



Acoustic Assessment

Te Kowhai East Industrial Development

Te Kowhai East Limited Partnership

Prepared by:

SLR Consulting New Zealand Limited

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Revision Record

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2.0	28 August 2026	L. Jansen	P. Runcie	P. Runcie
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Basis of Report

This report has been prepared by SLR Consulting New Zealand Limited (SLR) on the instructions of Te Kowhai East Limited Partnership (the Client), in accordance with the agreed scope of work. It is intended to support the Client's application under the Fast-track Approvals Act 2024 and may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application. While SLR has exercised due care in preparing this report, it does not accept liability for any use of the report beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

Statement of Qualifications and Experience

Lodewyk Petrus Jansen – Associate Consultant – Acoustics & Vibration

Lodewyk Petrus Jansen is an Associate Consultant in the Acoustics & Vibration team at SLR, a global environmental consultancy specialising in sustainability, planning, environmental management, and impact assessment. He has been with SLR since 2020. He holds a Bachelor of Science (Honours) in Environmental Sciences and Development from North West University (2009) and is a full member of the Acoustical Society of New Zealand (ASNZ).

Lodewyk has over 14 years of experience in acoustics, including ten in New Zealand, with his focus on environmental noise. His work includes acoustic assessments for industrial developments, infrastructure, and utilities. He has contributed to several environmental noise assessments and was involved in several solar farm applications under the COVID-19 Recovery (Fast-track Consenting) Act 2020. He has participated in Environment Court mediation and presented technical evidence at Council hearings.

As the author of this report, Lodewyk confirms he has read and abides by the Environment Court of New Zealand Practice Note 2023, specifically section 9 – the Code of Conduct for Expert Witnesses.

Peter Michael Runcie – Technical Director – Acoustics & Vibration

Peter Michael Runcie is Technical Director – Acoustics & Vibration at SLR. He holds a Bachelor of Science (Honours) in Audio Technology from the University of Salford (UK, 2007) and is a full member of the Institute of Acoustics (UK), the Acoustical Society of New Zealand, and the New Zealand Planning Institute. He also represents SLR New Zealand in the Association of Australasian Acoustical Consultants.

Peter has over 18 years' experience in acoustic consultancy across New Zealand, Australia, the Middle East, and the UK. His expertise includes environmental noise assessments for industrial, infrastructure, and land use planning projects. He has presented expert evidence at council hearings and in the Environment Court. As reviewer of this report, Peter confirms he has read and abides by the Environment Court of New Zealand Practice Note 2023, specifically section 9 – the Code of Conduct for Expert Witnesses.



Executive Summary

SLR has assessed the potential construction noise, construction vibration, and operational noise effects associated with the proposed Te Kowhai East Industrial Development (TKE) in support of the substantive application under the Fast-track Approvals Act 2024.

As the detailed nature, scale, location, and operational characteristics of future activities within TKE are not yet known, a framework based approach has been adopted for the assessment and management of operational noise effects. The proposed framework establishes construction noise and vibration standards and operational noise limits to manage effects to reasonable levels in line with those anticipated and sought by the Waikato District Plan and Hamilton City Plan.

Construction noise effects are expected to be temporary and localised in nature and can be appropriately managed through compliance with the recommended construction noise criteria and implementation of Best Practicable Option measures through a Construction Noise and Vibration Management Plan. Construction vibration effects are anticipated to be low and are expected to comply with the nominated vibration criteria.

The proposed operational noise framework has been developed to manage noise effects at surrounding noise sensitive receivers while maintaining compatibility between industrial and non-industrial activities within TKE. The proposed operational noise limits are consistent with, or more stringent than, the relevant provisions of the Waikato District Plan and Hamilton City Plan. Meeting these criteria is considered to be achievable through standard acoustic design measures and site layout considerations.

The framework also includes an internal acoustic design requirement for ancillary residential units and provides flexibility for future industrial, commercial, community, recreational, and ancillary activities anticipated within TKE.

Overall, the assessment concludes that construction noise, construction vibration, and operational noise effects associated with TKE can be appropriately managed through the recommended conditions of consent to be reasonable.



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Appendices

Appendix A Relevant Acoustic Performance Standards

- A.1 Waikato District Plan (Operative in Part) – Relevant Noise Rules
- A.2 Hamilton City Council Operative District Plan – Relevant Noise Rules



