Styles Group
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18 June 2026

Jeff Fuller
Senior Planner
Queenstown Lakes District Council

Dear Jeff,

Mt Iron Junction Housing Scheme (FTAA-2602-1173) – Acoustics Review of Substantive Application

1.0 Executive summary

Queenstown Lakes District Council engaged Styles Group to review the acoustic and vibration assessments prepared for the Mt Iron Junction Fast-track substantive application, and to review the proposed draft conditions relating to noise and vibration.

I agree that construction noise and vibration generated by the project can be managed to avoid unreasonable disturbance, provided the required mitigation measures, restrictions, monitoring, and construction hours are clearly reflected in the conditions. I have recommended amendments to the conditions in this report.

Operational noise is predicted to comply with the Queenstown Lakes Proposed District Plan (**PDP**) limits at all sites outside the project area. Appropriate building design is expected to manage road traffic noise levels within the proposed residential units. I agree with these assessments.

The pickleball activity, and commercial deliveries, are expected to generate noise levels above the PDP noise limits during the day at residential units within the project area. In my opinion, the noise effects of these activities can be managed appropriately through additional conditions that clearly authorise and control the operational noise, limit pickleball hours, and require the acoustic barrier specified in the acoustic assessment.

I have considered the potential noise effects of the project in terms of the existing noise environment, the noise standards for the zone, and the nature and scale of the noise emissions. Overall, noise and vibration generated by the project will not cause unreasonable disruption to activities on neighbouring sites or at future dwellings in the project area if my recommended updates to the draft conditions are adopted.

2.0 Introduction

Queenstown Lakes District Council (**QLDC**) engaged Styles Group to review the acoustics and vibration assessments provided with the substantive application and the proposed draft conditions relevant to noise and vibration.

Acoustic Engineering Services (**AES**) provided acoustics and vibration assessments of the proposal in the following documents:

- *Mt Iron Junction Mixed Use Development, 237 Wanaka – Luggate Highway, Wanaka Assessment of Environmental Noise Effects*, 19 December 2025 (Appendix U to the Application) (the **Acoustic Assessment**).
- *Mt Iron Junction Mixed Use Development - Fast Track Application, Response to Peer review questions for Queenstown Lakes District Council*, 7 May 2026 (the **RFI Response**).

This report covers:

1. My experience and qualifications.
2. My review of the Acoustic Assessment and RFI Response with respect to:
    a. The relevant noise and vibration criteria.
    b. The potential construction noise and vibration effects.
    c. The potential operational noise effects.
    d. The potential effects of road traffic noise on the occupants of the proposed residential units.
3. My review of the proposed draft conditions.
4. My recommendations and conclusion.

In this report I refer to sites within the project area as ‘internal sites’ and all others as ‘external sites’.

3.0 Statement of qualifications

I, Jamie Exeter, am a Principal at Styles Group Acoustics & Vibration Consultants and have more than 20 years’ experience in acoustics. For more than 18 years I have specialised in the measurement, prediction, and assessment of environmental noise and vibration in relation to District Plans and the Resource Management Act. I have worked on several FTAA applications for both applicants and Councils and Styles Group has worked on a significant number.

I hold a Diploma in Audio Engineering and am a professional Member of the Acoustical Society of New Zealand. I served as an elected council member from 2012 until 2018. I have extensive experience in assessing residential and commercial developments and construction projects and regularly undertake peer review work for local authorities. I am also one of three authors of the Association of Australasian Acoustical Consultants (**AAAC**) *Guideline for Interpreting and*

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Applying NZS 6803-1999, the New Zealand Standard for measuring and assessing construction noise.

I prepared this review in accordance with the Environment Court's Code of Conduct for Expert Witnesses, contained in the Environment Court Practice Note 2023. Except where I state that I have relied on the advice of another person, the matters addressed in this report are within my expertise. I have not omitted any material facts known to me that might alter or detract from the opinions expressed.

4.0 Assessment criteria

This section discusses the noise and vibration criteria, Standards, and guidelines adopted in the Acoustic Assessment and the RFI Response.

4.1 Noise and vibration criteria

The Acoustic Assessment identifies the relevant noise and vibration limits outlined in the Queenstown Lakes Proposed District Plan (the **PDP**) and the required Standards[1] for the assessment of construction noise and vibration and operational noise.

I have adopted the noise limits outlined in the Acoustic Assessment and the Standards referenced by the PDP in this review.

4.2 References to Standards and guidelines

When considering the potential noise effects of the proposal, the Acoustic Assessment and RFI Response refer to the following:

a. World Health Organization (1999) G*uidelines for Community Noise* (**WHO guidelines**).

b. NZS 6802:2008 Table 3 *Guidelines residential upper noise limits*.

c. AS/NZS 2107:2016 *Acoustics – Recommended design sound levels and reverberation times for building interiors*.

I recommend disregarding these references when considering the potential noise effects of the proposal for the reasons set out in Sections 4.2.1 and 4.2.2.

In my experience, the assessment of potential noise effects should be based on the existing noise environment. This includes the ambient and background noise levels (including allowances for future traffic growth as assessed by AES), noise from consented activities in the area, the level, character, frequency, timing, and duration of noise anticipated from permitted activities in the zone, and the potential for the noise to cause unreasonable disruption during the day or sleep disturbance at night.

[1] NZS 6803:1999 Acoustics – Construction noise for construction noise, DIN 4150–3:1999 for construction vibration, and NZS 6801:2008 *Acoustics – Measurement of environmental sound* and NZS 6802:2008 *Acoustics – Environmental noise* for operational noise.

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4.2.1 WHO guidelines and NZS 6802:2008

The Acoustic Assessment refers to the WHO guidelines and Table 3 of NZS 6802:2008 for the assessment of potential noise effects on internal and external sites and to support predicted noise levels that exceed the PDP standards for permitted activities.

Neither the WHO guidelines nor the guideline noise limits in NZS 6802:2008 provide a basis for increasing noise levels up to the values they state. Instead, both emphasise controlling noise to avoid adverse effects.

The WHO guidelines are a public health document that identifies noise levels at which harmful effects may begin to occur across a population. They are intended to guide efforts to reduce noise exposure. I am not aware of any part of the WHO guidelines that supports increasing noise levels in an environment.

The noise exposure values in the WHO guidelines relate to total environmental noise from all sources combined over time. This would include noise from the project, road traffic noise, and all other sources of anthropogenic noise in the area. The approach taken in the Acoustic Assessment is inconsistent with the WHO guidelines because it only applies the values to noise from the project. It ignores how noise emissions from the project would add to the existing noise environment and affect overall amenity.

District plan noise limits serve a different purpose to the WHO guidelines. District plan noise limits are designed to manage both health effects and amenity, and to give effect to the relevant objectives and policies for the zone (along with other plan provisions).

The recommended limits in NZS 6802:2008 are upper limits rather than targets. Section 8.6.1 of the Standard states that local authorities may adopt more stringent limits to reflect community expectations. The PDP adopts more stringent limits in the rural and residential zones to give effect to the relevant objectives and policies.

In my view, the WHO guidelines are not relevant to the potential noise effects of the project. The effects should be considered with reference to the PDP provisions for the zone and the existing noise environment.

4.2.2 AS/NZS 2107:2016

The Acoustic Assessment and RFI Response both refer to AS/NZS 2107:2016 when assessing the potential effects of noise from State Highway 6 on amenity within the proposed residential units.

AS/NZS 2107:2016 states in Section 2.2 *Limitations* that the Standard is not intended for assessing or prescribing acceptable recommended noise levels for transient or variable external noises such as road traffic noise. Accordingly, I consider that the references to AS/NZS 2107:2016 in the Acoustic Assessment and RFI Response should be disregarded.

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5.0 Construction noise and vibration

The RFI Response includes an assessment of the construction noise and vibration.

I agree that construction noise and vibration from the project will not cause unreasonable disturbance if the PDP limits for permitted activities are complied with and noisy activities such as earthworks, compaction, and concrete pours take place between 7:30 am and 6:00 pm, Monday to Saturday.

I generally agree with the reference levels and methodology used to calculate the worst-case construction noise and vibration levels. The RFI Response shows that mitigation, restrictions, and monitoring will be required to ensure that all construction activities comply with the PDP construction noise and vibration limits.

I recommend that the measures required for compliance are referenced in the Construction Noise and Vibration Management Plan condition.

6.0 Operational noise

The Acoustic Assessment and RFI Response identify the following operational noise sources:

a. The operation of a childcare centre for up to 65 children.

b. The use of a pickle ball court.

c. Private vehicles, commercial vehicles including refrigeration trucks.

d. Mechanical plant associated with the market and café.

e. Café patrons talking outside the building.

I expect that mechanical plant associated with the residential units and rubbish trucks on the site will also generate operational noise. Although these sources have not been assessed, they are unlikely to increase the predicted Noise Rating Levels, provided that rubbish collection only occurs during the daytime period of 8:00 am to 8:00 pm.

I generally agree with the reference levels and methodology used to calculate the worst-case operational noise levels. However, the predictions in the Acoustic Assessment, which showed non-compliance with the PDP noise limits at two external sites, were not prepared in accordance with NZS 6802:2008 and should be disregarded. The RFI Response updates the operational noise assessment and provides predicted Noise Rating Levels that demonstrate compliance at all external sites. I agree with that assessment.

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6.1 Potential operational noise effects on external sites

The existing noise environment is characterised by road traffic noise, noise from the consented service station, and noise that permitted activities in the Rural Zone could generate, including farming and mining activities. Based on the road traffic noise levels provided in the Acoustic Assessment, noise generated by the project will be audible during the daytime when traffic flows are low or intermittent, but it is unlikely to appreciably increase total sound levels at any external site.[2] I consider that operational noise from the development will largely align with the existing noise environment and will not cause unreasonable disturbance or annoyance at external sites where the PDP noise limits are complied with.

6.2 Potential operational noise effects on internal sites

The predicted Noise Rating Levels exceed the PDP noise limits at five internal sites. At these locations the higher noise levels arise from proximity to the pickleball court and the market and café delivery area. It will not be practicable to screen the upper floors of the nearest residential units from these activities with acoustic barriers.

Noise from pickleball will be intermittent and limited in duration over the day. The predicted Noise Rating Levels for pickleball noise include a +5 dB adjustment to account for the special audible character of the sound, which is atypical in rural and residential settings and may cause additional annoyance (compared to a sound without those characteristics).

Refrigeration truck servicing the market and café are expected to generate noise levels of up to 11 dB above the PDP limits. This will occur infrequently and for short durations.

In my opinion, operational noise will not cause unreasonable disruption within the internal residential units. This view is based on the predicted noise levels, the limited duration and intermittent nature of the noise, and the existing noise environment. However, this conclusion depends on these noise sources operating during the daytime period only.

7.0 Road traffic noise levels within residential units

The Acoustic Assessment recommends a road traffic noise limit of 40 dB $L_{Aeq(24\ hr)}$ inside the proposed residential units, which is included in the proposed condition set. The RFI Response provides indicative façade constructions to demonstrate that compliance with the proposed limit will be practicable. Based on the predicted road traffic noise levels, I agree that the proposed internal noise limit can be achieved. The units exposed to the highest road traffic noise levels will require substantial façade construction to comply with the proposed internal limit of 40 dB $L_{Aeq(24\ hr)}$. The second-floor façade and roof constructions stated in the RFI Response may be too light to comply with the proposed limit, but practicable options will be available to upgrade them during detailed design if necessary.

[2] 'Total sound' is used in NZS 6802:2008 to describe the sound from all sources near and far.

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Designing to 40 dB $L_{Aeq(24\ hr)}$ does not necessarily avoid adverse noise effects at night. For example, in situations where there are considerable heavy vehicle movements outside dwellings before 7:00 am. The RFI Response uses hourly traffic distribution data to analyse the highest night-time noise levels expected. The results are:

- 31 dB L_{Aeq} from 5:00 am to 6:00 am.
- 37 dB L_{Aeq} from 6:00 am to 7:00 am.
- 42 dB L_{Aeq} from 7:00 am to 8:00 am.

Based on these results, road traffic noise will be noticeable inside the residential units closest to the highways from 5:00 am and clearly noticeable from 6:00 am if the occupants are awake. However, the noise is unlikely to cause sleep disturbance or serious annoyance. I therefore agree that the proposed road traffic noise limit of 40 dB $L_{Aeq(24\ hr)}$ is appropriate.

8.0 Conditions

My comments on the proposed condition set with respect to noise and vibration are set out below.

8.1 Operational noise limits

The following information was provided[3] in response to a question about imposing noise limits at the external sites where predictions showed the PDP permitted noise limits would be exceeded:

> On point 20 – No specific conditions have been proposed to enable the predicted non-compliant noise levels and it is considered that none are required as district plan rule infringements do not need to be accompanied by specific condition(s) relating to that infringement.

I do not support this approach. When predicted noise levels exceed District Plan standards and are deemed to be reasonable, the conditions should clearly link the predicted levels and assessed effects with noise limits that authorise the exceedance and set the basis for compliance monitoring. This typically requires conditions that specify clear, certain, and enforceable noise limits.

The updated Noise Rating Level predictions comply with the PDP noise limits at all external sites[4] but exceed the limits at internal residential sites.

In my experience, applying conditions that specify noise limits for activities that cannot comply with the PDP would be best practice because:

a. It would clearly outline the maximum noise levels that are authorised, to provided certainty for the noise maker, the receivers, and the Council.

[3] Mt Iron Junction, Wānaka – Fast Track Application Information Response, 7 May 2026, Patersons.

[4] Noise level predictions in the Acoustics Assessment suggested the permitted noise limits would be exceeded but these were not in accordance with NZS 6802:2008. This was corrected and updated in the RFI Response.

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b. It would ensure the noise effects that are authorised are no greater than those considered by the decision makers.

c. It would provide council officers with clear, measurable limits to use when investigating complaints or carrying out monitoring.

