

12 September 2025

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Dear Emma,

Plan Change 1 Minor Improvements – Health New Zealand Submission

1.0 Introduction

Dunedin City Council (**DCC**) has engaged Styles Group to provide further evidence on the construction vibration matters raised by Mr Brendon Shanks on behalf of Health New Zealand (**HNZ**) regarding Change TA3.¹

This evidence has been prepared by Jamie Exeter in accordance with Section 9 of the *Code of Conduct for Expert Witnesses* contained in the Environment Court of New Zealand *Practice Note 2023*. It addresses:

- the submission points relevant to the construction vibration rules recommended in the section 42A report²
- the replacement to rule 4.5.4.X proposed by HNZ (the **proposed replacement rule**)
- the changes to the assessment criteria under rule 4.8.2 and the special information requirements under rule 4.11.2 proposed by HNZ.

At the request of the hearing panel, I have discussed the changes proposed by HNZ with Mr Shanks. My views on the construction vibration rules proposed in the section 32 report are set out in previous evidence.³

2.0 Construction vibration amenity limits (4.5.4.X.a)

I agree with the s42A report and Mr Shanks that a separate standard is required for vibration effects on people in buildings. The limits recommended in the s42A report are consistent with my earlier advice. I support limits of 2 mm/s peak particle velocity (**PPV**) during the day, with flexibility to generate up to 5 mm/s PPV on three days per project, and 0.3 mm/s PPV at night to avoid sleep disturbance.

¹ Evidence of Brendon Shanks on behalf of Health New Zealand Te Whatu Ora, Submitter #252 on Plan Change 1, Acoustics, 1 August 2025

² Plan Change 1 – Minor Improvements, Non-Heritage Topics, Section 42A Report, 25 July 2025

³ Plan Change 1 minor improvements – evidence on submissions, Styles Group, 3 July 2025

The recommended amenity limits reflect the temporary and intermittent nature of construction vibration. In my experience, it is unlikely that construction projects would exceed these limits – and trigger the need for consent – without also infringing the permitted construction noise limits and/or other relevant standards.

I agree with Mr Shanks that the vibration amenity limits should not apply to works in the road, provided that the duration is no longer than three days and the nearest receivers are given prior notice. The plan is not clear on whether permitted standards apply to construction work in the road, so I support including an exception in the updated rule.

3.0 Construction vibration building damage limits (4.5.4.X.b)

Mr Shanks and I have both recommended adopting the guideline values of DIN 4150–3:2016 (the **DIN Standard**) as the permitted limits for avoiding minor building damage, when measured and assessed in accordance with the Standard. The DIN Standard has also been adopted in other district plans including the Auckland Unitary Plan, Hamilton City District Plan, and the Queenstown Lakes District Proposed District Plan.

The s42A report recommends a rule that modifies the assessment criteria of the DIN Standard for simplicity and applies the most stringent low frequency vibration limits to all short-term vibration (the **s42A rule**). While the s42A rule generally reflects the methodology of the DIN Standard, it modifies the building classifications, redefines ‘short-term’ and ‘long-term’ vibration, and removes the frequency-dependant component of the limits. It is outside my area of expertise to determine whether the guideline values in the DIN Standard can still be relied upon as thresholds for avoiding minor damage when deviations are made from other parts of the Standard.

The s42A rule could work effectively as a permitted standard, provided a suitably qualified expert confirms that any deviations from the DIN Standard do not compromise the effectiveness of the numerical limits in avoiding minor damage. However, adopting this rule could result in construction vibration exceeding the permitted limits – and requiring consent – at levels that empirical evidence indicates would not cause minor damage.

I consider that adopting the DIN Standard would provide a better balance between avoiding potential building damage and enabling typical construction work. This approach would require referring to a separate Standard to determine the permitted limits, although most plan users would likely need to consult a vibration specialist in any case to understand the practical application of the vibration limits.

The s42A rule requires construction vibration to comply with the building damage limits under 4.5.4.X.b at heritage buildings on the same site. These limits are based on the DIN Standard, which aims to protect buildings from minor damage, including new cracks in plastered or rendered walls, enlargement of existing cracks, and detachment of partitions from load-bearing walls or floor slabs (i.e. non-structural damage). The DIN Standard values are appropriate for heritage buildings on construction sites if the objectives and policies of the plan aim to protect these buildings from minor damage, irrespective of ownership. However, they are not suitable if the focus is solely on avoiding structural damage.

If the s42A rule is adopted, the note below the Table in rule 4.5.4.X.b should be removed, as the rule already incorporates long-term limits.

4.0 Updates to proposed rules

I have discussed rules 4.5.4.X, 4.8.2, and 4.11.2 with Mr Shanks. We have drafted updated versions of the rules proposed by HNZ, which are attached as Appendix A. There are no outstanding areas of disagreement.

I support the updated rules where they are within the scope of my expertise. This does not extend to matters of activity status or the level of protection required for heritage buildings, which I understand will be addressed in planning evidence.

5.0 Summary

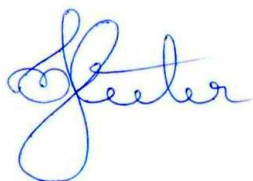
I have reviewed the s42A recommendations, the evidence of Mr Shanks, and the rules proposed by HNZ with respect to construction vibration.

The s42A rule could work effectively as a permitted standard, provided a suitably qualified expert confirms that any deviations from the DIN Standard do not compromise the effectiveness of the numerical limits in avoiding minor damage. However, adopting this as a permitted standard would be a conservative approach. I consider that applying the DIN Standard would provide a better balance between avoiding potential building damage and enabling typical construction work.

The DIN Standard values are appropriate for heritage buildings on construction sites if the objectives and policies of the plan aim to protect these buildings from minor damage, irrespective of ownership. However, they are not suitable if the objectives and policies are only concerned with avoiding structural damage.

I support the updated rules in Appendix A where they are within the scope of my expertise, which does not extend to matters of activity status or the level of protection required for heritage buildings on the subject site.

Yours sincerely,



Jamie Exeter, MASNZ, Assoc. NZPI
Principal

Appendix A: Updated rules

4.5.4.X Construction and Site Investigation Vibration

- (a) Construction and site investigation vibration received at occupied buildings in any zone must not exceed the following amenity vibration limits:

Location	Time Period	Vibration Limit (mm/s PPV)	Assessment Locations
A building housing a noise sensitive activity	7.00am to 10.00pm	2 mm/s PPV	In the corner of the floor of the storey of interest for any occupied multi-storey building, or within 500mm of ground level at the foundation of any occupied single storey building.
	10.00pm to 7.00am	0.3 mm/s PPV	
All other buildings	At all times	2 mm/s PPV	

- (i) Except that this standard does not apply to:
- Vibration received at a building on the same site as the construction and site investigation activity where the building and land on which the construction and site investigation activity is undertaken are in the same ownership; or
 - Vibration from construction and site investigation activity undertaken within a road where:
 - the works cannot practicably comply with the vibration limits specified in standard 4.5.4.X(a); and
 - the number of days on which vibration is predicted to exceed the limits in standard 4.5.4.X(a) at any building is three or less; and
 - the works in the road are separable from any work on private land that is part of the same project; and
 - occupants of all buildings where vibration is predicted to exceed the limits are advised in writing no less than three days before the vibration-generating construction and site investigation works begin. The written notice must include the location and duration of the works, and a contact name and phone number for enquiries, questions or complaints. This requirement to provide written notice does not apply to emergency works.
 - Vibration that complies with a limit of 5 mm/s PPV unless a lower limit for avoiding building damage in rule 4.5.4.X(b) applies, in which case the lower limit must be complied with; and

- i. Vibration occurs on a total of no more than three days at any one building per construction project and only between the hours of 7.00am and 6.00pm; and
 - ii. The occupants of all buildings where vibration is predicted to exceed 2 mm/s PPV are advised in writing no less than three days before the vibration-generating construction and site investigation works begin. The written advice must include the location and duration of the works, and a contact name and phone number for questions or complaints.
- (b) Construction and site investigation vibration received at any buildings in any zone must not exceed the following building damage vibration limits:

Location	Time Period	Vibration Limit (mm/s PPV)	Measurement Location
Any building	At all times	The guideline vibration velocity values (PPV) set out in the German Standard DIN 4150-3:2016 <i>Vibration in buildings – Part 3: Effects on Structures</i> .	In accordance with the requirements of DIN 4150-3:2016

- (i) Except that this standard does not apply to vibration received at a building on the same site as the construction and site investigation activity, and the building and land on which the construction and site investigation activity is undertaken are in the same ownership.
 - (ii) Vibration generated by construction and site investigation must be assessed using peak particle velocity (PPV). This is consistent with the metrics used in ISO 4866:2010 *Mechanical vibration and shock*.
- (c) Activities that contravene performance standard (a) or (b) above are restricted discretionary activities.