Acronyms and Abbreviations

Term	Description
BPO	Best Practicable Option. As defined by the Resource Management Act 1991.
CNVMP	Construction Noise and Vibration Management Plan.
dB	Decibel.
dB(A)	A-weighted decibel. Frequency weighting that approximates the sensitivity of human hearing.
DIN 4150-3:2016	German Standard DIN 4150-3:2016 <i>Structural Vibration – Effects of Vibration on Structures</i> .
HCP	Hamilton City Operative District Plan.
LAeq	A-weighted equivalent continuous sound level over a specified assessment period.
LAeq(15-minute)	A-weighted equivalent continuous sound level measured over a 15-minute period.
LAeq(24hour)	A-weighted equivalent continuous sound level measured over a 24-hour period.
L_{Amax}	A-weighted maximum sound pressure level.
NCB	Noise Control Boundary.
NZBC	New Zealand Building Code.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 <i>Acoustics – Measurement of Environmental Sound</i> .
NZS 6802:2008	New Zealand Standard NZS 6802:2008 <i>Acoustics – Environmental Noise</i> .
NZS 6803:1999	New Zealand Standard NZS 6803:1999 <i>Acoustics – Construction Noise</i> .
PPV	Peak Particle Velocity. A measure of vibration commonly used for assessing building damage effects.
TKE	Te Kowhai East Industrial Development.
WDP OiP	Waikato District Plan (Operative in Part).



1.0 Introduction

The proposed TKE provides for the future development of industrial activities, supporting commercial activities, transport infrastructure, stormwater infrastructure, ecological restoration areas, and associated development activities on land that is currently utilised for agricultural purposes.

SLR has assessed the potential construction noise and vibration and operational noise effects associated with the proposed TKE.

This report has been prepared in support of a substantive application under the Fast-track Approvals Act 2024 (**FTAA**).

Construction noise and vibration effects have been assessed based on construction activities and plant typically associated with developments of this scale and nature.

The detailed nature, scale, location, and operational characteristics of future activities within TKE have not yet been determined. Accordingly, a framework based approach has been adopted for the assessment of operational noise effects. The framework establishes acoustic performance standards and management measures that can be applied to future development irrespective of the specific activities that ultimately establish within TKE.

2.0 Project and Site Description

2.1 Project Description

TKE provides for the establishment of industrial allotments, supporting commercial activities located within the Non-industrial Land Use Precinct, open space areas, stormwater infrastructure, ecological restoration areas, and associated transport and servicing infrastructure. The proposed master plan layout is shown in **Figure 1¹**.

Development of TKE is anticipated to occur progressively over an extended period in a series of stages as demand for industrial allotments arises. The current proposal primarily relates to the establishment of development platforms, transport infrastructure, stormwater infrastructure, and associated site preparation works that will facilitate future industrial development.

TKE comprises approximately 187.5 ha, of which approximately 123 ha is developable land.

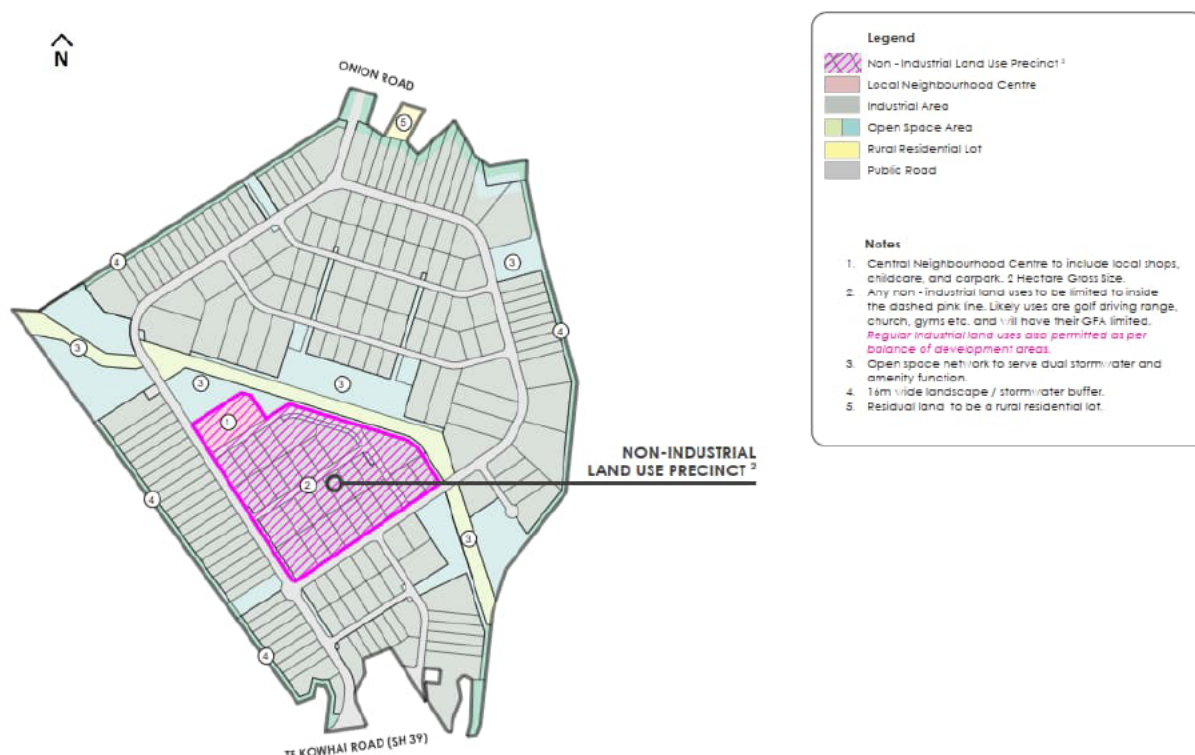
The development includes a central Neighbourhood Centre of approximately 2 ha, providing for local shops, a childcare facility and associated parking. The wider Non-Industrial Land Use Precinct provides for a broader range of compatible non-industrial activities, which may include commercial activities, a golf driving range, church, gymnasium and similar community or recreational uses.

