

Under the Resource Management Act 1991

In the matter of the Central Hawkes Bay Proposed District Plan

Statement of evidence of Jon Robert Styles (Noise)

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1. EXECUTIVE SUMMARY

- 1.1 My evidence relates to the Proposed District Plan (**PDP**) standards relating to noise sensitive activities adjacent to State Highways and the railway network (the **road and rail network**) that are operated by Waka Kotahi and KiwiRail (the **transport authorities**).
- 1.2 In fundamental terms, I support controls that seek to manage the community's exposure to unreasonable noise, where evidence (noise modelling) demonstrates controls to be warranted.
- 1.3 It is well accepted and globally recognised that exposure to noise from road, rail and air transport infrastructure, industry, ports commercial activities and a variety of other sources has the potential to generate high levels of annoyance and adverse health effects if it is not managed carefully.
- 1.4 In my opinion, based on my experience and review of the Central Hawke's Bay network generally, the road traffic volumes, vehicle speeds and rail volumes in some parts of the district are such that noise levels are likely to exceed the WHO Guidelines for a number of existing noise sensitive activities that are close to the transport infrastructure.
- 1.5 I consider that the PDP's focus on avoiding reverse sensitivity effects on the Transport Authorities is misdirected.
- 1.6 The issue at-hand is that the transport networks are generating noise effects on the existing environment that are likely to be significant in many instances – especially in urban areas. The effects are being generated and received now. In my view these are serious adverse effects on health and amenity. It is these effects that the PDP needs to manage.
- 1.7 I consider that if the PDP provisions address the primary adverse health and amenity effects that are being experienced, there will be no reverse sensitivity effects.
- 1.8 I have not been able to find any examples of reverse sensitivity effects arising on the Transport Authorities in the Central Hawke's Bay from the s32 Topic Report (the **s32**), s42A Report or Waka Kotahi's submission.

- 1.9 I consider that the adverse noise effects from land transport needs to be managed at the source as the priority. Any development controls imposed on activities sensitive to noise in the surrounding environment should only be imposed when they are demonstrated to be necessary to address adverse noise effects on receivers and in circumstances where the noise and vibration cannot be reduced to an acceptable level, after the Transport Authorities have adopted the Best Practicable Option (**BPO**) to reduce noise from their networks.
- 1.10 The PDP provisions shift the burden of mitigating land transport noise effects entirely on to the occupants of the receiving environment. This burden applies to all existing and future noise sensitive activities. These costs have not been quantified in the s32. While Objective NOISE-03 seeks to address reverse sensitivity effects from **new** noise sensitive activities, NOISE-S3 requires acoustic treatment to be applied to **all** noise sensitive receivers within a standard 100m effects area¹ from the edge of all parts of the District's State Highway and rail networks.
- 1.11 Proposed standard NOISE-S3 relies on a standard metric setback of 100m. This distance is based on the "worst-case" potential noise emissions at maximum distances from the corridors. This approach is crude and does not take into account various factors that influence the propagation of noise across the receiving environment.
- 1.12 It is probable that in many circumstances across the District where speeds and / or traffic volumes are low , the effects areas from State Highways could be as little as 20m or less. If the standard 100m metric setback is bigger than it actually needs to be, it will lead to potentially significant and unnecessary costs being incurred for noise sensitive activities adjacent to the networks.
- 1.13 I consider that the method for defining the extent of the effects beyond the designation boundaries should be based on modelled setbacks. This approach ensures the mitigation response by the community does not extend any further into the community than is absolutely necessary, while allowing the noise generator to function efficiently.
- 1.14 Determining the mitigation response to noise effects from the District's railway network requires a more detailed evaluation. In my opinion, it has not been

¹ This approach is referred to as "standard metric setbacks" throughout this evidence.

established that there are enough trains on the District's railway network to warrant a mitigation response.

- 1.15 I consider that that the noise effects from the State Highway and railway networks need to be accurately predicted and mapped to take into account the specific local circumstances that heavily influence the propagation of noise (including topography, permanent screening, noise barriers and other features). This is particularly relevant for the low speed environments through townships and where traffic flows are relatively low.
- 1.16 "Modelled setbacks" are recognised by Waka Kotahi's own section 32 analysis (provided to other District Plan reviews) as being:
- "the preferred approach to manage the potential health and amenity effects of transport network operations, and to and provide a reasonable and appropriate balance between cost and benefit....The Modelled Setback/Option B are considered to represent the most appropriate means of achieving the proposed objective and of addressing the underlying resource management issues relating to the transport environment, human health and amenity."*
- 1.17 Importantly, this approach will ensure that the community does not bear an unreasonable and unnecessary mitigation burden as the contours would not extend any further into the community than is absolutely necessary.
- 1.18 In my experience, requiring simple compliance with clause G4 of the Building Code will supply a relatively low volume of fresh air, but will not provide any appreciable cooling for occupants. This will lead to occupants opening windows and doors to achieve adequate thermal comfort, particularly in the warmer months.
- 1.19 I consider it critical that the occupants of noise sensitive spaces that are to be insulated from external noise should be able to remain comfortable without having to open windows or doors for fresh air and cooling.
- 1.20 I provide comment on a number of general issues with the NOISE chapter. This input is to assist the development of District Plan provisions that are effective and enforceable from a noise perspective.

2. INTRODUCTION

2.1 My full name is Jon Robert Styles. I am an acoustic consultant and the director and principal of Styles Group Acoustics and Vibration Consultants. I lead a team of seven consultants specialising in the measurement, prediction and assessment of environmental and underwater noise, building acoustics and vibration.

