Before the Hearings Panel
At Porirua City Council

Under	Clause 14, Schedule 1 of the Resource Management Act 1991
In the matter of	the Proposed Porirua District Plan
Between	**Various**
	Submitters
And	**Porirua City Council**
	Respondent

Statement of Evidence of Nigel Robert Lloyd on behalf of Porirua City Council
Noise

Date: 1st December 2021

INTRODUCTION:

1 My full name is Nigel Robert Lloyd. I am employed as an acoustic consultant.

2 I have prepared this statement of evidence on behalf of the Porirua City Council (**Council**) in respect of technical related matters arising from the submissions and further submissions on the Proposed Porirua District Plan (**PDP**).

3 Specifically, this statement of evidence relates to the matters in Part 2: District-Wide Matters - Noise and APP1 - Permitted Noise Standards and TEMP and APP2 – Noise Standards for Temporary Military Training Activities.

4 I am authorised to provide this evidence on behalf of the Council.

QUALIFICATIONS AND EXPERIENCE

5 I have a degree in mechanical engineering gained at the University of Wales University College Cardiff in 1976.

6 I am an acoustical consultant with Acousafe Consulting & Engineering Limited, a position I have held for 36 years. Prior to my current position, I was employed by the Industrial Acoustics Company in the UK as an acoustical consultant between 1977 and 1980 and then spent five years as the Department of Labour noise control engineer in New Zealand, advising the safety inspectorates on occupational noise management and control. I have a total of over 40 years' experience as a noise control engineer/acoustical consultant.

7 I have advised Palmerston North City Council and New Plymouth District Council on the noise aspects of their District Plans including Temporary Military Training Activity provisions.

8 I am a Member of the Acoustical Society of New Zealand and the Association of Australasian Acoustical Consultants, and I have completed 'Making Good Decisions' courses.

CODE OF CONDUCT

9 I have read the Code of Conduct for Expert Witnesses set out in the Environment Court's Practice Note 2014. I have complied with the Code of Conduct in preparing my evidence and will continue to comply with it while giving oral evidence before the Environment Court. My qualifications as an expert are set out above. Except where I state I rely on the evidence of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from my expressed opinions.

INVOLVEMENT WITH THE PROPOSED PLAN

10 I advised the Council in 2011 on its proposals to revitalise the City Centre, then in 2015 I provided a Discussion Document on the District Plan review. I also provided a letter to Council dated 10 June 2020 providing additional advice on the management of reverse sensitivity effects on state highways and rail lines.

11 I provided a review of District Plan Noise Provisions in 2018[1].

12 I also provided a review of Temporary Activity Noise in 2019[2].

[1] Review of District Plan Noise Provisions for Porirua City Council, Acousafe Consulting & Engineering Lts 7 December 2018.

[2] District Plan Review of Temporary Activity Noise for Porirua City Council, 5 June 2019.

SCOPE OF EVIDENCE

13 My statement of evidence addresses the following submissions:

13.1 Waka Kotahi NZ Transport Agency (82)

13.2 KiwiRail (86)

13.3 New Zealand Defence Force (124)

14 In addition, Council has asked me to consider submissions that have requested that the definition of 'noise sensitivity activity' be modified to include 'places of worship' and 'retirement villages', and to say whether I consider that it is appropriate to include these land uses in the definition.

WAKA KOTAHI (82)

15 Waka Kotahi seeks to replace noise rules NOISE-R5 and NOISE-S1 to NOISE-S6 with the rules they provide in Appendix Four of their submission.

<u>Citing external information</u>

16 The first part of Waka Kotahi's request suggests that people contact them to determine if the road noise in their location is below 57 dB $L_{Aeq(24)}$ in order to determine if the District Plan rules apply. I have discussed this with Council's planners, and I agree with them that it is not appropriate to cite a third party in the District Plan to determine if a resource consent is required.

17 The road traffic noise analysis and assessment must form part of the Design Certificate process from a *suitably qualified and experienced professional* as set out by NOISE-S1. This design certificate could be informed by information available from Waka Kotahi or from other sources (such as actually measuring the road traffic noise at the

location of interest to determine the level of acoustic insulation required).

18 I do not agree with this aspect of the Waka Kotahi submission.

Noise Barriers

19 The section under "*outdoor road noise*" (P94 of Appendix Four) mandates 3 metre high noise barriers next to State highways to control the outdoor noise levels for noise sensitive activities, with no alternative.