The proposed transport network utilises new connections to Te Kowhai Road (SH39), to the south, and Onion Road, in the north. A primary collector road loop network extending through the site provides for the movement of pedestrians and vehicles throughout the development. The transport network incorporates dedicated pedestrian and cycling facilities together with shared path connections linking the site to surrounding active transport networks.

¹ Te Kowhai East Industrial Development – Urban Design Statement by Adapt Studio Ltd, dated 25 August 2026



Figure 1 Proposed Master Plan



The proposed master plan incorporates an integrated open space and ecological network centred on the Mangaheka Stream corridor. This network includes wetlands, stormwater management areas, ecological enhancement areas, recreational pathways, and public amenity spaces. Landscape, stormwater and a general buffer around the perimeter of the site (approximate width of 16 metres), are proposed to assist with integration between the development and surrounding land uses. Larger areas of open space, ecological restoration, wetlands, and stormwater infrastructure are also proposed throughout the Mangaheka Stream corridor.

2.2 Site and Surrounding Environment

The site is located wholly within the Waikato District. The southern and eastern TKE boundaries adjoin land within Hamilton City, with State Highway 1C and Te Kowhai Road (SH39) generally forming the jurisdictional boundary between TKE and Hamilton City.

Noise from future activities within TKE has the potential to be received by existing and future noise sensitive receivers located within Waikato District and Hamilton City. The surrounding receiving environment within the Waikato District comprises land zoned General Rural Zone. The surrounding land within Hamilton City comprises a mixture of Medium Density Residential Zone, Future Urban Zone, and Industrial zoned land (refer **Figure 2**). Parts of TKE are also subject to the State Highway Noise Control Boundary² identified in the Waikato District Plan, which is shown on **Figure 2**.

The surrounding environment comprises a mixture of rural, residential, and partially developed industrial land activities. Land surrounding TKE within Waikato District is predominantly rural in character and contains a number of established rural properties.

² The purpose of this Noise Control Boundary (NCB) overlay is to manage reverse sensitivity effects by requiring noise sensitive activities located close to the state highway network to achieve an appropriate internal acoustic environment.

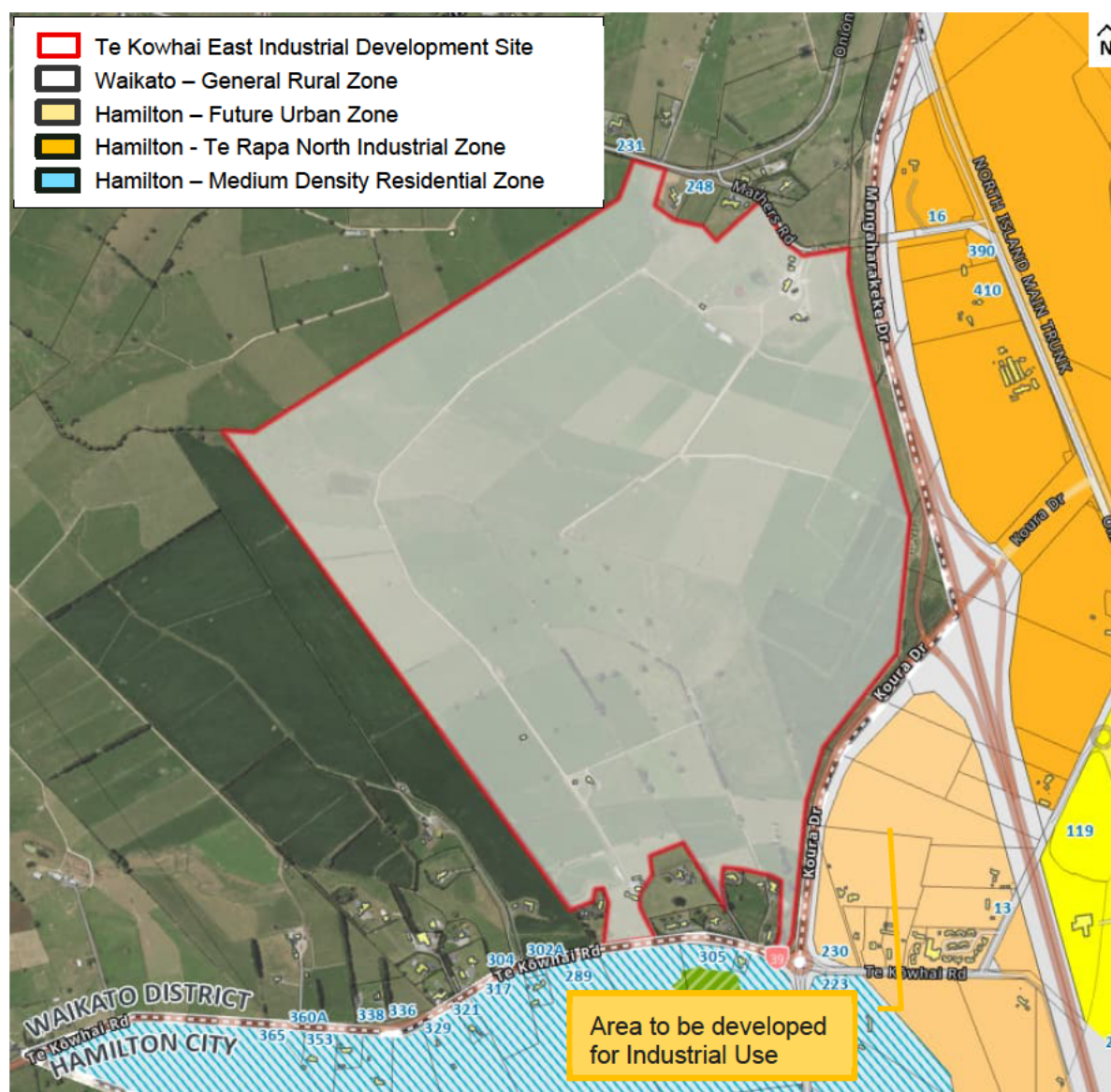


Adjoining land within Hamilton City includes residential dwellings and areas identified for future urban growth and development.

TKE occupies a transitional area between the existing rural environment of Waikato District and the expanding urban environment of Hamilton City. Ongoing urban growth and industrial development are anticipated to influence the character of the surrounding environment. It has been confirmed by the planner that land immediately east of TKE, currently zoned Future Urban Zone, is anticipated to accommodate industrial activities.

The receiving environment comprises both existing noise sensitive receivers and areas identified for future urbanisation and industrial development. The closest and most relevant noise sensitive receivers are located along Te Kowhai Road and Onion Road adjacent to the southern and northern boundaries of the site. These receivers represent the primary noise sensitive interfaces for the assessment.

Figure 2 Site and Surrounding Environment



While a number of noise sensitive receivers exist in the surrounding environment, this assessment focuses on the nearest receivers that have not provided written approval to the TKE. These receivers are considered the most relevant for evaluating potential construction and operational noise effects and are identified in **Table 1** and shown on **Figure 4**.

Table 1 List of identified nearest receivers

Receiver	Address	District Zoning	Approximate Shortest Distance to Site Boundary	Comment
Written Approval Provided (identified as a green circle on Figure 3 and Figure 4)				
R01	244 Te Kowhai Road	Waikato District – General Rural Zone	<10	Single storey dwelling
R02	244 Te Kowhai Road	Waikato District – General Rural Zone	20	Single storey dwelling
R04	248 Te Kowhai Road	Waikato District – General Rural Zone	<10	Single storey dwelling
R07	268 Te Kowhai Road	Waikato District – General Rural Zone	40	Single storey dwelling
R08	282 Te Kowhai Road	Waikato District – General Rural Zone	<10	Single storey dwelling
Properties Considered in the Assessment (identified as a yellow circle on Figure 3 and Figure 4)				
R03	245 Te Kowhai Road	Hamilton City – Medium Density Residential Zone	80	Single storey dwelling
R05	252 Te Kowhai Road	Waikato District – General Rural Zone	20	Single storey dwelling
R06	254 Te Kowhai Road	Waikato District – General Rural Zone	50	Single storey dwelling
R09	302A Te Kowhai Road	Waikato District – General Rural Zone	40	Single storey dwelling
R10	196 Onion Road	Waikato District – General Rural Zone	285	Single storey dwelling
R11	218 Onion Road	Waikato District – General Rural Zone	110	Single storey dwelling
R12	231 Onion Road	Waikato District – General Rural Zone	75	Single storey dwelling
R13	239 Onion Road	Waikato District – General Rural Zone	100	Single storey dwelling
R14	246 Onion Road	Waikato District – General Rural Zone	20	Single storey dwelling
R15	256 Onion Road	Waikato District – General Rural Zone	20	Single storey dwelling
R16	3 Mathers Road	Waikato District – General Rural Zone	45	Single storey dwelling
R17	216 Te Kowhai Road	Hamilton City – Future Urban Zone	115	Single storey dwelling