I understand that the intended subdivision will place most residential units on separate titles. I therefore recommend including a condition that specifies noise limits at any internal site where the PDP permitted noise limits will not be complied with (based on the predicted noise levels in the RFI Response). I have recommended a noise limit condition in Section 8.6.

8.2 Pickleball hours

The Acoustic Assessment recommends limiting the use of the pickleball court to between 8:00 am and 8:00 pm to 'give confidence that noise emissions associated with the activity are maintained at appropriate levels'.

I recommend including this restriction in the conditions because it is necessary for compliance with the PDP limits and to maintain a reasonable level of noise at night. I have recommended a condition to limit the pickleball hours in Section 8.6.

8.3 Acoustic barriers

The Acoustic Assessment references a proposed 2 m high acoustic fence between the southern loading bay of the market and the boundary of Lot 102. This has been relied on in the noise modelling and assessment. I have recommended a condition requiring the fence to be constructed and maintained in Section 8.6.

Condition A-15 includes the requirement for an acoustic fence around the proposed ECE centre outdoor play area. I recommend updating that condition to specify where the fence must be constructed, its minimum specifications, and the timeframe for constructing and maintaining it.

8.4 CNVMP

I recommend updating the CNVMP condition (B-15) to adopt the AAAC guidelines[5] on CNVMP objectives. It should also reference the mitigation, setbacks, restrictions, and monitoring that have been relied on for predicting compliance with the project noise and vibration limits.

8.5 Construction hours

The RFI Response recommends updating Condition 28 to state that construction machinery cannot be used on the site before 7.30 am. I agree with this recommendation.

Condition 19 would enable the CNVMP to authorise any construction work outside the hours stated in Condition 28 (the **proposed construction hours**), provided the PDP limits are complied with. I do not support that approach because:

[5] Guideline for Interpreting and Applying NZS 6803-1999

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a. The assessment of construction noise and vibration effects was based on all work taking place within the proposed construction hours.

b. Compliance with the PDP construction noise and vibration limits outside of the proposed construction hours does not mean there will be no effects on the receivers.

c. The condition enables construction noise that is clearly audible and vibration that is perceptible inside dwellings before 7:00 am, in the evenings, and at night. This may cause annoyance and will reduce the respite periods offered by the proposed construction hours. The potential effects of this have not been described or assessed.

I recommend updating the condition to impose construction noise and vibration limits that ensure any work outside the proposed construction hours will not cause annoyance at neighbouring sites and that vibration will not reach perceptible levels within any occupied dwelling.

8.6 Recommended updates to conditions

As requested, I have provided QLDC with recommended edits to the relevant draft conditions in a separate document. In addition to those edits, I recommend the conditions below.

Operational noise limits

Noise generated by activities associated with the pickleball court and any commercial activity within the project area must comply with the relevant noise limits of the Queenstown Lakes Proposed District Plan (QLPDP) except as specified below.

a. Noise generated by the use of the pickleball courts may increase the Noise Rating Levels between 8:00 am and 8:00 pm up to the following limits:

- 54 dB L_{Aeq} anywhere within the boundary of Block 16 – Unit 400 – Lot 203.
- 53 dB L_{Aeq} anywhere within the boundary of Block 23 – Unit 500 – Lot 204.
- 52 dB L_{Aeq} anywhere within the boundary of Block 17 – Unit 411 – Lot 203 and Block 25 – Unit 512 – Lot 204.

b. Noise generated by truck deliveries in the loading bay of the market may increase the Noise Rating Level between 8:00 am and 8:00 pm up to a limit of 61 dB L_{Aeq} when measured at the façade of the dwelling at Block 22 – First and Second Floor Apt 3 – Lot 102.

Operational hours for pickleball

The pickleball courts must not be used outside 8:00 am to 8:00 pm on any day.

Acoustic barrier in the loading bay of the market

An acoustically effective barrier with a minimum height of 2.0 m must be constructed between the southern loading bay of the market and the boundary of Lot 102. The barrier must be solid with no gaps and have a surface mass of no less than 10 kg/m^2. The barrier must be in place before the market operates and must be maintained to be acoustically effective for as long as the centre is operational.

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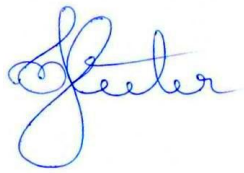
9.0 Conclusion

I have considered the potential noise effects of the project in the context of the existing noise environment, the relevant PDP noise standards for the zone, and the nature and scale of the noise emissions.

In my opinion, construction noise and vibration and operational noise from the project will not cause unreasonable disruption to activities on neighbouring sites, provided the draft conditions are updated to address the matters set out in Section 8.0 of this review.

Yours sincerely,



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