

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of the Proposed Waikato District Plan

**STATEMENT OF EVIDENCE OF CHRISTOPHER WILLIAM DAY FOR
PORTS OF AUCKLAND LIMITED IN RELATION TO HEARING 7 –
INDUSTRIAL AND HEAVY INDUSTRIAL ZONE**

9 DECEMBER 2019

CONTENTS

1. INTRODUCTION	1
2. SCOPE OF EVIDENCE	2
3. NOISE LIMITS	2
4. EXISTING NOISE ENVIRONMENT	3
5. THE NOTIONAL BOUNDARY	7

EXECUTIVE SUMMARY

- A. This statement of evidence addresses the further submissions made by Ports of Auckland Limited ("**POAL**") in relation to noise under 'Hearing 7: Industrial and Heavy Industrial' of the Proposed Waikato District Plan ("**Proposed Plan**").
- B. The Proposed Plan introduces night time noise limits of 40 dB L_{Aeq} to some residential receivers around existing industrial activities. Ambient noise measurements show that 45 dB L_{Aeq} is a more appropriate night time limit for this areas.
- C. The Proposed Plan sets noise limits at the industrial site boundary interface with rural land. This approach would unnecessarily restrict the industrial activity and overly protect land that is 'not used for human habitation' (NZS6802:2008 clause 8.4.4).
- D. The evidence of Mr Mark Arbuthnot proposes modifications to the noise rules to rectify these two deficiencies.

1. INTRODUCTION

1.1 My full name is Christopher William Day. I am a principal and founding partner of the acoustical consulting practice of Marshall Day Acoustics Ltd.

Qualifications and experience

1.2 I hold the qualification of Bachelor of Engineering (Mechanical) from Monash University in Melbourne, Australia.

1.3 For the past 40 years I have worked in the field of acoustics, noise measurement and control in England, Australia and New Zealand, specialising in environmental noise and acoustics for the performing arts. My work over the last 35 years has included noise control engineering and resource management work for various major corporations and City Councils within New Zealand, and I have been engaged on numerous occasions as an expert witness before the Environment Court.

1.4 I have been involved with writing noise rules for District Plan reviews for over 35 years. I have been engaged by Ports of Auckland Limited since 1992 to advise on a range of noise matters.

Code of conduct

1.5 I confirm I have read the Code of Conduct for Expert Witnesses 2014 contained in the Environment Court Practice Note and I agree to comply with it. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise, except where I state I am relying on what I have been told by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

2. SCOPE OF EVIDENCE

2.1 I have been engaged by POAL to review the noise rules within the Industrial and Heavy Industrial provisions of the Proposed Waikato District Plan to be heard as part of Hearing 7.

2.2 In summary, most of the noise rules in the Industrial section of the Proposed Plan are reasonable however, I have become aware of two issues that could benefit from modification;

(a) some night noise limits are unnecessarily low; and

(b) the imposition of a site boundary noise limit is unnecessarily restrictive for the industrial users and is contrary to the widely accepted 'notional boundary' concept.

2.3 My evidence addresses how these two issues are overly restrictive for industrial users and provides recommendations to improve the rules. The proposed wording of the revised rules are provided in the evidence of Mr Arbuthnot.

3. NOISE LIMITS

3.1 The Operative Plan noise rules have historically used the outdated parameter L_{A10} for setting noise limits. The Proposed Plan has correctly changed L_{A10} to L_{Aeq} . There are a number of reasons why L_{Aeq} is more appropriate than L_{A10} however these do not need to be explained here as L_{Aeq} has now been adopted. However, the numerical value used in the limit does need to be considered as there is a difference in value between L_{A10} and L_{Aeq} .

3.2 For most industrial noise sources, the L_{Aeq} will be approximately 2dB less than the L_{A10} for the same source. For example, a freight hub producing 45 dB L_{A10} would measure at approximately 43 dB L_{Aeq} .

3.3 In the Operative Plan, the night-time industrial noise limit was 45 dB L_{A10} for the Country Living and Rural zones – this would equate to

approximately 43 dB L_{Aeq} for the reasons discussed above. In the Proposed Plan, the night noise limit is proposed to be 40 dB L_{Aeq} for residential and rural zones – this is 3 dB more restrictive than the previous operative limit when measured within those properties that are currently zoned Country Living and Rural under the Operative Plan.

3.4 I have not seen any justification of this reduction in noise limit. The normal approach to determining appropriate noise limits is to carry out an ambient noise survey in the applicable area. Higher noise limits are appropriate in higher ambient noise environments and vice versa.

3.5 Noise limits in New Zealand have historically been set using the 'background plus' concept. This concept is based on the premise that intrusive noise is likely to be found acceptable if it is controlled to a level that is 5 to 10 dB (L_{Aeq}) above the background noise L_{A90} (the continuous noise level that is exceeded for 90% of the measurement period). It is thus important to understand the existing noise environment.

4. EXISTING NOISE ENVIRONMENT

4.1 As part of the POAL Freight Hub resource consent application, MDA carried out an extensive ambient noise survey to determine the existing noise environment in the areas surrounding the POAL site. The study involved short-term (attended) measurements and long-term (unattended) noise surveys at the following locations identified in Figure 1 below.

4.2 Long-term unattended noise monitors measured consecutive 15 minute intervals over a 7 day period between 4 and 11 May 2016 at two sites shown in Figure 1 overleaf:

- (a) Logger 1 (Duo) was located at the north end of the WFH site on top of one of the sand mounds with good line of sight to the surrounding roads, NIMT rail line and industrial area.

- (b) Logger 2 (NP5) was located at the south end of the Horotiu Industrial area, with good line of sight to the site, surrounding roads, NIMT rail line and industrial area.

4.3 Short-term attended noise measurements were undertaken near the following residential sites in the wider environment:

- (a) 6241 Great South Road (representative of the closest 'Rural' zoned dwelling to the east).
- (b) 46 Horotiu Road (representative of the closest 'Living' zoned dwelling to the north).
- (c) 62C Ridge Park Drive (representative of the closest 'Rural' zoned dwelling to the south).

4.4 All measurements were undertaken generally in accordance with the relevant standards. A calibration check was carried out prior to and post all survey periods with no notable change in calibration level.

Figure 1: Noise survey locations (Long-term red, short-term yellow)



Long-Term Survey Results

4.5 The results of the unattended long-term noise measurements are summarised in

Table 1 (overleaf). Weather conditions during the long-term surveys were generally fine (total of 2mm rain reported) with little to no wind (less than 2m/s).

4.6 The background noise level (L_{A90} continuous sound) at both locations was controlled by distant road traffic (SH1 and Great South Road). However, the ambient noise level (L_{Aeq} average noise level) at both locations was controlled by intermittent train movements.

4.7 There is approximately one freight train per hour passing the site. They are evenly distributed throughout the day and night periods. Based on the recordings, each train pass is audible for 2-3 minutes at an average noise level of 55 – 57 dB $L_{Aeq(3mins)}$. The average Sound Exposure Level (L_{AE}) of 25 freight train pass-bys at 200m from the NIMT rail line was found to be 78 dB L_{AE} . L_{AE} is a measure of the total sound energy of a specific noise event.

		L_{AFmax}	L_{Aeq}	L_{A90}
Logger 1 (Duo) (WFH site)	Day (7am – 10pm)	55	43	38
	Night (10pm – 7am)	53	41	35
Logger 2 (NP5) (Ridge Park Dr)	Day (7am – 10pm)	59	47	43
	Night (10pm – 7am)	59	47	40

Table 1: Long term noise survey average periods

Location	Period	Noise level (dB)
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Short-Term Survey Results

- 4.8 The results of the attended noise measurements are summarised in Table 2 (over leaf). Weather conditions during all short-term surveys were generally fine (wet ground on 3 August, but no surface water) with a slight northerly wind (less than 2m/s).
- 4.9 The background noise level was generally controlled by distant road traffic, interspersed by occasional local road traffic or train movements.
- 4.10 The sound exposure level L_{AE} of measured freight train movements align with the long-term noise survey results when adjusted for distance.