Figure 3 Nearest Identified Receivers – Northern Section

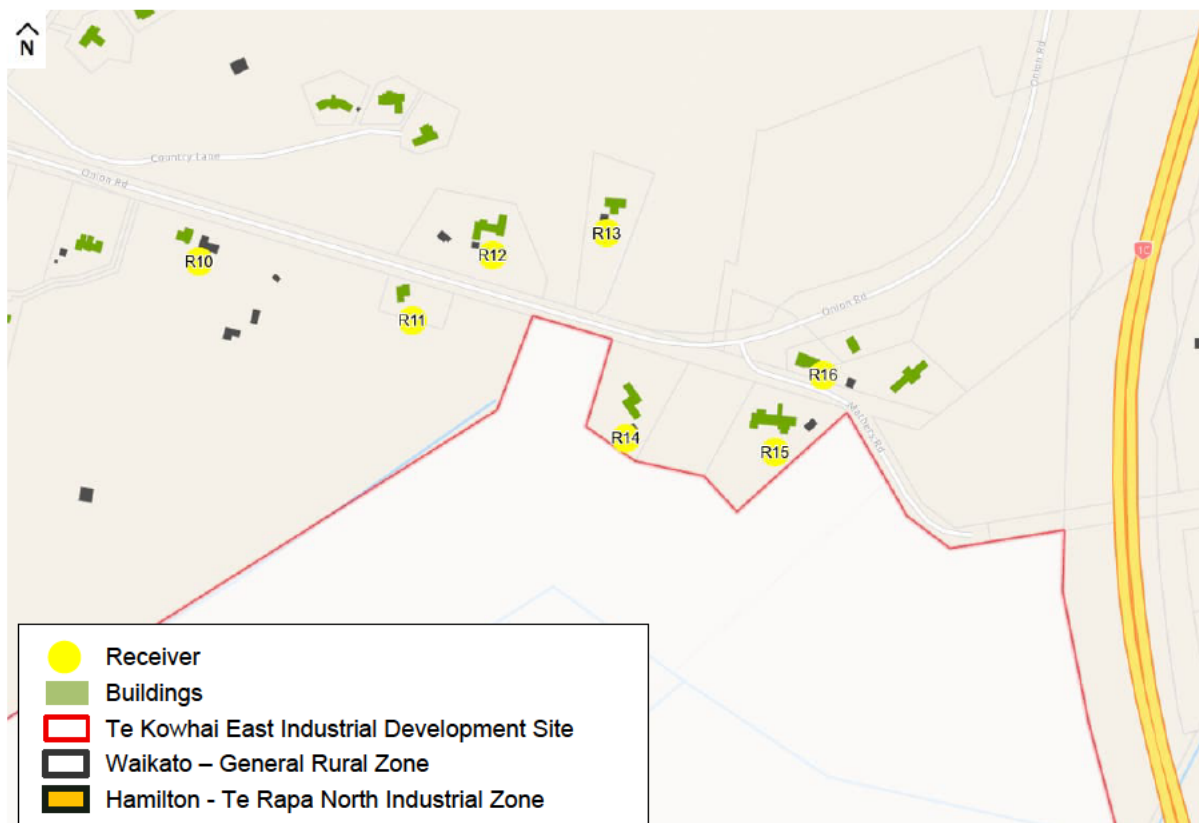
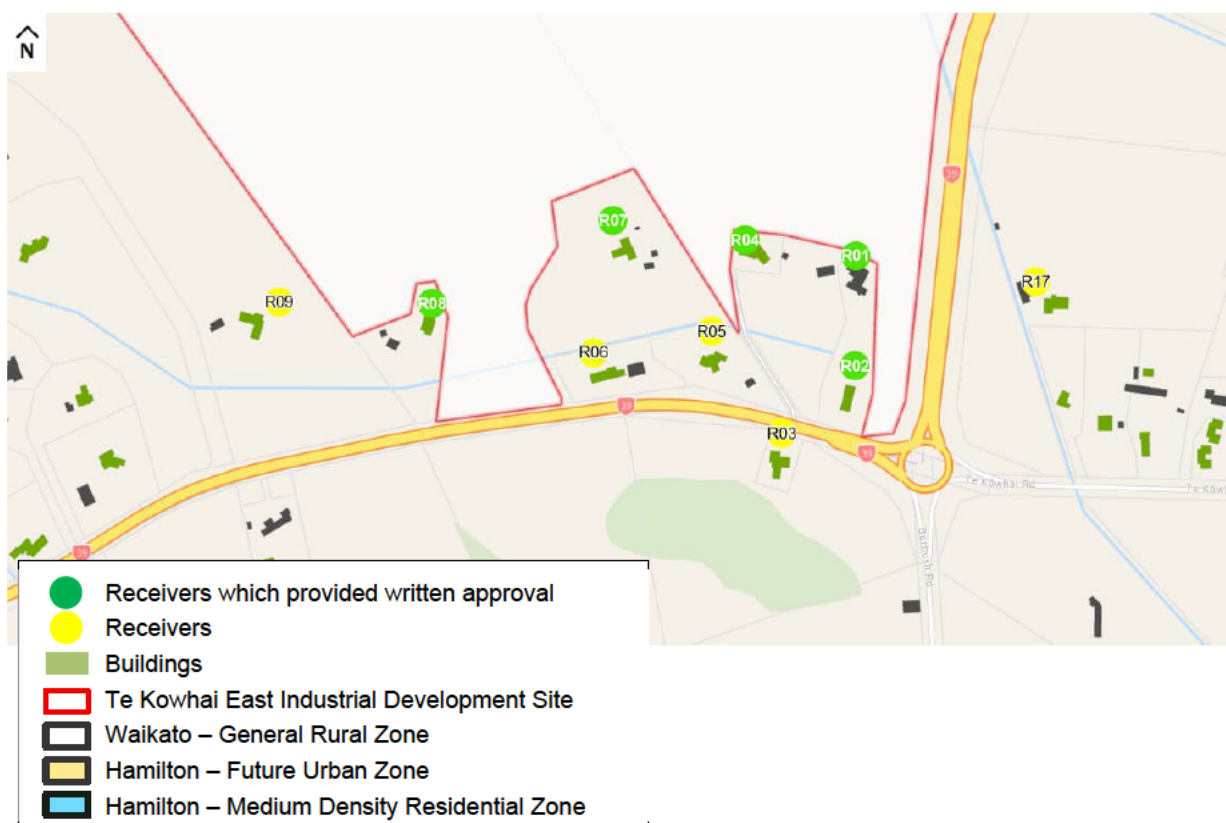


Figure 4 Nearest Identified Receivers – Southern Section

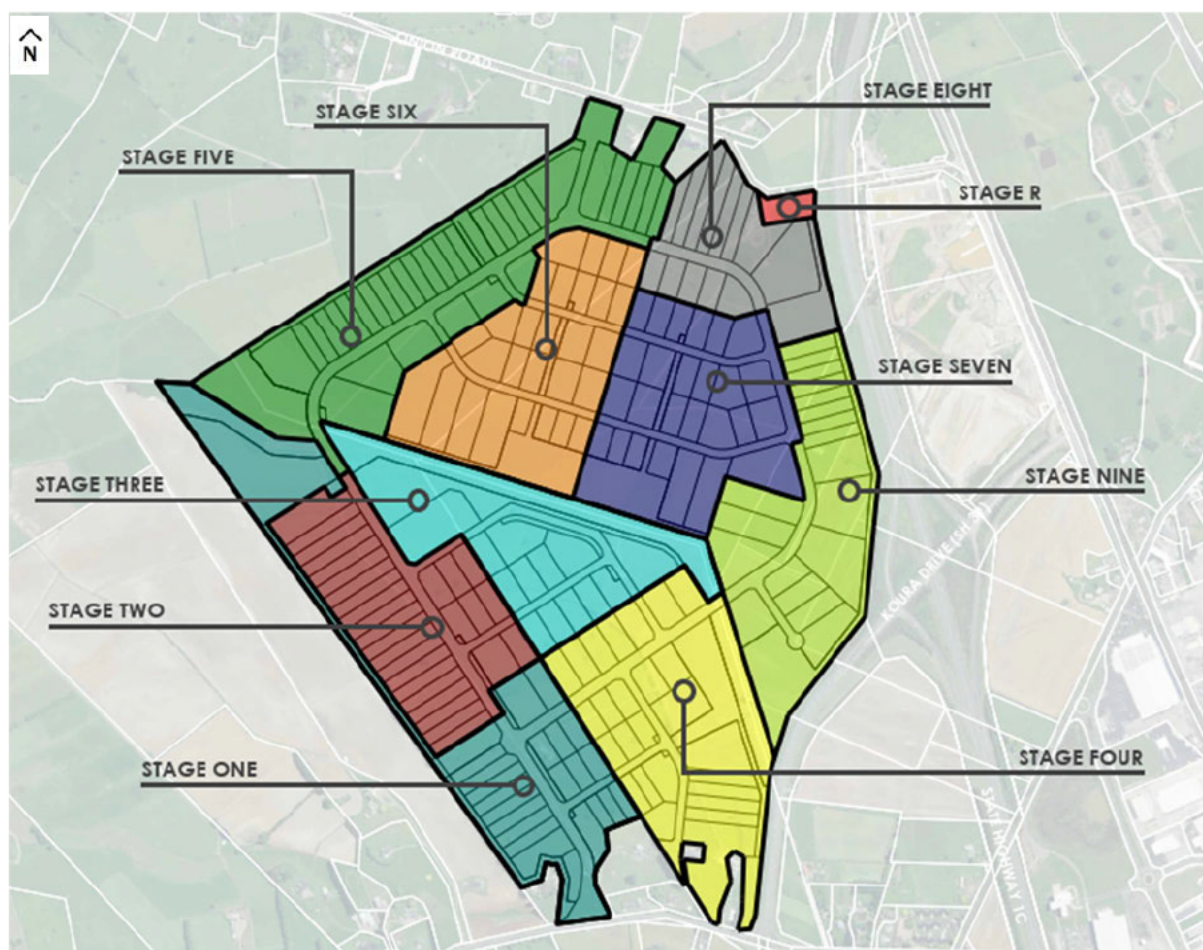


3.0 Construction Noise and Vibration

Construction of TKE is anticipated to occur progressively in stages (refer **Figure 5**) and would primarily comprise earthworks, site preparation, infrastructure installation, road construction, and stormwater works associated with establishing development ready allotments.

A number of existing structures are currently located within the TKE development area. This assessment assumes that any occupied dwellings located within the TKE development area would either be removed prior to commencement of works within the relevant stage or written approval would be obtained. Accordingly, the assessment focuses on occupied dwellings located outside the TKE development area.

Figure 5 Staged Development of TKE



3.1 Performance Standards

The key acoustic considerations relate to managing temporary construction noise and vibration effects at neighbouring receivers while enabling the efficient construction of the development.

The proposed construction noise and vibration criteria have been selected to result in reasonable effects having regard to the nature, scale, and duration of the works and the surrounding receiving environment.

3.1.1 Noise

Both the WDP OiP and HCP reference NZS 6803:1999 *Acoustics – Construction Noise (NZS 6803)* for the measurement and assessment of construction noise.

NZS 6803 has therefore been chosen as the nominated criteria for the assessment of construction noise. Meeting the requirements of the recommended NZS6803 construction noise limits would result in reasonable effects, as the standard is specifically intended to balance the protection of neighbouring receivers with the practical requirements of construction activities. The recommended criteria are set out in Condition N.1.

3.1.2 Vibration

The HCP references the German Standard DIN 4150-3:1999 *Structural Vibration – Effects of Vibration on Structures (DIN 4150-3)* for the assessment of construction vibration effects. This standard sets guideline values to avoid cosmetic building damage (i.e., plaster and paint cracking) and is a commonly adopted assessment approach for construction vibration effects across New Zealand. There is no specific requirement on this topic in the WDP OiP.

The latest version of DIN 4150-3 has therefore been adopted as the nominated criteria for the assessment of construction vibration. The guideline values are intended to avoid cosmetic building damage (such as cracking of plaster and paint finishes) and represent a widely accepted approach for the management of construction vibration effects. Compliance with the recommended limits would therefore result in reasonable vibration effects. The recommended criteria are set out in Condition N.2.



3.2 Construction Noise

At the time of writing, the detailed construction methodology and plant inventory remain subject to detailed design and contractor input. Accordingly, representative construction plant and activities commonly associated with developments of a similar scale and nature have been adopted for the assessment.

A summary of representative construction plant, indicative noise levels, and indicative setback distances to meet the nominated limit without mitigation is provided in **Table 2**. The source levels are based on a combination of in-house measurements and published data from BS 5228-1:2009³.

Table 2 Plant Items and Typical Noise Emission Levels

Activity	Plant Item	Sound Pressure Level at 10m	Approximate setback distance without mitigation – for compliance with 70 dB LAeq
Excavation / levelling site	Excavator (5-20t) fitted with a bucket attachment	70 dB LAeq	15 m
	Excavator (20-30t) fitted with a bucket attachment	75 dB LAeq	25 m
	Excavator (≥30t) fitted with bucket attachment	80 dB LAeq	45 m
	Dozer (≤10t or ≤80kW)	75 dB LAeq	25 m
	Dozer (10-25t or 80-165kW)	80 dB LAeq	45 m
	Dozer (25-40t or 165-275kW)	80 dB LAeq	45 m
Compaction	Non-vibratory roller (<15t)	65 dB LAeq	10 m
	Vibratory Plate Compactor (<250kg)	70 dB LAeq	15 m
	Vibratory roller (<8t)	75 dB LAeq	25 m
	Vibratory roller (8-12t)	80 dB LAeq	45 m
	Vibratory roller (>12t)	80 dB LAeq	45 m
Piling works	Excavator (20-30t) fitted with auger piling attachment	75 dB LAeq	25 m
	Impact Piling Rig	85 dB LAeq	75 m

Notes:

A) The setback distance for the compactor is based on six vehicle movements (passing an individual receiver) every 15 minutes, as the compactor is anticipated to move across the site rather than operate from a fixed location.

The indicative setback distances presented in **Table 2** provide an indication of where construction noise management measures may need to be considered to achieve the nominated construction noise criteria. The setback distances are based on individual items of plant operating in isolation and are intended to identify locations where construction noise effects are most likely to require management. While multiple items of plant may operate concurrently during some stages of construction, they are not expected to operate in

³ British Standard BS 5228 - 1:2009 *Code of practice for noise and vibration control on construction and open sites – Part 1; Noise*.



immediate proximity to one another for extended periods. Any separation between items of plant would also contribute to the overall distance between the noise source and receiver. Accordingly, the setback distances derived for individual items of plant are considered appropriate for informing this assessment.

Written approvals have been obtained from a number of affected adjoining landowners. However, three dwellings⁴ remain within approximately 45 m of the TKE site boundary and may experience elevated construction noise levels during periods when earthworks and other high noise construction activities are undertaken adjacent to the site boundary.