20 Conceptually, (besides the practicality of such a performance standard) I disagree with the need for such a measure. The spaces to the rear of dwellings are normally screened from traffic noise and this provides an appropriate aural amenity area. This is a natural function of dwelling design and site layout.

21 Providing for State highway noise barriers in a District Plan does not generally work for a number of reasons, such as:

(a) Noise barriers for roads are unreliable where adjoining land is owned in separate titles and where the need for the barrier depends on it being situated on land in the ownership of others;

(b) Any spaces between sections of the barrier (such as for accessways) reduces the effectiveness;

(c) Each barrier has to meet a certain standard (such as having a certain superficial density and being without gaps) to be effective.

22 The requirement proposed by Waka Kotahi is that line of sight is blocked between the road surface and a position 1.5 metres above ground level within the proposed notional boundary. The notional boundary is a line 20 metres from any side of a dwelling, or the legal

boundary where this is closer to the dwelling. If the barrier only needs to interrupt the line of site between a point 1.5 metres above the ground and the road surface, then it is unclear why the barrier needs to be 3 metres high. Put another way, a sloping section makes the mandate for the barrier to be 3 metres high potentially redundant.

23 For these reasons I do not agree with the part of the Waka Kotahi submission around outdoor noise.

Indoor noise limits and mechanical ventilation

24 Waka Kotahi seek maximum road noise levels (limits) in Table 1 of Appendix Four of their submission.

25 The noise performance standards in the Waka Kotahi submission are 40 dB $L_{Aeq(24H)}$ both for sleeping spaces and for other habitable rooms[3]. There is therefore no need to separate them into these two categories.

26 The internal noise criterion in NOISE-S1-1 for habitable rooms is 40 dB $L_{Aeq(24H)}$.

27 Otherwise, the criteria in Table 1 of the Waka Kotahi submission are within the design sound levels recommended by the relevant NZ Standard[4]. From an acoustic viewpoint Table 1 of the Waka Kotahi submission could be used as the criteria in NOISE-S1 but I consider that NOISE-S1 is appropriate.

[3] Road noise varies between daytime and night-time and this allows the $L_{Aeq(24H)}$ criterion to apply both to rooms that accommodate daytime activities and to bedrooms. There therefore no need to differentiate bedrooms from *habitable rooms.*

[4] AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors.

28 With respect to mechanical ventilation. The need for alternative ventilation (where windows need to be kept closed against the noise) is set out in NOISE-S3.

29 I am not a suitably qualified and experienced professional when it comes to ventilation.

30 My reading of the Waka Kotahi submission is that the main difference it seeks is for the ventilation system to provide cooling and heating that is controllable by the occupant and can maintain the inside temperature between 18 degrees and 25 degrees centigrade.

31 I consider that the need is to replace the lost ventilation requirements caused by needing to keep the windows closed and that, logically, this can be achieved by satisfying the requirements of clause G4 of the NZ Building Code, which is what is principally required by NOISE-S3.

32 Going beyond a simple requirement to provide mechanical ventilation to satisfy G4 by providing heating and cooling and limiting the noise of the ventilation might be desirable but it does not sit comfortably in the District Plan which Council needs to administer.

33 I therefore do not agree with that the Waka Kotahi submission in regard to the need to expand the indoor noise standards in NOISE-S1 or alter the ventilation requirements in NOISE-S3.

<u>Indoor vibration standard</u>

34 The indoor vibration standard sought by Waka Kotahi is the same as the criterion in NOISE-S4 which references Norwegian Standard 8176 E:2005 (which has now been superseded by the 2017 version). I do not consider that a vibration standard is necessary, for the reasons I explain below, but if reference is to be made to one then it should be to the latest version i.e. Norwegian Standard NS 8176:2017 *Vibration and Shock – Measurement of vibration in buildings from land-based*

transport, vibration classification and guidance to evaluation of effects on human beings.

35 The performance standard in NOISE-S4 is that habitable rooms must comply with class C in the NS 8176 Standard. Class C corresponds to satisfactory vibration conditions for a large proportion of exposed people and is defined in Table 1 of the NS 8176 Standard as the statistical maximum value of weighted velocity, 0.3mm/s $V_{w,95}$.

36 This is the same standard as sought by Waka Kotahi.

37 My previous stance on setting indoor vibration standards has been that, while this is a logical step, road vibration tends not to be a major issue.