Experience

2.2 I have approximately 21 years of experience in the industry, the first four as the Auckland City Council's Environmental Health Specialist – Noise, and the latter 17 as the Director and Principal of Styles Group.

2.3 I hold a Bachelor of Applied Science majoring in Environmental Health and I have completed the Ministry for the Environment's 'Making Good Decisions' programme.

2.4 I am the immediate Past-President of the Acoustical Society of New Zealand having completed two full terms. Prior to being elected as the President I was the secretary and on the Council of the Society for 8 years. I have recently been appointed as an Executive Member of the Australasian Association of Acoustical Consultants. My role on the executive team is to develop guidelines for the assessment of noise and vibration effects.

2.5 I have extensive experience advising on the management of noise and vibration effects within and between land uses, including the construction, maintenance and operational noise effects of major and strategic transport infrastructure (including port, road, air and rail) and the protection of strategic industry and transport infrastructure by achieving reasonable noise levels in the community.

2.6 I have been involved a significant number of plan reviews, plan changes and master planning processes across New Zealand. Specific assignments relevant to this evidence include:

- (a) The Auckland Council's witness through the development of the High Land Transport Noise Overlay in the AUP, and all other noise-related topics in the AUP (except for airports).

- (b) Advising Councils on several recent District Plan reviews, including the Whangarei Urban and Services Plan Change and whole of plan reviews for Taupō, Napier and Kaipara.
- (c) Providing advice on numerous public and private plan changes involving land exposed to road and rail noise, including recommendations for appropriate acoustic mitigation response.
- (d) Noise and vibration measurements, on a significant number of resource consent applications involving activities sensitive to noise (**ASN**) being established adjacent to various forms of transport infrastructure
- (e) A large number of projects around New Zealand involving road traffic noise and the application of New Zealand Standard NZS6806:2010 *Acoustics – Road Traffic Noise – New and Altered Roads (NZS6806)*. A number of these projects have been Roads of National Significance and include the Southern Corridor Improvements, Te Atatu Road widening, Lincoln Road Corridor Improvements, Ellerslie and Takanini Noise Walls, Mill / Redoubt Road, SH1 Whangarei Improvements, SH12 Matakohe Bridges, CSM2 & MSFRL (Christchurch Southern Motorway Stage 2 & Main South Road Four Laning), Mackays to Pekapeka, Waikato Expressway (numerous sections), Southern Links Hamilton, Central Motorway Junction, AMETI, Victoria Park Tunnel, Waterview Connection, St Lukes Interchange, SH16 Causeway, Puhoi to Warkworth, the East West Link, Penlink, Northern Corridor Improvements, Warkworth to Wellsford and many others.
- (f) I have given evidence before several Boards of Inquiry on road traffic noise effects including providing advice direct to the Board.

2.7 I have, and continue to provide, acoustic advice to accompany Kāinga Ora's submissions to several other plan reviews and plan changes across New Zealand. These include Waikato, Selwyn, Palmerston North, Tauranga, New Plymouth, Porirua and Christchurch.

Involvement in the Central Hawke's Bay District Plan Review

2.8 I have been engaged by Kāinga Ora to prepare this statement of evidence to address the PDP standards relating to noise sensitive activities adjacent to the

state highway and railway network, the recommendations contained in the s42A Report and the relief sought by Waka Kotahi.

Code of Conduct

2.9 I confirm that I have read the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2014. I have complied with the Code of Conduct in preparing this evidence and agree to comply with it while giving evidence. Except where I state that I am relying on the evidence of another person, this written evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in this evidence.

3. BASIS FOR MANAGING COMMUNITY EXPOSURE TO LAND TRANSPORT NOISE

3.1 In fundamental terms, I support controls that seek to manage the community's exposure to unreasonable noise, where evidence (noise modelling) demonstrates controls to be warranted.

3.2 I consider it important to first set out the reasons why it is important to manage the community's exposure to transport noise.

3.3 It is well accepted and globally recognised that exposure to noise from road, rail and air transport infrastructure, industry, ports commercial activities and a variety of other sources has the potential to generate high levels of annoyance and adverse health effects if it is not managed carefully.

3.4 The World Health Organisation (**WHO**) has published many policies and studies documenting extensive investigations into the effects of noise exposure on people, estimating the burden of disease from environmental noise² and quantification of healthy life years lost as a result of exposure to environmental noise³.

² WHO Regional Office for Europe (2012). Methodological guidance for estimating the burden of disease from environmental noise. Copenhagen,

³ WHO Regional Office for Europe (2011). Burden of disease from environmental noise: quantification of healthy life years lost in Europe. Copenhagen,

- 3.5 The 1999 WHO Community Noise Guidelines⁴ was the first major international large-scale document addressing the effects of noise on large populations.
- 3.6 In 2011, WHO published the “Burden of Disease from Environmental Noise”⁵ that quantified the healthy years of life lost in western European countries as a result of exposure to environmental noise⁶. The study identified that least 1 million healthy life years⁷ are lost every year from exposure to transport noise in the western European countries⁸. The study provided sufficient evidence from large-scale epidemiological studies to link the exposure to environmental noise with adverse health effects, including annoyance⁹, tinnitus, sleep disturbance, cognitive impairment in children and cardiovascular disease. The 2011 study identifies road-traffic noise as the most prevalent source of environmental noise, with the largest contribution to the burden of disease due to noise.
- 3.7 The 2011 study found that sleep disturbance and annoyance, mostly related to road traffic noise, constitute the bulk the burden of disease. Available assessments place the burden of disease from environmental noise as the second highest after air pollution.
- 3.8 In 2018, WHO published the Environmental Noise Guidelines for the European Region¹⁰ (**the 2018 Guidelines**). The purpose of the 2018 Guidelines is to provide robust public health advice to drive policy action to protect communities from the adverse effects of noise. The guidelines provide recommendations for protecting human health from exposure to environmental noise originating from various sources, including exposure to road-traffic noise.
- 3.9 The 2018 Guidelines provide strong recommendations to implement measures to reduce noise exposure from road traffic in the population exposed to levels

⁴ WHO, Geneva, (1999), Guidelines for Community Noise, Berglund B, Lindvall T, Schwela D H.

⁵ https://www.euro.who.int/__data/assets/pdf_file/0008/136466/e94888.pdf

⁶ WHO Regional Office for Europe (2011). Burden of disease from environmental noise: quantification of healthy life years lost in Europe. Copenhagen

¹⁰ This is measured in ‘DALYs’. DALYs are the sum of the potential years of life lost due to premature death and the equivalent years of “healthy” life lost by virtue of being in states of poor health or disability - WHO Burden of disease from environmental noise

⁸ Comprised of 61 000 years for ischaemic heart disease, 45 000 years for cognitive impairment of children, 903 000 years for sleep disturbance, 22 000 years for tinnitus and 654 000 years for annoyance.

⁹ High annoyance is not classified as a disease in the International Classification of Disease (ICD-9; ICD-10), it does affect the well-being of many people and therefore may be considered to be a health effect falling within the WHO definition of health as being a “state of complete physical, mental and social well-being”.

¹⁰ https://www.euro.who.int/__data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf

above the guideline values for average and night noise exposure. The 2018 WHO Guidelines state¹¹:

“For average noise exposure, the GDG¹² strongly recommends reducing noise levels produced by road traffic below 53 dB Lden¹³, as road traffic noise above this level is associated with adverse health effects.

For night noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic during night time below 45 dB Lnight, as road traffic noise above this level is associated with adverse effects on sleep.

To reduce health effects, the GDG strongly recommends that policy-makers implement suitable measures to reduce noise exposure from road traffic in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions, the GDG recommends reducing noise both at the source and on the route between the source and the affected population by changes in infrastructure.”

3.10 The recommended target noise level of 53dB L_{den} is approximately equivalent to 48dB L_{Aeq(24hr)}¹⁴.

3.11 The 2018 WHO Guidelines also discuss the importance of interventions to reduce road traffic noise exposure. They conclude that:

“The GDG also considered the evidence for the effectiveness of interventions. The results showed that:

- *addressing the source by improving the choice of appropriate tyres, road surface, truck restrictions or by lowering traffic flow can reduce noise exposure;*

¹¹ Section 3.1 of the 2018 WHO Guidelines.

¹² The Guideline Development Group.

¹³ The L_{den}, or day-evening-night equivalent sound level represents the average sound level over a 24 hour period, with a penalty of 5 dB added for the evening hours or 19:00 to 22:00, and a penalty of 10 dB added for the night time hours of 22:00 to 07:00.

¹⁴ Based on the diurnal traffic flow of SH1 in the Waikato

- *path interventions such as insulation and barrier construction reduce noise exposure, annoyance and sleep disturbance;*
- *changes in infrastructure such as construction of road tunnels lower noise exposure, annoyance and sleep disturbance;*
- *other physical interventions such as the availability of a quiet side of the residence reduce noise exposure, annoyance and sleep disturbance.”*

3.12 In my opinion, based on my experience and review of the Central Hawke’s Bay network generally, the road traffic volumes, vehicle speeds and rail volumes in some parts of the district are such that noise levels are likely to exceed the WHO Guidelines for a number of existing noise sensitive activities that are close to the transport infrastructure. I have not carried out a full objective analysis to identify the spatial extent of the issue. However, I am certain that the effects area will not be a uniform 100m corridor for all parts of the District’s networks.

3.13 My expectation is that, in terms of the recommendations of the WHO Guidelines, noise exposure to some communities in the district should be reduced, and that consideration should be given to the full range of interventions available. This is likely to be necessary to avoid adverse effects on the health of the communities.

3.14 To avoid any ambiguity, I am not suggesting that the PDP contain controls that require the WHO Guidelines to be met in all cases. Instead, I consider that a coordinated and efficient approach is required to reduce exposure to high levels of transport noise. The WHO Guidelines provide context to measure the magnitude and seriousness of the problem.

3.15 I consider that the WHO Guidelines should be achieved as often and as extensively as is practicable to avoid the adverse effects of exposing the community to high levels of transport noise.

