Styles Group
Acoustics & Vibration Consultants

ASSESSMENT OF NOISE EFFECTS

BRYMER ROAD DEVELOPMENT
127 BRYMER ROAD

PREPARED FOR

Brymer Farms Limited

DATE

15 April 2025

Acoustic assessment prepared by Styles Group for Brymer Farms Limited.

REVISION HISTORY

Rev:	Date:	Comment:	Version:	Prepared by:	Reviewed by:
1	14/04/25		Final Draft	Jon Styles, MASNZ Director and Principal Styles Group	Gemma Styles Consultant Styles Group
2	15/04/25		Final		

Statement of experience

I am and have been the Director and Principal of Styles Group Acoustics and Vibration Consultants for 20 years. I am a Council Member of the Acoustical Society of New Zealand, and I am on the Board of Directors of the Australasian Association of Acoustical Consultants.

I have over 24 years' experience advising on the management of construction and operational noise and vibration effects. I have worked on a significant number of plan changes and resource consent applications for large-scale residential and mixed use developments across New Zealand. I have extensive experience advising on the management of noise effects from land transport infrastructure, and development of controls to improve the compatibility of residential development around such infrastructure.

I am a regular and experienced expert witness for Council, Environment Court, District Court, High Court and Board of Inquiry hearings. I confirm that, in my capacity as author of this report, I have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

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Executive summary

Styles Group has assessed the construction noise and vibration and operational noise effects from the proposed development of the Brymer block at 127 Brymer Road (the Site).

The proposal is to develop the Site for a range of residential and rural lifestyle activities, with a small mixed use neighbourhood centre to provide for the needs of residents.

The Site is in the General Rural Zone of the Waikato District. The receivers adjacent to the Site are in the General Rural Zone of the Waikato District and General Residential Zone of Hamilton City.

The appropriate management of noise effects between the Site (within the jurisdiction of the Waikato District) and receivers in Hamilton City and Waikato District are a key focus of this assessment.

This assessment identifies the key considerations for the management of noise effects from the proposal and confirms the proposal can be designed and constructed to comply with the relevant permitted activity standards of the Waikato District Plan Operative in Part (WDPOP) and Hamilton City Operative District Plan (HCDP).

Our assessment finds that construction noise effects from the majority of the construction phase can be managed to achieve compliance with the permitted construction noise standards in the WDPOP and HCDP. Construction vibration effects will comply with the permitted standards. Construction noise levels from civil works (road construction) may generate short term exceedances of the permitted construction noise standards when works are undertaken close to occupied residential dwellings. These exceedances can be managed to ensure the effects will be reasonable for all occupied dwellings using a Construction Noise and Vibration Management Plan (CNVMP). The CNVMP will prescribe the Best Practicable Option (BPO) for the appropriate management of construction noise and vibration effects and will ensure the effects are controlled in terms of level, timing and duration.

The proposal will enable a comprehensive residential development at the interface of the Rural and Residential Zone. Our assessment finds that the range of residential and retirement living activities can comply with the permitted activity noise standards for noise received in the Rural Zone of the Waikato District and the General Residential Zone of Hamilton City.

The proposal includes a small-scale mixed use neighbourhood centre to provide for the needs of residents. The centre is well separated from existing receivers. Noise levels between the neighbourhood centre and all noise sensitive activities within and beyond the Site be managed to ensure ongoing land use compatibility.

The southern boundary of the Site is adjacent to State Highway 23 and part of the Site is inside the State Highway noise control boundary. Future dwellings constructed inside the road-traffic noise boundary are required to be designed, constructed and maintained to ensure that road-traffic noise levels do not exceed 40dB $L_{Aeq(24hours)}$ inside habitable rooms. Our assessment finds that compliance with the permitted activity standards will be straightforward to achieve as part of any future building consent application.

1.0 Introduction

Brymer Farms Limited has engaged Styles Group to assess the construction and operational noise effects from the proposal to develop approximately 80.99ha of land (the **Site**) at 127 Brymer Road.

This advice has been prepared accompany a referral application under the Fast-track Approvals Act 2024.

This assessment sets out the key considerations for management of noise effects from the proposal and provides an assessment of the potential construction and operational noise effects in accordance with the relevant permitted noise standards prescribed by the Waikato District Plan Operative in Part (**WDPOP**) and Hamilton City Operative District Plan (**HCDP**).

This report should be read in conjunction with the documentation submitted with the Referral application and site plans. A glossary of acoustical terms used within this document is attached as Appendix A.

2.0 The proposal

The Brymer development is a residential development that comprises approximately 1,650 residential units of varying typologies such as detached, duplexes, terraces, apartment units and retirement village units, along with a supporting mixed-use neighbourhood centre, open spaces, and infrastructure. The Brymer Masterplan is shown in Figure 1 overleaf.