38 As stated on the Waka Kotahi website[5], significant vibration issues mostly occur where there is a defect in the road surface. This would be the responsibility of Waka Kotahi to remedy. I consider that the cost and inconvenience that would result from requiring the developers of noise sensitive buildings to obtain a design certificate to achieve NOISE-S4-1 is not warranted given the low likelihood of road vibration being an issue.

39 I have reproduced the FAQ section of the Waka Kotahi Website dealing with vibration as Appendix A of my evidence. This section gives a context to the likely lack of any severity of road vibration and the potential injustice of imposing the costs of defective road surfaces on developers of noise (vibration) sensitive activities. If issues are found with vibration at a site, then I discuss the difficulties in providing remedial works (such as vibration isolated foundations) in my discussion of the KiwiRail submission below.

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[5] https://www.nzta.govt.nz/roads-and-rail/highways-information-portal/technical-disciplines/noise-and-vibration/frequently-asked-questions/road-traffic-vibration-faqs/

40 The issues with vibration standards as they relate to New Zealand are usefully canvassed by acoustician James Whitlock[6]. This 2010 paper discusses the historical issues between the different international vibration standards. Unfortunately, there is no New Zealand Standard for vibration.

41 The recommendation in Acousafe's review dated 7th December 2018 was that buffer distances should only apply to State highways where the speed limit is 60km/h or greater[7] and that this is more appropriate for the Rural Zone (and new sub-divisions close to Transmission Gully).

42 NOISE-R5 provides for noise sensitive activities to be Permitted Activities where they are further than 40 metres from the outer painted lane marking, where the speed limit is greater than 60 km/h, and further than 20 metres when the speed limit is 60 km/h or less. NOISE-S4 provides for noise insulation of those noise sensitive activities, and I consider these distances and insulation requirements to be appropriate.

43 NOISE—R5-3 provides for an activity status of Restricted Discretionary where noise sensitive activities are to be located closer than these set-back distances. Compliance is to be achieved with NOISE-S1 (for State highways), NOISE-S3 (for ventilation) and the vibration standard in NOISE-S4.

44 For the same general reasons that I explain below, I do not consider that it is an efficient use of resources to impose the vibration standards in NOISE-S4 given the low risk of vibration issues occurring. This would

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[6] https://www.acoustics.org.nz/sites/www.acoustics.org.nz/files/journal/pdfs/Whitlock,_J_NZA2011.pdf

[7] My understanding is that Waka Kotahi avoids using the speed limit of 70 km/h on State highways, therefore >60 km/hr means equal to or greater than 80 km/h.

not stop obvious vibration issues from being considered as part of a resource consent application.

KIWIRAIL (86)

45 I have been asked by Council to also address **vibration** from the railway line.

46 Introducing new District Plan vibration standards will not significantly alter the historical reverse sensitivity issues with many dwellings being constructed closer than 30 metres to the railway line and some closer than 10 metres. NOISE-R5-1(b) has a set-back distance of 30 metres.

47 NOISE-R5-3(iv) requires that compliance be achieved with NOISE-S4 for noise sensitive activities to be constructed closer than 30 metres to the railway line.

48 The level of railway vibration that would be experienced by a sensitive activity would depend on:

48.1 Maintenance of the railway line,

48.2 Maintenance of the rolling stock,

48.3 The geomorphology – the ability to generate vibration and its transmissibility through the intervening landform.

49 A November 2017 report on railway vibration[8] is a useful reference.

50 This report identifies that, whether the vibration can be perceived depends on many factors, including distance to the source, speed and type of trains, quality of the track, type and build-up of the ground, and the construction of the building itself. Modifications performed in the

[8] Railway Vibration – State of the Art Report by Principal author Paul de Vos, Satis and edited by Nick Craven with input from the members of the International Union of Railways.

soil (modification of the sewer network, for example) or even in adjacent buildings can give rise to an increase of vibration.

51 Vibration caused by passing trains is far too weak to cause even cosmetic damage to buildings. Nevertheless, residents affected by vibration may experience annoyance and could voice concern. The degree to which the vibration sensation is masked by audible noise can also play a role, as well as personal sensitivity.

52 For railways, vibration is most often generated by the contact between the train wheel and the railway track. The vibration then travels from the track, through the ground and into the building foundation. Generally, the strength of ground vibration reduces as one moves away from the track. However, the strength of vibration may increase when moving up floors inside the building due to resonances of the building structure.

