Styles Group
Acoustics & Vibration Consultants

ASSESSMENT OF NOISE EFFECTS

ROGERSON BLOCK DEVELOPMENT
SL1 HAMILTON SOUTH

PREPARED FOR

G A Rogerson

DATE

16 June 2025

Acoustic assessment prepared by Styles Group for G A Rogerson.

REVISION HISTORY

Rev:	Date:	Comment:	Version:	Prepared by:	Reviewed by:
1	14/05/25		Final Draft	Jon Styles, MASNZ Director and Principal Styles Group	Gemma Styles Consultant Styles Group
2	16/06/25		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 between land use activities and the development of controls to achieve ongoing land use compatibility.

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.

Table of contents

Executive summary

Styles Group has assessed the operational and construction noise and vibration effects from the Rogerson Block Development in the Southern Links 1 (SL1) growth area in Hamilton South.

The application site is in the Rural Zone of the Waipa District. The western and northern boundaries of the site interface with the territorial boundary of Hamilton City. The receivers adjacent to the site are in the Rural Zone of the Waipa District, as well as the General Residential Zone and Future Urban Zone of Hamilton City.

The proposal is to enable a comprehensive residential and industrial development at the interface with the Rural and Residential Zone. This assessment identifies the key considerations for the management of noise effects from the proposal, to ensure that they are consistent with the relevant permitted activity noise standards of the Waipa District Plan (WDP) and Hamilton City Operative District Plan (HCDP).

Our assessment finds that future industrial activities can be designed, located and managed to achieve compliance with noise limits reflecting the relevant permitted activity noise standards when measured and assessed at all adjacent receivers (beyond the Site) in the Rural Zone of the Waipa District and Residential and Future Urban Zones of Hamilton City.

We have provided options for the appropriate management of noise effects between industrial activities and noise sensitive activities within the Site. These options are straightforward and can be readily addressed and refined within the substantive application.

Overall, our assessment finds that the proposal can be designed to achieve compatibility with the level of acoustic amenity anticipated and provided for in the adjacent Rural Zone of Waipa District as well as the adjacent Residential and Future Urban Zones of Hamilton City.

1.0 Introduction

G A Rogerson has engaged Styles Group to assess the operational and construction noise and vibration effects from the Rogerson Block Development. This advice has been prepared accompany a referral application under the Fast-track Approvals Act 2024.

This assessment sets out:

i. The key considerations for management of operational and construction noise and vibration effects from the proposal

ii. An assessment of the potential construction and operational noise and vibration effects in accordance with the relevant permitted noise standards prescribed by the Waipa District Plan (**WDP**) and Hamilton City Operative District Plan (**HCDP**).

iii. The key options and recommendations to be addressed by the substantive application to ensure that the proposal manages land use compatibility and is compatible with the level of acoustic amenity prescribed by the WDP and HCDP.

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

2.0 The proposal

The Rogerson Block Development is a combined residential and industrial development within the wider Southern Links 1 (**SL1**) area. We understand that Graeme Rogerson is part of a well-established group of developers involved in a consortium that has been established for some time that represent the bulk of the SL1 growth cell, recognised by Future Proof and the development community in the Waikato. Strong synergies with the listed (Southern Links 1 Stage 1 Industrial and Stage 1 Residential), Fast-Track project exist.

The Site comprises approximately 43 hectares, which will be split into approximately 13 hectares of medium density residential development and 28 hectares of industrial development. The Rogerson Block masterplan is shown in Figure 1.

The residential component of the proposal will comprise approximately 200 residential units, primarily medium-density (300m^2 allotments) of varying typologies such as terraced, duplex and detached dwellings.

The industrial component of the proposal will comprise approximately 35 industrial allotments of varying size, including less than 5,000m^2 (small lots), 5,000m^2 to 10,000m^2 (medium lots), and over 10,000m^2 (large lots). The smaller industrial allotments are adjacent to the proposed residential development. The larger lots have been designed to integrate with a proposed industrial development within the wider SL1 development on the adjacent site. The industrial lots will provide for a range of uses from small-scale manufacturing or workshops to light industrial workshops and warehouses.

The proposed transport network utilises existing connection points on Tuhikaramea Road and Karen Crescent. A 27.8m wide east-to-west spine road extending from Tuhikaramea Road will provide for the movement of people and vehicles through the Site. Two additional transport corridors will extend from the spine road to provide access to the industrial allotments.

The proposed masterplan includes an open space network and proposed 20-metre-wide green buffer that is designed to provide a separation buffer between the proposed industrial development and residential activity.