Table 2: Short-term noise survey results

Location	Date, Time & Duration	L_{AFmax}	L_{Aeq}	L_{A90}	Description of noise sources
6241 Gt Sth Rd	6 May 16, 9.39am 15m 0s	78	63	51	Great South Rd traffic noise
	12 May 16, 11.30pm 15m 0s	75	57	39	Traffic noise, occasional cicadas and birds b/g
46 Horotiu Rd	2 Aug 16, 11.06pm 2m 13s	80	67	42	Train pass-by on MIMT rail line
	2 Aug 16, 11.10pm 15m 5s	78	54	38	3-5 cars on Horotiu Rd, distant road traffic background
	3 Aug 16, 10.40am 7m 38s	83	67	48	Horotiu Road traffic, industrial noise, B/G Gt Sth rd (no train)
	3 Aug 16, 10.48am 52s	81	67	50	Train pass-by
62C Ridge Pk Dr	2 Aug 16, 10.34pm 15m 2s	61	47	37	SH1 road traffic 44 dB L_{Aeq} at 10min, one train pass-by raised level + 3 dB

Discussion

- 4.11 The background noise environment at all sites is controlled by nearby major roads and industrial activities (during the day). The ambient noise environment is heavily influenced by regular train movements.
- 4.12 Overall, the existing noise environment is higher than would normally be experienced in a rural or outer residential area. It is more typical of a suburban area.
- 4.13 The background noise level (L_{A90}) during the critical night time period varies from 35 dB to 42 dB. The ambient noise level varies from 41 dB to 57 dB L_{Aeq} .
- 4.14 In my opinion the existing noise environment supports 45 dB L_{Aeq} as an appropriate night time noise limit for residential dwellings in this area.

5. THE NOTIONAL BOUNDARY

- 5.1 Many years ago, the concept of setting 'residential grade' noise limits at the site boundary of industrial activities in rural areas was determined to be inappropriate as it constrained the activity unnecessarily to provide a residential quality noise environment for land that was occupied by animals and used for intermittent agricultural activities.
- 5.2 This issue has been debated in hearings on occasions and to assist the profession, the latest revision of NZS6802 (2008 version) has clarified the matter in clauses 8.4.4 and 8.4.6 to 8.4.8 copied below.

- 8.4.4** The measurement location should always be defined in terms of 'received sound', that is, immissions. The appropriate measurement location will generally be at any point within an area desired to be protected. In rural environments it is generally dwellings or land in the vicinity of dwellings that require the greatest level of protection. Pasture or land not actually used for human habitation may be afforded an equal or lesser degree of protection (or none at all) depending on the circumstances. There may be special reasons for protecting the amenity of rural land, for example, a natural, cultural or other reason why an area is accorded some special status which distinguishes it from other land. Whether rural land not used for human habitation deserves protection against noise may depend on the suitability of the land for future residential development and the existing or future potential recreational amenity of the land.
- 8.4.6** The notional boundary concept recognises that sound immissions are the basis for protection from noise under the Resource Management Act. Unless special planning reasons exist to justify using the legal boundary rather than the notional boundary of dwellings where lot sizes are large and settlement density is low, 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.
- 8.4.7** Where notional boundary is used, it always relates to a building used for a noise sensitive activity, typically residential. The notional boundary is within 20 m of any side of a dwelling (or other specified class of building). In this context, the term 'façade' is no longer used for legal reasons. If the legal boundary is 20 m from the dwelling, then the measurement location is still at any point within the notional boundary.
- 8.4.8** An important distinction will often need to be made between existing dwellings and potential future dwellings. For reasons now called 'reverse sensitivity', the concept of people coming to a noise source or nuisance not being entitled to an amenity level as if the noise source did not exist has long been upheld. Thus it is common to find the noise assessment location specified as:
- 'at any point within the notional boundary of an **existing** dwelling'.
- Sometimes this is expressed as:
- 'at any point within the notional boundary of any existing dwelling shown on map X attached', or
 'dwellings existing at the date this consent comes into effect'.

- 5.3 The Standard is clear in my opinion that the 'notional boundary' concept is preferred to site boundary noise limits.
- 5.4 Clause 8.4.8 also addresses the issue of 'reverse sensitivity' caused by a potential future change in land use where a noise sensitive activity could be built much closer to the industrial activity and the 'notional boundary' could cause a significant restriction to the industrial activity. For rural zones, it is important to ensure that the 'notional boundary' concept applies to existing noise sensitivity receivers only.
- 5.5 I agree with the Standard's recommended approach (8.4.8) of specifying, "...within the notional boundary of any dwelling existing at the [specify the date when the Plan will become operative]".

- 5.6 The Proposed Plan adopts the ‘notional boundary’ concept for other industrial zones such as the Heavy Industry Zone – Huntly Power Station (21.2.3.2) and the Nau Mai Business Park (20.5.6). I recommend the notional boundary be used for all industrial interfaces with rural zones.
- 5.7 Mr Arbuthnot has recommended modifications to the noise rules to rectify these issues in his evidence.

Christopher Day

9 December 2019