53 KiwiRail has some control over the level of vibration that its activities generate. Vibration is caused at different frequencies at different train speeds. For example, track unevenness typically generates vibration between 2 Hz and 200Hz with a train travelling at 80 km/h. Noise and vibration occur due to rail corrugation, wheel unevenness and wheel polygonization, but feelable ground borne vibration generally occurs in the range of 1 Hz to 80 Hz.

54 Vibration levels will change with time and would have to be measured in each case. There are a limited number of acoustic specialists who are willing and/or able to do this and Council does not have the expertise or equipment to check on vibration.

55 If vibration levels exceed a permitted standard at a noise sensitive location, then it is technically demanding and expensive to construct a dwelling on anti-vibration mounts to counter this. An example of elastic bearing in a building foundation is shown in Figure 1.

Figure 1. An example of an elastic bearing in a building foundation (Source CDM Group)

56 Considering the rail corridor through Porirua, some dwellings have been built within ten metres of the railway line. The issue with a new vibration rule is that it will present a major hurdle to the process of dwellings being constructed close to the railway line. The vibration assessment process itself is complex and if dwellings need to be constructed on anti-vibration foundations, then this is likely to prove to be technically demanding and cost prohibitive.

57 The current NOISE-R5 rule makes any noise-sensitive activities within 30 metres of the railway line a restricted discretionary activity. While I consider that developing noise sensitive activities near to the NIMT should be discouraged, requiring compliance with the vibration standard in NOISE-S4 would effectively prevent the development of land. Developers would commence with a technical analysis of vibration only to find the solutions unpalatable.

58 I do not consider that NOISE-S4 is an efficient method of protecting development of noise sensitive activities from railway vibration.

NEW ZEALAND DEFENCE FORCE (124)

59 I have set out the differences between the noise standards in APP2 and the relief sought by NZTA for Temporary Military Training Activities ("**TMTA**") in Appendix B of my report.

60 APP2 uses a significantly greater separation distance than sought by NZDF. The APP2 distances have been taken from the original recommendations that were based on work undertaken by Malcolm Hunt and Associates for NZDF[9] ("**The Hunt Report**").

61 I do not consider there is a need to analyse the difference between these separation distances because the space is quite limited as to where TMTA could take place the Porirua City District that is greater than 500 metres from a noise sensitive activity. This is the shortest separation distance sought by TMTA (even in daytime) for TMTA to be a permitted activity.

62 TMTA will struggle to comply with the APP2 separation distance noise standards therefore, particularly at night-time, and would find it difficult to locate where it could be a Permitted Activity under TEMP-R6.

63 The critical consideration then becomes the appropriateness of the revised noise standards sought by NZDF to mitigate effects on noise sensitive activities, taking into account the temporary nature of the noise generating activity.

64 My main concern is with the night-time noise impacts of live firing and battle simulations, including explosions.

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[9] Re-Assessing Noise from Temporary Military Training in New Zealand District Plan Recommendations, Malcolm Hunt Associates, January 2013

65 My issue is not with the noise level itself rather that people who hear even distant gunfire (battle simulations) will be perturbed or frightened. I note from the NZDF submission that they would give notice to Council 5 working days prior to the activity taking place but it is unclear how Council or NZDF could proactively communicate to the community over the wide area that would be impacted prior to these activities taking place.

66 My concern is that the nature of battle simulation noise at night-time in particular, will be audible for long distances and would be likely to wake people in the wider community and cause consternation.

67 In terms of the daytime (7am to 7pm) standard, I consider it to be prudent to replace the APP2 standard of 120 dBC with 95 dBC as proposed by the NZDF submission.

68 As far as the night-time 85 dBC standard is concerned, for battle simulation, this approximates to an L_{AFmax} of 80 dB (according to the Hunt Report). Given that this noise is likely to be quite noticeable at night and that the character of this noise could be perturbing to people, I consider that weapons firing, explosives and battle simulation noise even below 85 dBC peak would be disturbing and inappropriate between the hours of 7pm and 7am.

69 There is little if any space that is a sufficient distance from noise sensitive activities in the Porirua District to allow for night-time live firing of weapons, single or multiple explosions (4500m) or firing of blank ammunition (2250m). I do not agree with the NZDF submission and I recommend that night-time (7pm to 7am) live firing of weapons, single or multiple explosions or firing of blank ammunition should not be provided for as permitted activities.