4. THE PDP’s FOCUS ON REVERSE SENSITIVITY

4.1 I consider that the PDP’s focus on avoiding reverse sensitivity effects on the Transport Authorities is misdirected.

- 4.2 The issue at-hand is that the transport networks are generating noise effects on the existing environment that are likely to be significant in many instances – especially in urban areas. The effects are being generated and received now. In my view these are serious adverse effects on health and amenity. It is these effects that the PDP needs to manage.
- 4.3 I consider that if the PDP provisions address the primary adverse health and amenity effects that are being experienced, there will be no reverse sensitivity effects.
- 4.4 I am not aware of any legitimate reverse sensitivity effects arising on the Transport Authorities' networks in the Central Hawkes Bay District. I have not seen any evidence in this process that demonstrates the incidence of reverse sensitivity effects occurring in the district, either now or for the life of the PDP.
- 4.5 I accept that provisions could mention reverse sensitivity effects as a potential consequence of not addressing unreasonable noise levels, but I consider that reverse sensitivity effects should not be the focus.
- 4.6 I understand the duty imposed by s16 of the RMA to avoid generating unreasonable noise applies at all times to the operators of the transport networks. I consider that the focus of District Plan controls should be to avoid exposing people to unreasonable levels of noise from the operation of the transport infrastructure.
- 4.7 Objective NOISE-03 requires the avoidance of conflict and reverse sensitivity effects on "*existing lawfully established activities as a result of new noise sensitive activities establishing in close proximity to them*". The objective appears to provide primacy to the effects generated from the Transport Networks but does not recognise that the noise sensitive activities that currently exist within 100m of the District's State Highway and railway networks are also "*lawfully established activities*".
- 4.8 The tension of operating noise generating infrastructure through noise sensitive communities forms part of the existing environment and must be managed responsibly.
- 4.9 In my view, the noise from traffic on the roads and trains on rail lines are a significant source of noise for parts of the Central Hawke's Bay community. I

note that the reference to “excessive noise” rather than “unreasonable noise” in NOISE-I1 may exclude land transport noise effects due to the RMA definition of excessive noise (linked to s326 and s237 of the RMA). The effect that requires managing is exposure to **unreasonable** noise.

- 4.10 The problem exists now and affects all existing noise sensitive activities close to noisy transport infrastructure.
- 4.11 If traffic and rail volumes increase, it is likely that the problem will get worse with time if there is no intervention.

5. GOVERNMENT POLICY STATEMENT ON LAND TRANSPORT 2021

- 5.1 The WHO Guidelines are relevant to New Zealand’s own strategic objectives under the Government Policy Statement on Land Transport¹⁵ (**GPS 2021**) to reduce the number of people exposed to elevated levels of land transport noise by 2031. Waka Kotahi’s submission acknowledges the GPS 2021, and their duty to carry out functions in a way that will deliver the outcomes of the GPS.
- 5.2 GPS 2021 identifies that “*the purpose of transport system is to improve people’s wellbeing, and the liveability of places*”¹⁶. To this end, the policy statement seeks to reduce the number of people exposed to elevated levels of land transport noise.
- 5.3 GPS 2021 states that “*Reduced air and noise pollution*” is a short to medium term goal that will be delivered by 2031.

6. THE METHODS AVAILABLE FOR MITIGATING TRANSPORT NOISE EFFECTS

- 6.1 District Plan controls requiring noise sensitive activities adjacent to transport infrastructure to be acoustically treated can at-most form only a small part of the overall approach to managing the effects of noise and vibration from land transport infrastructure.
- 6.2 At best, acoustic treatment only serves to reduce the noise effects of rail or road traffic inside the habitable rooms of noise sensitive activities. Acoustic treatment

¹⁵ <https://www.transport.govt.nz/area-of-interest/strategy-and-direction/government-policy-statement-on-land-transport/>

¹⁶ <https://www.transport.govt.nz/assets/Uploads/Paper/GPS2021.pdf>

does not address the outdoor amenity within outdoor spaces of dwellings, or the general amenity of the environments / zones adjacent to the infrastructure.

6.3 For this reason, the most effective way of addressing noise effects is through the application of mitigation at or near the source. That approach benefits the broader receiving environment and not just the indoor environment of the buildings that are subject to the specific controls.

6.4 I consider that there are three primary methods of reducing the effects:

- (a) Reducing the effects at the source (and potentially in the existing receiving environment) as part of the construction of new or altered roads or rail
- (b) Reducing the effects at the source (and potentially in the existing receiving environment) as part of a prioritised effort to reduce noise effects from existing roads and rail networks
- (c) Requiring new and altered noise sensitive activities establishing close to roads and rail to be developed appropriately.

6.5 These options are discussed below.

Managing the effects at source

6.6 I understand that the duty imposed by s16 of the RMA to avoid generating unreasonable noise applies at all times to the operators of the transport networks.

6.7 In my experience the duty is observed mostly when there is a capital works project involving the construction of a new or altered road.

Reducing the effects of existing road and rail noise

6.8 I understand that there is no standard, NES or other descriptive mechanism or requirement for reducing the effects of exposing existing communities to high levels of noise from existing road and rail networks.

6.9 I understand that GPS 2021 is applicable and the duties under s16 of the RMA remain relevant, and that these require (in general terms) that noise levels are 'reduced' and 'reasonable' (respectively). I am not aware of any limits or specific

requirements or any specific strategy in place in the Central Hawke's Bay District to achieve these outcomes.

6.10 I consider that it is reasonable for the Transport Authorities to be required to mitigate their noise effects on the existing receiving environment, where:

- (a) The noise levels are already unreasonable (i.e. above the WHO Guidelines); and
- (b) Where practicable options exist to reduce noise levels.

6.11 I consider that specific provisions requiring the Transport Authorities to mitigate their effects is a reasonable proposition. Such provisions could involve a staged approach, where the worst of the noise effects are targeted first. The provisions could require the Transport Authorities to identify the worst affected areas and to identify a range of mitigation options that could reduce the noise levels as far as practicable. Depending on context, such options can include:

- (a) Changing the pavement to a low noise surface;
- (b) Finding an alternate route for heavy vehicles, especially at night;
- (c) Controlling engine braking by prohibition, especially at night;
- (d) Reducing the speed limit on roads and reducing the speed of freight trains where the effects are greatest;
- (e) Scheduling freight train movements so they travel during the day time as often as practicable;
- (f) Installing noise barriers;
- (g) Offering to pay for acoustic insulation treatment for existing noise sensitive activities (in the same way that airports and ports are required to do).

6.12 The BPO could then be selected and implemented, and noise effects reduced. The WHO Guidelines may not be able to be practicably achieved in all cases, but the effects could be reduced significantly.

- 6.13 I am only aware of one example where Waka Kotahi introduced a noise mitigation measure in the absence of any associated road upgrade or alteration. I was involved in the Ellerslie Noise Walls project in Auckland in 2017 where Waka Kotahi constructed approximately 1km of three-metre-high noise walls alongside the Southern Motorway to reduce noise levels in the community. This is the only such example I am aware of.
- 6.14 This is not an example of a reverse sensitivity effect to which Waka Kotahi was responding, as the receivers were all existing. In my opinion, it is an example of Waka Kotahi implementing mitigation to meet its duties under s16 of the RMA in the absence of a road upgrade or alteration.
- 6.15 Overall, I consider that the adverse noise effects from land transport needs to be managed at the source as the priority. Any development controls imposed on activities sensitive to noise in the surrounding environment should only be imposed when they are necessary to address adverse effects on receivers and where the noise cannot be reduced to an acceptable level, after the Transport Authorities have adopted the BPO.

Managing the effects in the receiving environment

- 6.16 In my view, the focus on mitigating transport noise effects in the receiving environment should only be applied where the noise effects extend beyond the designation boundaries at a level that is unreasonable after the BPO has been adopted at the source.
- 6.17 I consider that the method for defining the extent of the effects beyond the designation boundaries should be based on modelled setbacks. This approach ensures the mitigation response by the community does not extend any further into the community than is necessary, while allowing the noise generator to function efficiently.
- 6.18 If the PDP does not include a framework to promote the prioritisation of noise mitigation measures at the source as the first priority. I consider that it also fails to recognise that managing adverse noise effects is a shared responsibility between Transport Authorities and the occupiers of the receiving environment.

7. COST OF ACOUSTIC TREATMENTS

7.1 My reading of the s42A Report and Section 32 Topic Report (the **s32 Report**) is that the cost of the various assessments and treatments required by the proposed provisions and specifically NOISE-S3 have not been considered.

7.2 The s32 Report¹⁷ states that the PDP provisions are “highly effective” for the following reasons:

“Noise provisions have been reviewed by Marshall Day Acoustics and hence represent best practice in terms of applying limits and standards for the measurement and assessment of noise in accordance with the current New Zealand Standards, address reverse sensitivity issues relating to state highways and the rail network, recognise latest industry best practice methods, and provide for activity-specific responses to noise”¹⁸

7.3 I have reviewed Marshall Day Acoustics’ ‘Revision of Noise Rule Report’¹⁹ (the MDA Report). The MDA Report does not provide any discussion of land transport noise effects, nor does it provide any recommendations relating to management of such effects. The s32 Report does not provide any discussion of the issue, the basis for the PDP controls, or any other options to achieve the anticipated environmental results.

7.4 In my experience, the costs of complying with NOISE-S3 may include:

- (a) Sound level measurements over a day or several days and / or noise modelling work to demonstrate that the noise level is less than 57dB and no treatment is required. This could range from approximately \$750 +GST to over \$3k +GST depending on the complexity of the work.
- (b) Acoustical design work to ensure that the internal noise levels are no greater than the standards required. This is generally straightforward and for a typical dwelling the cost would generally be between \$500

¹⁷ <https://www.chbdc.govt.nz/assets/Document-Library/Draft-District-Plan/Section-32a/Section-32-Remaining-Chapters-Report-May-2021.pdf>

¹⁸ Page 59 of <https://www.chbdc.govt.nz/assets/Document-Library/Draft-District-Plan/Section-32a/Section-32-Remaining-Chapters-Report-May-2021.pdf>.

¹⁹ <https://www.chbdc.govt.nz/assets/Document-Library/Draft-District-Plan/ACOUSTIC-REPORT-Central-Hawkes-Bay-District-Plan-Noise-Rules-31-July-2018.pdf>

+GST and \$2000 +GST. The higher cost estimates would be applicable to dwellings close to the rail line or state highway where noise levels are high.

- (c) Additional or more expensive building materials, such as thicker glass or double-glazing, a heavier façade materials, sarking under the roof, additional layers of plasterboard, solid core doors in the façade to reduce the internal noise levels. Based on my experience of working on these types of projects, the extra costs of building materials and labour can be significant (>\$50,000 +GST) for dwellings very close to major roads or dwellings close to railway lines. The cost is typically less for a new-build compared to retrofitting insulation to an existing building.
- (d) Providing mechanical cooling (air conditioning) and a mechanical fresh air supply to enable people to keep their windows and doors closed to keep the noise out. In my experience the cost of this ranges considerably based on the size of the building and the number of rooms. For a typical single-level dwelling, it is my experience that either a ducted heat pump system would be required, or a system comprising at least two indoor high-wall or cassette units, as well as a one or more small, silenced fans to provide an exchange of fresh air. In my experience, the cost of these systems can range from approximately \$1000 +GST for the supply and install of a fresh air fan, (or fans) where air conditioning is already proposed, or \$10k to \$20k +GST for an air conditioning system and silenced fans where none were otherwise proposed.
- (e) Resource consent processes. The estimation of these costs is beyond my area of expertise.

8. DEFINING THE EXTENT OF THE EFFECTS

- 8.1 NOISE-S3 of the PDP adopts a standard 100m metric setback from all parts of the District's State Highway and Railway networks without any evaluation of the costs and benefits of using noise modelling to identify the land where acoustic treatment is *demonstrated* to be necessary. This is likely to apply the controls to land that is not affected by noise to a degree that warrants controls – especially in urban areas.

- 8.2 I support a more refined and accurate method of defining the extents based on noise modelling. A modelled approach to managing State Highway noise effects would involve Waka Kotahi preparing and providing noise level contours for the Central Hawke's Bay network. The noise modelling process would take into account the local circumstances, including road surface, traffic flows, topography, permanent screening, noise barriers and other features that can heavily influence the propagation of noise. The emphasis should be on defining the extent of the effect in urban areas.
- 8.3 A modelled approach to managing railway network noise would involve:
- (a) KiwiRail preparing and providing noise level contours for rail traffic through the Central Hawke's Bay network. The modelling process is relatively straightforward, with topographical data, building data and rail centrelines available from a variety of sources. Again, the emphasis should be on defining the extent of effects in urban areas.
 - (b) KiwiRail would be able to forecast a busy hour of freight and / or future commuter rail traffic for the network for the model to be based on. The noise model would take into account the local train speed environments, signalling constraints and any other local and specific features of the network that might affect the generation of noise, as well as the topographical and other physical features in the environment.
 - (c) Noise effects from the railway network will be heavily influenced by the volume of traffic on the rail line and the speed of the trains. Information relating to the frequency and speed of train pass bys is fundamentally necessary to determine whether an acoustic mitigation response is necessary. This information should include:
 - The number of trains likely in an average 24 hour period in the future (where the distance into the future is defined by others)
 - The number of trains likely in the day time period (between 7am and 10pm) and in the busiest hour during that time after the BPO has been adopted

- The number of trains likely in the night time period (between 10pm and 7am) and in the busiest hour during that time after the BPO has been adopted
 - The approximate mix of freight trains and passenger trains
 - The approximate speed environments for trains across the network, but especially in the urban areas.
- 8.4 Once KiwiRail has provided this information, the need for noise controls can be determined, and if noise controls in the receiving environment are deemed appropriate, the nature of the controls can be determined.
- 8.5 The noise modelling is always conducted based on the BPO for minimising the noise at the source having been defined and implemented with a reasonable and demonstrable allowance for future growth.
- 8.6 The resulting noise contours can be used to inform the extent of land where an acoustic mitigation response is warranted. Relying on modelled noise level contours rather than a standard metric setback ensures the burden of mitigation does not extend any further into the community than is absolutely necessary
- 8.7 The evidence based approach I promote to noise mitigation is no different than the approach typically applied to other noise generators that have effects extending into the community. Examples include noise control boundaries surrounding airports and ports, and some other major industries (such as dairy factories).
- 8.8 Using noise modelling ensures that only the parts of the community that are or will be affected by the noise are captured by the controls. It provides a clear and certain set of controls for the noise-generator and the affected parts of the community, and the extent of affected land is clearly visible on the District Plan maps.
- 8.9 I consider that there is no reason why the same approach cannot be taken in this case. In my view, this task is relatively straightforward and not particularly costly. These costs should be compared to the costs of requiring all existing and future noise sensitive activities within 100m of the State Highway networks

to comply with NOISE-S3, and in many cases how that cost is unnecessary given the effects are unlikely to extend to 100m.

9. WAKA KOTAHI'S OWN SECTION 32 ANALYSIS

9.1 Based on my involvement with this topic in other District Plan reviews, I am aware that Waka Kotahi frequently relies on a generic s32 analysis of the options available to define the extents of the road noise effects area.

9.2 Version 8 of its generic s32 analysis has recently been submitted in evidence in the Porirua District Plan review that I am involved with. The generic s32 analysis considers the following options for defining the effects areas:

Option A – Do nothing. This option has no controls or overlays.

Option B – Modelled Setback. This option uses “...a model based on existing environmental conditions to calculate expected noise levels...”. It is based on variables including “traffic volume, road surface, topography and buildings”. This is consistent with my view that noise emissions should be modelled using computer software.

Option C - Metric Setback. “Require specific response to manage noise where a sensitive activity is located within a specific NCBO based on distance (eg 40m, 80m or 100m) from a state highway.”

Option D – Yard. This option simply involves “A ‘no build’ setback from state highways”. All noise sensitive activities within the setback would be non-complying activities.

9.3 The generic s32 analysis concludes that:

“The Modelled Setback/Option B is identified as the preferred approach to manage the potential health and amenity effects of transport network operations, and to and provide a reasonable and appropriate balance between cost and benefit. The provisions apply only where an existing noise sensitive activity is extended or a new noise-sensitive activity is proposed adjacent to a designated transport corridor.

The Modelled Setback/Option B have been detailed and compared against a number of alternatives in terms of their costs, benefits, and

efficiency and effectiveness in accordance with the relevant clauses of section 32 of the RMA.

The Modelled Setback/Option B are considered to represent the most appropriate means of achieving the proposed objective and of addressing the underlying resource management issues relating to the transport environment, human health and amenity.”

- 9.4 I note that the Waka Kotahi submission does not mention either the National Road Noise Mapping project or the use of modelled setbacks, consistent with their own s32 analysis.

10. RAIL NOISE EFFECTS

- 10.1 KiwiRail have not made a submission to the PDP. The Section 32 Report and the s42A Report do not discuss the volume of rail traffic through the district, the realistic potential future volumes or the typical times of the day when trains pass through the district. In my view, these are all critical factors in understanding the magnitude of the noise effects that need to be managed. Without this information, the controls are likely to be formulated inaccurately and possibly even without any reasonable evidential justification at all.
- 10.2 Determining the exact threshold of train movements and timing to justify noise controls is difficult and dependent on several factors. However, as a general guide, I consider that up to six or maybe eight movements per day would be permissible without any noise controls in the PDP, provided those movements were forecast to be during the day. The number of permissible movements could vary depending on the mix of freight and passenger movements and on the nature and frequency of night time movements.
- 10.3 Intermittent movements for construction or maintenance work would not be included in this evaluation in the same way that the noise from roadworks is not included in the road traffic noise emissions.
- 10.4 I also consider that it would very likely be the Best Practicable Option for KiwiRail to run any freight trains during the day time period when the noise and vibration effects will be significantly less than at night.

- 10.5 If KiwiRail were able to confirm that even after adopting the BPO, freight trains may use the line at night or there were more than a small number of movements per day, the effects may be high enough to justify noise controls in the PDP.
- 10.6 I consider that KiwiRail should be required to robustly demonstrate the likely future use of the line before any related noise controls are considered for the PDP. The likely future use needs to be determined so that the likely future noise and effects can be determined. Once the noise and vibration effects are known, the nature of any necessary noise and vibration controls can be determined.

11. MECHANICAL VENTILATION REQUIREMENTS

- 11.1 NOISE-S3(2) requires mechanical ventilation to be supplied to rooms subject to the acoustic treatment in NOISE-S3. The standard requires compliance with the Building Act “to ensure adequate ventilation and fresh air”.
- 11.2 In my experience, requiring simple compliance with clause G4 of the Building Code will supply a relatively low volume of fresh air, but will not provide any appreciable cooling for occupants. This will lead to occupants opening windows and doors to achieve adequate thermal comfort, particularly in the warmer months. Open windows will negate any benefits of the acoustic treatment and invalidate the cost and effort of treating noise sensitive spaces.
- 11.3 I consider it critical that the occupants of noise sensitive spaces that are to be insulated from external noise should be able to remain comfortable without having to open windows or doors for fresh air and cooling.
- 11.4 This approach is consistent with the Transport Authorities reverse sensitivity provisions that require ventilation systems that provide for adequate thermal comfort. Requiring mechanical cooling (air conditioning) is also consistent with the Auckland Unitary Plan, the Whangarei District Plan and many other District Plans that have been reviewed recently. I support the following mechanical ventilation controls:

i. Provides mechanical ventilation to satisfy clause G4 of the New Zealand Building Code; and

iii. provides relief for equivalent volumes of spill air; and provides cooling and heating that is controllable by the occupant and can maintain the inside temperature between 18C and 25C; and

v. does not generate more than 35 dB LAeq(30s) when measured 1 metre away from any grille or diffuser.

b. For other spaces, is as determined by a suitably qualified and experienced person.

12. COMMENTS ON THE SECTION 42A REPORT

12.1 Sections 4.3.21 and 4.3.21 of the s42A Report defend the PDP provisions on the basis that:

“The state highway and rail networks are important regional and national infrastructure, and the PDP has adopted an approach of requiring new residential development (including additions to existing dwellings) within 100m of either of these existing networks to be suitably acoustically insulated. Given the rail and state highway networks are existing, there is no real power to reduce noise effects, as suggested by the submitter. Whilst Councils are responsible for managing the effects of noise (s31(1(d))), it is important to note that the RMA excludes noise emitted by vehicles being driven on a road (within the meaning of section 2(1) of the Land Transport Act 1998); or trains, other than when being tested (when stationary), maintained, loaded, or unloaded from being considered as excessive noise (Sections 326). In that sense car and rail noise are exempt from the provision of a district plan and the requirement to require acoustic mitigation for new (or altered) noise sensitive activities within the 100m setback, is in my view not unreasonable.

I consider it is appropriate to have a policy that specifically relates to noise associated with transport networks, and that requires mitigation for new or extended noise sensitive activities that develop in proximity to such. These networks provide regional and national infrastructure that is important for the wellbeing of communities, and they need to be able to operate effectively and efficiently.”

12.2 I do not agree with Ms Morgan’s conclusions. In my view Ms Morgan has failed to take into account:

(a) S326 is part of the ‘party noise’ provisions in the RMA and is not relevant for the management of noise effects from transport infrastructure. In my

view Ms Morgans reference to the RMA excluding noise from cars and trains is incorrect in this context.

- (b) That the duties in s16 to adopt the Best Practicable Option to ensure the noise from transport networks is reasonable apply to the Transport Authorities;
- (c) The nature and extent of the actual effects and the absence of evidence in this process that demonstrates this;
- (d) The costs of applying mitigation in the receiving environment;
- (e) The cost of applying the provisions across land that is not affected by noise from the transport networks;

GENERAL COMMENTS ON THE NOISE CHAPTER

12.3 I have identified a number of issues with the PDP NOISE Chapter. I have provided the following comments to assist in the development of noise provisions that are effective and enforceable for acoustic reasons. The following comments do not necessarily relate to Kainga Ora's submission.