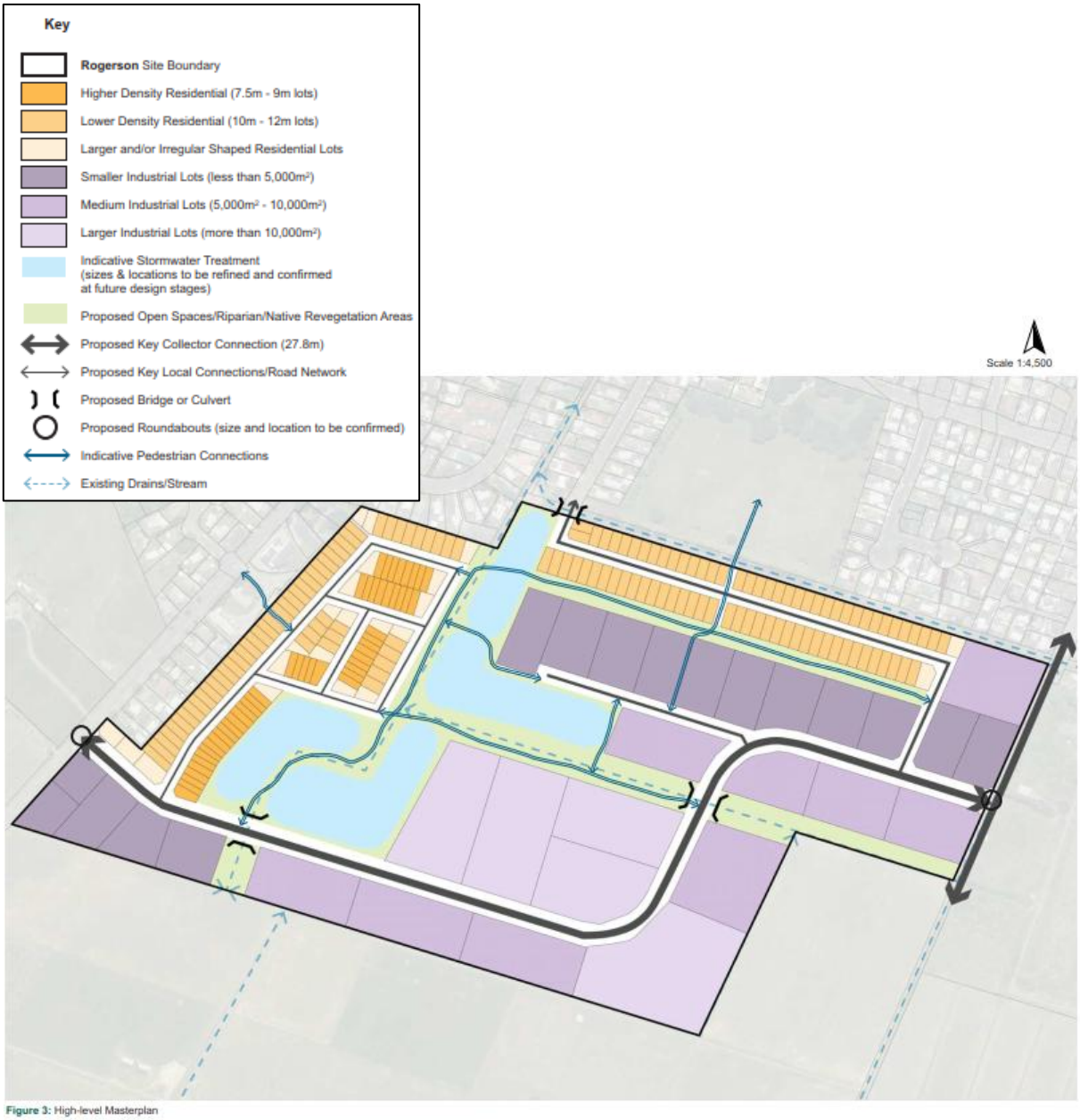

Figure 3: High-level Masterplan

Residential Metric	Typical Lot Size	Estimated Yield	Potential Typologies/Uses
Higher density (7.5m - 9m lot)	200m² - 250m²	50	Terraced dwellings, duplexes
Lower density (10m - 12m lot)	300m² and above	133	Duplexes, detached dwellings
Larger lot and/or irregular shaped	400m² and above	22	Detached dwellings
Total		**205**	

Industiral Metric	Typical Lot Size	Estimated Yield	Potential Uses
Smaller lots	Less than 5,000m²	16	Small-scale manufacturing, repair workshops, and wholesale businesses
Medium lots	5,000m² - 10,000m²	9	Light industrial workshops, warehouse, and commercial showrooms
Larger lots	10,000m² and above	5	Light industrial workshops, warehouse, and commercial showrooms
Total		**30**	

Figure 1 Rogerson Block High Level Masterplan

4.0 The Site and surrounding environment

The Site is in the Rural Zone of the Waipa District. The adjacent land to the southern and eastern boundaries of the Site is within the jurisdiction of the Waipa District and is also zoned Rural.

The northern and western boundaries of the Site interface with the territorial boundary of Hamilton City. The adjacent land to the north of the Site is in the General Residential Zone (**Residential Zone)** of the HCDP. Kahikatea Park is also adjacent to the northern Site boundary and is in the Sports and Recreation Open Space Zone (**SARZ**). The eastern side of Tuhikaramea Road is in the Residential Zone and the western side of Tuhikaramea Road is in the Future Urban Zone (**FUZ**). The land to the north-east of the Site on the eastern side of Higgins Road is in the Industrial Zone.