70 With respect to other mobile noise sources, the relief sought by NZDF is similar to the provisions of APP2.

71 For other stationary noise sources, the relief sought by NZDF is to make the noise standard stricter in the evening (50 dB $L_{Aeq(15\ mins)}$ 7pm to 10pm). This brings the standard in line with the General Rural Zone noise standard (see APP1-Table 2) and is appropriate.

72 It is not ideal to use NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas for the temporary use of helicopters as part of TMTA. This is because of the work that would be required to demonstrate compliance prior to any exercises. However, helicopters could not normally comply with standards such as NZS 6802:2008 or the District Plan noise limits. On that basis I consider that it is reasonable to use NZS 6807:1994 for temporary TMTA helicopter landing areas as sought by NZDF.

73 I consider that the replacement of APP2 with the revised standards proposed by NZDF would be inappropriate for the reasons above. I do, however, recommend that some of the amendments to APP2 sought by NZDF should be made. I have shown these in red in the revised version of APP2 attached as Appendix C to my statement of evidence. Some of these changes clarify the purpose of APP2 and I have set out the reasons for other changes in my evidence.

DEFINITION OF NOISE SENSITIVE ACTIVITY

74 Both Waka Kotahi NZ Transport Agency ("**Waka Kotahi**") (82.17) and Radio New Zealand Limited ("**RNZ**") question whether places of worship and/or retirement villages should be included in the definition of *noise sensitive activity*.

75 Waka Kotahi considers that *retirement village* is already considered to be a *residential activity* and can therefore be excluded from the definition. I am informed by Council though that *'retirement villages*' are considered to be commercial activities.

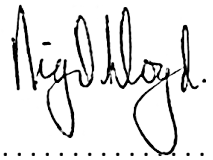
76 Radio New Zealand seeks to include *retirement villages* within the definition of *noise sensitive activities*.

77 I consider that the residential aspect of retirement villages are noise sensitive activities and that Standards NOISE-S1 and NOISE-S2 need to provide protection to habitable rooms and bedrooms of retirement villages. If there is any doubt about residential accommodation in retirement villages being *noise sensitive,* then this should be remedied.

78 With respect to *places of worship*, both of these submitters seek to include places of worship within the definition of noise sensitive activities. The issue here though, is that the noise insulation rules for noise sensitive activities apply to habitable rooms in NOISE-S1 and habitable rooms and bedrooms in NOISE S2, which *places of worship* do not have[10]. NOISE-S1 and NOISE-S2 separately identify the noise management requirements and indoor sound levels for places of worship alongside those for noise sensitive activities.

79 I consider that this is appropriate and recommend that the submissions seeking that *places of worship* be included in the definition of *noise sensitive activities* be declined.

Date: 1/12/2021 Nigel Robert Lloyd



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[10] Unusually, the definition of *Habitable Room* includes "offices", which although somewhat anomalous, does not affect my overall assessment about whether *Places of Worship* should be categorised as *Noise Sensitive Activities.*

Appendix A

Extract from Waka Kotahi Website Discussing Road Vibration

There are several factors which influence vibration arising from road traffic at nearby houses. These include the following:

Distance from road to house: Vibration levels decrease with distance from the road. Although it is unlikely, vibration levels may occasionally exceed annoyance criteria when a house is located within 20m of the active carriageway of a road. At distances greater than 20m it becomes increasingly less likely annoyance criteria will be exceeded.

Condition of road surface: In most cases where significant vibration is identified, the cause is a defect in the road surface, such as a pothole, rutting, or a poor transition to a manhole cover.

Traffic conditions: Road traffic vibration is related to traffic volume (number of vehicles travelling a road per day will affect frequency of occurrence), traffic speed (vibration is proportional to speed), and the number of heavy vehicles using a road.

Presence of underground services/utilities: In some case vibration might travel farther distances from a road or occur at higher levels if underground services are poorly constructed (generally poor backfilling of a trench), and/or if services such as waterlines or drains, are leaking causing deterioration of trench backfill.

Ground conditions: The magnitude of vibration and the distance vibration levels are felt can depend on the both the soil type and the stratification of soil. Vibration travels farther in hard/stiff soils than in loose/soft soils. Vibration can also travel 'preferentially' in hard/stiff layers of soil.

House foundation/construction type and condition: The type and condition of house foundation can influence vibration levels felt inside. Vibration is more likely to be felt in houses with foundations in poor condition, foundations with 'rigid' connections between the ground and the house, and/or with significant surface area contact between the ground and the foundation. House construction can also influence the vibration levels felt inside, such as whether there is a timber or concrete floor.