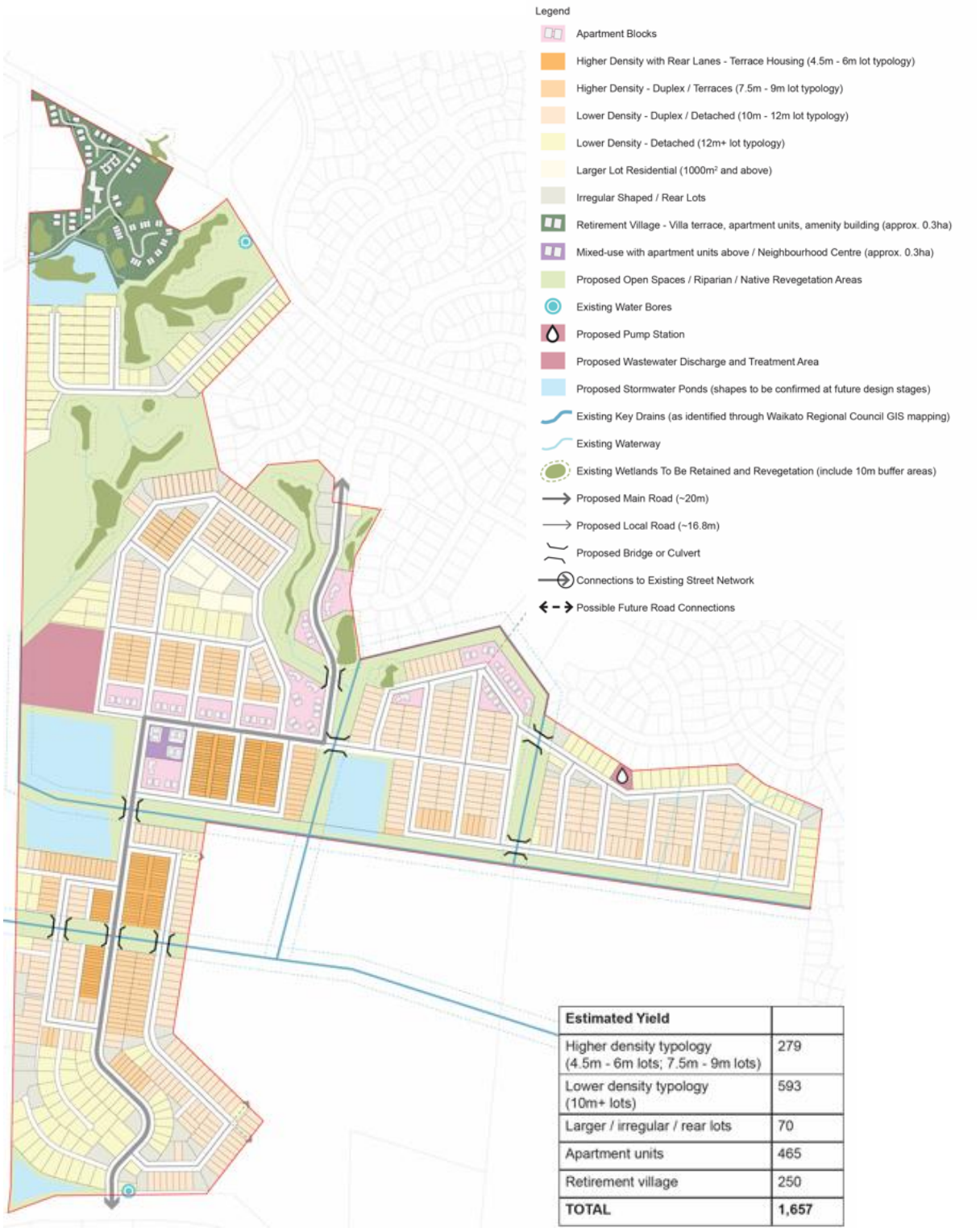
The proposal includes a 0.3 hectare mixed-use neighbourhood centre that will provide a range of amenities and services to support the residential development. The mixed-use neighbourhood centre will include commercial activity (such as a café and a local superette), with upper-floor apartment living.

A retirement village of approximately 3.4 hectares is proposed in the northern part of the Site. The village will provide villa terraces, apartment units and an amenity building and will be serviced by its own private transport network, infrastructure, and high amenity open spaces.

The proposed transport network comprises a 20-metre wide spine road running north-to-south, supported by local roads, cycle connections and pedestrian pathways.

The development will be serviced via a robust infrastructure strategy, which includes a new pump station, wastewater discharge and treatment area, stormwater ponds, and utilisation of the existing water bores.

The development includes open spaces areas throughout the development.



Estimated Yield	
Higher density typology (4.5m - 6m lots; 7.5m - 9m lots)	279
Lower density typology (10m+ lots)	593
Larger / irregular / rear lots	70
Apartment units	465
Retirement village	250
TOTAL	**1,657**

Figure 1 Brymer Masterplan

3.0 The Site and receivers of noise

The Site is in the General Rural Zone (**GRUZ**) of the Waikato District Plan. The adjacent land to the north, west and south of the Site is within the jurisdiction of the WDPOP and is also in the GRUZ.

The north-eastern and eastern boundaries of the Site interface with the territorial boundary of Hamilton City. The adjacent land that is within the jurisdiction of Hamilton City is zoned General Residential Zone (**Residential Zone)**. Te Kootii Park is zoned Sports and Recreation Open Space Zone (**SARZ**).

3.1 Receivers

Noise generated from the Site will be experienced by receivers within the jurisdiction of the Waikato and Hamilton Districts.

The appropriate management of cross-territorial boundary noise effects between the Site (within the jurisdiction of the Waikato District) and receivers in Hamilton City and Waikato District is a key focus of this assessment.

The receivers surrounding the Site include:

- The dwellings in the GRUZ adjacent to the northern, western and southern boundaries of the Site. These receivers are in the Waikato District. The closest GRUZ dwellings are identified with a red circle in Figure 2.
- The dwellings in the Residential Zone of Hamilton City to the east of the Site. These receivers are in the jurisdiction of Hamilton City.

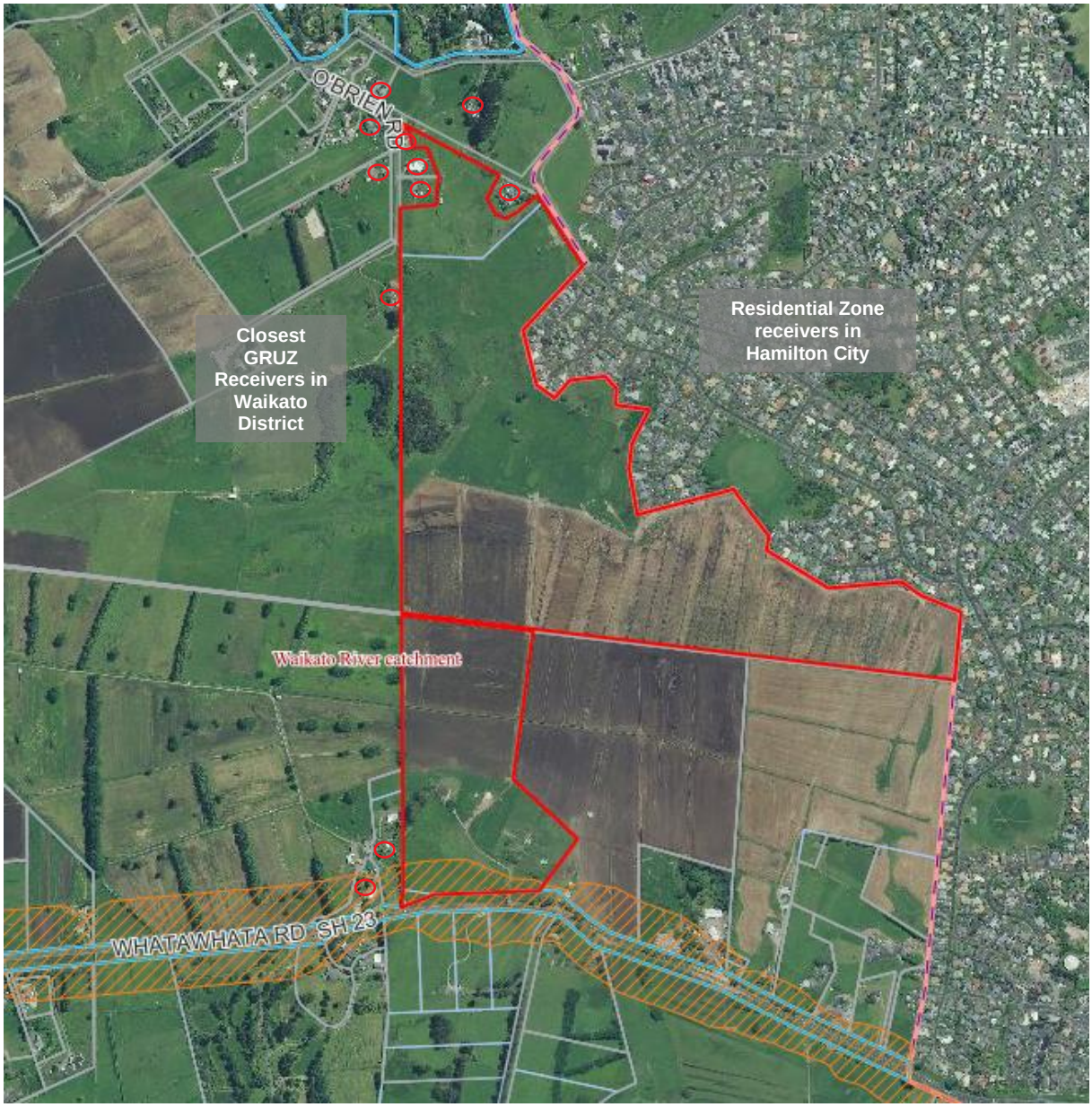


Figure 2 The Site (outlined red) and closest receivers in the GRUZ and Residential Zone. The closest adjacent GRUZ dwellings are identified with a red circle.

4.0 The key noise considerations for the management of noise effects from the proposal

Noise effects generated from the Site and received at adjacent sites within the Rural and Residential Zones

The key considerations for the management of noise effects from the proposal include:

- Ensuring that **construction noise and vibration** effects will be reasonable for the receivers adjacent to the Site.

- Ensuring that **operational noise** levels from the activities proposed within the Site will be compatible with the level of noise amenity that is anticipated and provided for in the GRUZ and Residential Zone. Our assessment is focused on the noise from activities near to the perimeters of the Site, including roads, a proposed pumpstation, a retirement village and residential activity.

Noise effects generated and received within the Site

The key considerations for the management of noise effects within the Site include:

- Ensuring that the proposal includes appropriate conditions to control **operational noise** levels generated and between sites, including noise levels generated and received between activities and sites in the mixed use neighbourhood centre.
- Ensuring that the proposed dwellings adjacent to SH23 are designed and constructed to mitigate **road-traffic noise** so that future occupants experience an adequate level of acoustic amenity while indoors.

The permitted noise standards of the WDPOP and HCDP are both relevant given that noise generated from activities within the Site will be received in both jurisdictions.

Noise generated from the Site has the potential to be received by receivers in the GRUZ of the Waikato District and Residential Zone of Hamilton City. We have prepared a high-level assessment of compliance with the relevant permitted activity noise standards of both District Plans.

The relevant permitted activity noise standards of the WDPOP and HCDP are reproduced in full in Appendices B and C.

5.0 Assessment of construction noise and vibration effects

5.1 Construction noise

Construction noise will be generated from the civil works to prepare the Site for future development, including enabling earthworks to clear and prepare the Site for civil infrastructure, building platforms and road construction.

The masterplan identifies that many areas of the Site near to the interface with the Residential Zone of Hamilton City will be set aside as open space. The construction noise levels from vertical construction of built development will generally be quieter than the noise from civil works, especially where proposed buildings are separated from external boundaries by open space.

The highest construction noise levels are likely to be generated by the construction of the spine road (which extends from the existing termination of Harrogate Place) and initial earthworks involving heavy plant near to the perimeters of the Site boundaries.

5.1.1 Permitted construction noise standards

NOISE-R4 of the WDPOP and Rule 25.8.3.2 of the HCDP both require that construction noise levels are managed in accordance with the recommended numerical limits set out in NZS 6803:1999 '*Acoustics – Construction Noise' (***NZS6803:1999**). Rule AINF-R2[1] of the WDPOP controls noise associated with the construction of infrastructure[2] and also requires compliance with NZS6803:1999.

NZS6803 provides guideline noise limits that are based on the duration of construction works at any one location, and the occupation of the receiving site.

Construction activity will need to take place between 7:30am and 6:00pm, Monday to Saturday, when NZS6803:1999 recommends that a noise limit[3] of 70 dB L_{Aeq} and 85 dB L_{AFmax} applies when measured and assessed 1m from the façade of any occupied dwelling in a rural or residential zone.

5.1.2 Key recommendations for construction noise

At this point in time, a contractor has not yet been appointed which means that we have not been able to review a proposed construction methodology such as details of the construction equipment and durations of construction work in various parts of the Site.

The masterplan indicates that the majority of enabling works that are likely to be undertaken near to the Site boundaries will comprise bulk earthworks at the beginning, followed by recontouring, compaction and paving of access roads and installation of services. We expect that the works will require very typical plant and machinery such as bulldozers, compactors, excavators, paving machines, concrete pours and trucks.

The vast majority of construction activities are expected comply with the recommended noise limits in NZS6803:1999 '*Acoustics – Construction Noise'* at all occupied dwellings based on the expected type of construction activities and large separation distances.

Our assessment finds that the construction of the spine road from Harrogate Place may generate short term exceedances of the construction noise standards when earthworks, paving and compaction works are undertaken near to dwellings at the termination of the existing cul-de-sac.

Our assessment finds that any exceedances of the construction noise standards are likely to be intermittent and very short-term when high noise generating activity is undertaken near to the Site boundaries. Based on our experience with similar projects, we expect that construction noise levels can be managed to be reasonable for all receivers through a Construction Noise and Vibration Management Plan (**CNVMP**) that is designed to mitigate the effects of any minor exceedances of the construction noise limits.

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[1] We understand this rule is subject to currently subject to an appeal [000086].

[2] Including structures for transport on, under or over land by cycle ways, rail, roads, walkways, or any other means;

[3] The construction noise limit applying to construction projects greater than 20 weeks in duration.

Recommendation 1: Construction Noise

We recommend that substantive application includes:

- An assessment of construction noise levels in accordance with the recommended numerical limits and assessment procedures set out in NZS 6803:1999 *Acoustics – Construction Noise*.
- Details of how a CNVMP will be used to ensure the best practicable option is adopted so that construction noise effects are minimised as far as practicable to ensure compliance with the permitted standards for as much of the project as is practicable.

5.2 Construction vibration

The WDPOP does not include any rules or standards to control vibration generated from construction work. Rule 25.8.3 of the HCDP requires that construction vibration received by any building on any other site shall comply with the provisions of and be measured and assessed in accordance with German Standard DIN 4150-3:1999 *Structural vibration – Effects of vibration on structures* (the **DIN limits**).

The DIN limits are designed to ensure that construction vibration avoids damage to buildings. Our assessment finds that vibration generated by construction work on the Site will comply with the limits for avoiding building damage without requiring any specific mitigation. This is due to the nature of construction work near to the boundary and the distance between any vibration-generating activities on Site and the nearest existing and potential future buildings.

Recommendation 2: Construction vibration

We recommend that the substantive application includes:

- An assessment of construction vibration levels in accordance with German Standard DIN 4150-3:1999 Structural vibration – Effects of vibration on structures.
- Details of how a CNVMP will be used to ensure the best practicable option is adopted so that construction vibration effects are minimised as far as practicable.
- Conditions that will require compliance with the DIN limits at all receivers in the GRUZ of the Waikato District as well as Residential Zone receivers in Hamilton City.

6.0 Operational noise received beyond the Site

6.1 Permitted operational noise levels

Rule NOISE-R8 controls the noise levels generated and received between sites in the GRUZ of the WDPOP. The rule requires that noise levels received at the notional boundary of any site in the GRUZ must not exceed:

- 50 dB L_{Aeq} between 7am and 7pm
- 45 dB L_{Aeq} between 7am and 10pm
- 40 dB L_{Aeq} and 65 dB L_{Amax} between 10pm and 7am

Rule 25.8.3.7 of the HCDP controls noise levels received in a Residential Zone. The rule requires that noise levels received at the boundary of any site in a Residential Zone must not exceed:

- 45 dB L_{Aeq} and 75 dB L_{Amax} between 6am and 7am
- 50 dB L_{Aeq} between 7am and 8pm
- 45 dB L_{Aeq} between 8pm and 11pm
- 40 dB L_{Aeq} and 75 dB L_{Amax} between 11pm and 6am

Our assessment finds that the WDPOP and HCDP both prescribe the same numerical noise limits during the daytime and nighttime periods, however the prescribed timeframes for daytime, evening, morning and night-time vary slightly between the plans.

6.2 Assessment of operational noise sources

We have reviewed the masterplan to identify the location of all noise generating activities and to determine compliance with the maximum permitted noise levels prescribed by NOISE-R8 of the WDPOP and Rule 25.8.3.7 of the HCDP.

The operational noise sources associated with the proposal include:

- Noise levels from residential activity across the development
- Noise levels from retirement village activity in the northern part of the development
- Noise levels from vehicles on the proposed road network
- Noise levels from commercial activity in the proposed neighbourhood centre.

These sources are discussed below.

6.2.1 Residential and retirement living activities

The masterplan shows that the majority of the Site will be developed for residential activity with a retirement village proposed in the northern part of the Site. The noise levels generated from residential and retirement living activities are expected to be consistent with a residential area

where the noise environment is primarily be controlled by vehicle movements and intermittent noise from typical household activities. Our assessment finds that the noise levels generated from activities within the Site and experienced at receivers beyond the Site will be consistent with the overall character, timing and duration of noise generated by residential activity in the adjacent Residential Zone.

Our review of the masterplan has not identified any constraints in terms of the proposed residential and retirement living activities within the Site complying with the permitted noise standards prescribed by the WDPOP (for noise received at any notional boundary in the GRUZ) and the HCDP (for noise received at the boundary of any site in a Residential Zone).

6.2.2 Road traffic noise

The masterplan shows that the proposed spine road to provide access to the development will extend from the current termination of Harrogate Place.

The HCDP does not control road traffic noise levels generated from the alteration of transport corridors that are identified as a local roads[4].

The WDPOP zone noise limits do not apply[5] to road traffic noise generated from roads that are vested or dedicated as road.

6.2.3 Activities in the mixed-use neighbourhood centre

The proposed mixed use neighbourhood centre is very small and well separated from the Site boundaries. We have not identified any concerns in terms of noise from proposed commercial activities affecting receivers beyond the perimeters of the Site.

6.2.4 Pumpstation

The masterplan shows that a pump station is proposed in the north-eastern part of the development, to the south of the dwellings on Friesian Place. At this point in time, the detailed design of the pump station is not yet available. We recommend that the pumpstation is designed and operated so that operational noise levels are compatible with adjacent residential activity.

We consider that this can be achieved by requiring the pumpstation to be designed, constructed and maintained to comply with noise levels that are 5dB lower than the relevant noise limits that control noise levels received in the Residential Zone (Rule 25.8.3.7 of the HCDP). The recommendation to manage pumpstation noise to be 5dB lower than the noise standards for permitted activities reflects the consistent nature of the noise (compared to the more intermittent noise that the standards are designed to control).

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[4] Standard 25.8.3.4(b)Iii) *Design and Construction of New and Altered Roads* states that the standard does not apply to local transport corridors identified within Volume 2, Appendix 15-4, Figures 15-4b to 15-4f of the HCDP. The transport hierarchy plan in Figure 15-4e of the HCDP identifies that Harrogate Place is a local road and therefore Standard 25.8.3.4 does not apply.

[5] AINF Rule 10 of the WDPOP states that any zoning rules cease to have effect from the time land is vested or dedicated as road

Recommendation 3: Operational noise

We recommend that the substantive application includes:

- Confirmation that operational noise levels from all activities can be located, designed and managed to comply with the permitted noise levels prescribed by NOISE-R8 of the WDPOP and Rule 25.8.3.7 of the HCDP.
- A condition that will require the pumpstation to be designed, constructed and maintained to achieve compliance with noise levels that are 5 dB lower than the maximum permitted noise levels in Rule 25.8.3.7 of the HCDP. We recommend the same principle applies to pumpstation noise received at residential lots within the Site. This condition will ensure that the potentially constant noise generated from mechanical plant within the pumpstation will not be dominant or intrusive when experienced at adjacent lots.

7.0 Operational noise generated and received *within* the Site

7.1 Noise levels between sites occupied by noise sensitive activities

Noise levels generated and received between the proposed lots within the Site will be controlled by the underlying GRUZ noise limits in NOISE-R8. The noise limits in NOISE-R8 apply when measured and assessed at the notional boundary location. The notional boundary is defined by the WDPOP as:

> "*A line 20 metres from any side of a residential unit or other building used for a noise sensitive activity, or the legal boundary where this is closer to such a building*".

The maximum permitted noise levels prescribed by NOISE-R8 are designed to deliver a good level of acoustic amenity to residential activity that is non-acoustically treated.

We consider that the noise levels in NOISE-R8 are appropriate to control noise levels generated and received between sites across the development that contain a noise sensitive activity.

7.1.1 Noise levels generated and received between activities in the neighbourhood centre

The masterplan includes a 0.3 hectare mixed-use neighbourhood centre that will provide amenities and services (such as a café and superette) to support the residential development. The proposed masterplan anticipates that apartments may be constructed above ground-floor commercial activity,

The underlying GRUZ noise limits in NOISE-R8 will control the noise levels generated from a commercial activity and received at adjacent sites containing a dwelling or other noise sensitive activities. However, the limits and assessment locations in NOISE-R8 are not designed to control intertenancy noise levels generated between walls and floors of buildings that contain a mix of commercial and residential activity in a unit title arrangement, or noise levels generated and received between commercial activities.

Recommendation 4: Noise levels between units in the neighbourhood centre

We recommend that the substantive application includes appropriate conditions to control the maximum permitted noise levels that can be generated and received between units in the neighbourhood centre (i.e. in situations where common building elements such as floors and walls connect two units).

These conditions will ensure that noise levels generated by commercial activity in the neighbourhood centre are compatible with residential activity that may establish within the same building.

8.0 Road-traffic noise effects from SH23

Figure 3 displays the extent of the Site that is within the State Highway Corridor Noise Control Boundary (**NCB**). The overlay affects all parts of the Site within approximately 25m from the eastern frontage with SH23, increasing to approximately 95m at the western end of the Site frontage.

NOISE-R44 of the WDPOP requires that new dwellings constructed inside the NCB are designed and constructed to mitigate road-traffic noise. NOISE-R44 and Section 8.1(4) of APP1 require bedrooms and habitable rooms to be designed and constructed so that road traffic noise does not exceed 40 dB $L_{Aeq(24hours)}$ indoors.

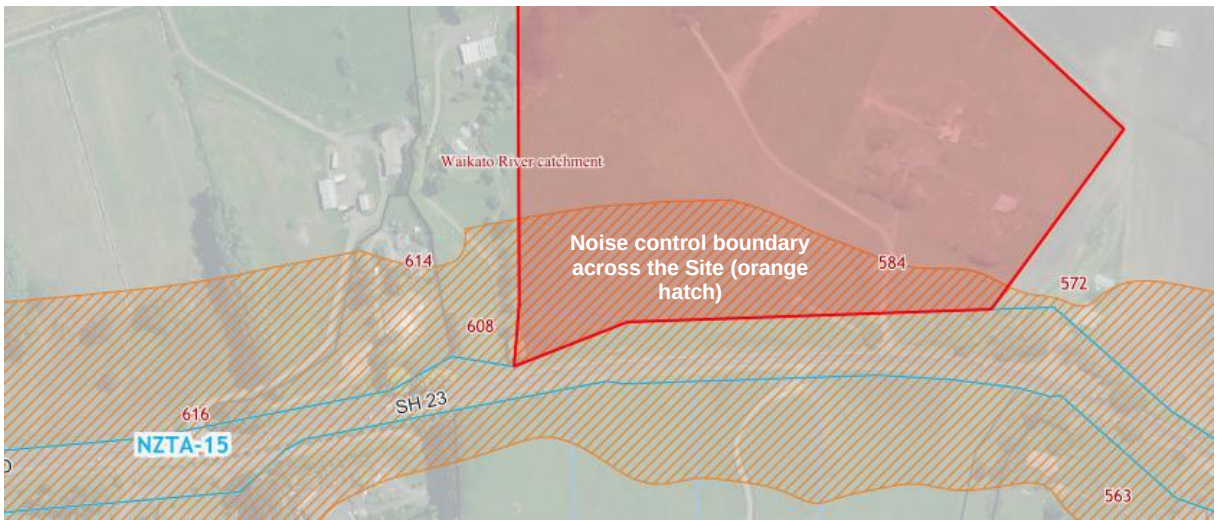

Figure 3 Area of the Site within the State Highway Corridor Noise Control Boundary

8.1.1 Management of road-traffic noise effects from SH23

Our preliminary assessment finds that compliance with NOISE-R44 will be straightforward to achieve and can be demonstrated through the compliance pathway specified in the rule and permitted activity standard in Section 8.1(4) of APP1.

The rule and permitted activity standard enables compliance with the internal noise levels to be demonstrated through two compliance pathways prior to construction of any building:

i. Through submission of an acoustic design report that uses prediction or measurements to demonstrate that the noise levels at all external building facades will be no more than 15dB higher than the maximum indoor design noise levels; or

ii. Through submission of an acoustic design report that demonstrates that the proposed construction will meet (or exceed) the acoustic performance of the construction schedule in Table 29 of APP1.

We consider that compliance with the internal noise levels in NOISE-R44 will be straightforward to achieve through standard construction upgrades. Our assessment finds that compliance with the rule and permitted activity standard can be demonstrated as part of any future building consent application when the appropriate level of construction detail is available.

Recommendation 5: Road-traffic noise effects from SH23

We recommend that substantive application identifies the State Highway Noise Control Boundary across the Site and identifies the lots that will be subject to the acoustic treatment requirements set out in NOISE-R44.

We recommend that compliance with NOISE-R44 and the permitted activity standards in Section 8.1(4) of APP1 are demonstrated prior to construction of any building containing a noise sensitive activity when the appropriate level of construction detail is available.

9.0 Summary

Styles Group has assessed the potential construction noise and vibration effects from the Brymer development.

Our analysis of the masterplan finds that the proposal can achieve a high level of compatibility with the level of acoustic amenity anticipated and provided for in the GRUZ of the Waikato District and Residential Zone of Hamilton City.

We have identified five key recommendations for the appropriate management of construction and operational noise. These recommendations are straightforward and can be readily addressed within the substantive application.

The key recommendations are:

Recommendation 1: Construction Noise

We recommend that substantive application includes an assessment of construction noise levels in accordance with the recommended numerical limits and assessment procedures set out in NZS 6803:1999 *Acoustics – Construction Noise*. The application should set out how a CNVMP will be used to ensure the best practicable option is adopted so that construction noise effects are minimised as far as practicable to ensure compliance with the permitted standards for as much of the project as is practicable.

Recommendation 2: Construction Vibration

We recommend that substantive application includes an assessment of construction vibration levels in accordance with German Standard DIN 4150-3:1999 *Structural vibration – Effects of vibration on structures*. We recommend that the application includes conditions to require compliance with the DIN limits at all receivers in the GRUZ of the Waikato District as well as Residential Zone receivers in Hamilton City. The application should also set out how a CNVMP will be used to ensure the best practicable option is adopted so that construction vibration effects are minimised as far as practicable.

Recommendation 3: Operational noise

We recommend that the substantive application demonstrates that operational noise levels from all activities can be located, designed and managed to comply with the permitted noise levels prescribed by NOISE-R8 of the WDPOP and Rule 25.8.3.7 of the HCDP.

We recommend that pumpstation noise levels are controlled through a condition that will require plant to be designed, constructed and maintained to achieve compliance with noise levels that are 5 dB lower than the maximum permitted noise levels in Rule 25.8.3.7 of the HCDP. We recommend that the same principle is adopted to control noise levels at adjacent residential lots within the development.

Recommendation 4: Noise levels between units in the neighbourhood centre

We recommend that substantive application includes appropriate conditions to control the maximum permitted noise levels that can be generated and received between units in the neighbourhood centre (i.e. in situations where common building elements such as floors and walls connect two units). These conditions will ensure that noise levels generated by commercial activity in the neighbourhood centre are compatible with residential activity that may establish within the same building.

Recommendation 5: Road-traffic noise effects from SH23

We recommend that substantive application identifies the State Highway Noise Control Boundary across the Site and identifies the lots that will be subject to the acoustic treatment requirements set out in NOISE-R44. We recommend that the compliance with NOISE-R44 and the permitted activity standards in Section 8.1(4) of APP1 is demonstrated prior to construction of any future building when the appropriate level of construction detail is available.

Appendix A WDPOP Noise standards

These provisions apply to noise generated from the Site and received in the Waikato District.

Definition of Noise Sensitive Activities

Means buildings or parts of buildings used for, or intended to be used for the following purposes:

1. Residential activity;
2. Visitor accommodation;
3. Schools and tertiary education premises;
4. Health centre

Definition of Noise Sensitive Activity

Means any or all of the following:

(a) buildings used for residential activities, including boarding establishments, retirement villages, papakaainga housing development, visitor accommodation, and other buildings used for residential accommodation but excluding camping grounds;

(b) marae and marae complex;

(c) hospitals;

(d) teaching areas and sleeping rooms in an education facility; (e) places of assembly.

(e) places of assembly

Construction Noise

NOISE- R4	Noise- Construction	
All zones	(1) Activity status: PER Where: (a) Noise from any construction, maintenance, or demolition activity that is measured, assessed and managed in accordance with the requirements of NZS6803:1999 'Acoustics - Construction Noise'	(2) Activity status where compliance not achieved: RDIS (a) Effects on amenity values; (b) Hours and days of construction; (c) Noise levels; (d) Timing and duration; and (e) Methods of construction.

Construction Noise – All Infrastructure (Appeal 000086)

AINF-R2	Construction noise	
All zones	(1) Activity status: PER Where: (a) Construction, maintenance, repair, replacement, upgrading or removal of infrastructure or the	(2) Activity status where compliance not achieved: RDIS Council's discretion is restricted to the following matters: (a) Effects on amenity values;

	installation of new infrastructure must comply with NZS 6803:1999 Acoustics - Construction noise.	(b) Hours of construction; (c) Noise levels; (d) Timing and duration; and (e) Methods of construction

Noise generated and received in the General Rural Zone

NOISE- R8	Noise- general	
GRUZ- General Rural Zone	**(1) Activity status: PER** **Where:** (a) Noise measured at the notional boundary on any other site in the GRUZ - General Rural Zone must not exceed: (i) 50dB L_{Aeq}, 7am to 7pm every day; (ii) 45dB L_{Aeq}, 7pm to 10pm every day; (iii) 40dB L_{Aeq} and 65dB L_{Amax}, 10pm to 7am the following day. (b) Noise measured within any site in any zone, other than the GRUZ - General rural zone, must meet the permitted noise levels for that zone. (c) Noise levels must be measured in accordance with the requirements of New Zealand Standard NZS 6801:2008 "Acoustics - Measurement of Environmental Sound". (d) Noise levels must be assessed in accordance with the requirements of New Zealand Standard NZS 6802:2008 "Acoustic - Environmental noise".	(2) Activity status where compliance not achieved: DIS

State Highway Noise Control Boundary

NOISE- R44	Construction of a new building containing a sensitive land use within a State Highway or Rail Corridor Noise Control Boundary
1. **Activity status: PER** **Activity-specific standards:**	**Activity status where compliance not achieved: RDIS**

(a) New buildings are designed, constructed and maintained to ensure that any part of the building located within the State Highway or Rail Corridor Noise Control Boundary and containing an activity listed in Table 28 APP1: i. complies with the maximum future indoor design noise levels in Table 28 in APP1 and meets the ventilation requirements in Section 8.1(4) of APP1; or ii. is located so the nearest exterior façade of that part of the building is at least 50m from the formed carriageway of the state highway and 50m from the formed railway track and there is a solid building, fence, wall or landform that blocks the line of sight from all parts of all windows and doors to that activity to: 1) All parts of the formed carriageway of the state highway. 2) All points 3.8m directly above the formed railway track; or iii. is located so it can be demonstrated by way of prediction or measurement by a suitably qualified and experienced acoustic consultant that noise at all exterior facades of that part of the building will be no more than 15 dB above the relevant maximum indoor design noise levels in Table 28 in APP1: or iv. accords with the construction schedule in Table 29 of APP1 and meets the ventilation requirements in Section 8.1 (4) of APP1.	**Council's discretion is restricted to the following matters:** 1. Adverse effects on health and amenity of people indoors within the Noise Control Boundary overlays 2. Alternative options for building design or location that would achieve compliance with the standards in APP1 3. Adverse effects on the continuing operation of the state highway network, or railway corridor as a result of non-compliance with the standards in APP1 4. Any natural or built features of the site or surrounding area that will mitigate noise effects 5. The outcome of any consultation undertaken with NZTA or KiwiRail

APP1- Acoustic insulation requirements for the State Highway and Rail Corridor Noise Control Boundary

8. State Highway and Rail Corridor Noise Control Boundary

The State Highway and Rail Corridor Noise Control Boundary overlays shown on the planning maps identify areas that have the potential to experience high noise levels from road and rail traffic. New buildings and alterations to habitable rooms in buildings used for sensitive land uses are required to demonstrate that adverse noise effects have been appropriately managed by demonstrating compliance with the standards specified in section 8.1.

8.1 Standards for permitted activities within the State Highway and Rail Corridor Noise Control Boundary overlays

(1) Prior to the construction or alteration of, or change of use within, any building to which this standard applies, a design report shall be submitted to the Council demonstrating compliance with the maximum indoor design noise levels specified in Table 28, applying the assumptions in sections 8.1(2) and 8.1(3) below. Alternatively, the design report may be substituted with confirmation that the construction or alteration of, or change of use within, the building will meet the construction schedule requirements in Table 29.

Table 28 – Maximum indoor design noise levels for state highway and rail corridor noise

Type of Noise Control Boundary	Activity	Rail Corridor maximum indoor design noise level	State Highway maximum indoor design noise level
State Highway and Rail Corridor	Bedrooms	35 dB $L_{Aeq\ (1hour)}$	40 dB $L_{Aeq\ (24hour)}$
	Lecture rooms / theatres, music studios, assembly halls	35 dB $L_{Aeq\ (1hour)}$	35 dB $L_{Aeq\ (24hour)}$
	Conference rooms, drama studios, libraries and designated sleeping rooms for children aged 6 years or younger in schools, early childhood centres or tertiary institutions	40 dB $L_{Aeq\ (1hour)}$	40 dB $L_{Aeq\ (24hour)}$
	Sensitive activities in hospitals including overnight medical care, wards, clinics, consulting rooms, theatres, nurses' stations	40 dB $L_{Aeq\ (1hour)}$	40 dB $L_{Aeq\ (24hour)}$
	Places of assembly including churches, places of worship and marae	35 dB $L_{Aeq\ (1hour)}$	35 dB $L_{Aeq\ (24hour)}$
	Other habitable rooms	40 dB $L_{Aeq\ (1hour)}$	40 dB $L_{Aeq\ (24hour)}$

(2) For State Highways, the design road noise is to be based on measured or predicted external noise levels plus 3 dB*.

Table 29 - Construction Schedule

Elements	Minimum construction schedule for controlling noise in State Highway and Railway Noise Effects Areas in addition to the requirements of the New Zealand Building Code	
Exterior walls	Wall cavity infill of fibrous insulation, batts or similar (minimum density of 9kg/m3)	
	Cladding and internal wall lining complying with either Options A, B or C below:	
	Option A - Light cladding: timber weatherboard or sheet materials with surface mass between 8kg/m2 and 30 kg/m2 of wall cladding	Internal lining of minimum 17 kg/m2 plasterboard, such as two layers of 10 mm thick high-density plasterboard, on resilient/isolating mountings
	Option B - Medium cladding: surface mass between 30 kg/m2 and 80 kg/m2 of wall cladding	Internal lining of minimum 17 kg/m2 plasterboard, such as two layers of 10 mm thick high-density plasterboard
	Option C - Heavy cladding: surface mass between 80 kg/m2 and 220 kg/m2 of wall cladding	No requirements additional to New Zealand Building Code
Roof/ceiling	Ceiling cavity infill of fibrous insulation, batts or similar (minimum density of 7 kg/m3)	
	Ceiling penetrations, such as for recessed lighting or ventilation, shall not allow additional noise break-in	
	Roof type and internal ceiling lining complying with either Options A, B or C below:	
	Option A - Skillion roof with light cladding: surface mass up to 20 kg/m2 of roof cladding	Internal lining of minimum 25 kg/m2 plasterboard, such as two layers of 13 mm thick high-density plasterboard
	Option B - Pitched roof with light cladding: surface mass up to 20 kg/m2 of roof cladding.	Internal lining of minimum 17 kg/m2 plasterboard, such as two layers of 10 mm thick high-density plasterboard
	Option C - Roof with heavy cladding: surface mas between 20 kg/m2 and 60 kg/m2 of roof cladding	No requirements additional to New Zealand Building Code
Glazed areas	Aluminium frames with full compression seals on opening panes	
	Glazed areas shall be less than 35% of each room's gross floor area	

	Either: double-glazing with: • a laminated pane of glass at least 6 mm thick; • a cavity between the two panes of glass at least 12 mm deep; and • a second pane of glass at least 4 mm thick Or • any other glazing with a minimum performance of Rw 33 dB	
Exterior doors	Exterior door: • within the state highway noise effects area with a line-of-sight to any part of the state highway road surface; or • within the railway corridor noise effects area with a line-of-sight to any point 3.8m directly above the formed railway track.	Solid core exterior door, minimum surface mass 24 kg/m2, with edge and threshold compression seals; or other doorset with minimum performance of Rw 30 dB

(4) If opening windows must be closed to achieve the design noise levels in Table 28 or if a building is constructed in accordance with the construction schedule in Table 29, the building must be designed, constructed and maintained with a mechanical ventilation system that:

(a) For habitable rooms located within the State Highway or RailCorridor Noise effects area containing a residential activity, achieves the following requirements:

i. Provides mechanical ventilation that can operate continuously to satisfy clause G4 of the New Zealand Building Code and that provides at least 1 air change per hour, but no less than 7.5L/s per occupant;

ii. Provides cooling and heating that is controllable by the occupant and can maintain the inside temperature between 18°C and 25°C when assessed using a 2.5% design weather condition for the applicable location. An acceptable design weather set would include IRHACE Yearbook 2009 NIWA weather data; and

iii. A HVAC system installed in compliance with (4)(a)(i) and (ii) above, must not generate more than 35 dB $L_{Aeq(30s)}$ when measured 1 metre away from any grille or diffuser. The noise level must be measured after the system has cooled the rooms to the temperatures in (4)(a)(ii), or after a period of 30 minutes from the commencement of cooling (whichever is the lesser).

a) Alternatively, in lieu of section (4)(a) above, a design verified by a suitably qualified and experienced HVAC expert stating the design proposed will provide ventilation and internal space temperature controls to meet or exceed the outcomes described in parts (4)(a).

(5) A commissioning report must be submitted to the Council prior to occupation of the building demonstrating compliance with all of the mechanical ventilation system performance requirements in 8.1(4).

*The State Highway Noise Effects Area is based on national road-traffic noise modelling by AECOM. The inputs for key parameters are as follows:

- **Date of input datasets:** 2021 (generally reflecting 2020/21 conditions)

• **Traffic volumes (AADT):**	CoreLogic National Road Centreline dataset; 24h traffic data entered in CRTN as 18h traffic
• **Heavy vehicles (%HV):**	CoreLogic National Road Centreline dataset
• **Speed:**	CoreLogic National Road Centreline dataset; Posted speed limit
• **Road surface:**	Surface types as recorded in NZTA RAMM database; Surface corrections in accordance with NZTA Guide to state highway road surface noise, including a -2 dB correction from CRTN to a reference AC-10 surface.
• **Bridge locations:**	CoreLogic National Road Centreline dataset; Height interpolated from start and end points
• **Terrain:**	LIDAR where available; NZ School of Surveying 15m nationwide DEM in other areas; Data combined in GIS to produce 1 m×1 m DEM for noise model
• **Building footprints:**	LINZ NZ Building Outlines dataset
• **Building heights:**	Where available, calculated from DSM median height minus DEM median height, otherwise: 6 m residential / 8 m commercial
• **Noise barriers:**	None modelled

Appendix B HCDP Noise standards

These provisions apply to cross territorial noise effects generated from the Site and received in Hamilton City.

Definition of Noise-Sensitive Activities

Noise-sensitive activities: Means residential activities (including residential accommodation in buildings which predominantly have other uses such as commercial or industrial premises), marae, spaces within buildings used for overnight patient medical care, and teaching areas and sleeping rooms in buildings used as educational facilities. For the purpose of this definition educational facilities includes tertiary institutions and schools, and premises licensed under the Education (Early Childhood Services) Regulations, and playgrounds which are part of such facilities and located within 20m of buildings used for teaching purposes.

Construction noise and vibration

25.8.3.2

Construction Noise

All construction noise shall comply with the relevant noise levels stated in NZS6803: 1999, section 7.2 'Recommended numerical limits for construction noise' and shall be measured and assessed in accordance with NZS 6803:1999 'Acoustics – Construction Noise'.

25.8.3.3

Construction Vibration

Construction vibration received by any building on any other site shall comply with the provisions of and be measured and assessed in accordance with German Standard DIN 4150-3:1999 Structural vibration – Effects of vibration on structures.

Noise performance standards for noise received in Residential Zones

25.8.3.7

Noise Performance Standards for Activities in all Zones Except Major Facilities, Knowledge, Open Space, Ruakura Logistics and Ruakura Industrial Park Zones

Activities in all Zones except Major Facilities, Knowledge, Open Space, Ruakura Logistics and Ruakura Industrial Park Zones, shall not exceed the following noise levels at any point within the boundary of any other site in the:

i. Residential Zones.

Time of day	Noise level measured in $L_{Aeq(15min)}$	Noise level measured in L_{AFmax}
0600- 0700 hours	45 dB	75 dB
0700- 2000 hours	50 dB	-
2000- 2300 hours	45 dB	-
2300- 0600 hours	40 dB	75 dB

Rules – Specific Standards

25.8.3.1

Measurement and Assessment of Noise

Noise levels shall be measured in accordance with NZS 6801:2008 “Acoustics – Measurement of Environmental Sound” and assessed in accordance with NZS 6802:2008 ‘Acoustics – Environmental Noise’. These apply unless otherwise stated.

Design and Construction of New and Altered Roads

25.8.3.4

Design and Construction of New and Altered Roads

a. Application of this standard.

   i. This standard shall apply only to new and altered roads predicted to carry at least 2000 annual average daily traffic (AADT) at the design year.

b. This standard shall not apply:

i. In circumstances where NZS 6806: 2010 does not apply, as listed in paragraph 1.3.1 of NZS 6806: 2010.

ii. To local transport corridors identified within Volume 2, Appendix 15-4, Figures 15-4b to 15-4f.

iii. To altered roads where the vertical or horizontal alignment changes relate solely to providing pedestrian footpaths, cycleways, dedicated passenger transport or high-occupancy vehicle lanes, vehicle stopping or parking whereby that part of the carriageway dedicated to usual vehicle movement does not move closer to any protected premises and facilities.

c. Road-traffic noise shall be measured and assessed in accordance with NZS 6806:2010 ‘Acoustics – Road traffic noise – New and altered roads’.

d. Subject to 25.8.3.4.a and b. above, new or altered roads are designed and constructed to mitigate road-traffic noise in compliance with NZS 6806: 2010 ‘Acoustics – Road traffic noise – New and altered roads’.

Note

1. This rule mainly affects road controlling authorities such as Council and the New Zealand Transport Authority, but sometimes may affect a private developer building or altering a road in a subdivision designed to carry the requisite traffic volumes. The practical effect of the standard is that traffic noise received at ‘protected premises and facilities’ will be reduced by design features such as quieter road surfaces.