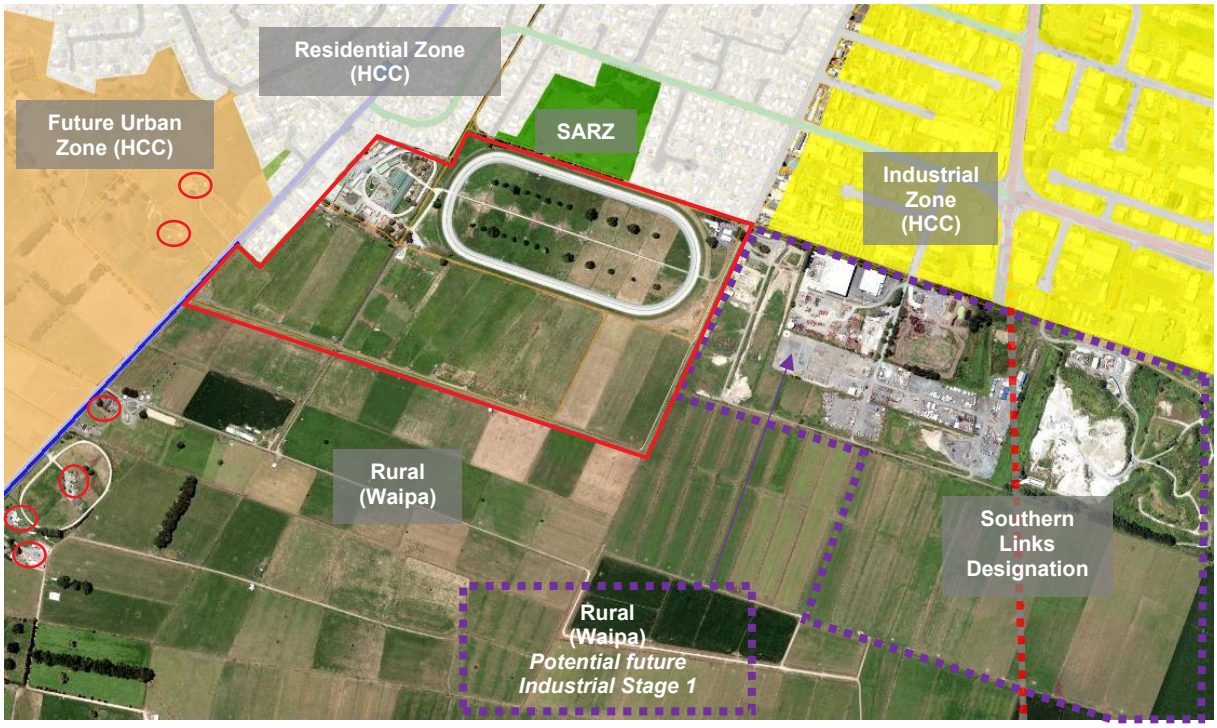

Figure 2 The Site (outlined red) and closest receivers in the Rural Zone (Waipa), FUZ and Residential Zone (Hamilton City). The closest adjacent Rural Zone and FUZ dwellings are identified with a red circle.

4.1 Receivers

Noise generated from within the Site will be received by rural and residential receivers within the jurisdiction of the Waipa and Hamilton Districts.

We note that the Waipa District Plan does not control noise as it might affect activities in the Hamilton District. The appropriate management of cross-territorial boundary noise effects between proposed activities within the Site (within the jurisdiction of the Waipa District) and receivers in Hamilton City and Waipa District is a key focus of this assessment.

The receivers surrounding the Site include:

- The Rural Zone dwellings to the south of the Site. The closest Rural Zone dwellings are in the Waipa District and are located more than 250m from the southern boundary of the Site. The closest rural dwellings are identified with a red circle in Figure 2.
- The dwellings in the Residential Zone, adjacent to the northern and western Site boundaries. The residential receivers are in the jurisdiction of Hamilton City.
- The existing FUZ dwellings to the west of the Site. The closest physically existing FUZ dwellings are over 80m from the western boundary of the Site and are identified with a red circle in Figure 2. Our assessment assumes that the future urbanisation of this land may introduce compliance locations for noise that are closer than the existing notional boundaries. The FUZ receivers are in the jurisdiction of Hamilton City.

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

Noise from the Site has the potential to be received in the Rural Zone of the Waipa District and Residential Zone and Future Urban Zone of Hamilton City. We have prepared a high-level assessment of compliance with noise limits that are consistent with the relevant permitted activity noise standards of the WDP and HCDP. The relevant permitted activity noise standards of the WDP and HCDP are reproduced in Appendices B and C.

The key considerations for the management of noise effects from the development of the Rogerson Block include:

- **Industrial noise effects:** To ensure that operational noise levels from proposed industrial development within the Site will be compatible with proximate noise sensitive activities within and adjacent to the Site, including:
    i. Residential activity within the adjacent Rural Zone of the Waipa District
    ii. Residential activity within the adjacent Residential Zone and Future Urban Zone of Hamilton City Council
    iii. Future residential development within the Site
- **Construction noise and vibration effects:** To ensure that construction noise and vibration effects will be reasonable for all receivers adjacent to the Site.

6.0 Management of operational noise from industrial activities

The proposal includes 35 industrial allotments of varying size, including lots of less than 5,000m^2 (small lots), 5,000m^2 to 10,000m^2 (medium lots), and large lots greater than 10,000m^2. The smaller

industrial allotments are located in the northern part of the Site adjacent to the proposed residential development. The larger industrial lots are located in the southern part of the Site.

The proposal is to integrate the proposed industrial development with a future industrial development on adjacent Rural Zone land to the east of the Site. The proposed industrial development is designed to consolidate with the nearby established Industrial Zone on the eastern side of Higgins Road.

Figure 3 displays the Site in relation to the Industrial Zone to the north-east of the Site, and the adjacent site to the eastern boundary that will be subject to a future application for an industrial development.

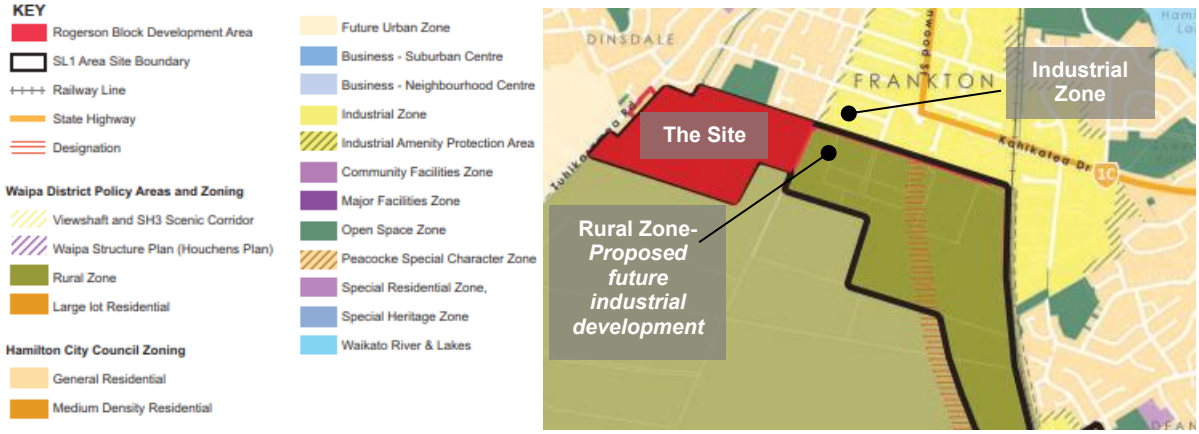

Figure 3 The Site in relation to the established Industrial Zone and land on which a future industrial development is proposed

The proposed industrial lots are expected to provide for a range of uses from small-scale manufacturing, or workshops to light industrial workshops and warehouses.

Figure 4 displays the conceptual development layout, the indicative size of the industrial lots and proximity to proposed residential activity within the Site.

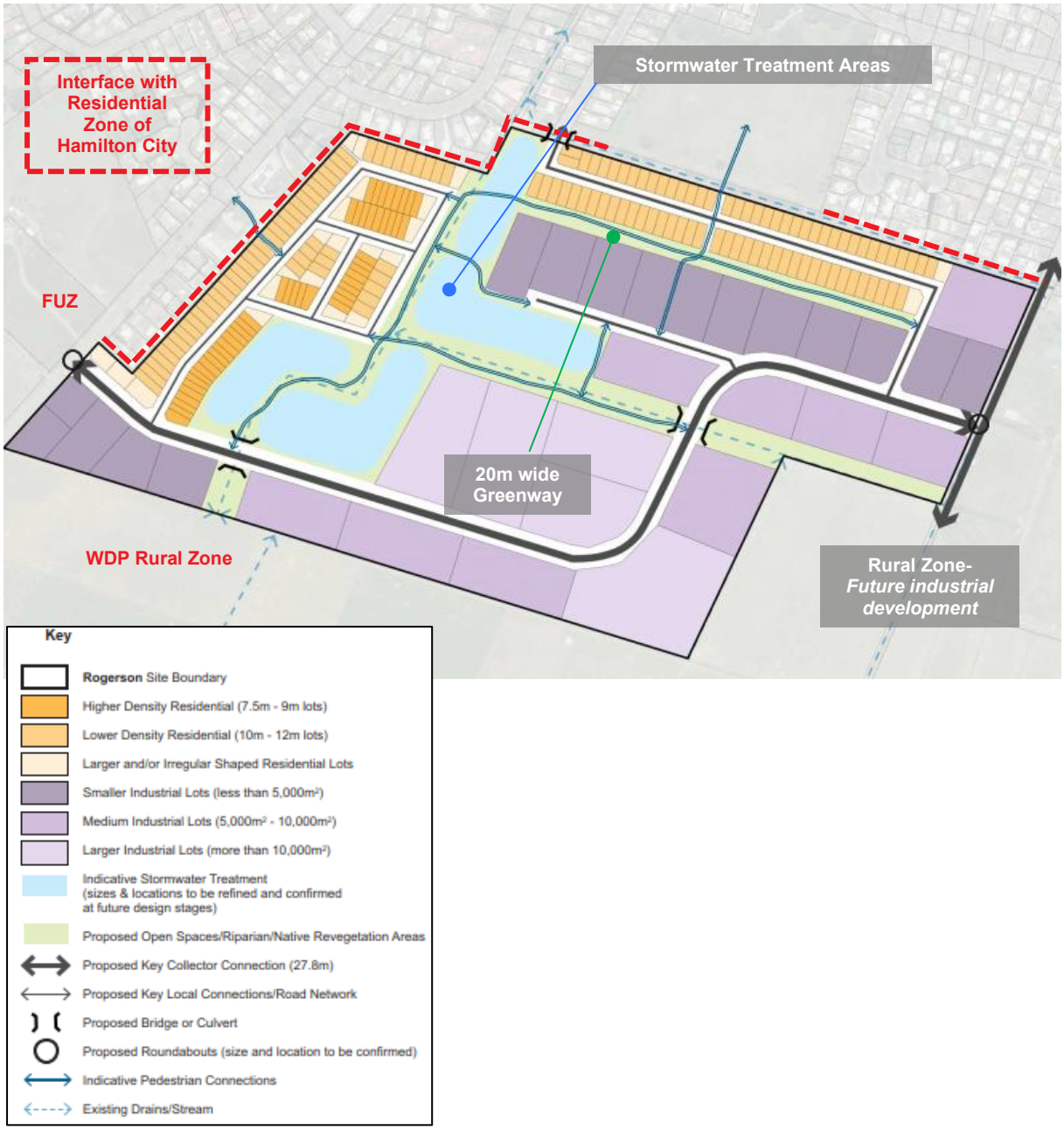

Figure 4 Proposed Industrial lots

6.1 Key considerations for achieving compatibility between industrial and noise sensitive activities

Industrial activities typically involve loading trucks, forklift movements in outdoor yard areas, mechanical plant and manufacturing processes that have the potential to generate noise on a 24-hour basis, 7 days per week.

Residential activity is sensitive to noise. The proposed industrial lots are near to proposed residential development within the Site and are also near to established Residential Zones to the north and west

of the Site. Noise sensitive land use is also anticipated and provided for in the adjacent Rural Zone to the south and Future Urban Zone land to the west of the Site.

The activities on the industrial lots will need to be designed and operated in a way that achieves compliance with the permitted noise standards that apply at all adjacent notional boundaries in the Rural Zone of the WDP, as well as specific noise limits that are consistent with the relevant noise limits for the Residential and Future Urban Zones of the HCDP.

The noise levels from the industrial lots will also need to be compatible with noise sensitive land use proposed within the Site.

We have reviewed the proposal to determine the types of noise mitigation measures that will be required to ensure that the following outcomes are achieved:

i. To ensure that the noise from industrial lots will be compatible with the level of acoustic amenity that is anticipated and provided for at **adjacent** sites in the Residential Zone and Future Urban Zone of Hamilton City, and Rural Zone of the Waipa District.

ii. To ensure that noise generated from industrial lots will be compatible with noise sensitive land use proposed **within** the Site.

6.1.1 Spatial design considerations

Noise levels from industrial activities are often unable to be wholly internalised within site boundaries. Large separation distances, enclosures or acoustic screening is sometimes required to bring the noise levels down to a reasonable level. In this case, the masterplan incorporates a number of spatial design considerations that are designed to reduce or mitigate the level of noise (and possibly other effects) at residential lots. These include:

- A 20m wide buffer (shown on Figure 4) to separate the industrial lots from the residential lots in the north of the development.
- The proposed stormwater infrastructure area running through the Site (also shown on Figure 4) that will separate the residential lots from industrial lots in the eastern part of the Site.
- The proposed residential development within the Site will provide a buffer for the established receivers in the Residential Zone adjacent to the northern and western boundaries of the Site.

The separation distances shown on the Masterplan assist to reduce the noise levels that will be received at future residential lots within the Site but cannot be relied on as a sole measure to ensure that noise levels will be reasonable for noise sensitive land use. Our assessment finds that one or more of several noise mitigation measures (i.e. noise limits, design considerations and operational noise mitigation measures) could be required to manage land use compatibility.

We have provided several options to manage the interface between noise sensitive and industrial development and suggested mechanisms to achieve land use compatibility. These options are currently recommended as the basis for proposed conditions, however the proposed mechanisms for achieving land use compatibility can be further explored and refined as part of the substantive application and proposed conditions (if required).

6.2 Option 1: Use of noise limits to control noise levels between industrial lots

The proposal will enable the Site to be divided into lots. The underlying noise limits for the Rural Zone will control industrial noise levels received at lots that contain a notional boundary, however Rule 4.4.2.15 *Noise* will not control the noise levels between industrial lots where the receiving lot does not contain a notional boundary. An industrial activity will not create a Notional Boundary.

We consider that the absence of any noise limits between industrial activities may give rise to potential conflict. We therefore recommend that the industrial lots are subject to a noise limit that is sufficiently enabling for industrial activity, while also ensuring that the application also controls the level of noise received at any lot containing a noise sensitive activity within the Site (see Option 2).

We recommend that the substantive application should consider a condition that will enable the industrial lots to generate maximum permitted noise levels of 65 dB L_{Aeq} when measured and assessed at the boundary of any other industrial lot within the Site, subject to a restriction that will preclude the establishment of noise sensitive land use on the industrial lots (Option 3). This noise limit is consistent with the permitted noise limits[2] for noise generated and received within the Industrial Zone of the HCDP, to the north-east of the Site.

Industrial activities will still be required to comply with the permitted noise limits of the WDP at all assessment locations beyond the Site. Section 7.0 of this advice includes recommendations to ensure that industrial activities comply with the same numerical noise limits prescribed by the HCDP at all assessment locations beyond the Site.

6.3 Option 2: Use of noise limits to control noise effects between industrial lots and residential lots within the Site

Rule 4.4.2.15 *Noise* of the WDP controls the noise levels received within the Rural Zone of the Waipa District. The rule requires that noise received at the notional boundary of any dwelling in the Rural Zone must not exceed 50 dB L_{Aeq} between 7am and 10pm and 40 dB L_{Aeq} and 70 dB L_{Amax} between 10pm and 7am. These noise limits are designed to control noise levels from permitted activities in the Rural Zone, where lots are typically large. The noise limits apply at the notional boundary location. The rule is not designed to manage noise levels between industrial and residential lots.

We recommend that the substantive application includes non-compliance with Rule 4.4.2.15 as a reason for consent and proposes a condition that will enable the industrial lots to comply with maximum permitted noise levels of 55 dB L_{Aeq} (daytime) and 45 dB L_{Aeq} and 75 dB L_{AFmax} (nighttime) when measured and assessed at the boundary of any residential lot **within** the Site.

Section 7.0 of this advice includes recommendations to ensure that industrial activities comply with the same numerical noise limits prescribed by the HCDP at all assessment locations beyond the Site.

[2] Rule 25.8.3.7(c) of the HCDP enables any activity within the Industrial Zone to generate noise levels of 65dBA $L_{Aeq\ (15\ min)}$ at any point within the boundary of any other site within the same zone.

Noise limits of 55 dB L_{Aeq} (daytime) and 45 dB L_{Aeq} and 75 dB L_{AFmax} (night time) are typically adopted for non-acoustically treated residential zones that are close to business zones. The recommended noise limits are consistent with the permitted noise environment in the FUZ to the west of the Site.

We consider that the proposed noise limits will deliver an adequate level of acoustic amenity for future occupants of the residential lots within the Site while enabling efficient use of the industrial lots. The noise limits will also set the expectation that the noise environment within the Site may be higher than the permitted noise environment typically found in a Rural Zone due to the proximity of industrial activity.

6.4 Option 3: Preclude noise sensitive activities on industrial lots

The Masterplan is designed to separate noise generating industrial land use activities from noise sensitive residential development. The recommendations in Option 1 and 2 take into account the noise mitigation that will be achieved through separation distance.

We understand that the permitted activity standards for the underlying Rural Zone could enable the establishment of noise sensitive activities within the proposed industrial area. The introduction of notional boundaries within the proposed industrial area would introduce a compliance location for noise and would introduce a significant constraint on the operation of the closest industrial lots.

We recommend that the substantive application incorporates a mechanism that will preclude the establishment of noise sensitive activities (which may be otherwise permitted by the underlying Rural zoning) from establishing on the industrial lots. This measure will assist to achieve appropriate separation distances between industrial and noise sensitive activities and will manage the potential for incompatibility and conflict.

Noise sensitive activities are defined by the Waipa District Plan as:

> "*BUILDINGS used for RESIDENTIAL ACTIVITIES, including boarding establishments, homes for elderly persons, RETIREMENT VILLAGE ACCOMMODATION AND ASSOCIATED CARE FACILITIES, in-house aged care facilities, hotels and motels, and other BUILDINGS used for residential accommodation but excluding camping grounds; and MARAE ;and*
> *HOSPITALS; and*
> *Teaching areas and sleeping rooms in an EDUCATION FACILITY."*

We recommend that the same principle applies to the future industrial development on the adjacent Rural land to the east of the Site.

7.0 Management of noise effects for receivers beyond the Site

The Site is located at the cross-territorial interface between the Waipa District and Hamilton City Council. The noise from existing or future activities in the Waipa District and received in the Hamilton District are not controlled by either District Plan.

We recommend that the substantive application includes a requirement that will require future industrial activities to locate, design and operate in compliance with numerical noise limits that are

consistent with the maximum permitted noise levels prescribed by Rule 25.8.3.7(a) and (b) of the HCDP. This will ensure that the proposal is compatible with existing levels of acoustic amenity in the adjacent Residential Zone and FUZ. Rule 4.4.2.15 of the WDP will control noise levels received at any adjacent notional boundary in the Rural Zone.

We have not identified any challenges in terms of future industrial activities being located, designed and managed to comply with Rule 4.4.2.15 of the WDP and Rule 25.8.3.7 of the HCDP at all assessment locations beyond the Site. This finding takes into account the separation distances achieved by the masterplan and the noise limits we have recommended for activities within the Site.

We note that the proximity of the industrial lots to noise sensitive activity will present a constraint to the noise generating potential of the industrial lots when compared to a situation where there are no noise sensitive receivers nearby.

The potential constraints are generally summarised below.

7.1 Noise constraints on the industrial lots

The requirement for the industrial lots to comply with the recommended noise limits within the Site whilst also complying with the WDP noise limits and noise limits reflecting the HCDP rules at assessment locations beyond the Site will constrain the noise emissions from the proposed industrial activities.