Road pavement condition: In some cases, road pavements (the engineered soil layer provided beneath the road surface to allow for a stable and smooth road surface) deteriorate over time causing defects in the road surface that might cause vibration issues. Occasionally, pavements in poor condition may also directly induce vibration in near surface soils that can be felt at nearby houses.

Appendix B

Temporary Military Training Activity

Comparison of APP2 with Relief Sought by NZDF

ACTIVITY	APP2 NOISE STANDARD	RELIEF SOUGHT
Live Firing Weapons and single or multiple explosions	7.00am to 7.00pm – 1,500m separation*	7.00am to 7.00pm – 500m separation**
	7.00pm to 7.00am – 4,500m separation*	7.00pm to 7.00am – 1,250m separation**
Firing of blank ammunition (N.B. in the NZDF submission this activity is not differentiated from *Live Firing*)	7.00am to 7.00pm – 750m separation*	7.00am to 7.00pm – 500m separation**
	7.00pm to 7.00am – 2,250m separation*	7.00pm to 7.00am – 1,250m separation**
Other mobile noise sources	Comply with tables 2 and 3 in NZS 6803:1999	Comply with tables 2 and 3 in NZS 6803:1999 with a further clarification that 'construction noise' is taken to refer to mobile noise sources.
Other stationary noise sources	7.00am to 10.00pm – 55 dB $L_{Aeq(15\ mins)}$	7.00am to 7.00pm – 55 dB $L_{Aeq(15\ mins)}$ 7.00pm to 10.00pm – 50 dB $L_{Aeq(15\ mins)}$
	10.00pm to 7.00am - 45 dB $L_{Aeq(15\ mins)}$ 75 dB L_{AFmax}	10.00pm to 7.00am – 45 dB $L_{Aeq(15\ mins)}$ 75 dB L_{AFmax}
Weapons Firing and/or the use of explosives (N.B. These criteria apply generally and as stand-alone standards in APP2 but in the NZDF submission are specific to this activity and alternatives to the set-back distances)	7.00am to 7.00pm – 120 dBC	7.00am to 7.00pm – 95 dBC
	7.00pm to 7.00am – 90 dBC	7.00pm to 7.00am – 85 dBC
Helicopter landing areas	Helicopter noise is exempted when used in emergencies or as air ambulances but otherwise the Plan is silent.	Compliance with NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas
Measurement and assessment of noise	District Plan requirements are NZS 6801-2008 and NZS 6802:2008 unless otherwise strictly provided for (*as for Other Mobile Noise Sources*).	Reference to NZS 6803:1999 for mobile noise sources, NZS 6807:1994 (and NZS 6801:2008) for helicopter noise, and NZS 6802:2008 for Fixed (Stationary) noise sources.

Appendix C

Temporary Military Training Activity

Recommended Changes to APP2

Noise Source	Time	Minimum Separation Distance
Live firing weapons and single or multiple explosive events	7.00am to 7.00pm	1500m
	~~7.00pm to 7.00am~~	~~4500m~~
Firing of blank ammunition	7.00am to 7.00pm	750m
	~~7.00pm to 7.00am~~	~~2250m~~
Other mobile sources other than firing of weapons and explosives, but including personnel, light and heavy vehicles, self-propelled equipment and earthmoving equipment.	Shall comply with the noise limits set out in tables two and three in ~~the NZS on Acoustics – Construction Noise (NZS 6803:1999)~~ NZS 6803:1999 Acoustics – Construction Noise with reference to 'construction noise' taken to refer to mobile noise sources.	
Other stationary sources – this includes power generation, heating, ventilation or air conditioning systems, or water or wastewater pumping/treatment systems	7.00am to ~~10.00pm~~ 7.00pm	55 dB $L_{Aeq(15\ min)}$
	7.00pm to 10.00pm	50 dB $L_{Aeq(15\ min)}$
	10.00pm to 7.00am	45 dB $L_{Aeq(15\ min)}$ 75 dB L_{Amax}

Between 7.00am to 7.00pm noise levels shall not exceed a peak sound level of ~~120~~95dBC at or within the notional boundary of a noise sensitive activity.

~~Between 7.00pm and 7.00am noise levels shall not exceed a peak sound level of 90dBC measured at or within the notional boundary of a noise sensitive activity.~~

Helicopter landing areas shall comply with NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas.