1	56	47.8
	Av. Day	**60.2**	**75.6**	**62.6**	**52.9**
EVENING	Max Evening	61.4	81	64.1	56.6
	Min Evening	52.6	68.5	52.5	48.3
	Av. Evening	**56.9**	**73.1**	**58.0**	**51.2**
NIGHT	Max Night	62.75	81.3	64.25	57.2
	Min Night	51	58.4	50.7	48.75
	Av.Night	**56.2**	**71.9**	**56.4**	**51.4**





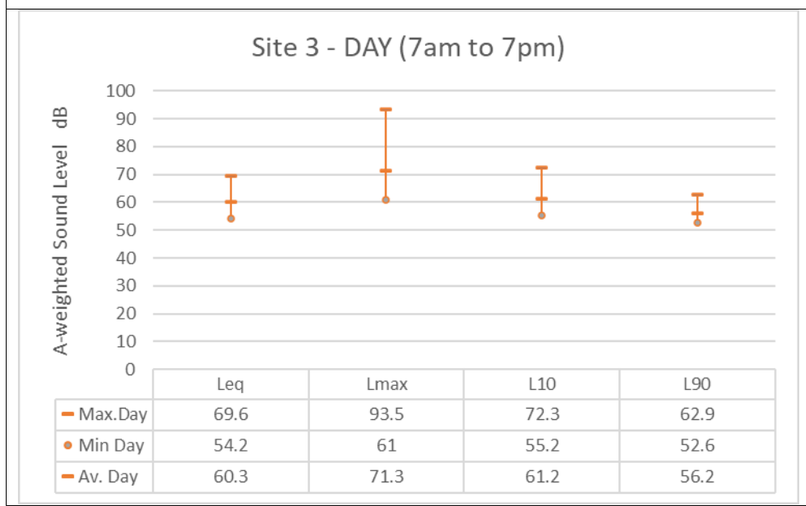


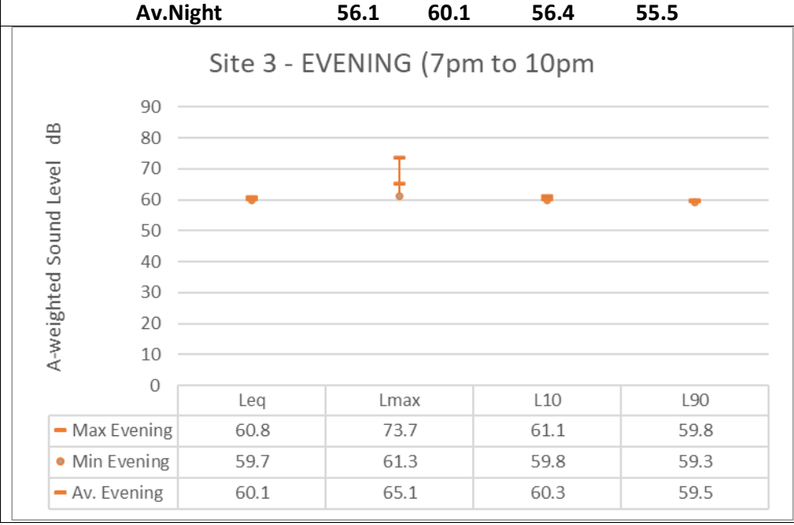
Site Number: 3	17 Wareham Place, Seaview (wastewater Treatment Plant)	Special Business

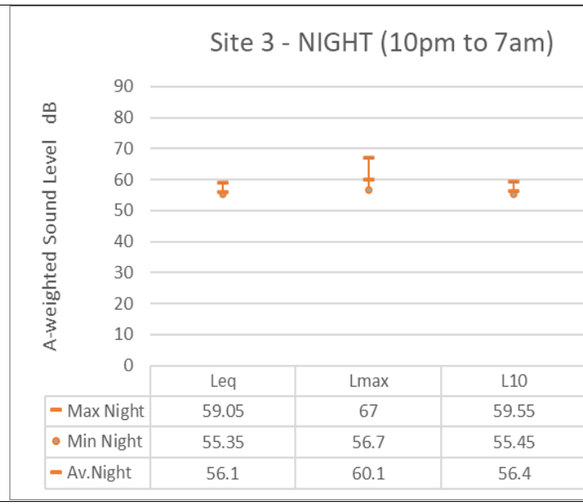


Summary Stats:

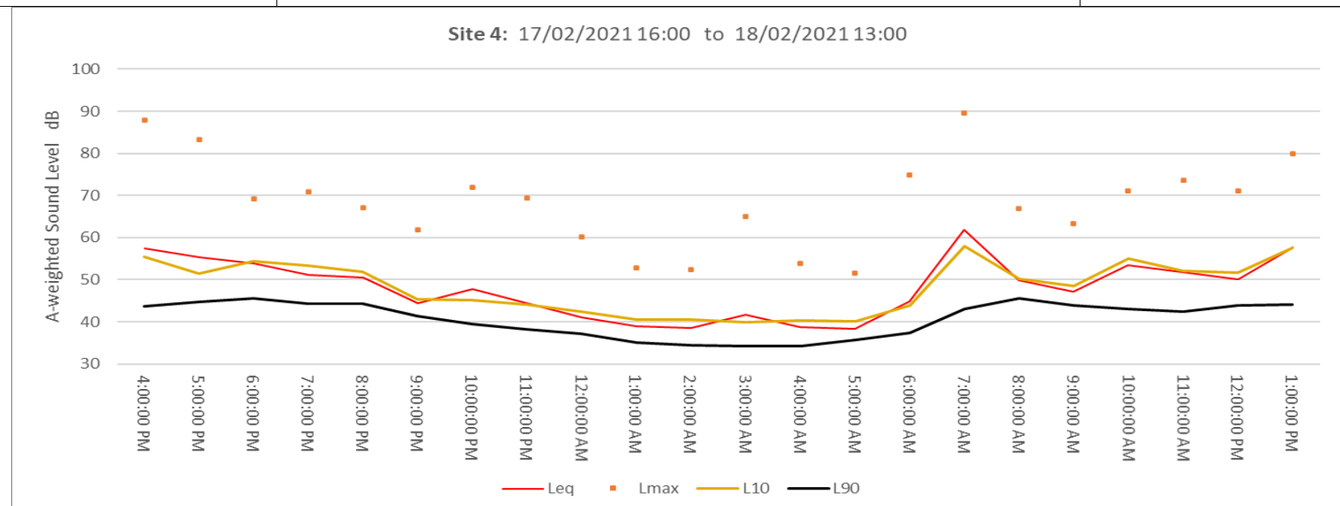
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	69.6	93.5	72.3	62.9
	Min Day	54.2	61	55.2	52.6
	Av. Day	**60.3**	**71.3**	**61.2**	**56.2**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	60.8	73.7	61.1	59.8
	Min Evening	59.7	61.3	59.8	59.3
	Av. Evening	**60.1**	**65.1**	**60.3**	**59.5**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	59.05	67	59.55	58.65
	Min Night	55.35	56.7	55.45	54.95
	Av.Night	**56.1**	**60.1**	**56.4**	**55.5**





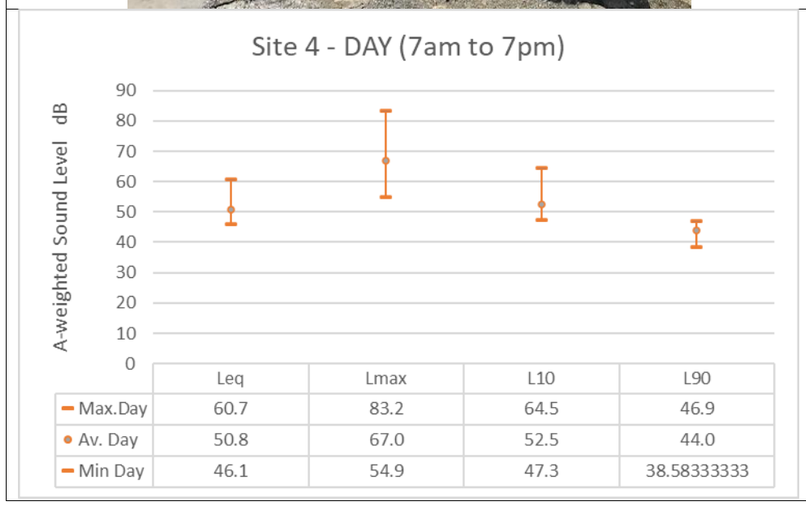


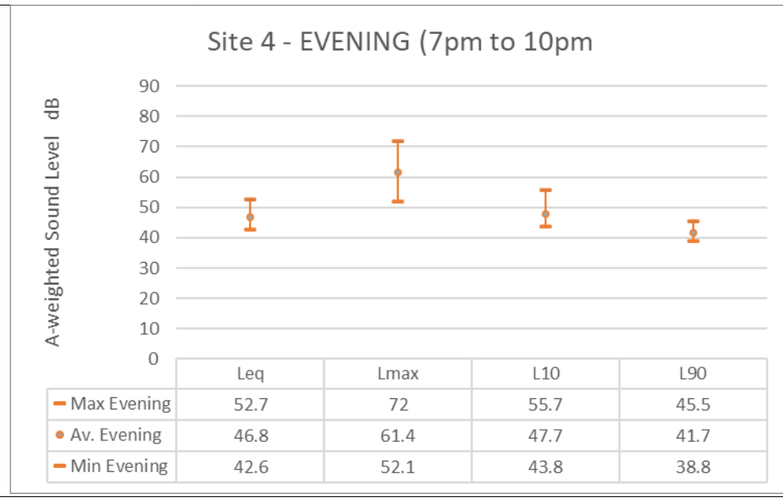
Site Number: 4	794 High Street Boulcott, (Brewery)	Suburban Mixed

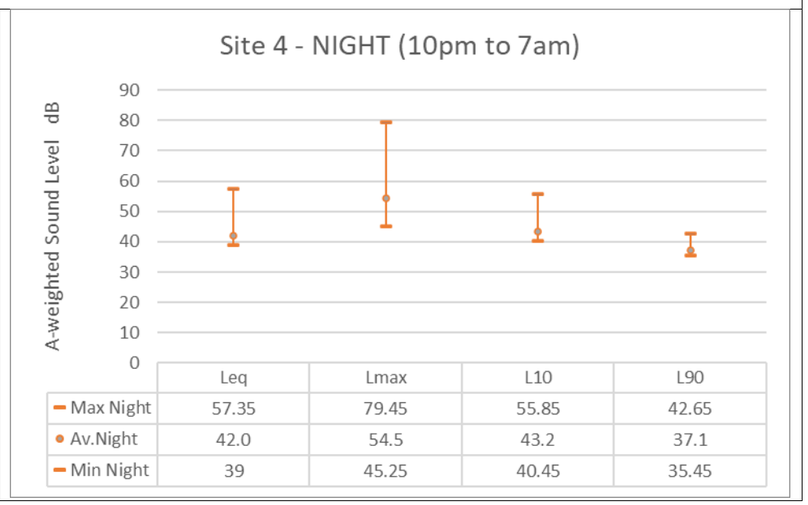


Summary Stats:

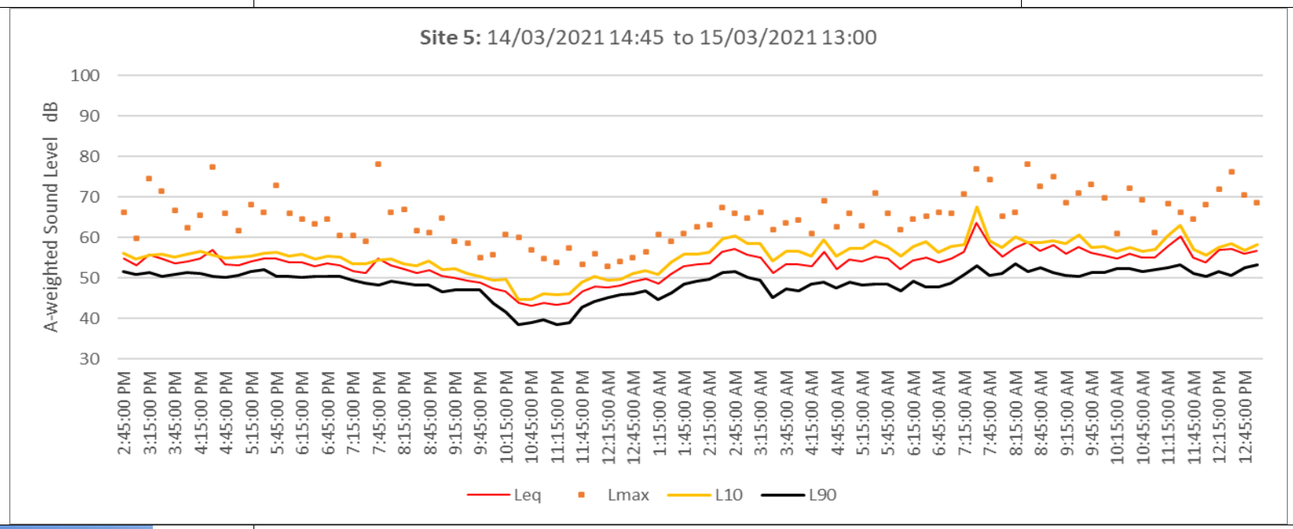
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	60.7	83.2	64.5	46.9
	Min Day	46.1	54.9	47.3	38.5
	Av. Day	**50.8**	**67.0**	**52.5**	**44.0**
EVENING	Max Evening	52.7	72	55.7	45.5
	Min Evening	42.6	52.1	43.8	38.8
	Av. Evening	**46.8**	**61.4**	**47.7**	**41.7**
NIGHT	Max Night	57.4	79.5	55.9	42.7
	Min Night	39.0	45.3	40.5	35.5
	Av.Night	**42.0**	**54.5**	**43.2**	**37.1**





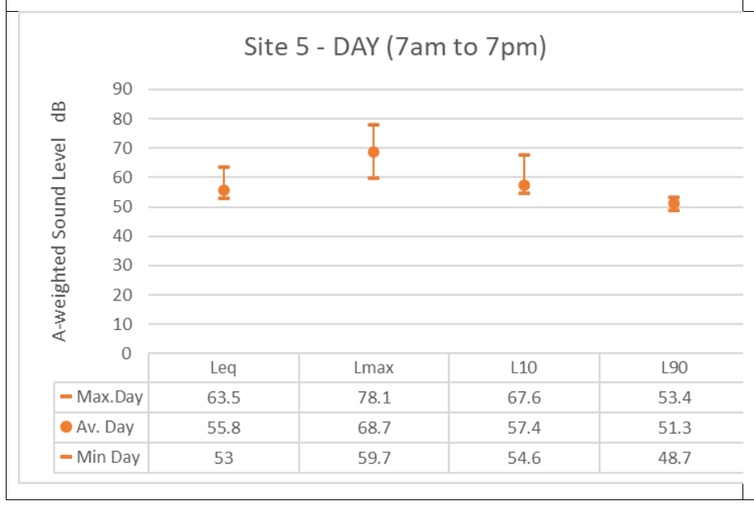


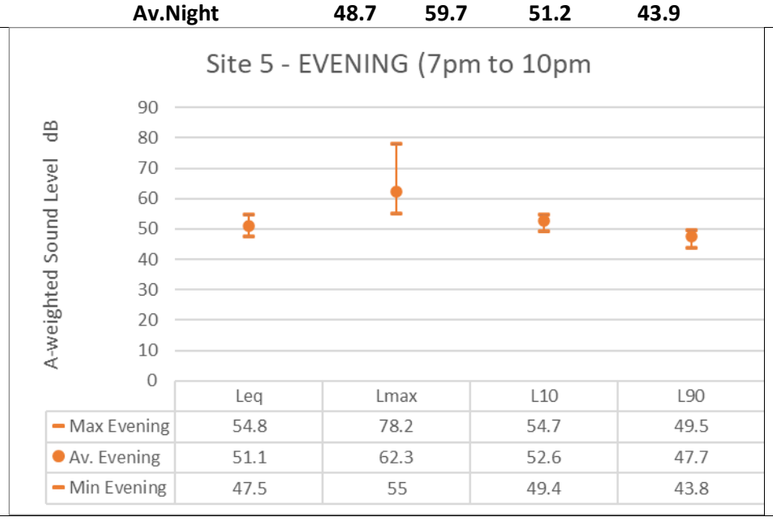
Site Number: 5	21 Rimu Street Eastbourne	Suburban Mixed

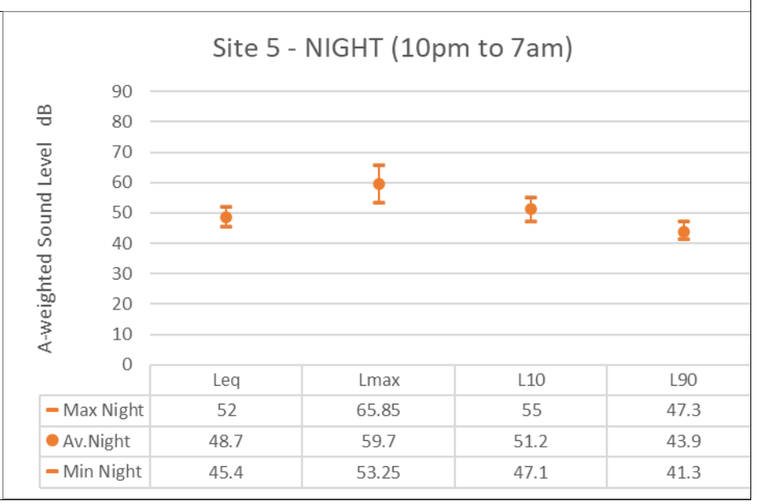


Summary Stats:

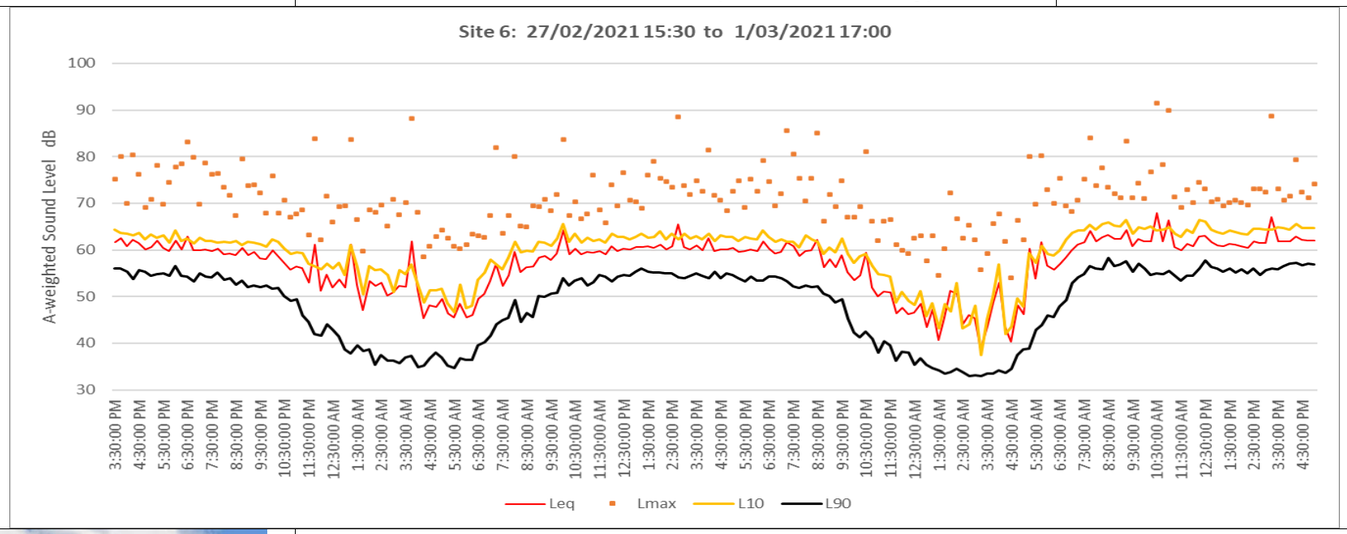
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	63.5	78.1	67.6	53.4
	Min Day	53	59.7	54.6	48.7
	Av. Day	**55.8**	**68.7**	**57.4**	**51.3**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	54.8	78.2	54.7	49.5
	Min Evening	47.5	55	49.4	43.8
	Av. Evening	**51.1**	**62.3**	**52.6**	**47.7**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	52	65.8	55	47.3
	Min Night	45.4	53.25	47.1	41.3
	Av.Night	**48.7**	**59.7**	**51.2**	**43.9**





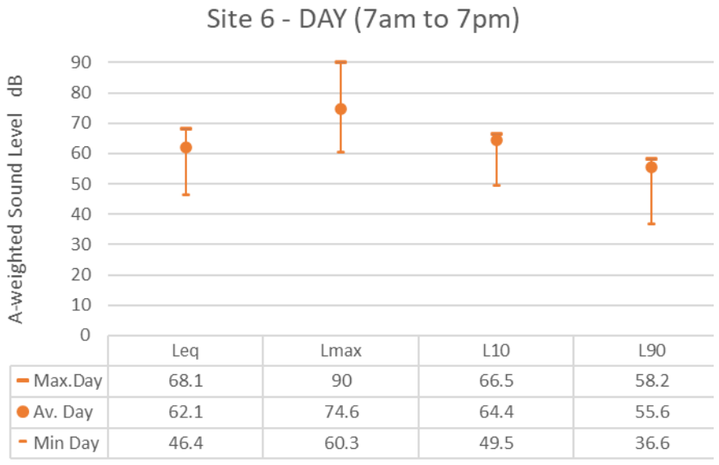


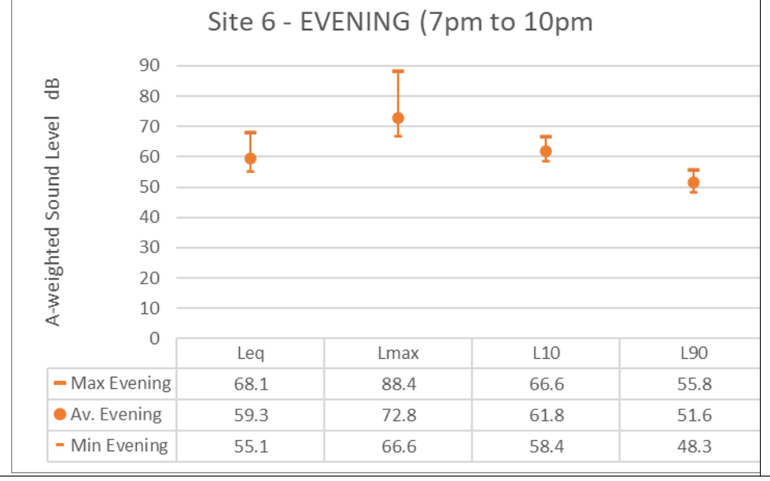
Site Number: 6	362-364 Jackson Street, Petone (Ist floor balcony)	Petone Commercial

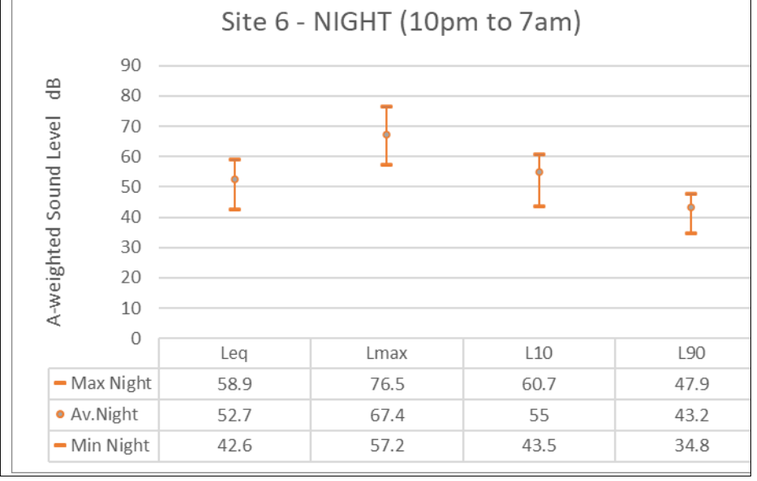


Summary Stats:

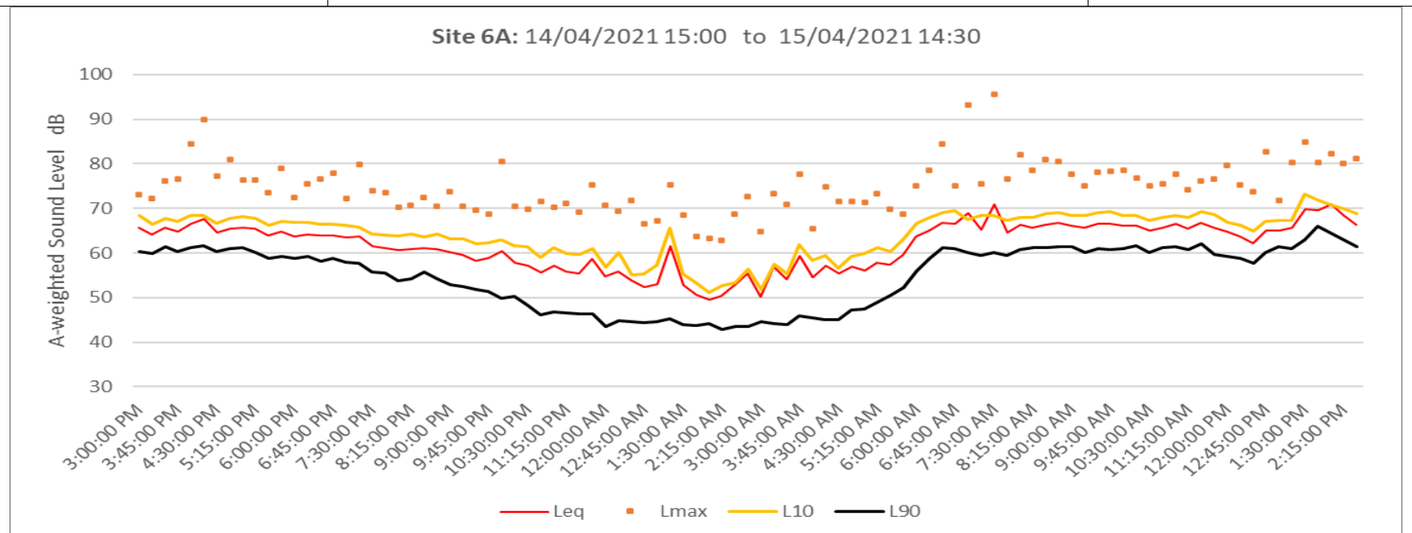
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	68.1	90	66.5	58.2
	Min Day	46.4	60.3	49.5	36.6
	Av. Day	62.1	74.6	64.4	55.6
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	68.1	88.4	66.6	55.8
	Min Evening	55.1	66.6	58.4	48.3
	Av. Evening	59.3	72.8	61.8	51.6
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	58.9	76.5	60.7	47.9
	Min Night	42.6	57.2	43.5	34.8
	Av.Night	52.7	67.4	55	43.2





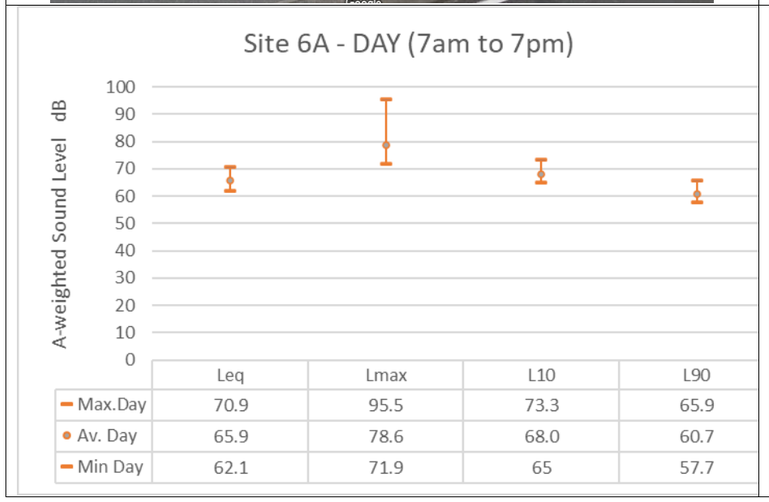


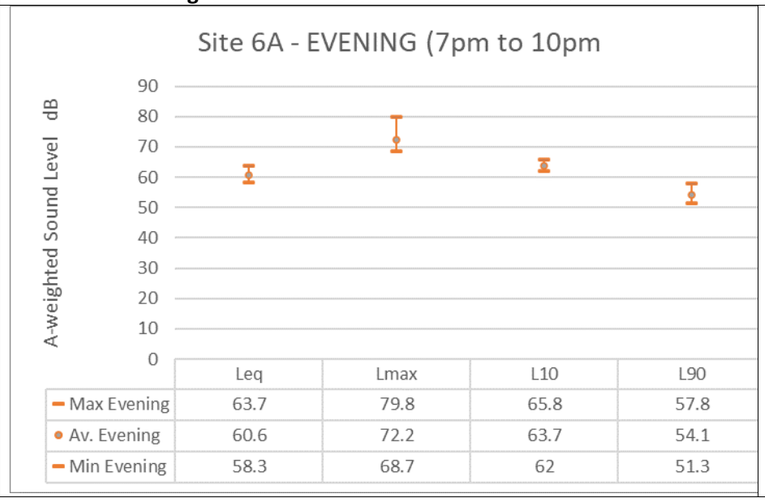
Site Number: 6A	Level 1, 1 Jackson Street Petone (1st floor deck)	Petone Commercial

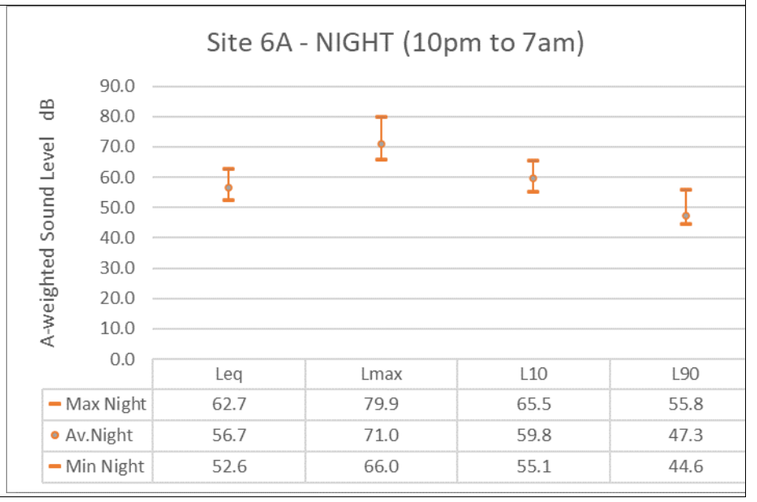


Summary Stats:

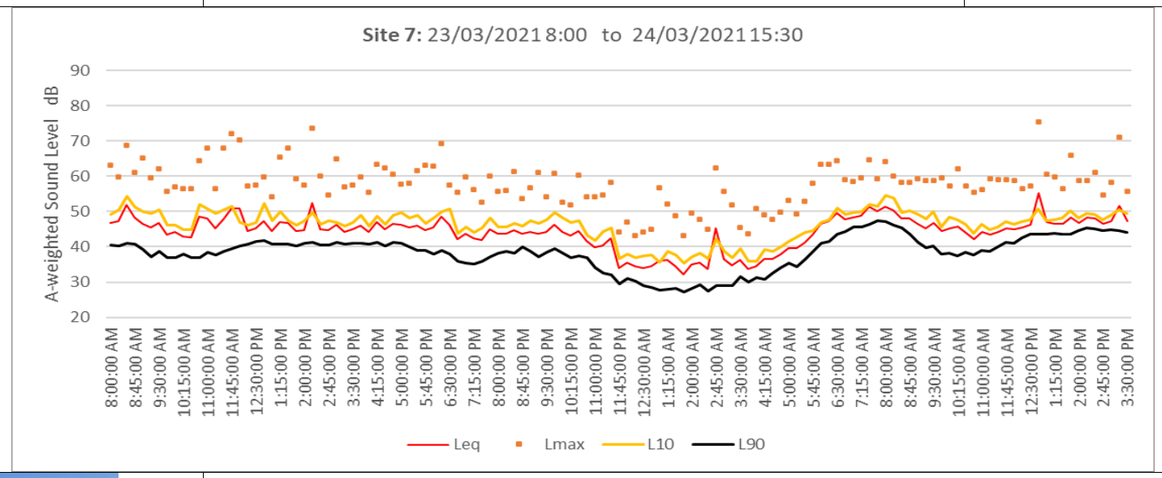
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	70.9	95.5	73.3	65.9
	Min Day	62.1	71.9	65	57.7
	Av. Day	**65.9**	**78.6**	**68.0**	**60.7**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	63.7	79.8	65.8	57.8
	Min Evening	58.3	68.7	62	51.3
	Av. Evening	**60.6**	**72.2**	**63.7**	**54.1**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	62.7	79.9	65.5	55.8
	Min Night	52.6	66.0	55.1	44.6
	Av.Night	**56.7**	**71.0**	**59.8**	**47.3**





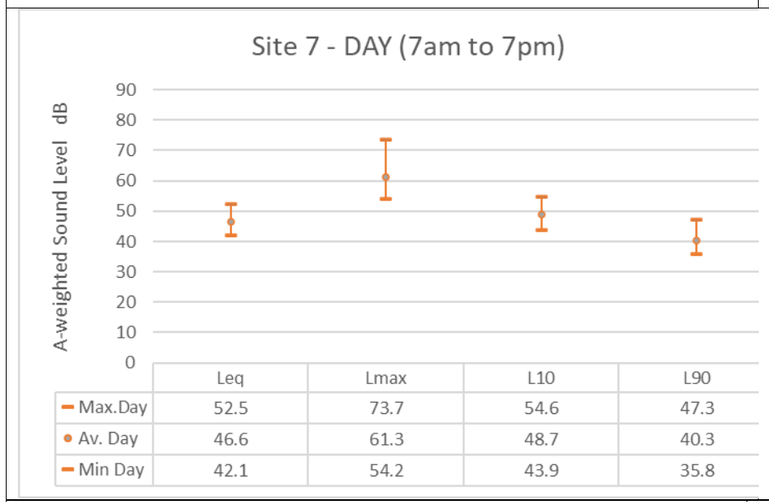


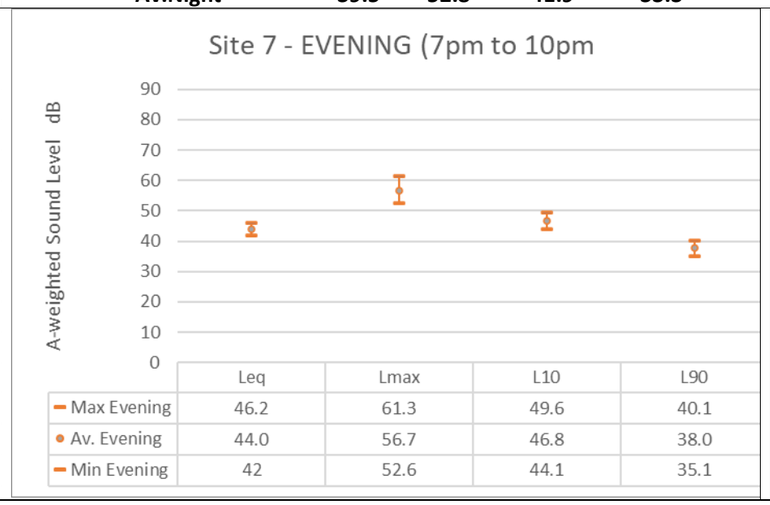
Site Number: 7	4-6 Heretaunga Street, Petone	Medium Density

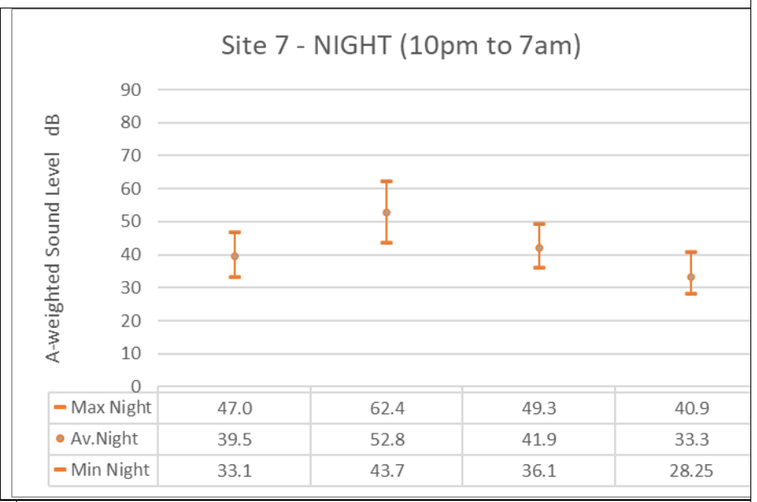


Summary Stats:

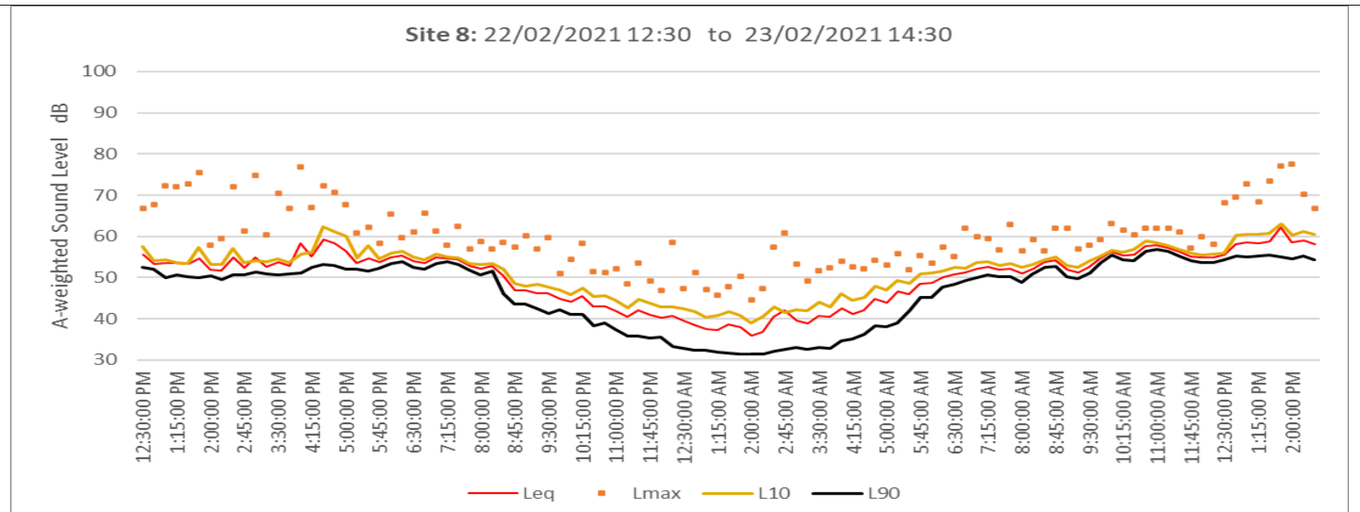
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	52.5	73.7	54.6	47.3
	Min Day	42.1	54.2	43.9	35.8
	Av. Day	**46.6**	**61.3**	**48.7**	**40.3**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	46.2	61.3	49.6	40.1
	Min Evening	42	52.6	44.1	35.1
	Av. Evening	**44.0**	**56.7**	**46.8**	**38.0**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	47.0	62.4	49.3	40.9
	Min Night	33.1	43.7	36.1	28.2
	Av.Night	**39.5**	**52.8**	**41.9**	**33.3**





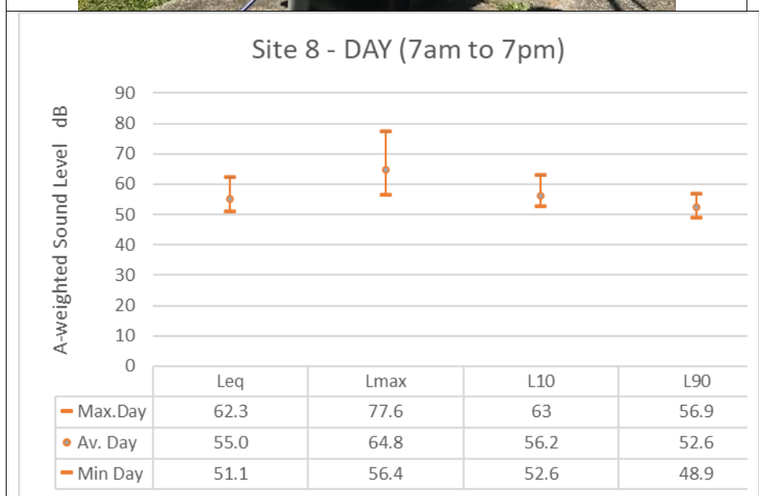


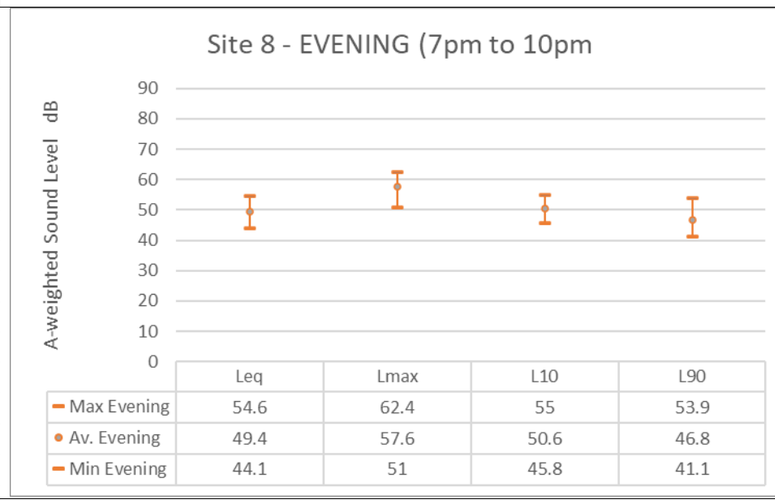
Site Number: 8	63 Hay Street Naenae	General Residential

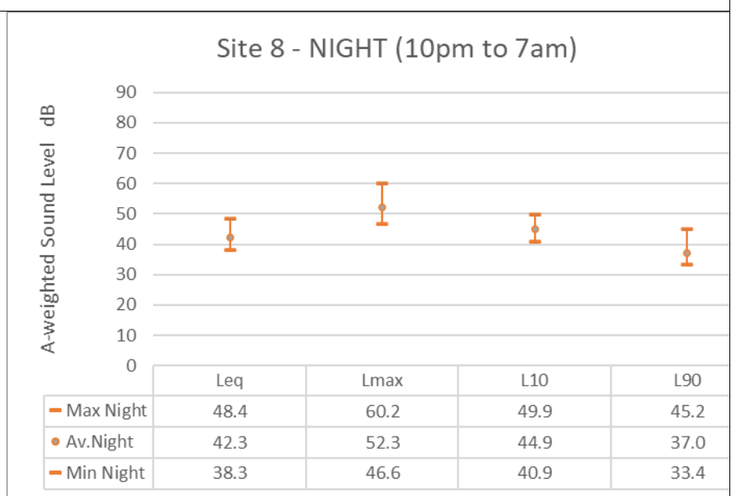


Summary Stats:

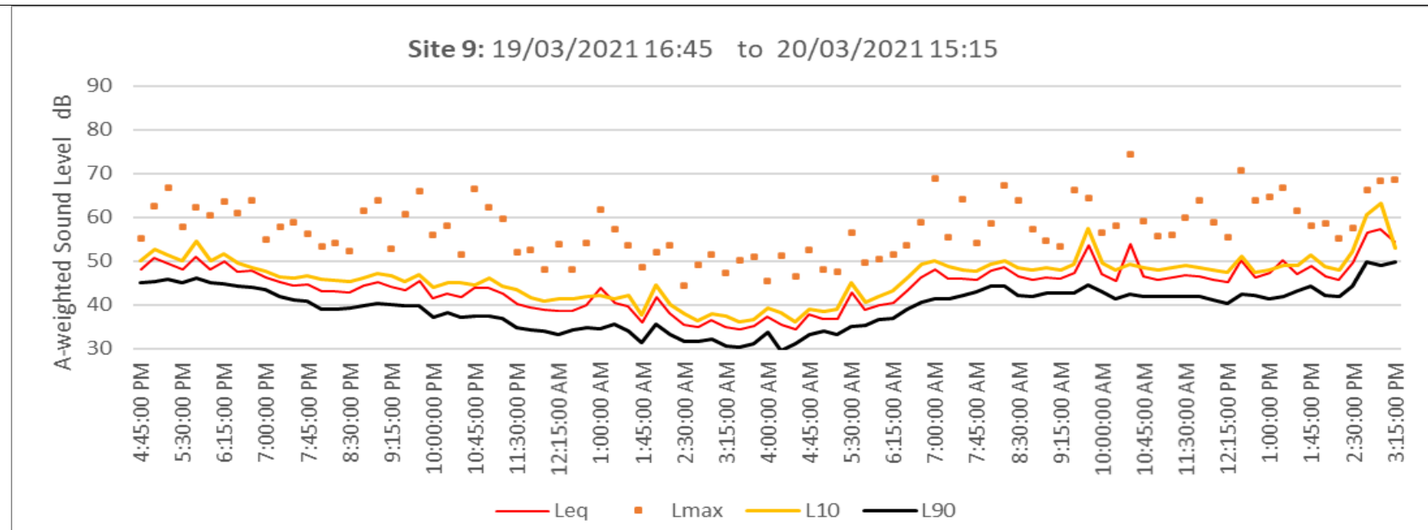
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	62.3	77.6	63	56.9
	Min Day	51.1	56.4	52.6	48.9
	Av. Day	**55.0**	**64.8**	**56.2**	**52.6**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	54.6	62.4	55	53.9
	Min Evening	44.1	51	45.8	41.1
	Av. Evening	**49.4**	**57.6**	**50.6**	**46.8**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	48.4	60.2	49.9	45.2
	Min Night	38.3	46.6	40.9	33.4
	Av.Night	**42.3**	**52.3**	**44.9**	**37.0**

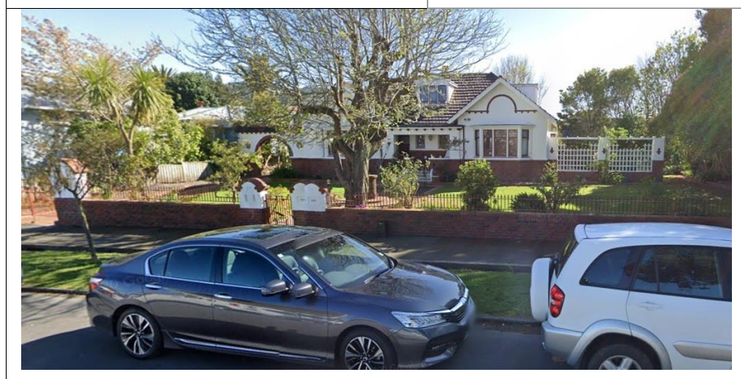






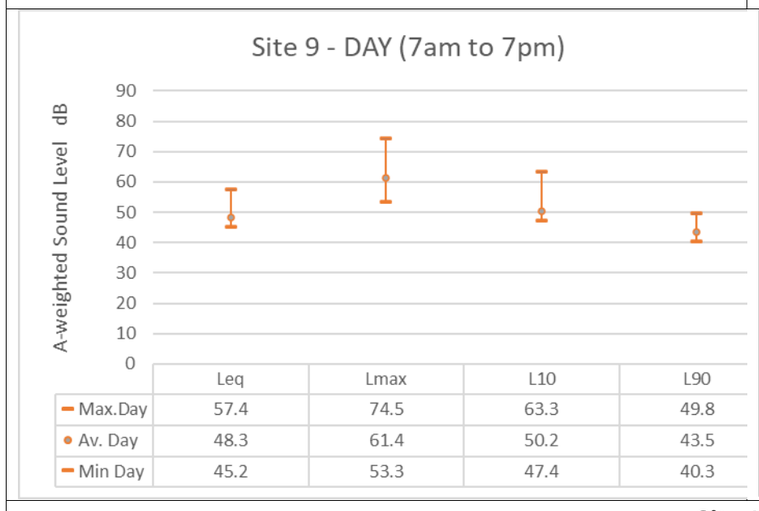
Site Number: 9 | **57 Queens Grove, CBD** | **General Residential**

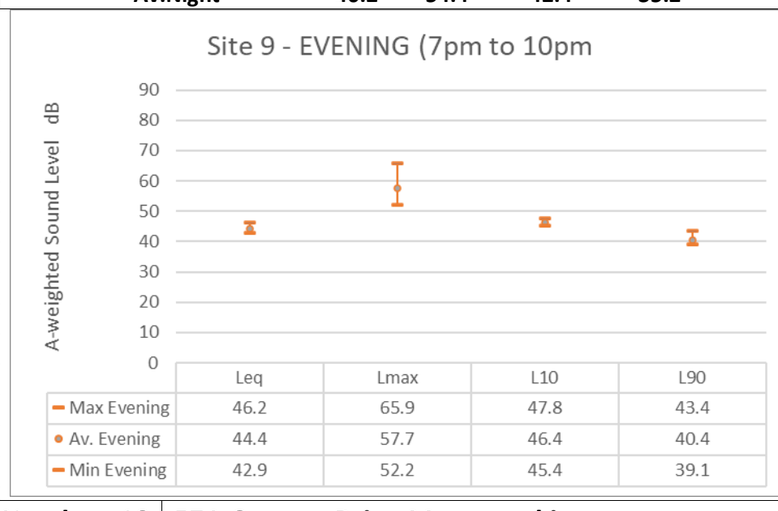


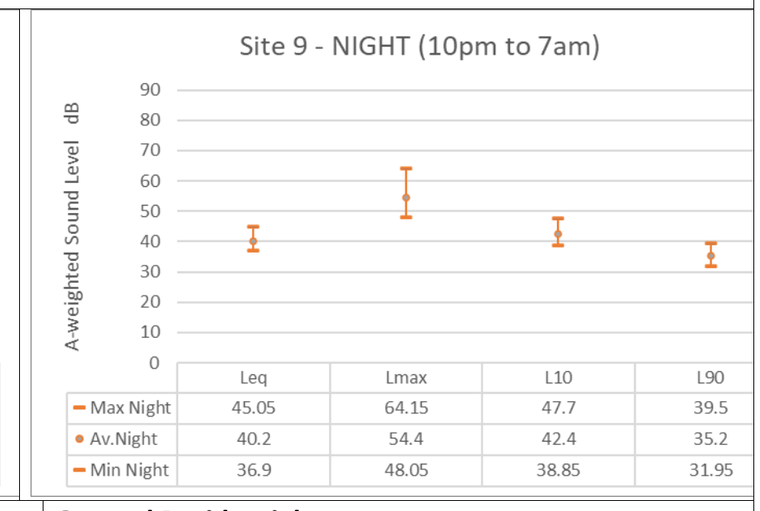


Summary Stats:

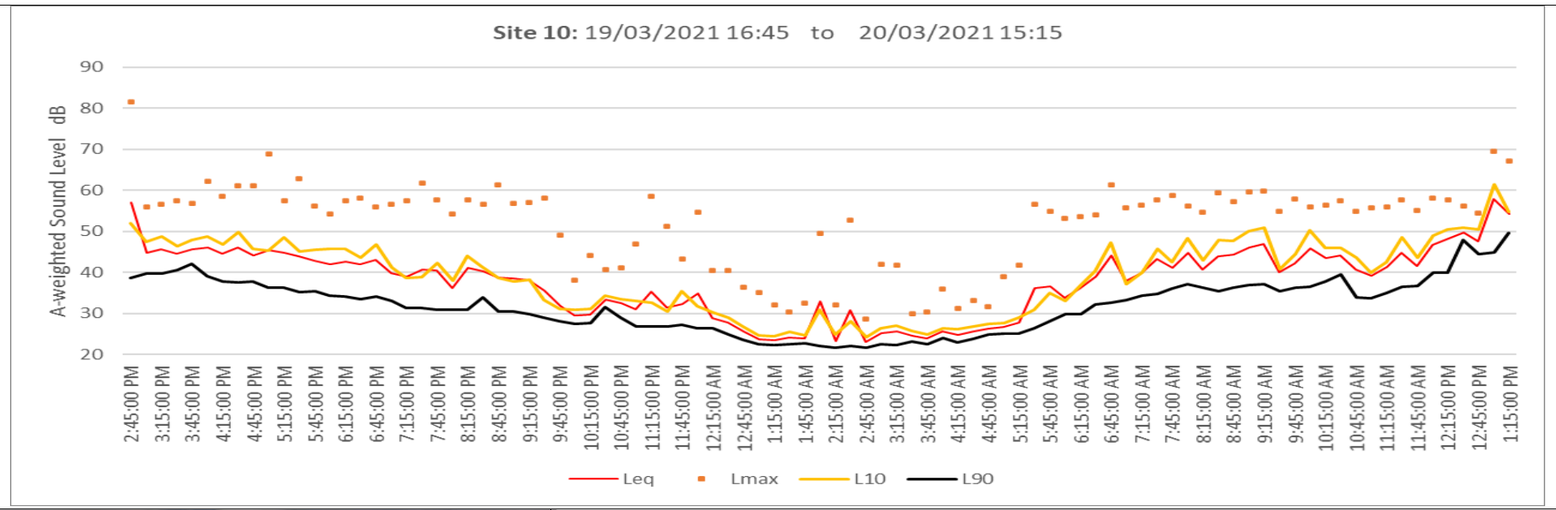
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	57.4	74.5	63.3	49.8
	Min Day	45.2	53.3	47.4	40.3
	Av. Day	**48.3**	**61.4**	**50.2**	**43.5**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	46.2	65.9	47.8	43.4
	Min Evening	42.9	52.2	45.4	39.1
	Av. Evening	**44.4**	**57.7**	**46.4**	**40.4**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	45.05	64.15	47.7	39.5
	Min Night	36.9	48.05	38.85	31.95
	Av.Night	**40.2**	**54.4**	**42.4**	**35.2**





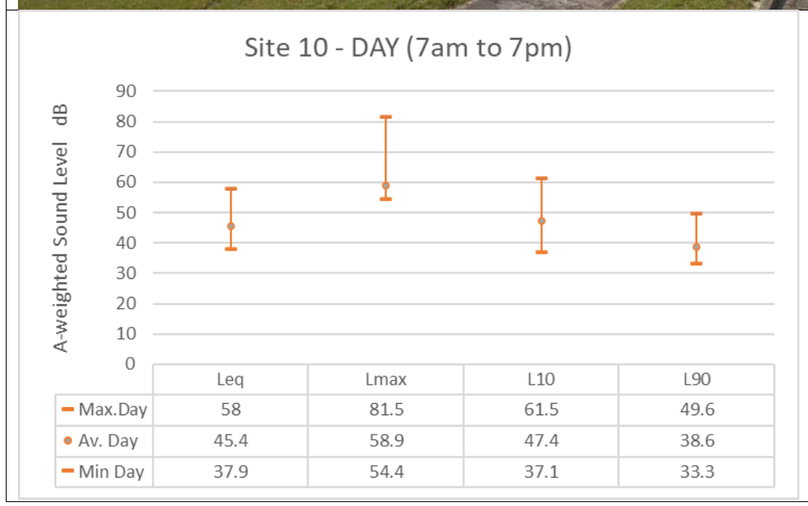


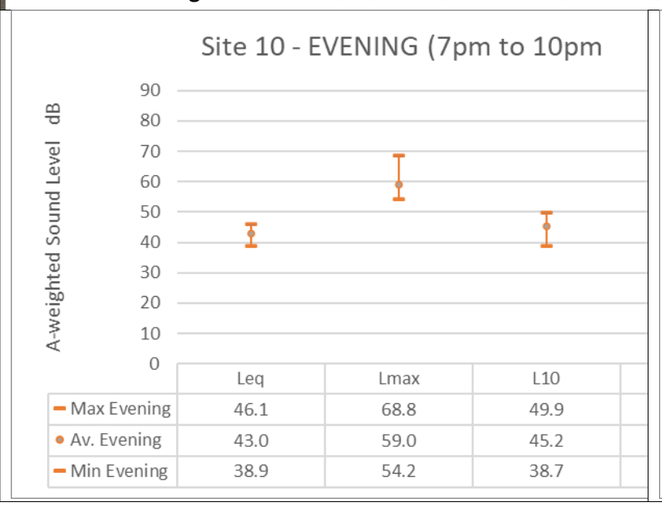
Site Number: 10 | **57A Cypress Drive Maungaraki** | **General Residential**

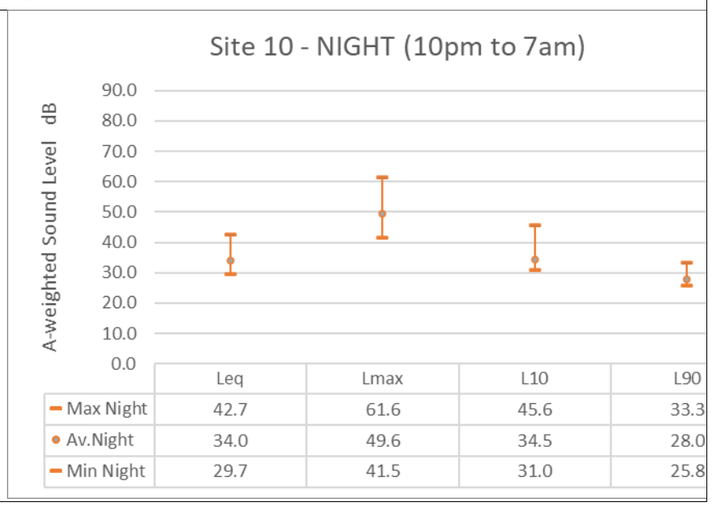


Summary Stats:

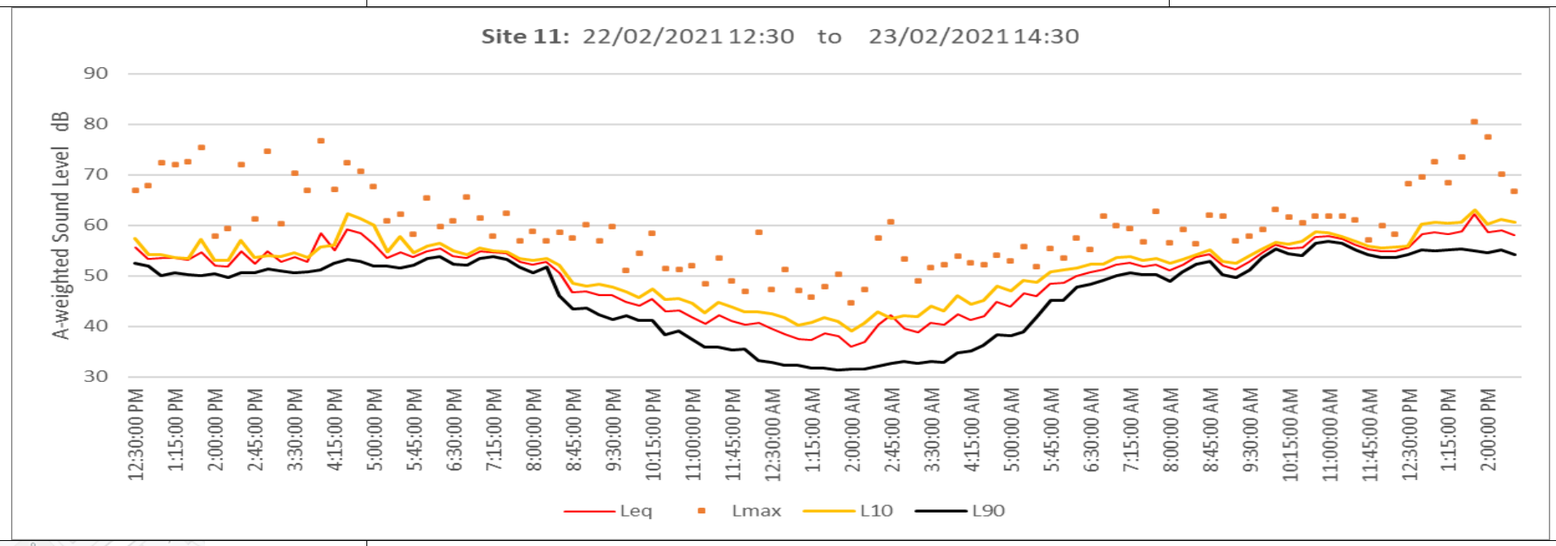
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	58	81.5	61.5	49.6
	Min Day	37.9	54.4	37.1	33.3
	Av. Day	**45.4**	**58.9**	**47.4**	**38.6**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	46.1	68.8	49.9	37.7
	Min Evening	38.9	54.2	38.7	31.4
	Av. Evening	**43.0**	**59.0**	**45.2**	**35.0**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	42.7	61.6	45.6	33.3
	Min Night	29.7	41.5	31.0	25.8
	Av.Night	**34.0**	**49.6**	**34.5**	**28.0**

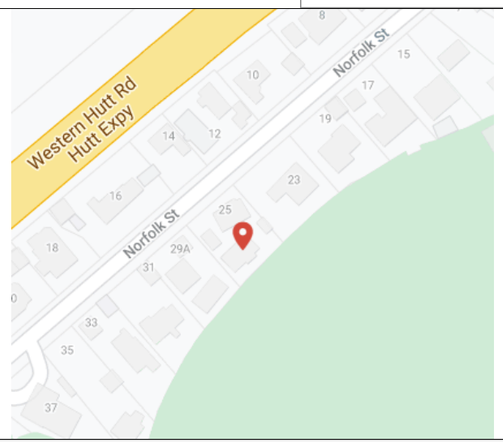






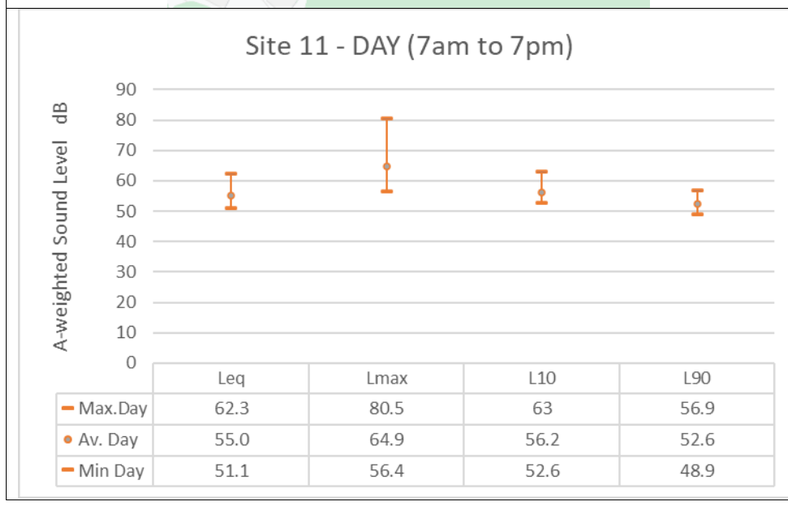
Site Number: 11	2/25B Norfolk Street Belmont	General Residential

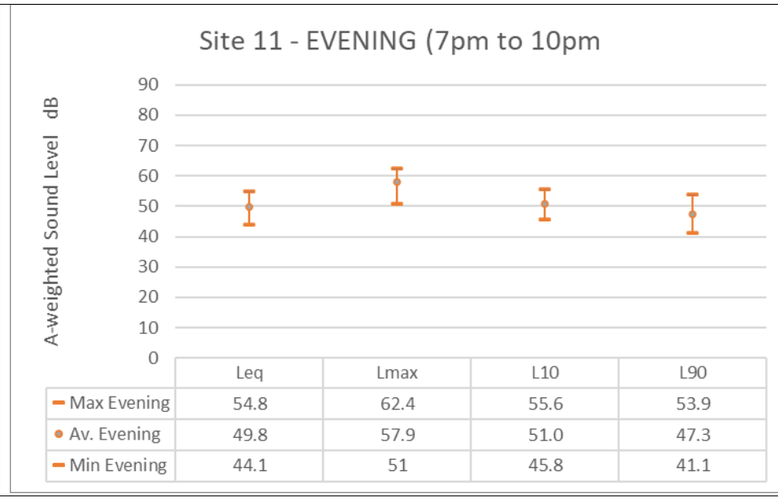


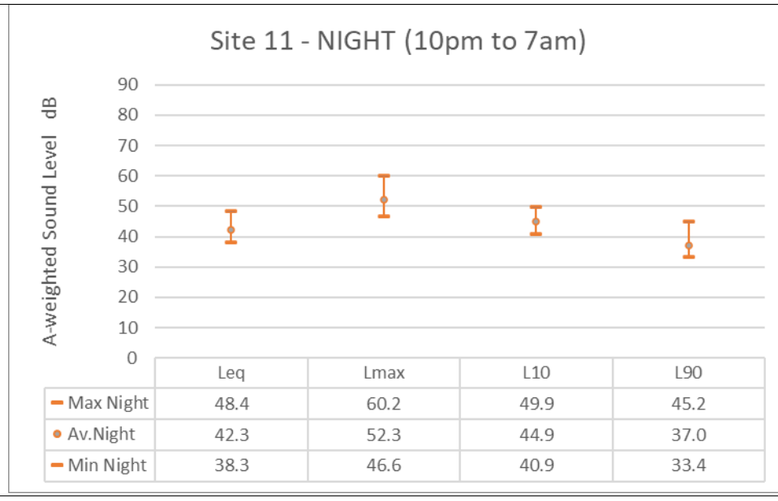


Summary Stats:

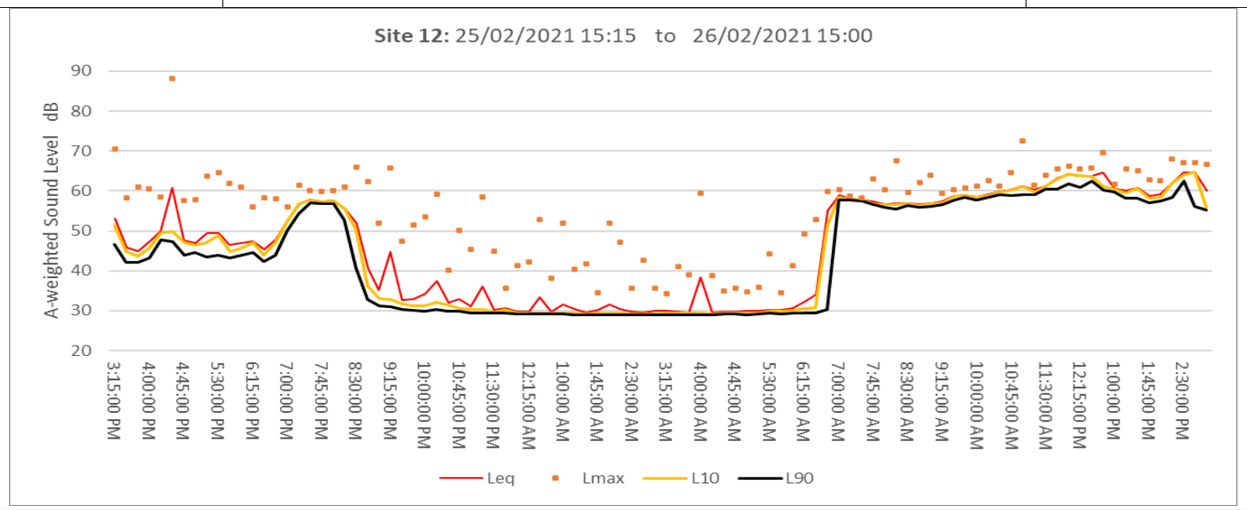
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	62.3	80.5	63	56.9
	Min Day	51.1	56.4	52.6	48.9
	Av. Day	**55.0**	**64.9**	**56.2**	**52.6**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	54.8	62.4	55.6	53.9
	Min Evening	44.1	51	45.8	41.1
	Av. Evening	**49.8**	**57.9**	**51.0**	**47.3**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	48.4	60.2	49.9	45.2
	Min Night	38.3	46.6	40.9	33.4
	Av.Night	**42.3**	**52.3**	**44.9**	**37.0**





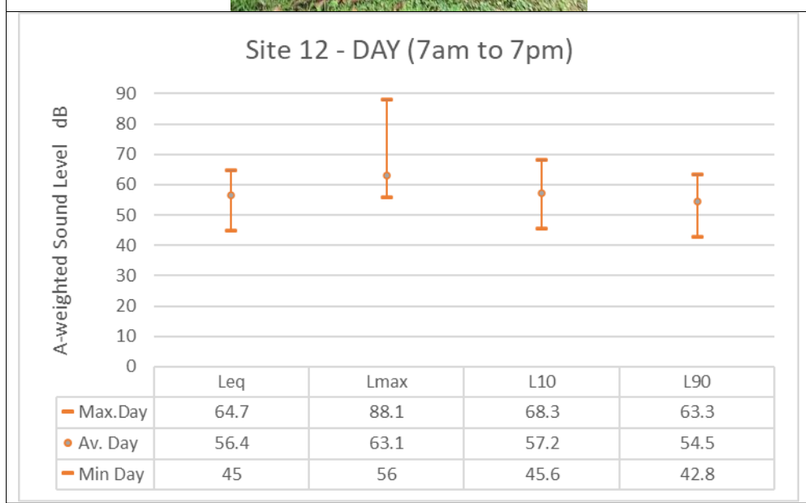


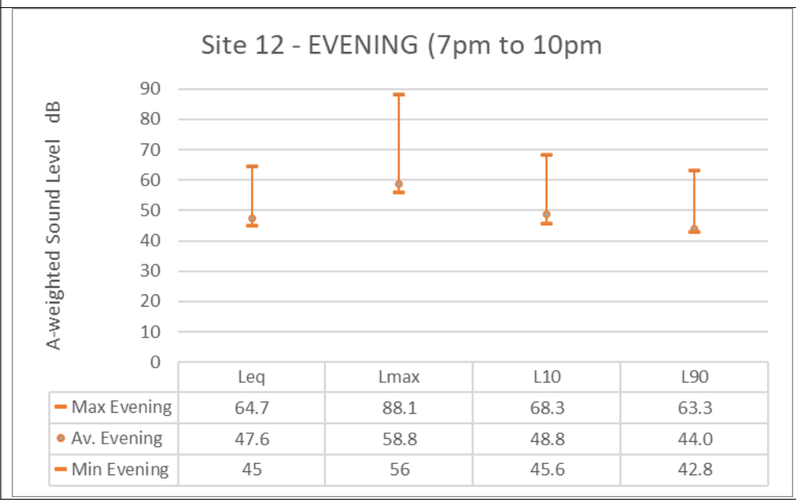
Site Number: 12	26A Kotari Road Days Bay	General Residential

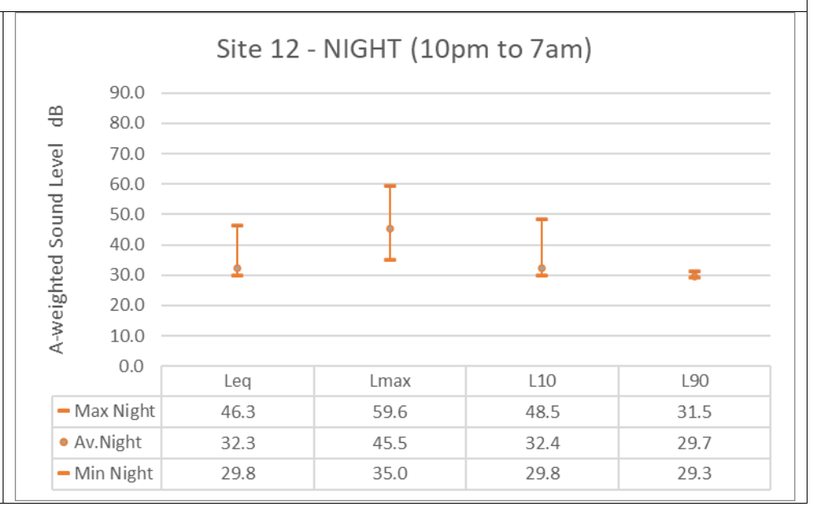


Summary Stats:

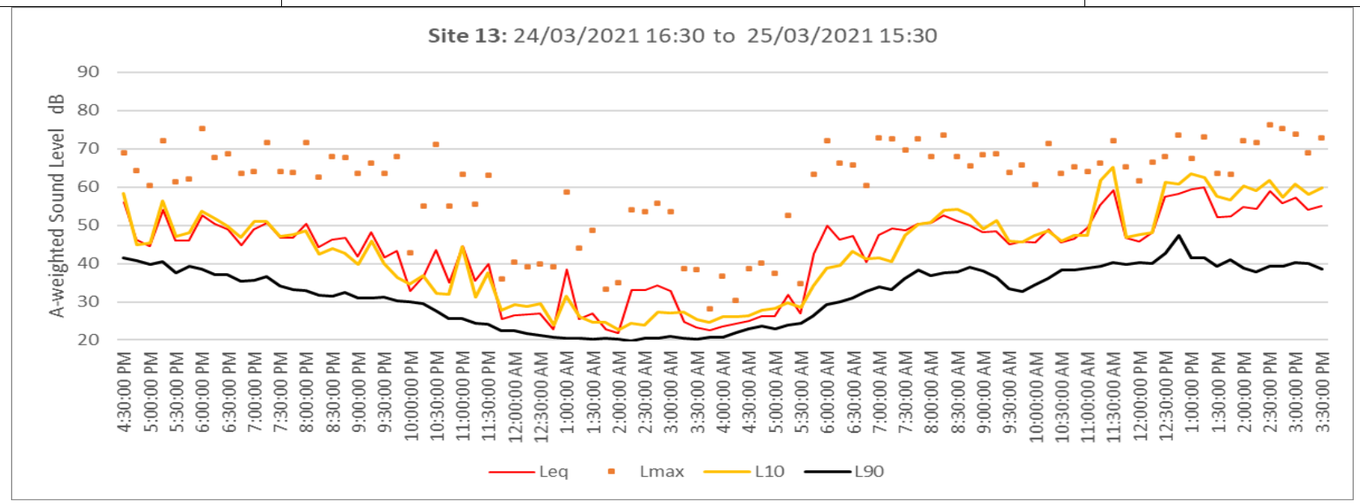
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	64.7	88.1	68.3	63.3
	Min Day	45	56	45.6	42.8
	Av. Day	**56.4**	**63.1**	**57.2**	**54.5**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	64.7	88.1	68.3	63.3
	Min Evening	45	56	45.6	42.8
	Av. Evening	**47.6**	**58.8**	**48.8**	**44.0**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	46.3	59.6	48.5	31.5
	Min Night	29.8	35.0	29.8	29.3
	Av.Night	**32.3**	**45.5**	**32.4**	**29.7**





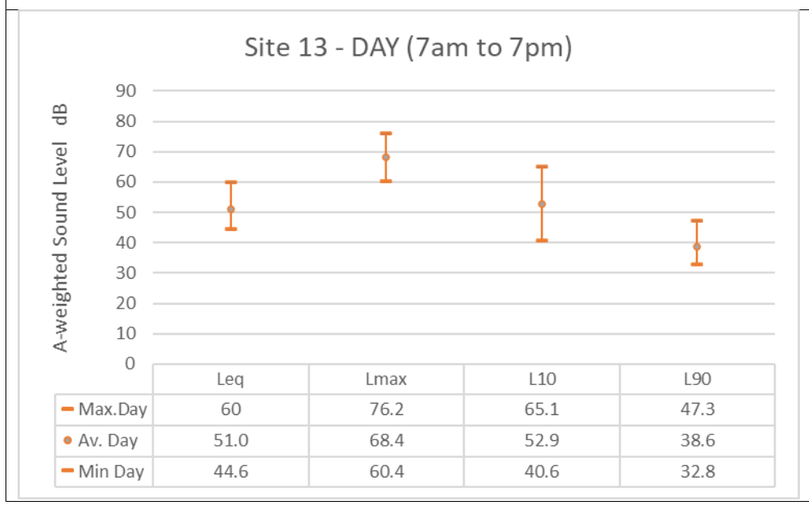


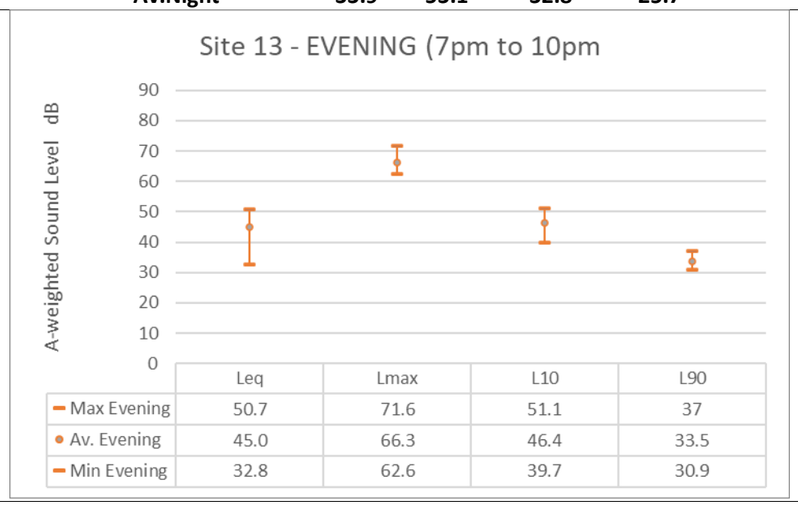
Site Number: 13	27 Bull Avenue, Wainuomata	General Residential

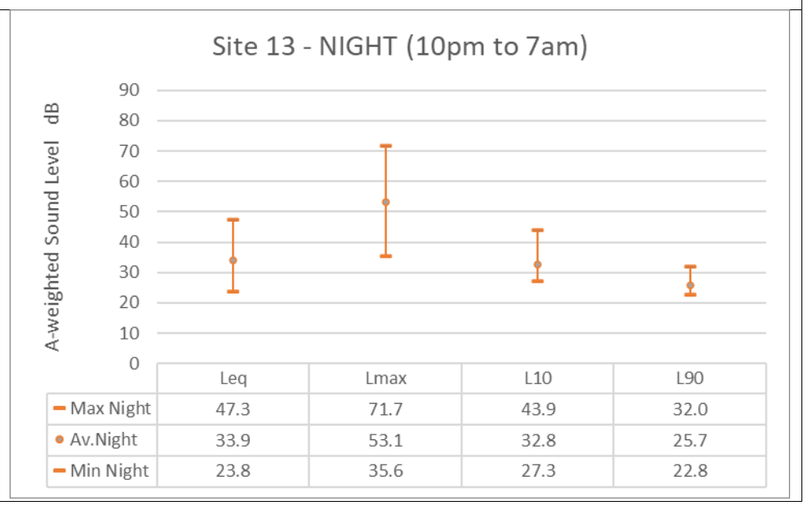


Summary Stats:

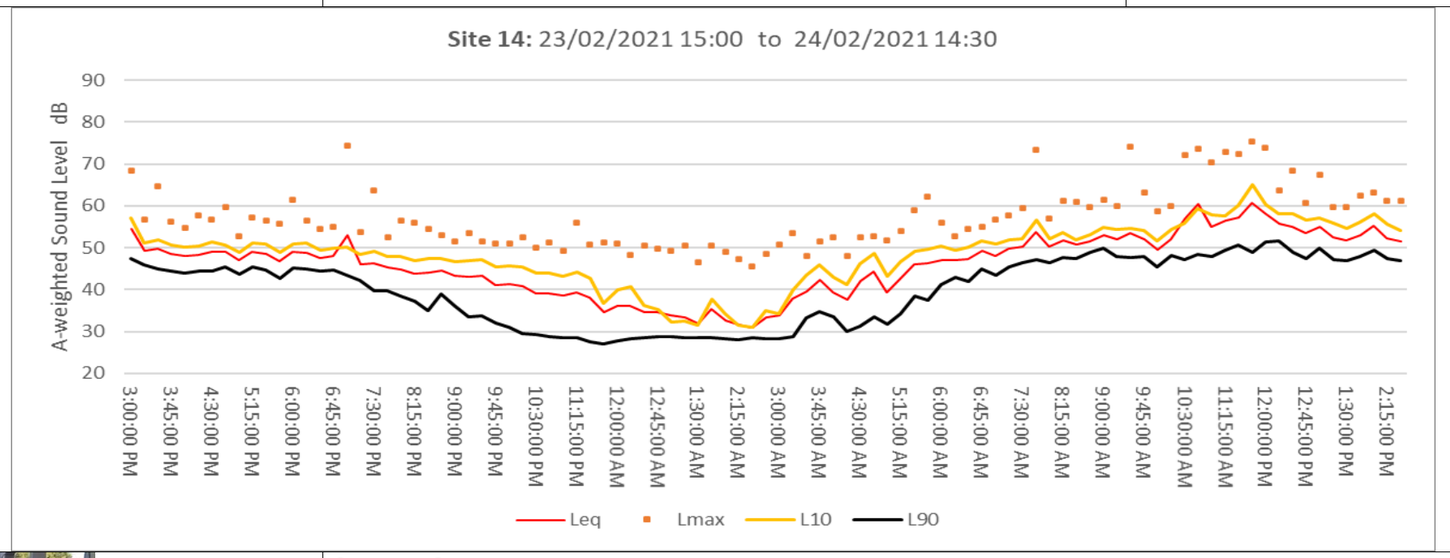
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	60	76.2	65.1	47.3
	Min Day	44.6	60.4	40.6	32.8
	Av. Day	**51.0**	**68.4**	**52.9**	**38.6**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	50.7	71.6	51.1	37
	Min Evening	32.8	62.6	39.7	30.9
	Av. Evening	**45.0**	**66.3**	**46.4**	**33.5**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	47.3	71.7	43.9	32.0
	Min Night	23.8	35.6	27.3	22.8
	Av.Night	**33.9**	**53.1**	**32.8**	**25.7**

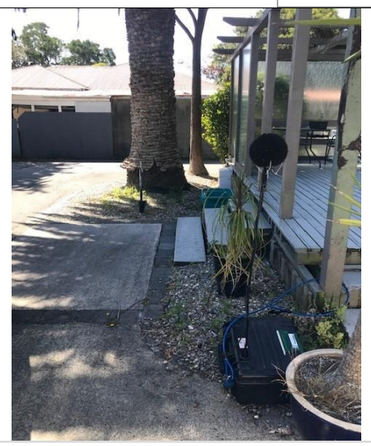






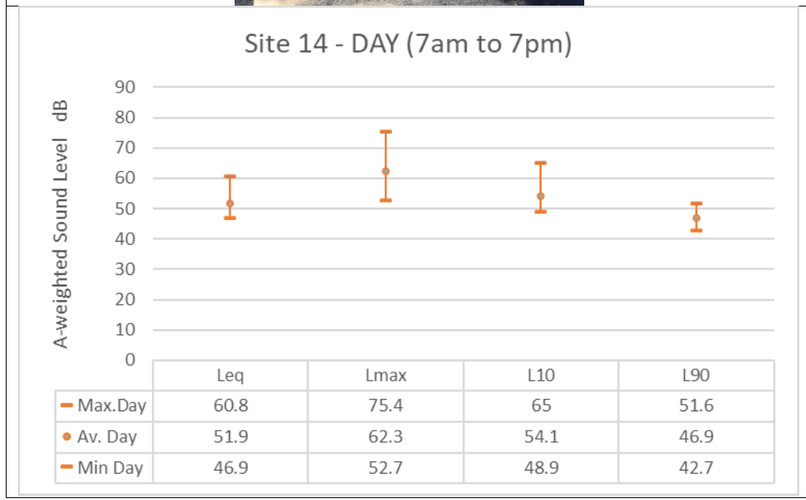
Site Number: 14	177A Stokes Valley Road, Stokes Valley	General Residential

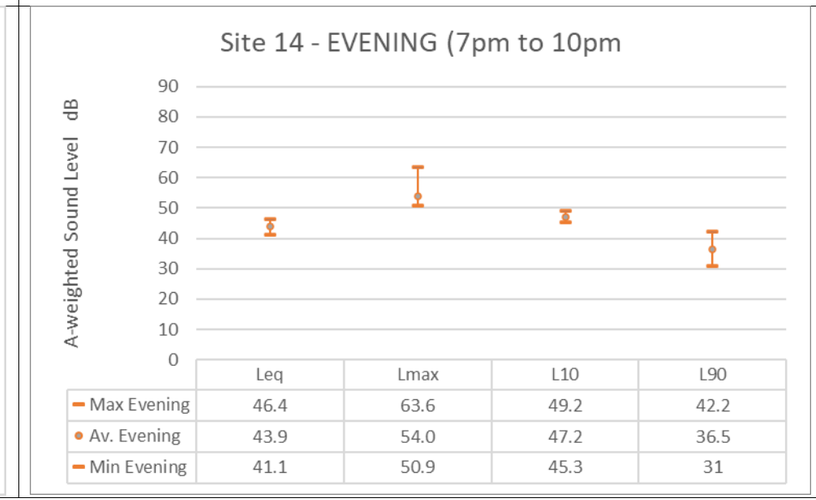


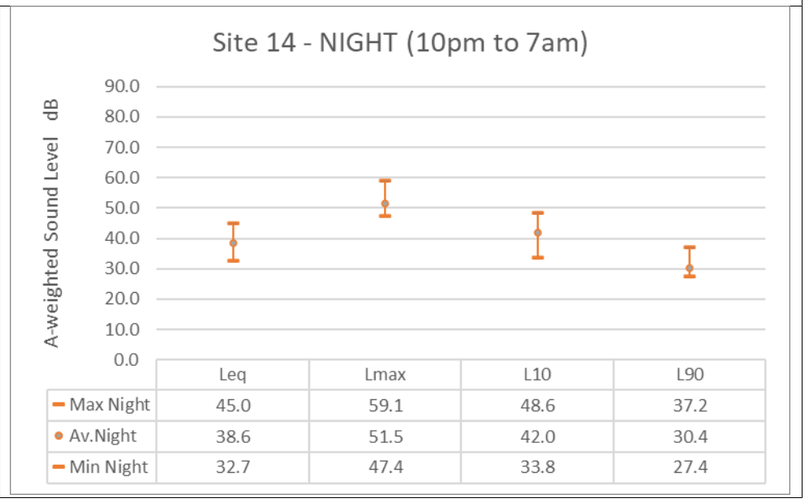


Summary Stats:

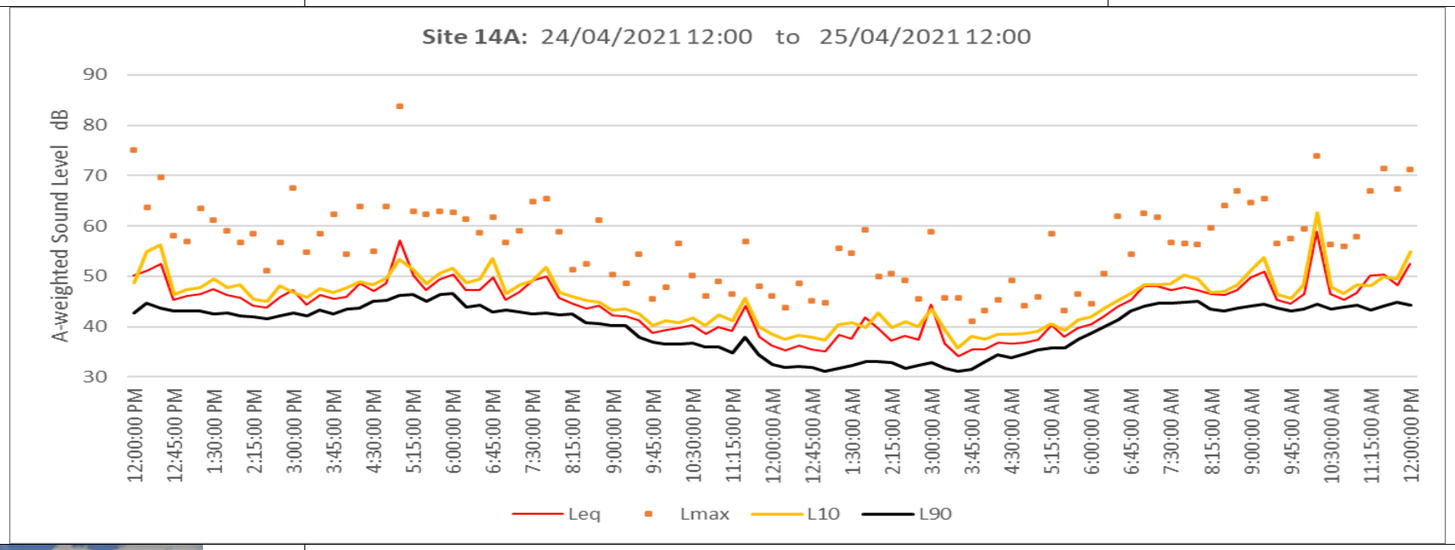
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	60.8	75.4	65	51.6
	Min Day	46.9	52.7	48.9	42.7
	Av. Day	**51.9**	**62.3**	**54.1**	**46.9**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	46.4	63.6	49.2	42.2
	Min Evening	41.1	50.9	45.3	31
	Av. Evening	**43.9**	**54.0**	**47.2**	**36.5**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	45.0	59.1	48.6	37.2
	Min Night	32.7	47.4	33.8	27.4
	Av.Night	**38.6**	**51.5**	**42.0**	**30.4**





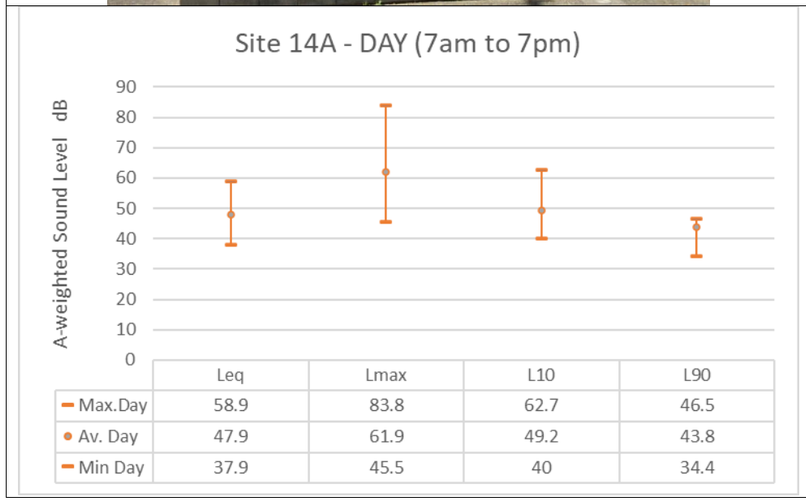


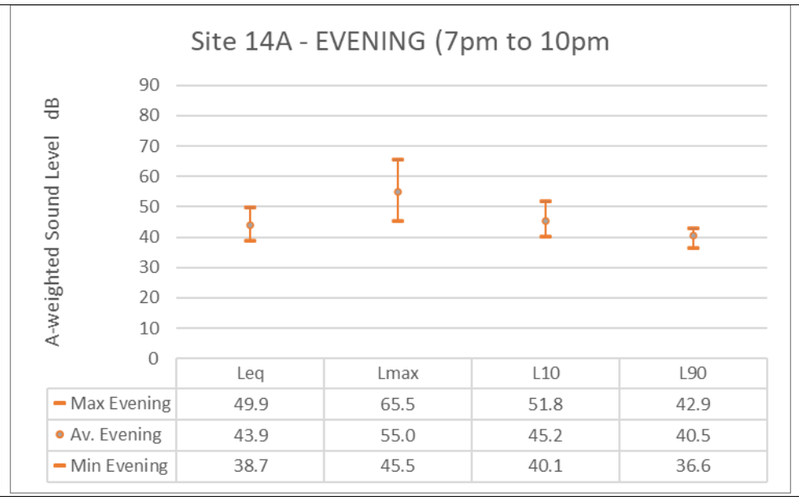
Site Number: 14A	20 Harrison Grove, Avalon	General Residential

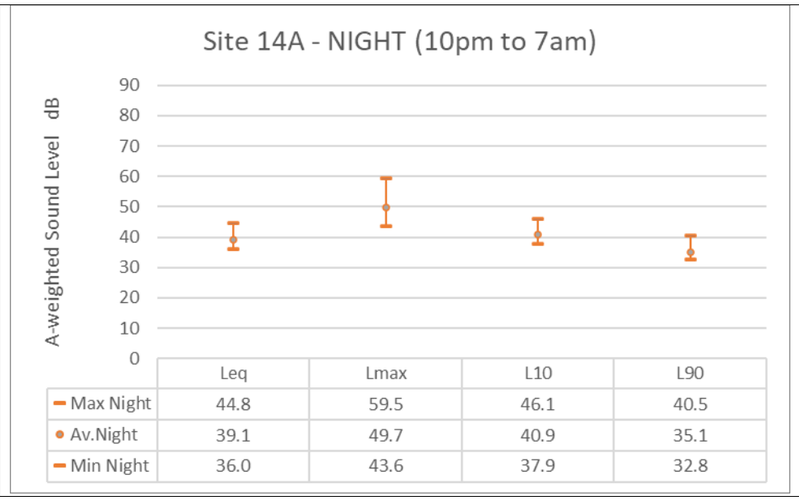


Summary Stats:

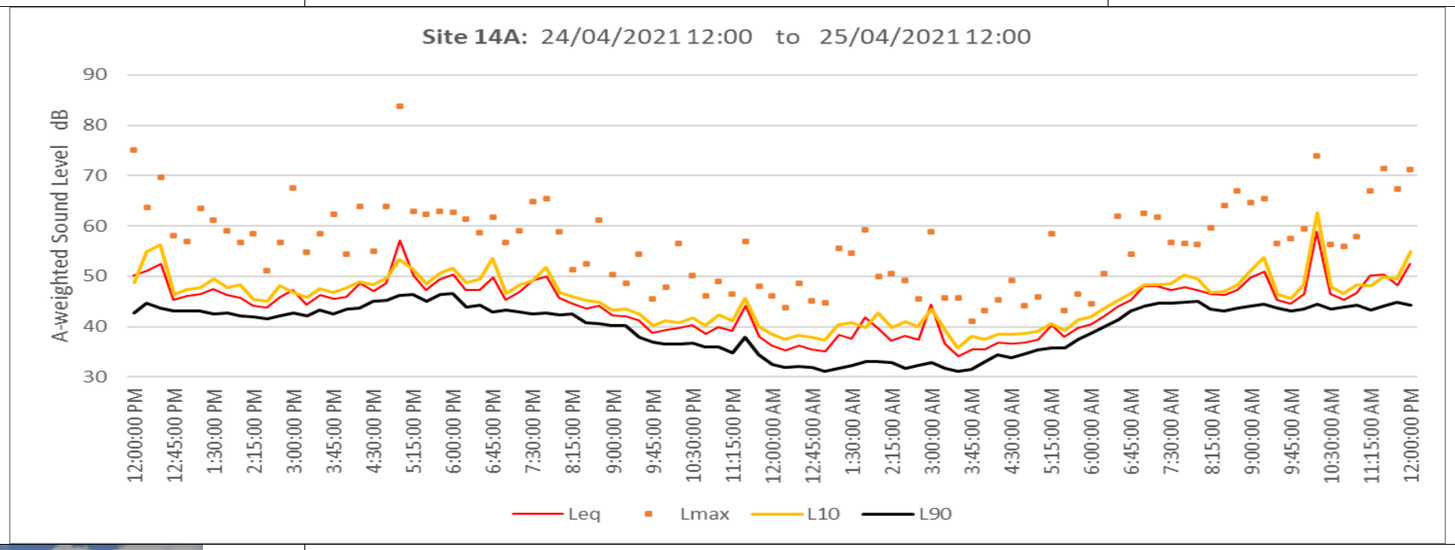
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	58.9	83.8	62.7	46.5
	Min Day	37.9	45.5	40	34.4
	Av. Day	**47.9**	**61.9**	**49.2**	**43.8**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	49.9	65.5	51.8	42.9
	Min Evening	38.7	45.5	40.1	36.6
	Av. Evening	**43.9**	**55.0**	**45.2**	**40.5**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	44.8	59.5	46.1	40.5
	Min Night	36.0	43.6	37.9	32.8
	Av.Night	**39.1**	**49.7**	**40.9**	**35.1**





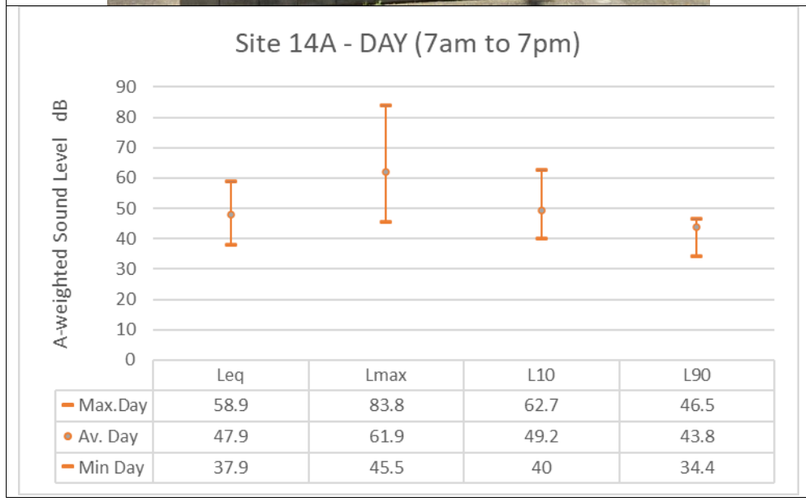


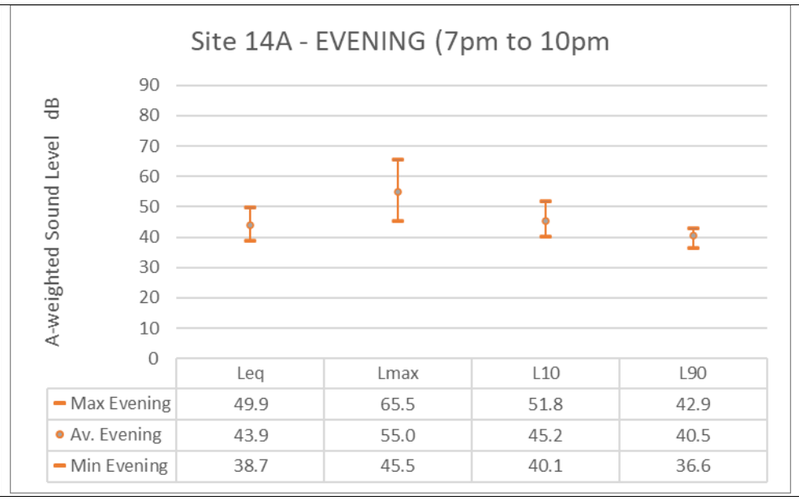
Site Number: 14A	20 Harrison Grove, Avalon	General Residential

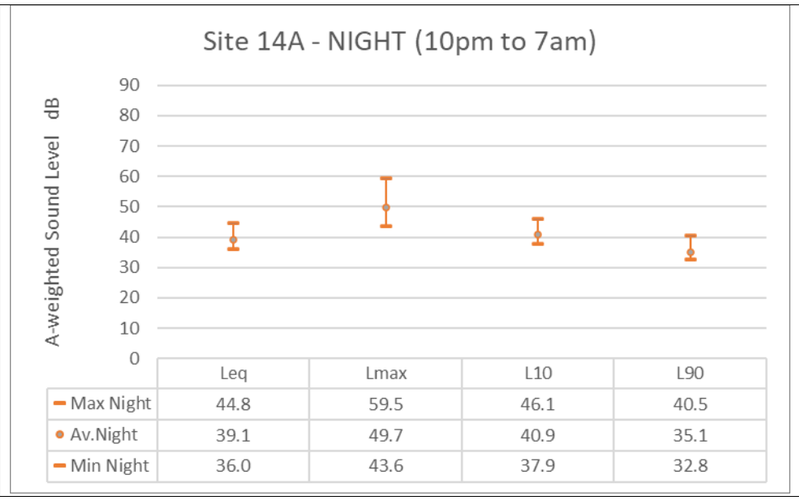


Summary Stats:

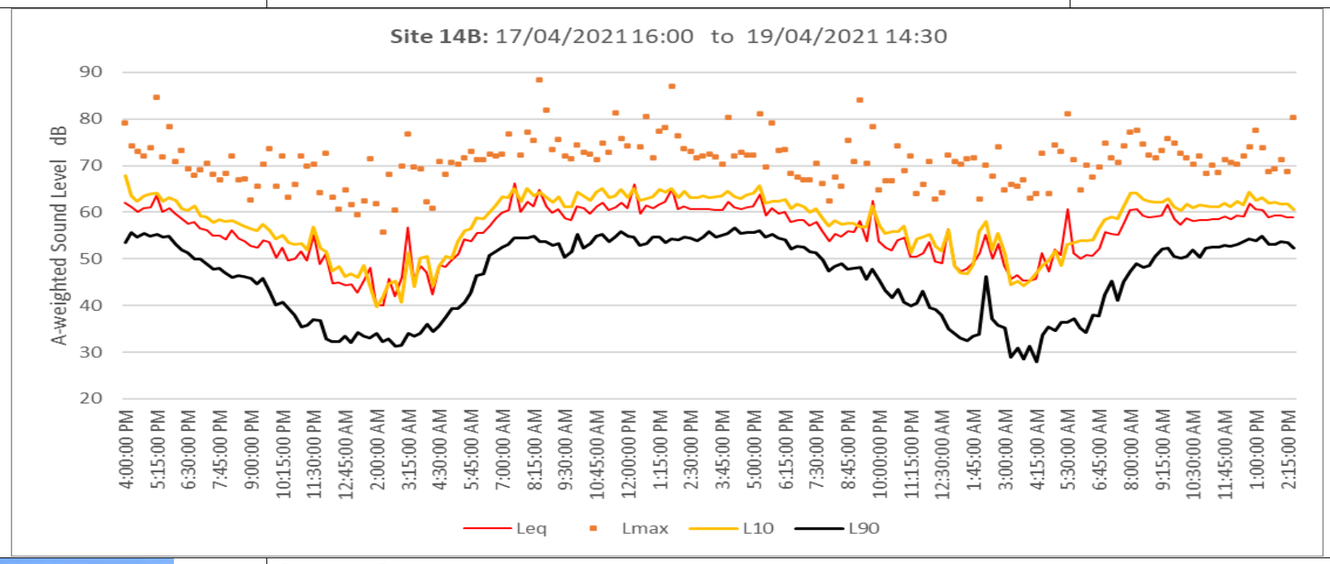
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	58.9	83.8	62.7	46.5
	Min Day	37.9	45.5	40	34.4
	Av. Day	**47.9**	**61.9**	**49.2**	**43.8**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	49.9	65.5	51.8	42.9
	Min Evening	38.7	45.5	40.1	36.6
	Av. Evening	**43.9**	**55.0**	**45.2**	**40.5**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	44.8	59.5	46.1	40.5
	Min Night	36.0	43.6	37.9	32.8
	Av.Night	**39.1**	**49.7**	**40.9**	**35.1**





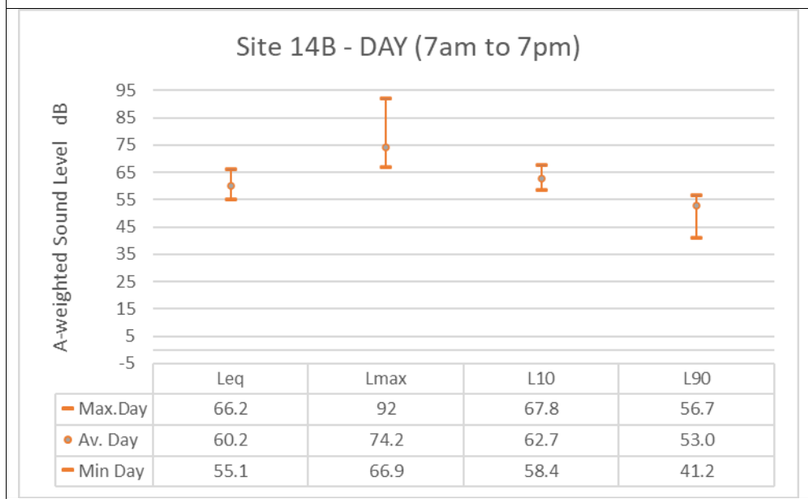


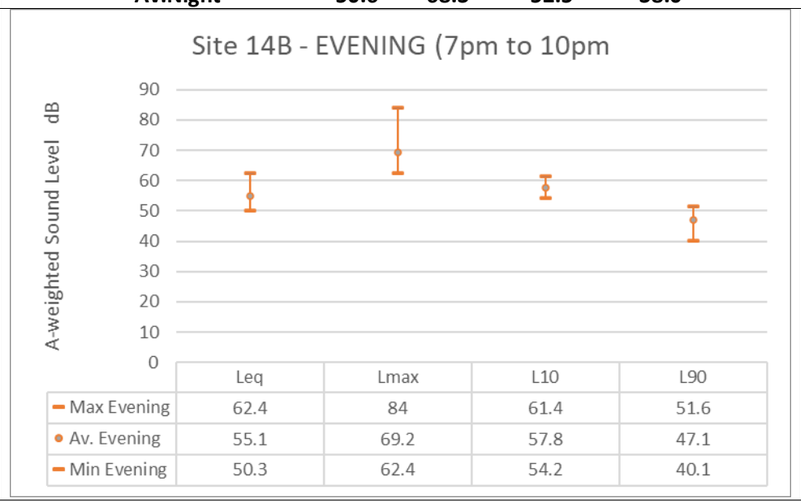
Site Number: 14B	86 Cambridge Terrace, Waterloo	General Residential

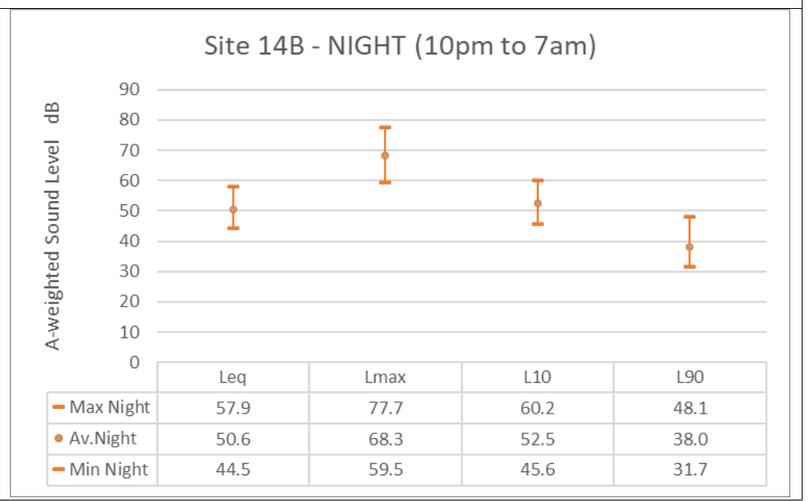


Summary Stats:

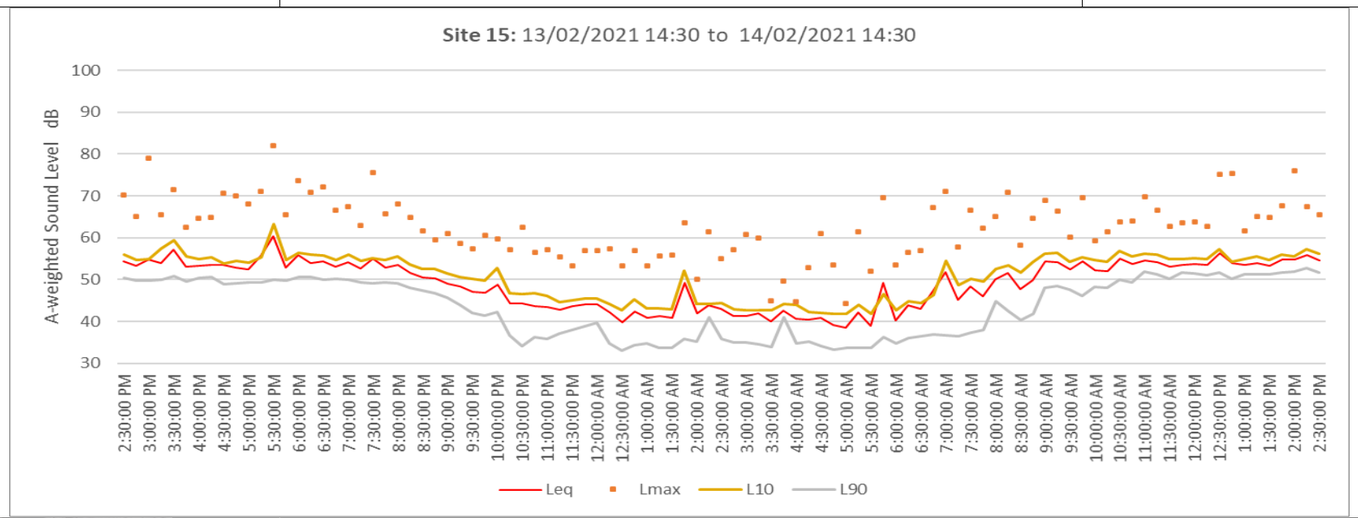
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	66.2	92	67.8	56.7
	Min Day	55.1	66.9	58.4	41.2
	Av. Day	**60.2**	**74.2**	**62.7**	**53.0**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	62.4	84	61.4	51.6
	Min Evening	50.3	62.4	54.2	40.1
	Av. Evening	**55.1**	**69.2**	**57.8**	**47.1**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	57.9	77.7	60.2	48.1
	Min Night	44.5	59.5	45.6	31.7
	Av.Night	**50.6**	**68.3**	**52.5**	**38.0**





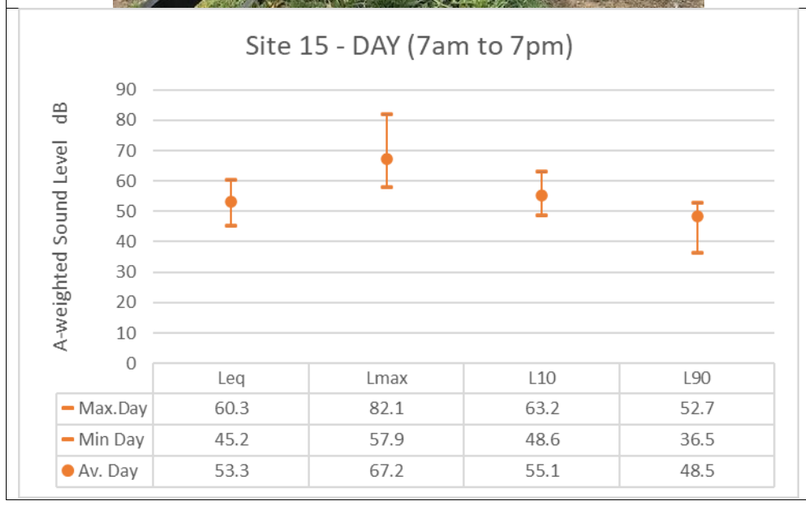


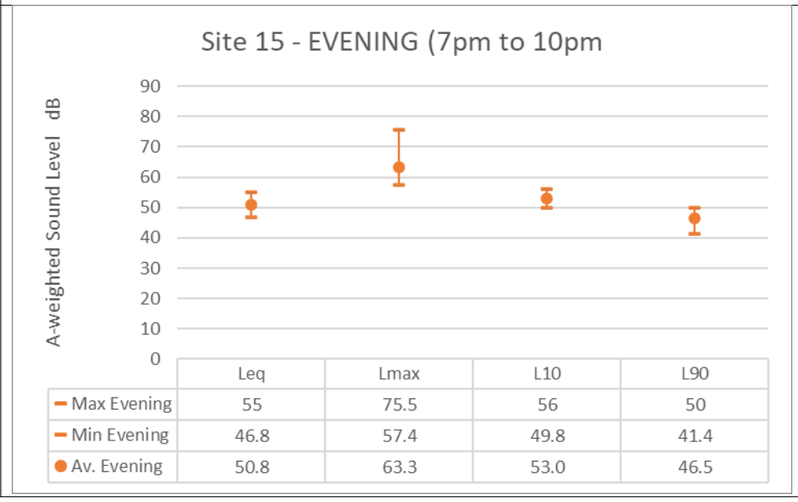
Site Number: 15	1090 Coast Road Wainuiomata	Rural

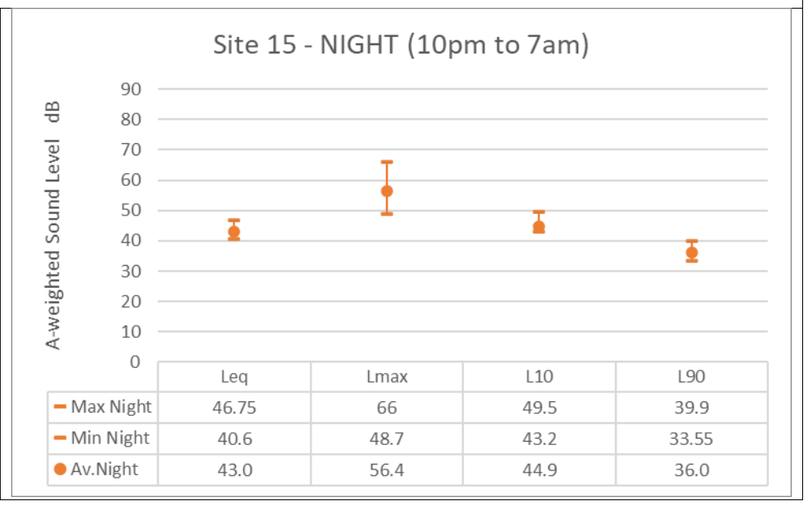


Summary Stats:

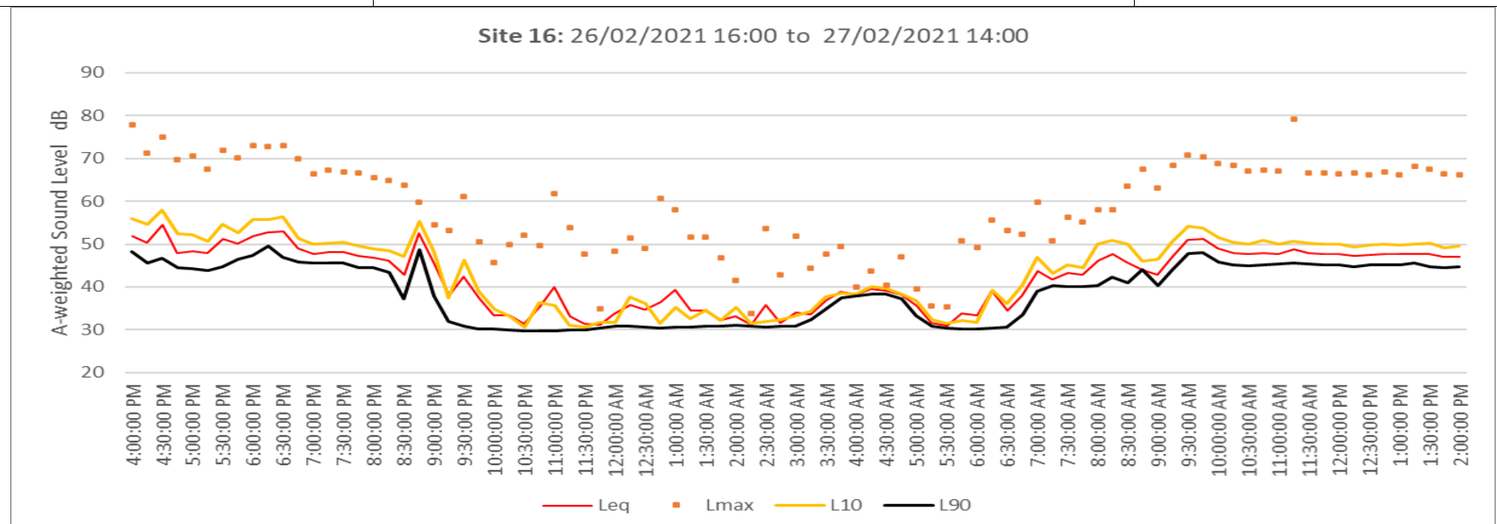
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	60.3	82.1	63.2	52.7
	Min Day	45.2	57.9	48.6	36.5
	Av. Day	**53.3**	**67.2**	**55.1**	**48.5**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	55	75.5	56	50
	Min Evening	46.8	57.4	49.8	41.4
	Av. Evening	**50.8**	**63.3**	**53.0**	**46.5**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	46.75	66	49.5	39.9
	Min Night	40.6	48.7	43.2	33.55
	Av.Night	**43.0**	**56.4**	**44.9**	**36.0**





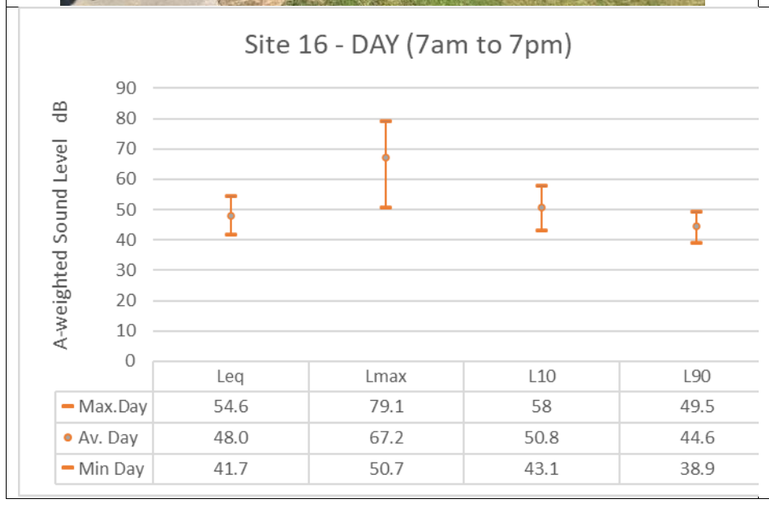


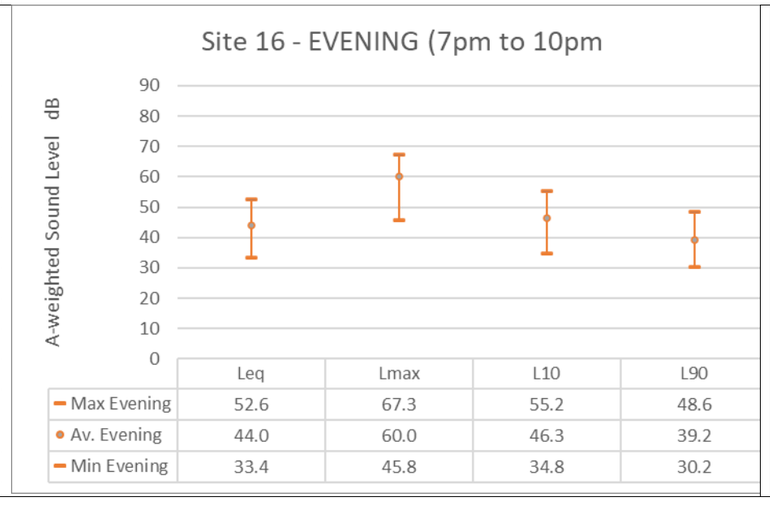
Site Number: 16	Upper Moores Valley Road	Rural

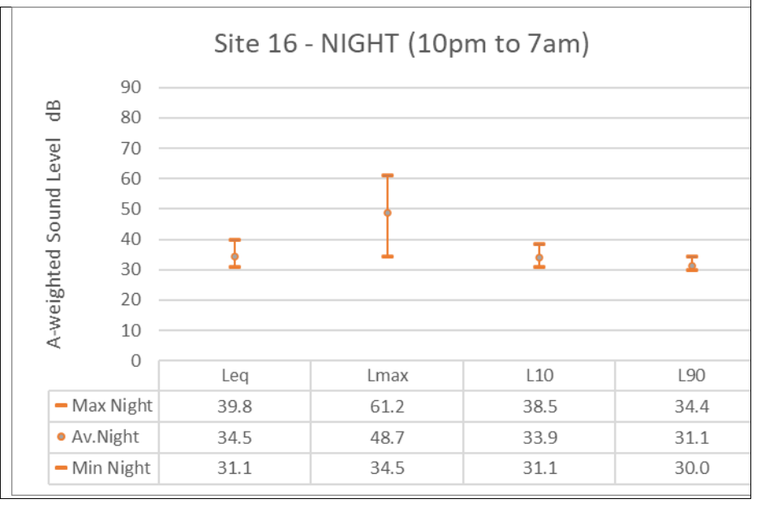


Summary Stats:

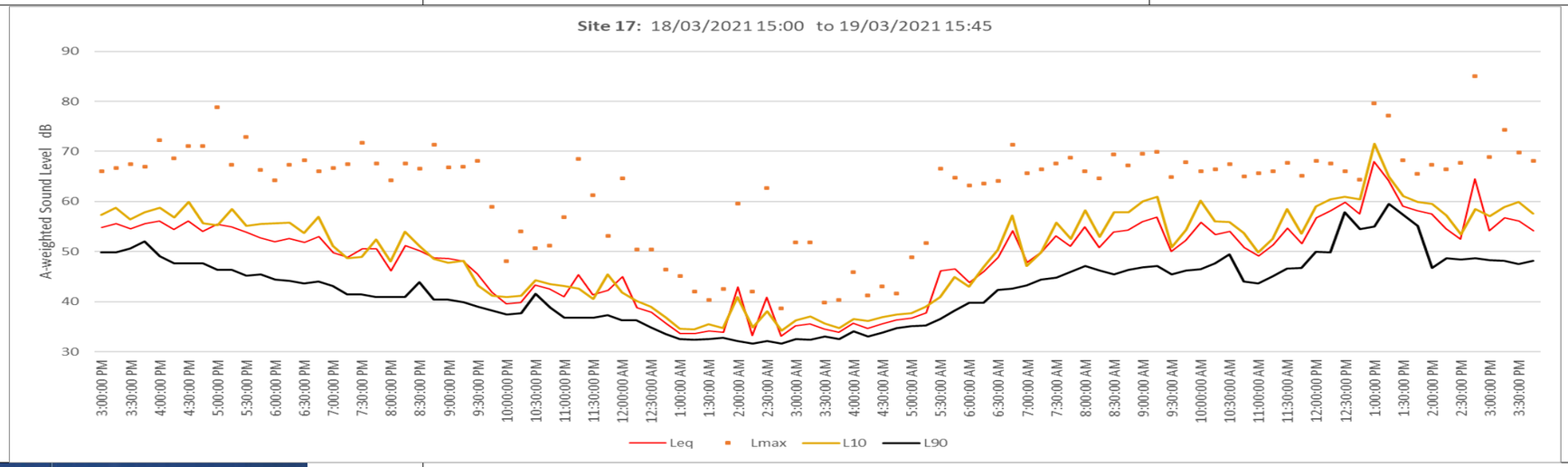
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	54.6	79.1	58	49.5
	Min Day	41.7	50.7	43.1	38.9
	Av. Day	**48.0**	**67.2**	**50.8**	**44.6**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	52.6	67.3	55.2	48.6
	Min Evening	33.4	45.8	34.8	30.2
	Av. Evening	**44.0**	**60.0**	**46.3**	**39.2**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	39.8	61.2	38.5	34.4
	Min Night	31.1	34.5	31.1	30.0
	Av.Night	**34.5**	**48.7**	**33.9**	**31.1**





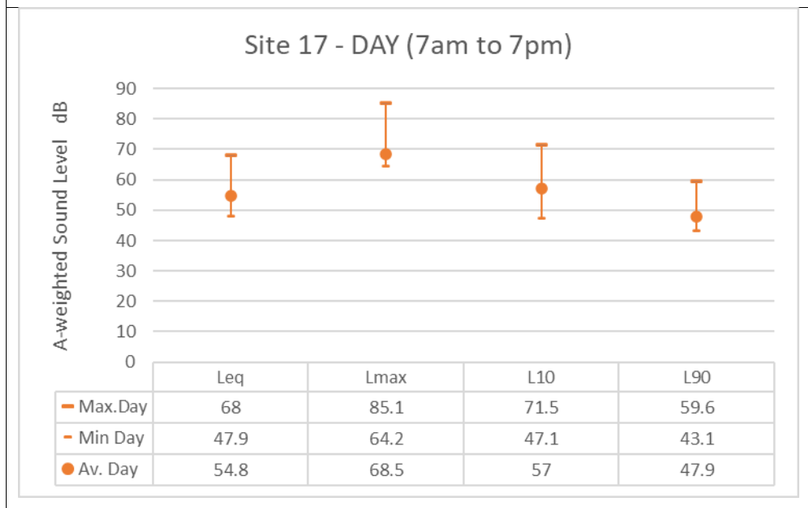


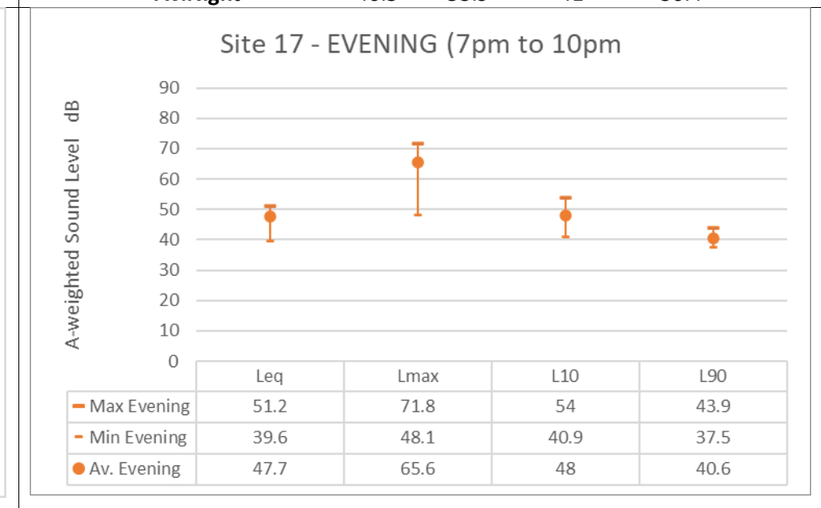
Site Number: 17	Level 1, 21-23 Andrews Avenue, Central Hutt	CBD

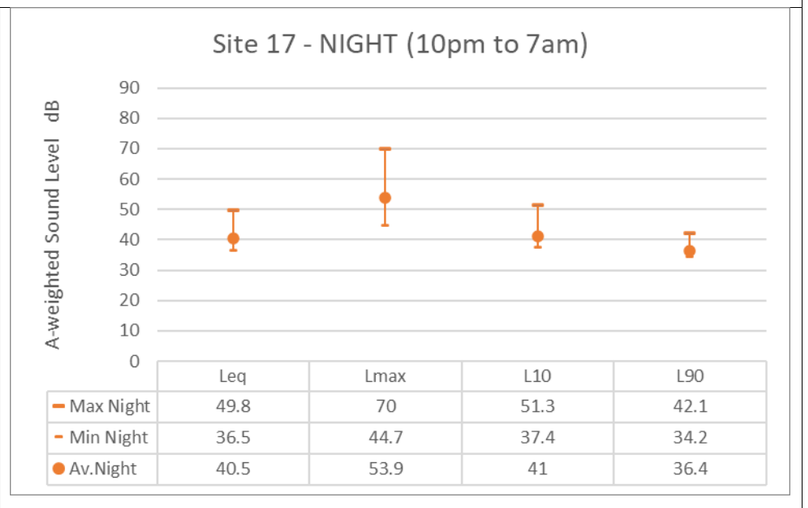


Summary Stats:

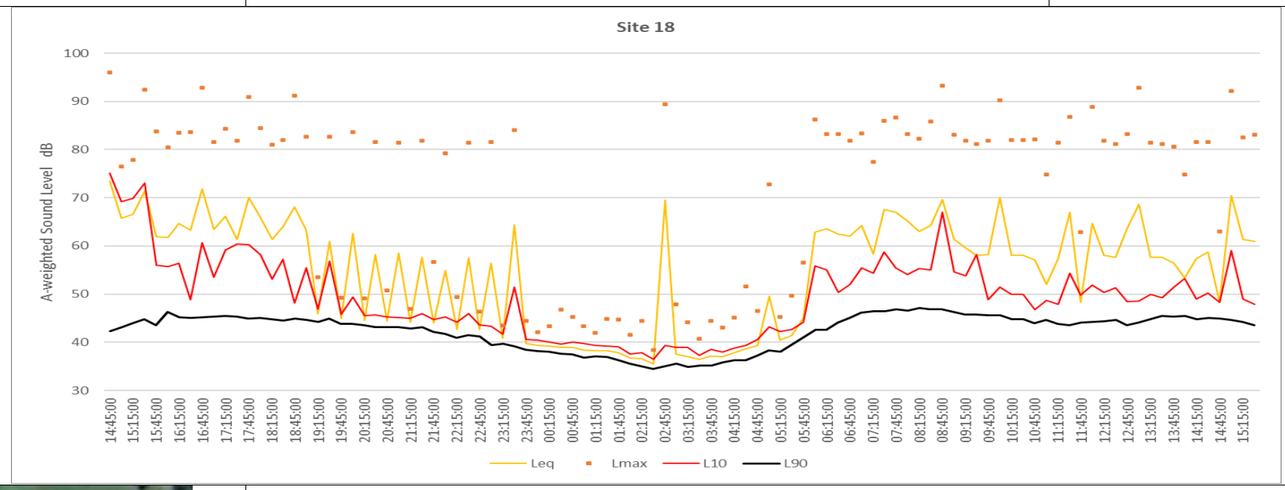
		LAeq	LAmax	LA10	LA90
DAY	Max.Day	68	85.1	71.5	59.6
	Min Day	47.9	64.2	47.1	43.1
	Av. Day	54.8	68.5	57	47.9
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	51.2	71.8	54	43.9
	Min Evening	39.6	48.1	40.9	37.5
	Av. Evening	47.7	65.6	48	40.6
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	49.8	70	51.3	42.1
	Min Night	36.5	44.7	37.4	34.2
	Av.Night	40.5	53.9	41	36.4

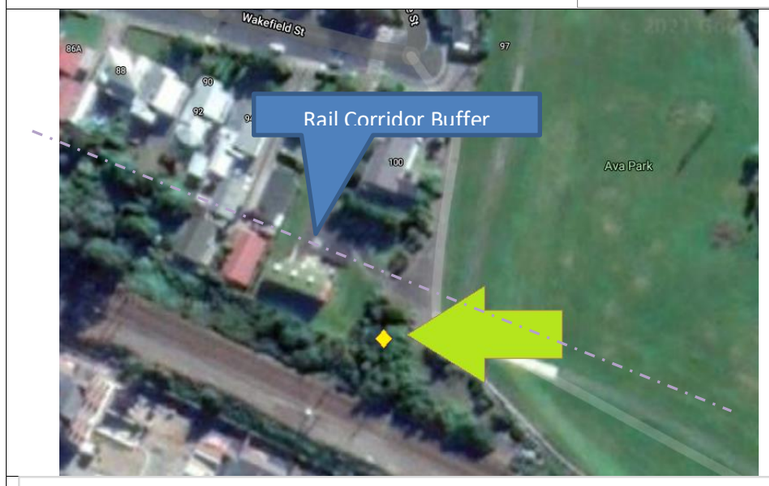






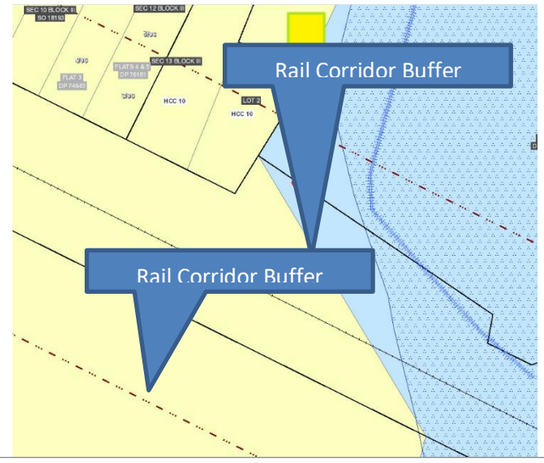
Site Number: 18	Ava Park, 10m from Rail Designation Boundary	Rail Corridor

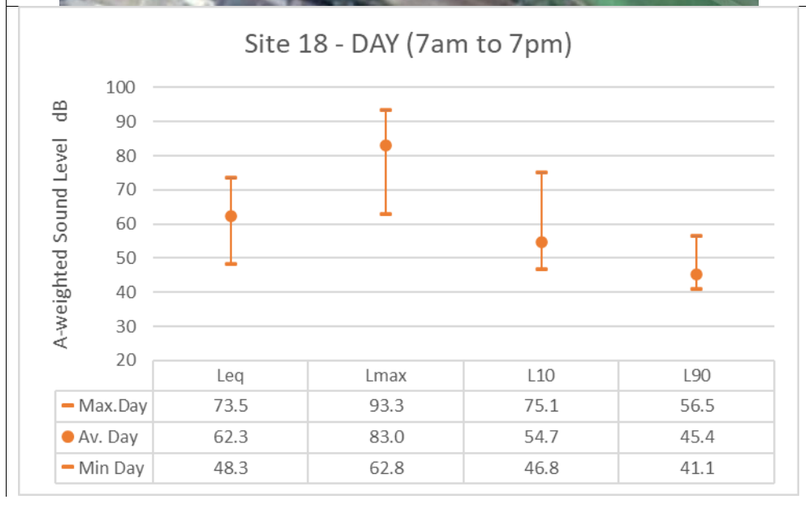


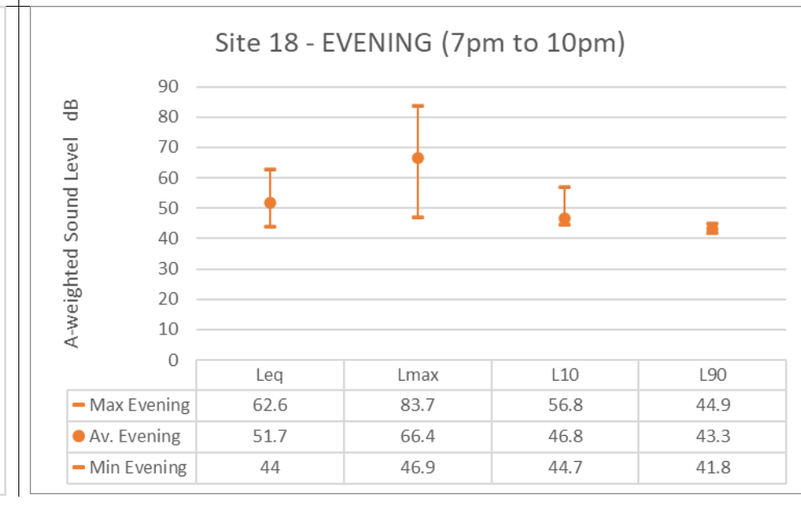


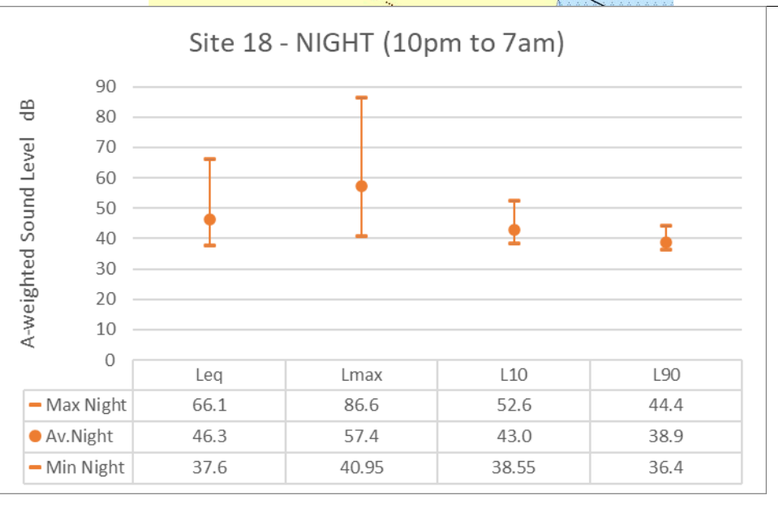
Summary Stats:

		LAeq	LAmax	LA10	LA90
DAY	Max.Day	73.5	93.3	75.1	56.5
	Min Day	48.3	62.8	46.8	41.1
	Av. Day	**62.3**	**83.0**	**54.7**	**45.4**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	62.6	83.7	56.8	44.9
	Min Evening	44	46.9	44.7	41.8
	Av. Evening	**51.7**	**66.4**	**46.8**	**43.3**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	66.1	86.6	52.6	44.4
	Min Night	37.6	40.95	38.55	36.4
	Av.Night	**46.3**	**57.4**	**43.0**	**38.9**

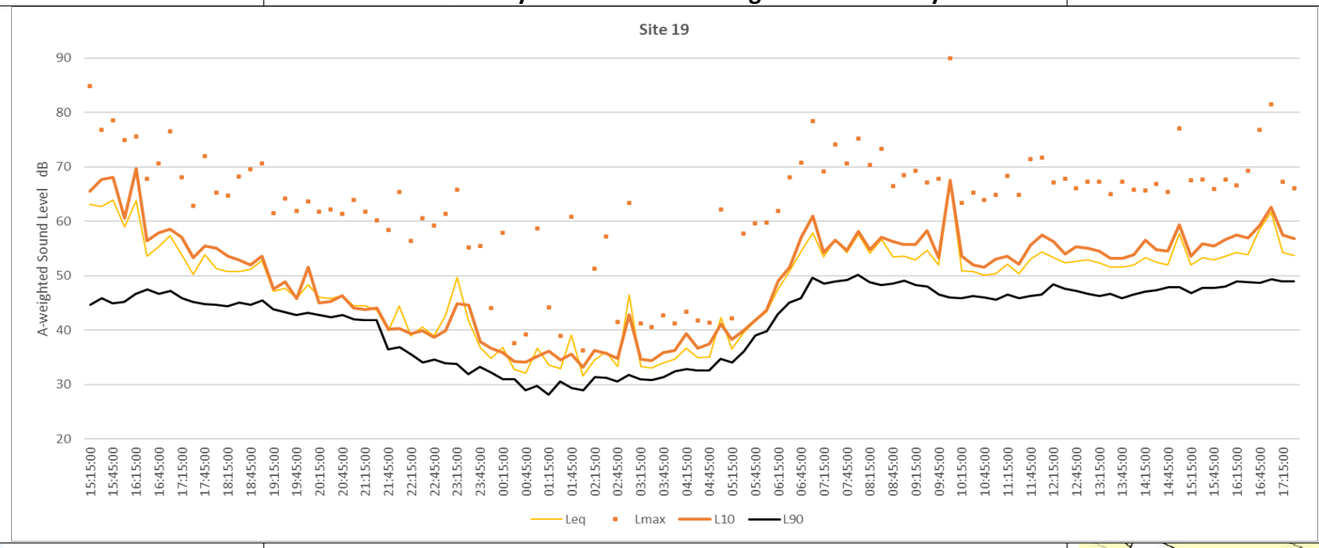






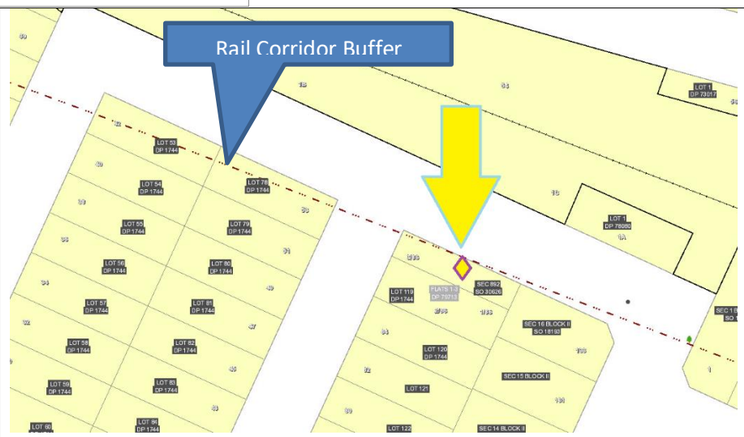


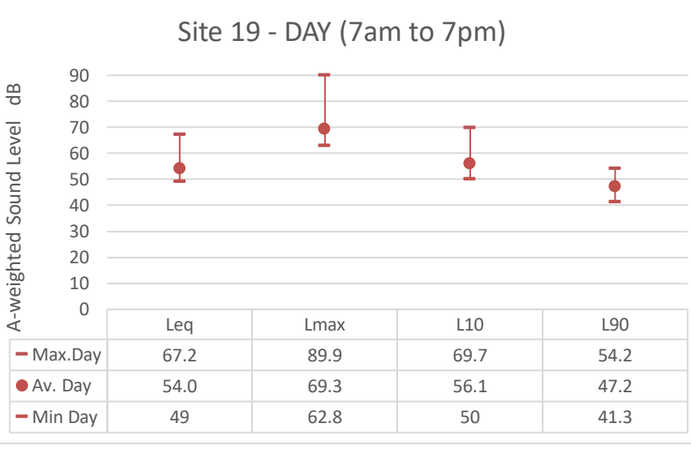
Site Number: 19	3/86 North Street, Ava, Petone. Located Just Outside "Rail Corridor Buffer Overlay" 40m from Rail Designation Boundary	Rail Corridor

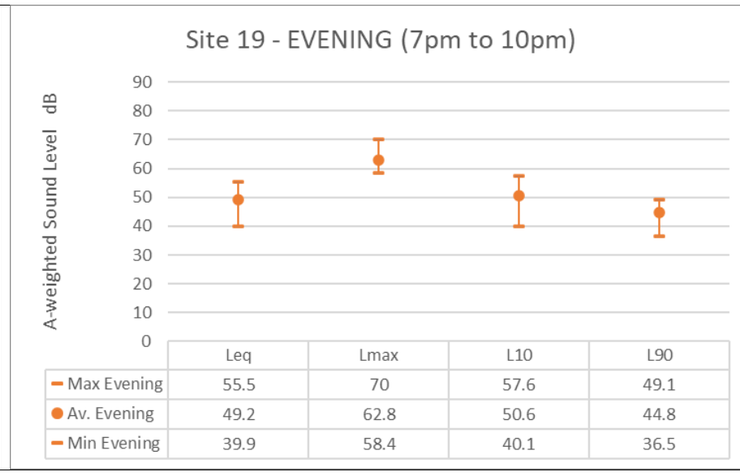


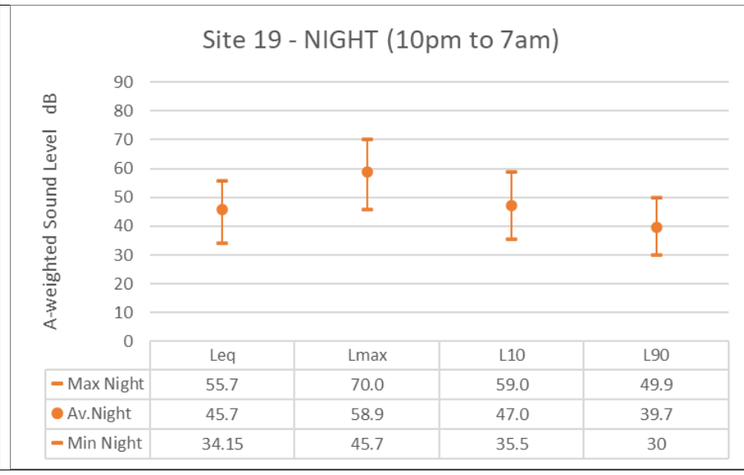
Summary stats

		LAeq	LAmax	LA10	LA90
DAY	Max.Day	67.2	89.9	67.5	50.2
	Min Day	31.5	36.2	33.2	28.1
	Av. Day	**44.1**	**58.4**	**45.0**	**38.5**
		LAeq	LAmax	LA10	LA90
EVENING	Max Evening	54.4	71.7	57.4	48.4
	Min Evening	51.5	65	53.1	45.9
	Av. Evening	**52.6**	**67.4**	**55.0**	**46.9**
		LAeq	LAmax	LA10	LA90
NIGHT	Max Night	58.6	73.2	63.0	48.0
	Min Night	45.4	60.9	46.45	41.15
	Av.Night	**52.1**	**67.4**	**54.0**	**45.7**









APPENDIX B

List of Council Investigations Into 'Unreasonable' Noise 2010 to 2021

Type of Noise, Location and Outcome Comments

Date	Noise Source Address	Type of Noise	Outcome
Jan-20	Port Road/Meachen Street, Barnes Street Seaview	Sprint Car Event	Compliant with Temp Activities Noise Rule
Jan-20	Williams Park, 611B Marine Drive Days Bay	Music concert	Compliant with Resource Consent Noise Limit
Jan-20	Hutt Recreation Ground, 135 Woburn Road Hutt Central	Music Concert	Compliant with Resource Consent Noise Limit
Dec-19	Hillary Court, Naenae	Open air movie	Non-compliant with Temp Activity Noise Rule - advice given prior to next event
Jul-19	State Highway 2, Belmont	Night Road works	Non-compliant - BPO adopted
Nov-18	Kaitangata Crescent Kelson	Roosters	Non-compliant - rooster numbers reduced
Aug-17	Brunswick Street Hutt Central	Compressor	Non-compliant - advised complainant who would work with VTNZ - did not wish further action from Council
Aug-17	Hutt Road Petone	Generator	Non compliant - remedial works undertaken and BPO adopted
Aug-17	Jackson Street Petone	Construction Work	Non-compliant - BPO adopted
Mar-17	Bell Road South Gracefield	Mechanical Plant (extraction system)	Borderline - difficult to assess and not sufficient to require more than BPO
Mar-17	Jackson Street Petone	Refrigerator Unit	Non compliant - BPO adopted
Feb-17	Seaview Road Seaview	Scrap Metal Loadout	Compliant and adopting BPO
Feb-17	Barnes Street Seaview	Scrap Metal Loadout	Technical Non Compliance but not enforceable (1.5dBA above limit)
Jan-17	Walter Nash Stadium	Music Concert	Compliant with Temp Activities Noise Rule
Dec-16	Hutt Road Petone	Child Care Centre	Compliant
Dec-16	McEwan Park, Marine Parade, Petone	Music Concert	Too windy to obtain useful results, but appeared to be compliant with Temp Activities Rule
Jul-16	Westminster Road Wainuiomata	Wind Turbine Generator	Non-compliant
May-16	The Strand Wainuiomata	Band Noise	Non-compliant
Nov-15	Port Road Seaview	Port Road Drag Race Event	Compliant with Temp Activities Noise Rule
Oct-15	Port Road/Meachen Street, Barnes Street Seaview	Sprint Car Event	Compliant with Temp Activities Noise Rule
Oct-15	George Street Stokes Valley	Panelbeater's Compressor	Compliant
Jun-15	Taita Netball Courts	Netball siren	"Compliant" - no DP noise rule for recreational but noise level reasonable
Jun-15	Karimu Street Stokes Valley	Noise from School Hall	Compliant with Temp Activities Noise Rule
May-15	Page Grove Wingate	Rifle Range	Compliant
Dec-14	Hutt Road Alicetown	Bar Concert	Technical non -compliance 1.6 dBA above limit
Sep-14	Waterloo Road Waterloo	Dance Studio	Technically non compliant, however high background level makes enforcement difficult - s16 applied
May-14	Pilmuir Street Boulcott	Mechanical plant (refrigerator units)	Remedial works undertaken to achieve compliance.
Feb-14	Makaro Street Eastbourne	Fire Siren	Exempt - however work undertaken to reduce noise due to children's classroom being 8m away
Jul-13	Wainui Road Waiwhetu	Childcare Noise	Hammering activity by children non compliant - activity ceased
Apr-13	Wainui Road Waiwhetu	Internal Plant	Technical Non Compliance but not enforceable (1dBA above limit)
Mar-12	Victoria Street Alicetown	Compressor	Compliant
Aug-11	Brunswick Street Central Hutt	Commercial Fans	Non compliant - remedial works undertaken in order to comply
Jul-10	Sydney Street Petone	Commercial Fan	Survey indicated compliance
Historical	Seaview Wharf	Pumping fluids to tank farm	Complaints are very rare now.

APPENDIX C

2020 Traffic Noise Measurements At Four sites In Lower Hutt

7 Harbour View Road

Existing noise levels survey details

Parameter	Setting/source
Operator	Edmond Wu
Address	7 Harbour View Road
Equipment details	Convergence Type 1 SLM Serial Cnp2pt2S018dILnSy2DRND
Measurement dates	14 Monday to 22 Tuesday December 2020
Observation	Traffic noise on Harbour View Road being dominant source of noise in the area with audible vegetation noise in breaks of traffic

Summary of noise levels survey results – $L_{Aeq(15min)}$ and $L_{A10(15min)}$

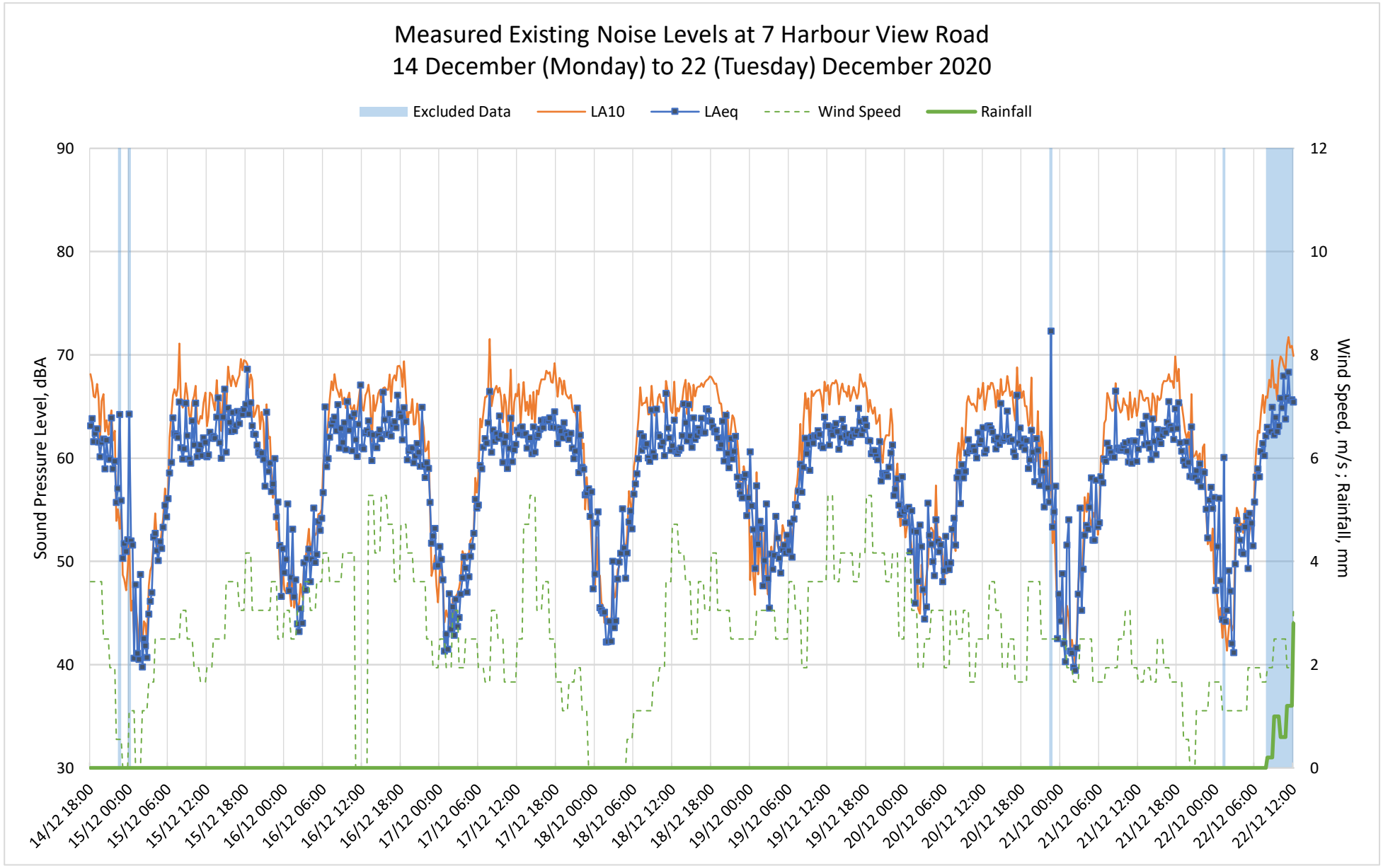
Time	Existing Noise Levels		
	Range	dB $L_{Aeq(15min)}$	dB $L_{A10(15min)}$
Daytime 7:00am – 10:00pm	Lowest	50	50
	Average	62	66
	Highest	69	72
Night-time 10:00pm – 7:00am	Lowest	39	40
	Average	54	55
	Highest	65	66

Summary of noise levels survey results – $L_{Aeq(24h)}$

Date	dB $L_{Aeq(24h)}$
15 December 2020	61
16 December 2020	61
17 December 2020	61
18 December 2020	61
19 December 2020	60
20 December 2020	59
21 December 2020	60
Average	61

Noise levels survey location

Photographs of noise levels survey position


Measured Existing Noise Levels at 7 Harbour View Road
14 December (Monday) to 22 (Tuesday) December 2020
Excluded Data
LA10
LAeq
Wind Speed
Rainfall
Sound Pressure Level, dBA
Wind Speed, m/s ; Rainfall, mm
90
80
70
60
50
40
30
12
10
8
6
4
2
0
14/12 18:00
15/12 00:00
15/12 06:00
15/12 12:00
15/12 18:00
16/12 00:00
16/12 06:00
16/12 12:00
16/12 18:00
17/12 00:00
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20/12 18:00
21/12 00:00
21/12 06:00
21/12 12:00
21/12 18:00
22/12 00:00
22/12 06:00
22/12 12:00

Note: Anomalous and weather affected measurement results have been excluded in the determination of the acoustic parameters

17 Tirohanga Road

Existing noise levels survey details

Parameter	Setting/source
Operator	Edmond Wu
Address	17 Tirohanga Road
Equipment details	Convergence Type 1 SLM Serial CNNer30Qed81KDvAawrRPD
Measurement dates	14 Monday to 22 Tuesday December 2020
Observation	Traffic noise on State Highway 2 being dominant source of noise in the area with occasional traffic noise on Tirohanga Road

Summary of noise levels survey results – $L_{Aeq(15min)}$ and $L_{A10(15min)}$

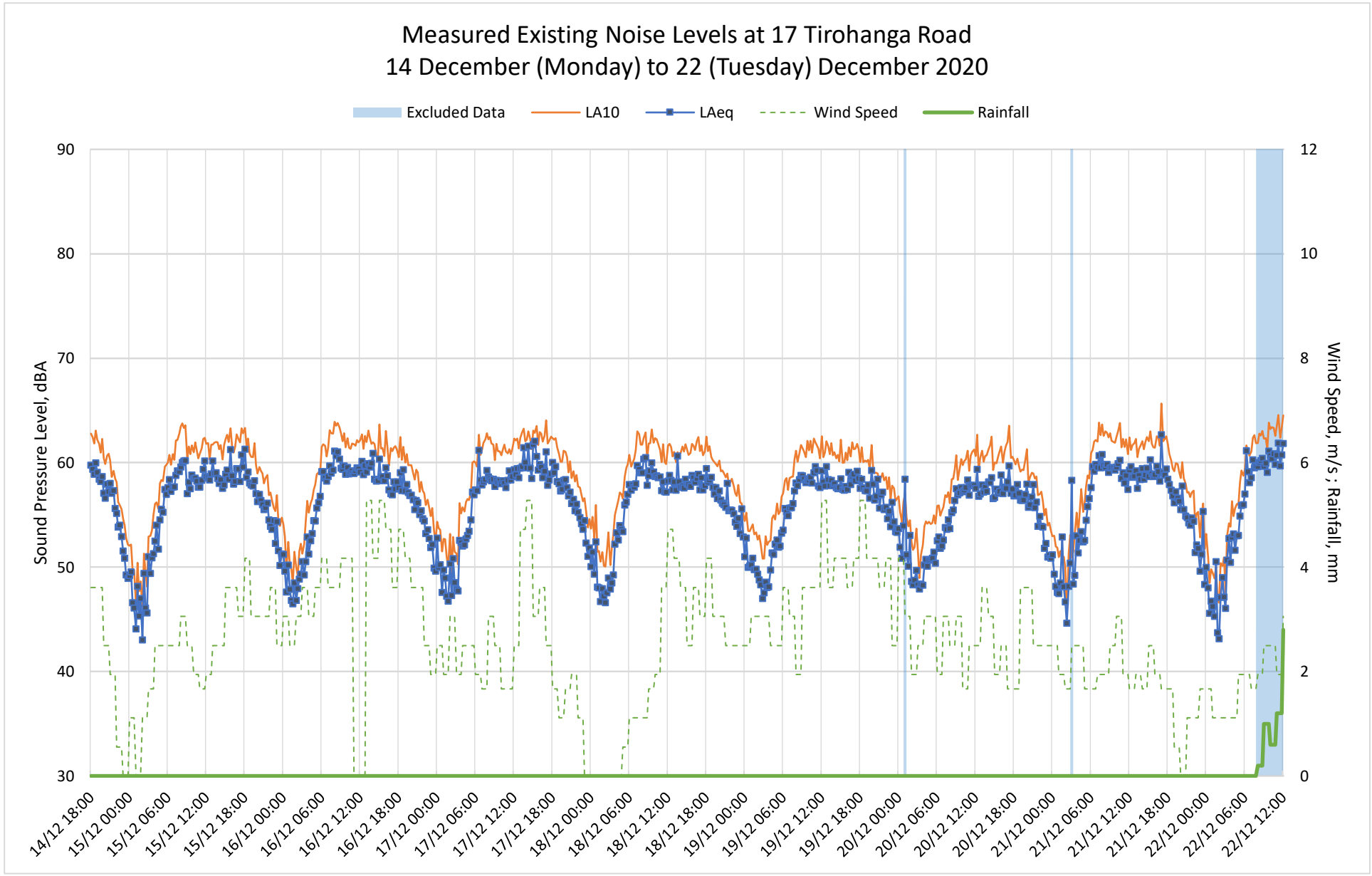
Time	Existing Noise Levels		
	Range	dB $L_{Aeq(15min)}$	dB $L_{A10(15min)}$
Daytime 7:00am – 10:00pm	Lowest	53	56
	Average	58	61
	Highest	63	66
Night-time 10:00pm – 7:00am	Lowest	43	45
	Average	53	56
	Highest	61	63

Summary of noise levels survey results – $L_{Aeq(24h)}$

Date	dB $L_{Aeq(24h)}$
15 December 2020	57
16 December 2020	57
17 December 2020	58
18 December 2020	57
19 December 2020	57
20 December 2020	56
21 December 2020	57
Average	57

Noise levels survey location

Photographs of noise levels survey position



Note: Anomalous and weather affected measurement results have been excluded in the determination of the acoustic parameters

28 Rutherford Street

Existing noise levels survey details

Parameter	Setting/source
Operator	Edmond Wu
Address	28 Rutherford Street
Equipment details	Convergence Type 1 SLM Serial Atj0pvUa0f23Chtw60p5vD
Measurement dates	14 Monday to 22 Tuesday December 2020
Observation	Traffic noise on Melling Link and Rutherford Street being dominant source of noise in the area

Summary of noise levels survey results – $L_{Aeq(15min)}$ and $L_{A10(15min)}$

Time	Existing Noise Levels[1]		
	Range	dB $L_{Aeq(15min)}$	dB $L_{A10(15min)}$
Daytime 7:00am – 10:00pm	Lowest	58	62
	Average	68	70
	Highest	72	73
Night-time 10:00pm – 7:00am	Lowest	45	44
	Average	60	63
	Highest	69	71

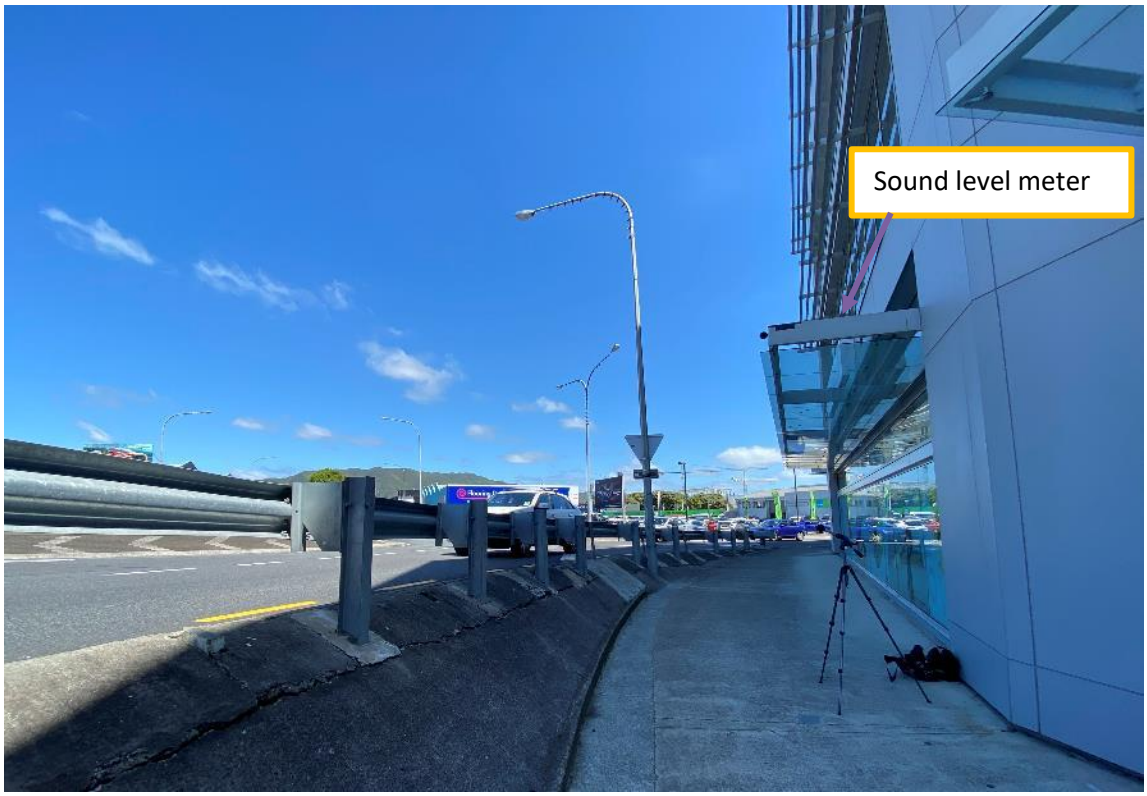
Summary of noise levels survey results – $L_{Aeq(24h)}$

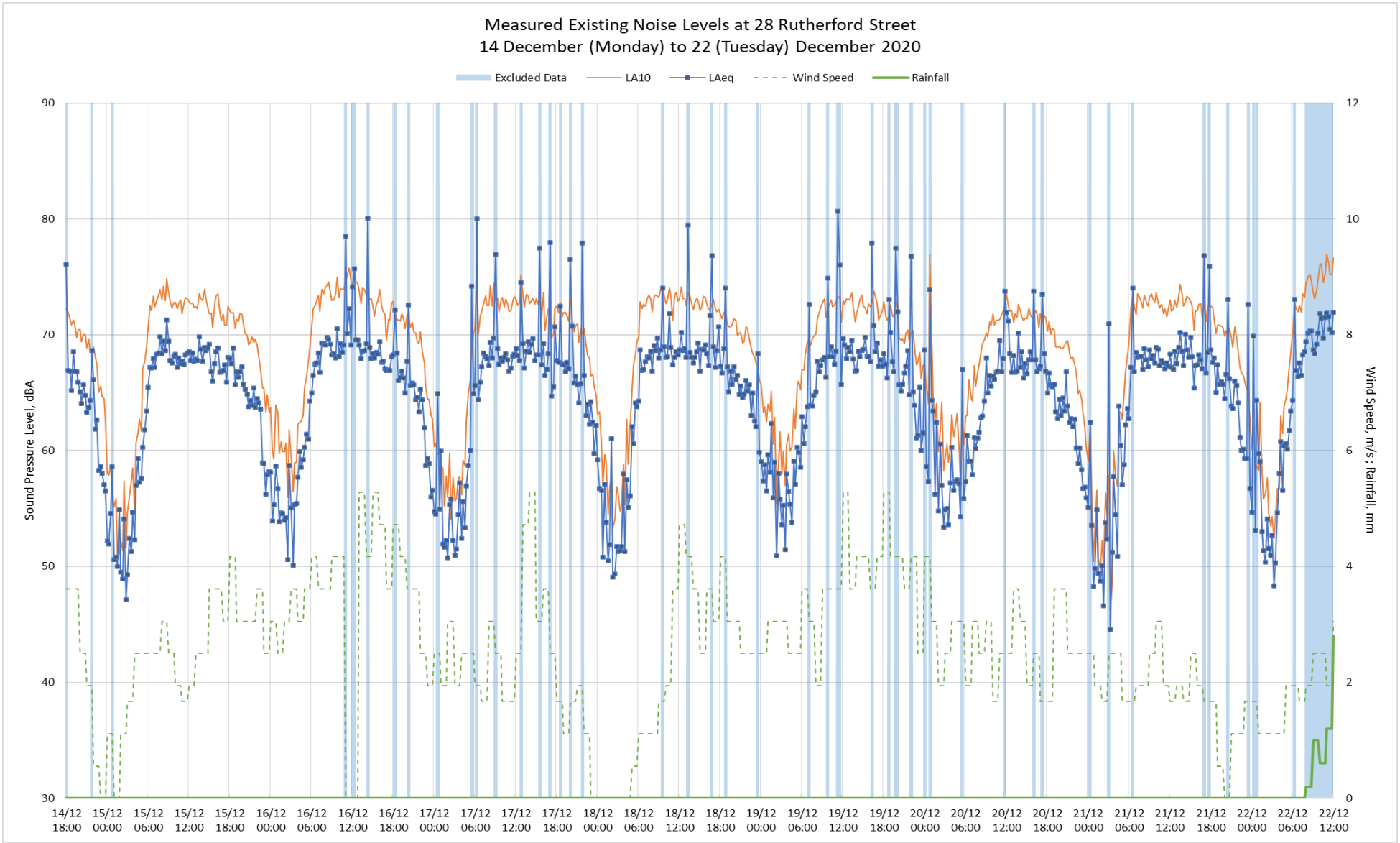
Date	dB $L_{Aeq(24h)}$[1]
15 December 2020	66
16 December 2020	67
17 December 2020	66
18 December 2020	67
19 December 2020	66
20 December 2020	65
21 December 2020	66
Average	66

1. Noise levels survey results presented as free-field noise levels by applying a façade correction of -2.5dB to the measured noise levels in accordance with NZS 6806.

Noise levels survey location

Photographs of noise levels survey position





Note: Anomalous and weather affected measurement results have been excluded in the determination of the acoustic parameters

2 Pomare Road

Existing noise levels survey details

Parameter	Setting/source
Operator	Edmond Wu
Address	2 Pomare Road
Equipment details	Convergence Type 1 SLM Serial CFNUJ30aed2XIDtgS0pZND
Measurement dates	14 Monday to 22 Tuesday December 2020
Observation	Traffic noise on State Highway 2 being dominant source of noise in the area with occasional traffic noise on Pomare Road and Wairere Road

Summary of noise levels survey results – $L_{Aeq(15min)}$ and $L_{A10(15min)}$

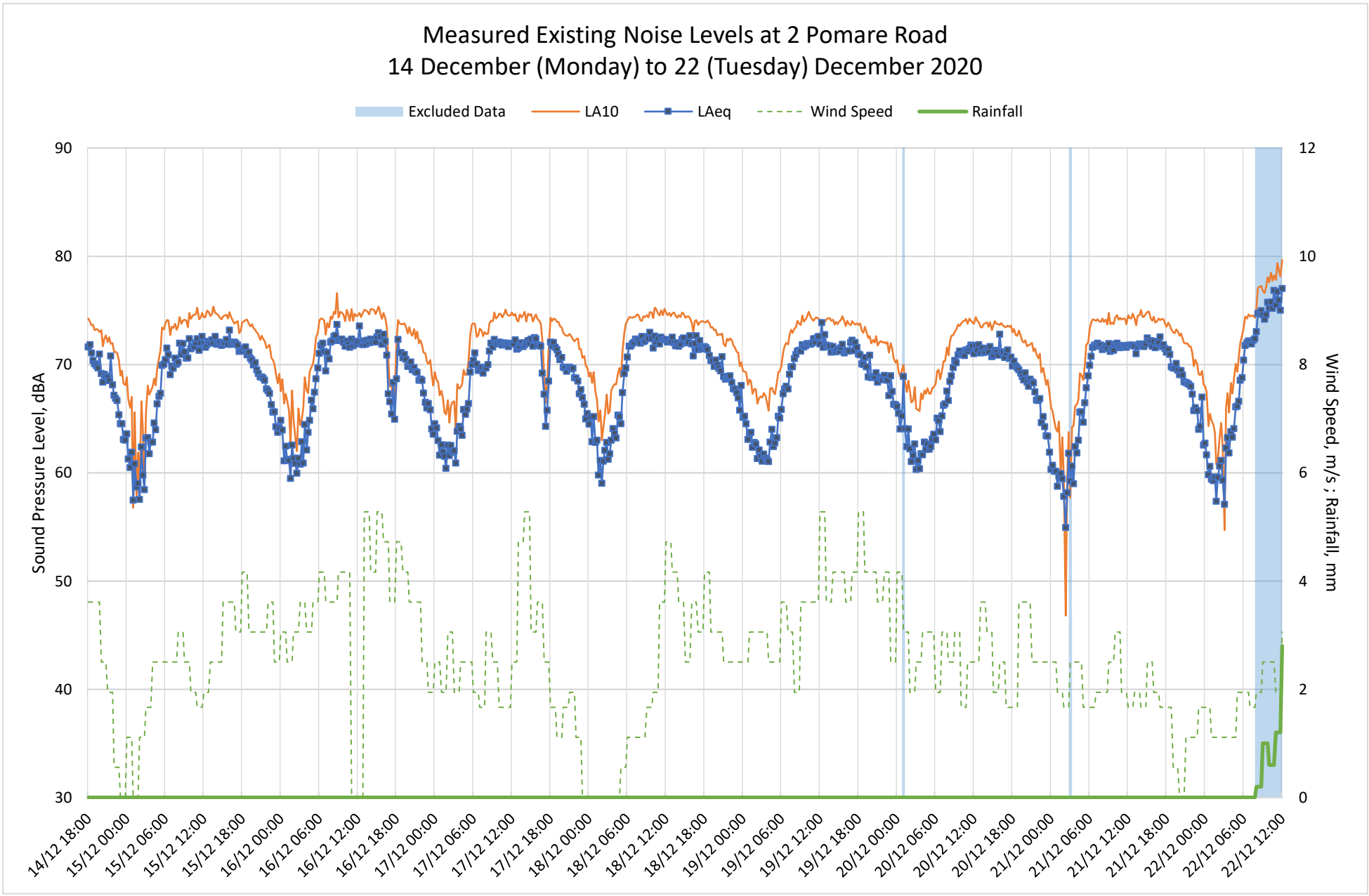
Time	Existing Noise Levels		
	Range	dB $L_{Aeq(15min)}$	dB $L_{A10(15min)}$
Daytime 7:00am – 10:00pm	Lowest	64	66
	Average	71	74
	Highest	74	77
Night-time 10:00pm – 7:00am	Lowest	55	47
	Average	66	70
	Highest	72	75

Summary of noise levels survey results – $L_{Aeq(24h)}$

Date	dB $L_{Aeq(24h)}$
15 December 2020	70
16 December 2020	70
17 December 2020	70
18 December 2020	70
19 December 2020	70
20 December 2020	69
21 December 2020	70
Average	70

Noise levels survey location

Photographs of noise levels survey position



Note: Anomalous and weather affected measurement results have been excluded in the determination of the acoustic parameters