Rule 4.8 Assessment of Restricted Discretionary Activities

4.8.2 Assessment of restricted discretionary activities		
Activity	Matters of discretion	Guidance on the assessment of resource consents
Construction and site investigation vibration	a. Effects on amenity. b. Effects on health and safety.	Relevant objectives and policies: a. Objective 4.2.1.1 Temporary activities are designed and operated in a way that minimises, as far as practicable, effects on: i. the amenity of surrounding properties; and ii. people's health and safety (Policy 4.2.1.1.a and b).

		Relevant guidance from other sections (priority considerations): b. See Section 13.7 for guidance on the assessment of resource consents in relation to Objective 13.2.1 and effects related to significant heritage values. General assessment guidance: c. In assessing the potential for vibration to cause building damage, Council will consider whether the proposal is in accordance with German Standard DIN 4150–3:2016 Vibrations in Buildings - Part 3: Effects on Structures. Council will also consider the potential effects of vibration on the amenity of surrounding properties, public health and safety, and significant heritage values. d. The assessment will consider the proposed construction noise and vibration assessment and preliminary management plan submitted with the application (see Special Information Requirements - Rule 4.11.2).
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Rule 4.11 Special Information Requirements

4.11.2 Construction noise and vibration

1. For applications for contravention of the construction and site investigation noise performance standard (Rule 4.5.4.1) or vibration performance standard (Rule 4.5.4.X), the following information is required:
 - a. The methodology and sound power levels used to calculate the construction noise levels;
 - b. A statement that all noise assessments have been undertaken in accordance with NZS 6803:1999;
 - c. The worst-case and typical construction noise and vibration levels predicted at the most exposed façades of receiving buildings and structures in the surrounding environment;
 - d. A description of the potential effects and the level of disruption that is expected from the contraventions in the context of the overall project; the level, timing, frequency, duration, and character of the noise and vibration; the activities at receiving sites; and the existing ambient noise levels (where relevant);

- e. For vibration that contravenes the building damage limits in Rule 4.5.4.X(b), an assessment of the potential for damage to receiving buildings or structures based on German Standard DIN 4150-3:2016, including whether scheduled heritage buildings or structures, or other buildings sensitive to vibration, are located within the receiving environment; and
 - f. Mitigation proposals for ensuring adverse effects on the amenity and character of the zone, people's health and safety are minimised as far as practicable.
2. For applications for contravention of the construction and site investigation noise performance standard (Rule 4.5.4.1) or vibration performance standard (Rule 4.5.4.X), Council may require a preliminary construction noise and vibration management plan prepared by a suitably qualified person that identifies the best practicable options to mitigate and minimise noise and vibration, and ensure the construction noise and vibration performance standards for the project are met. The management plan is to provide the following details:
- a. A description of the general construction methodology, noise and vibration generating equipment to be used for the works, and the nearest neighbouring sites;
 - b. The construction noise and vibration performance standards for the project;
 - c. The details of the proposed noise and vibration mitigation measures, including:
 - i. physical measures such as acoustic barriers and shrouds, and any restrictions on plant size and operating distances;
 - ii. management measures such as consultation with neighbours before and during the works, restrictions on timing for high-noise and vibration activities, procedures for responding to complaints, training of on-site personnel;
 - iii. procedures for noise and vibration monitoring; and
 - iv. for vibration:
 - 1. pre-construction condition surveys and post-construction condition assessment processes for potentially affected buildings and structures (where appropriate); and
 - 2. measures to mitigate vibration effects on scheduled heritage buildings and structures and other buildings sensitive to vibration.