- (i) **INTRODUCTION:** I consider that the references to sections 326 and 327 of the RMA at the end of the introduction section are inappropriate. It is my experience that these sections provide a process for noise control officers to respond to 'party noise'. I consider that they are not relevant to the plan-making process or the provisions of the Noise Chapter generally. I consider that these references should either be removed or rephrased to make it clear that these sections of the RMA provide processes for dealing with noise issues that are not covered by the PDP.
- (ii) **NOISE-I1:** I recommend the use of the word "excessive" is replaced with "unreasonable" to avoid confusion relating to the definition of excessive noise under the RMA, and the management of temporary noise sections 326 and 327 of the RMA. NOISE-I1 states the fundamental noise issue for the District. That issue should relate to the effects of unreasonable noise, not excessive noise.

- (iii) **NOISE-P2:** I consider that the reference to 100m should be replaced with words such as ‘mapped effects areas’ or similar to allow for the outputs of a noise modelling process to be used in the rules section.
- (iv) **NOISE- S2 VIBRATION:** This standard is unclear and not fit for purpose. There is no information in the standard to assist plan users to understand the performance standard that must be achieved. The standard requires a plan user to purchase a copy of ISO-4866:201. At the time of this advice, this standard costs \$250.54 +GST²⁰. The National Planning Standards requires this standard to be referenced in any plan rule to manage **construction vibration**, however NOISE-S2 applies the standard to all sources of vibration. NOISE-S2 does not contain any information to assist plan users to understand:
- Whether it applies to vibration generated from construction or operational vibration
 - What land use activities it applies to
 - What performance standard must be achieved (without having to obtain a copy of the standard).

I do not support the provisions of this standard being applied to all sources in the entire district. I have not seen any evaluation of whether this is appropriate and what the outcomes will be. I consider it an inappropriate standard to apply to the entire district.

I recommend the rule is revised to be more specific or narrowed to specific vibration sources.

- (v) **All noise standards:** The majority of noise limits stated throughout the chapter are not expressed in accordance with the requirements of the Noise and Vibration Metrics Standard (**NVMS**)²¹. This requires that the noise limits are expressed

²⁰ <https://www.standards.govt.nz/shop/iso-48662010/>

²¹ The NVMS is part of a National Planning Standard and is required to be adopted.

using the symbols contained in the relevant acoustical standards. As an example, one of the zone noise limits in NOISE-S4 is expressed as “50 L_{Aeq} ”. The NVMS requires that this is expressed as 50 dB $L_{Aeq(t)}$ or 50 dB $L_{Aeq(15min)}$.

I recommend that all noise limits in the chapter are checked and updated to ensure consistency with the NVMS.

(vi) **NOISE-S5 Specific activities exempt from the noise limits in**

NOISE-S4: This list includes a list of many activities that are either (a) exempt from any noise limits (b) managed by noise performance standards that vary from the underlying zone standards. I consider that there must be clear distinction between (a) and (b). This could involve creating two separate sections: 1) exemptions, and 2) activity-specific rules.

I have identified the following issues:

- **Construction**

This is not an “exemption” as the standard requires compliance with the noise limits in NZS 6803:1999. At the time of preparing this advice, the price of NZS6803 from Standards New Zealand is approximately \$150 including GST. I support updates to the standard that enable the plan user to determine the relevant noise limits for construction noise without holding a copy of the standard. Rule E25.6.27 of the Auckland Unitary Plan is a good example.

Clause 7.3 of NZS6803:1999 specifically states that the PDP should state the numerical limits that apply, rather than simply referring to the tables in the standard, or indeed just the standard itself.

- **Prospecting and Exploration (quarrying activities)**

This activity is not an “exemption”. The standard requires that compliance with the underlying noise limits and list of noise and vibration performance standards .

- **Temporary events (other than temporary military training)**

This activity is not an “exemption”. The standard requires compliance with the list of performance standards to be achieved.

- **Emergency aviation movements**

I recommend “emergency” is defined.

- **Residential units/ occupancies/ habitable spaces in Commercial and General Industrial Zones.**

This standard is not clear on the noise source that is subject to the “exemption”. This performance standard contains acoustic insulation requirements, and is not an exemption.

I have fundamental concerns relating to the appropriateness of noise sensitive activities on the General Industrial Zone (which authorises noise levels up to 70 dB L_{Aeq} during the day and 60 dB L_{Aeq} at night. I consider this noise environment to be incompatible with noise sensitive land use, and inconsistent with the objectives and policies that seek to avoid conflict.

As above, the mechanical ventilation requirements in this standard rely on the New Zealand Building Code which is not suitable for this application.

- (vii) **NOISE-AM3 Vehicle noise:** This indicates that a noise level of 55dB $L_{Aeq(1hr)}$ would be reasonable for traffic noise received at night time. I consider that this is much higher than reasonable, especially for traffic associated with a land use activity. Noise levels this high would generate significant adverse effects including severe annoyance and adverse health effects if it were permitted outside a residential dwelling at night. I consider that the zone or activity standards should apply and that this provision should be deleted.

12.4 I am available to assist with updating these provisions if required.



Jon Robert Styles

17 March 2022