Constraints may typically involve limitations on the timing and location of particularly noisy activities. These constraints can often be minimised and in some cases avoided with good site design and by using built form within and around the perimeters of the lots and the Site to screen noise generating activities.

Opportunities for bunds and barriers could be investigated in the detailed design of the proposed greenway and stormwater infrastructure areas. However, we understand that the future residential lots will provide for residential development greater than single level. The effectiveness of acoustic barriers will therefore be limited in many cases.

Figure 5 demonstrates that a 2m high acoustic barrier will not mitigate the noise levels received at upper-level residential development. If a noise sensitive receiver overlooks the industrial activity, the noise will not be effectively screened.

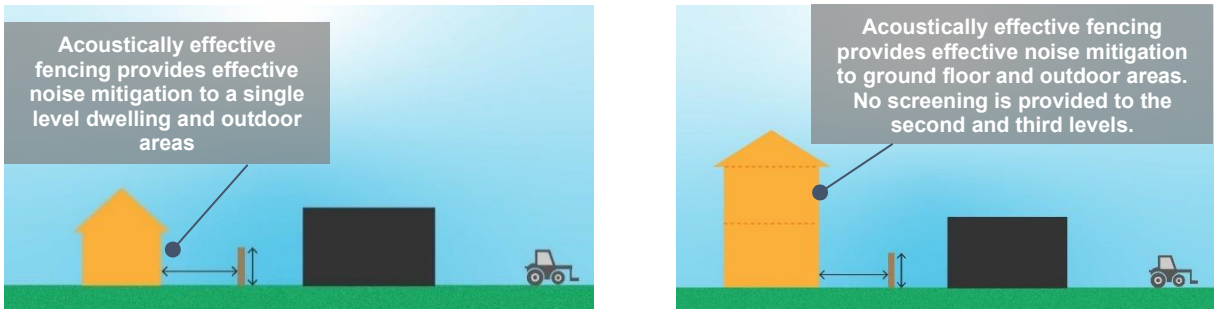

Figure 5 Effectiveness of acoustically effective barriers based on height of receiver

We expect that opportunities to use acoustically effective barriers and built form to mitigate noise emissions will be considered as part of the detailed design of individual lots.

The build out of the proposed residential lots along the northern and western parts of the Site will assist to mitigate noise received beyond the Site.

7.2 Vehicle noise

Access to the proposed industrial area is proposed from Road 1 (East to West Spine Road) extending from Tuhikaramea Road.

We understand that the internal access roads will be vested as a public road. The noise limits in the WDP and HCDP do not apply to noise generated by traffic on public roads.

Rule 25.8.3.4 of the HCDP is not triggered by the construction of the proposed internal road network.

7.3 Change in noise environment

The proposal is to introduce an industrial development on Rural Zone land, near to an established zoning pattern that contains noise sensitive land use.

The proposal will enable industrial activities with noise sources that operate on a more consistent basis (i.e. continuous running of external plant for air handling, fume and dust extraction and refrigeration). These noise sources may operate more consistently on a daily basis generally, when compared to the typical seasonal or intermittent activities that would otherwise be anticipated in the Rural Zone.

The nearby Industrial Zone on the eastern side of Higgins Road forms part of the existing noise environment. The existing noise environment at the established Residential Zone to the north of the Site is generally typical of a residential area near to an interface with an industrial zone. The proposed residential lots within the Site will provide a buffer between the established Residential Zone receivers and proposed industrial development within the Site.

The closest Rural Zone receivers are well separated from the southern boundary of the Site by over 200m and the closest existing receivers in the FUZ are over 80m from the Site boundary.

Overall, our assessment finds that the proposed industrial lots can be located, designed and managed to comply with the maximum permitted noise levels prescribed by the WDP and HCDP. We have provided recommendations that can be explored and refined as part of the detailed technical assessment to support a substantive application.

8.0 Construction noise and vibration effects

8.1 Construction noise

Rule 4.4.2.19 of the WDP and Rule 25.8.3.2 of the HCDP require that construction noise levels are managed in accordance with the recommended numerical limits and assessment procedures set out in NZS 6803:1999 '*Acoustics – Construction Noise' (***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[10] 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.

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. We understand that the ground conditions mean that no blasting or rock breaking will be required.

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.

The highest construction noise levels are likely to be experienced where works are undertaken near to established development in the adjacent Residential Zone. These works include the construction of the internal road network in areas near to the perimeter of the Site, including:

- The construction of proposed Road 1 (East to West Spine Road) where it intersects with Tuhikaramea Road.
- The connection of proposed Road 3 to Karen Crescent in the northern part of the Site
- The formation of Road 3 along the northern part of the Site.
- The construction of the Proposed Residential Local Road adjacent to the western boundary of the Site.

These works may involve the operation of heavy plant near to the perimeters of the Site boundaries, and within 50m of occupied dwellings on adjacent sites.

Our preliminary assessment finds that construction noise levels from civil works (road construction) may exceed or may require mitigation to comply with the construction noise limits at residential dwellings located on the eastern side of Tuhikaramea Road, the end of Karen Crescent and to the north-east of the Site (between Kahikatea Park and Higgins Road). The potential exceedances of the permitted construction noise standards are likely to be intermittent and very short-term when high noise generating activity associated with road construction is undertaken near to the Site boundaries.

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

The Rural Zone receivers in the Waipa District are well separated from the Site. The proposal will comply with the permitted construction noise standards at all Rural Zone receivers due to the ample separation distances involved.

8.1.1 Construction noise assessment to be provided as part of the substantive application

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.

A construction noise assessment will be provided as part of the substantive application, in accordance with the recommended numerical limits and assessment procedures set out in NZS 6803:1999 *Acoustics – Construction Noise*.

The assessment will provide 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, and to ensure compliance with the permitted standards for as much of the project as is practicable.

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.

8.2 Construction vibration

The WDP 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 will be able to comply with the limits for avoiding building damage without requiring any specific mitigation due to the separation distance between any vibration-generating activities on Site. This applies to receivers in both Waipa District and Hamilton City.

8.2.1 Construction vibration assessment to be provided as part of substantive application

Our preliminary assessment finds that vibration levels from construction work activity is likely to readily comply with the DIN limits at all nearby receivers. However, we have not undertaken a detailed review of the proposed construction methodology as this has not yet been confirmed. We recommend that the substantive application includes an assessment that confirms that construction vibration levels can be managed to comply with the limits in Rule 25.8.3 of the HCDP and German Standard DIN 4150-3:1999 *Structural vibration – Effects of vibration on structures*. This assessment will detail 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.

9.0 Summary

Styles Group has assessed the potential operational and construction noise and vibration effects from the Rogerson Block Development. The proposal is to enable a comprehensive residential and industrial development at the interface with the Rural and Residential Zone.

Management of noise and vibration effects beyond the Site

Our analysis of the masterplan finds that future activities on the proposed industrial lots can be located, designed and managed to achieve compliance with the relevant noise limits prescribed by the Waipa District Plan and Hamilton City Council at all assessment locations beyond the Site. We consider that the proposal can be designed to achieve compatibility with the level of acoustic amenity anticipated and provided for in the adjacent Rural Zone of Waipa District and the Residential Zone and Future Urban Zone of Hamilton City.

We recommend that the substantive application includes a detailed construction noise and vibration assessment that determines compliance with the recommended numerical limits and assessment procedures set out in NZS 6803:1999 *Acoustics – Construction Noise*. The assessment should also confirm that vibration generated from construction work will comply with the DIN limits in Rule 25.8.3 of the HCDP. We recommend that the assessment should describe how a CNVMP will be used to ensure the best practicable option is adopted so that construction noise and vibration effects are minimised for receivers as far as practicable.

Management of noise effects within the Site

Compatibility between the industrial and noise sensitive land use activities within the Site can be achieved through a range of measures. We have outlined a range of recommendations that can be explored and refined as part of detailed technical assessments to support a substantive application.

Appendix A WDP Noise standards

These provisions apply to noise generated from the Site and received between sites in the Waipa District

Definition of Noise Sensitive Activities

> "*BUILDINGS used for RESIDENTIAL ACTIVITIES, including boarding establishments, homes for elderly persons, RETIREMENT VILLAGE ACCOMMODATION AND ASSOCIATED CARE FACILITIES, in-house aged care facilities, hotels and motels, and other BUILDINGS used for residential accommodation but excluding camping grounds; and MARAE ;and*
> *HOSPITALS; and*
> *Teaching areas and sleeping rooms in an EDUCATION FACILITY."*

Rule 4.4.2.15 Noise (Rural Zone)

Noise generating activity other than that from farm animals including farm dogs, agricultural vehicles (when not being used for recreational purposes), agricultural machinery or equipment (including produce packing facilities where the only produce packed is grown on-site) operated and maintained in accordance with the manufacturer's specifications and in accordance with accepted management practices (e.g. for milking, spraying, harvesting, packing and the like, but not including frost fans) and provided that the best practicable option (including the option for the activity to take place at another time of the day), is adopted to ensure that the emission of noise does not exceed a reasonable level; shall be conducted and buildings located, designed and used to ensure that they do not exceed the following limits within the notional boundary of any dwelling (excluding dwellings within mineral extraction sites):

a.	Day time - 7.00am to 10.00pm	50dBA (Leq)
b.	Nighttime- 10.00pm to 7.00am	40dBA (Leq)
c.	Night time single noise event	70dBA (Lmax)

The noise levels shall be measured and assessed in accordance with the requirements of New Zealand Standard NZS 6801:2008 Acoustics – Measurement of environmental sound and assessed in accordance with New Zealand Standard NZS 6802:2008 Acoustics – Environmental noise. Provided that this rule shall not apply to the use or testing of station and vehicle sirens or alarms used by emergency services.

Activities that fail to comply with this rule will require a resource consent for a discretionary activity.

Rule 4.4.2.21 Construction noise

Construction noise emanating from a site shall meet the limits recommended in and be measured and assessed in accordance with New Zealand Standard NZS 6803:1999 Acoustics – Construction noise.

Appendix B HCDP Noise standards

These provisions are relevant 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.