Based on the indicative setback distances, construction noise management measures are most likely to be required during earthworks associated with Stage 1, Stage 4, Stage 5 and Stage 8, where the potential exists for works to occur within approximately 20 m to 30 m of the parts of the TKE site boundary with nearby receiver locations. Potential mitigation measures include temporary acoustic screening, equipment selection, activity scheduling, alternative construction methodologies, and other Best Practicable Option (**BPO**) measures.

With the implementation of these measures, construction noise effects are expected to be appropriately managed and controlled, such that any residual effects are temporary, localised, and generally limited to receivers in proximity to active work areas. The management of construction noise effects, including procedures for implementing mitigation measures and responding to any identified exceedances of the project criteria, would be addressed through the Construction Noise and Vibration Management Plan (**CNVMP**) discussed in **Section 3.4**.

3.3 Construction Vibration

Vibration levels depend on several factors, including the type and size of the machinery, the distance between the source and receiver, local ground conditions, and the construction of the receiving building. As these factors remain subject to detailed design and contractor input, representative vibration source levels have been adopted for the assessment.

Representative vibration levels for typical construction equipment likely to be used during site establishment and staged development are summarised in **Table 3**.

Table 3 Plant Items and Typical Vibration Levels

Activity	Plant Item	Approximate Distance to 5mm/s PPV
Bored Piling	Excavator (≤ 20) with piling attachment	1-2m
Compaction	Vibratory plate compactor (≤ 100 kg)	1-2m
	Vibratory Single drum roller $< 7t^3$	6-10m
	Non - Vibratory single drum roller $< 7t^3$	< 1 m
	Padfoot roller 12t - vibration mode on	3m
	Padfoot roller 12t - vibration mode off (static)	< 1

Note:

The reference levels presented above are derived from measurements undertaken on other sites and should be considered indicative only due to potential differences in machinery selection and ground conditions.

Comparison of the indicative separation distances in **Table 3** with the distances to surrounding dwellings identified in **Table 1** indicates that surrounding dwellings are

⁴ The nearest dwellings are located at 252 Te Kowhai Road, 246 Onion Road and 256 Onion Road.



appropriately separated from the construction activities anticipated for the project. On this basis, compliance with the nominated vibration criteria is anticipated to be achieved.

While vibration may be generated during portions of the earthworks and site preparation works, construction vibration effects are anticipated to be low and temporary in nature and can be appropriately managed through the implementation of BPO.

3.4 Management and Mitigation

Standard measures routinely employed on construction sites are recommended to mitigate noise and vibration effects. These include selecting lower noise and vibration generating plant, maintaining equipment in good working order, managing the timing and duration of higher noise generating activities, and maintaining appropriate separation distances between vibration generating activities and sensitive receivers where practicable.

Construction noise and vibration effects should be managed using the BPO approach. The specific mitigation measures adopted during construction will depend on the staging programme, construction methodology, and the proximity of works to neighbouring receivers.

Implementation of the BPO approach and associated mitigation measures would be managed through a CNVMP. A CNVMP provides a project specific framework for managing construction noise and vibration effects and enables mitigation measures to be refined as construction methodologies and staging programmes are confirmed. This approach provides flexibility to respond to site specific conditions while ensuring construction noise and vibration effects are appropriately managed.

4.0 Activity Noise

4.1 Nominated Performance Standards

The detailed nature, scale, and location of future activities within TKE have not yet been determined. Therefore, a framework approach has been adopted which sets noise limits at receivers inside and outside the TKE based on their use and sensitivity to noise.

The proposed noise limits have been developed to manage noise effects at neighbouring properties and to manage noise effects between activities within TKE.

4.1.1 Noise Received Outside TKE

Noise generated within TKE has the potential to be received at properties located within both the Waikato District and Hamilton City.

Both district plans require noise to be measured and assessed in accordance with NZS 6801:2008 *Acoustics – Measurement of Environmental Sound (NZS 6801)* and NZS 6802:2008 *Acoustics – Environmental Noise (NZS 6802)*.

While the WDP OiP and HCP adopt slightly different assessment approaches, both seek to protect noise sensitive activities from unreasonable noise effects. A comparison of the relevant district plan provisions and the nominated assessment framework is provided in **Table 4**.

The recommended external operational noise criteria are contained in Condition N.4. The nominated controls generally reflect the relevant provisions of the WDP OiP and HCP. The nominated limits are based on the WDP OiP General Rural Zone provisions and are generally equivalent to, or more stringent than, the applicable HCP limits. Accordingly, compliance with the recommended noise limits in Condition N.4 would achieve the noise outcomes sought by both district plans and would provide a reasonable level of amenity for surrounding noise sensitive activities.



Table 4 Comparison of WDP OiP and HCP Relevant Noise Standards

Control	Waikato District (NOISE-R8)	Hamilton City Council (Rule 25.8.3.7(a,b))	Nominated	Comment
Assessment Location	Notional boundary	At any point within the notional boundary of any other site in the future urban zone, at any point within the boundary of any other site.	At the Notional Boundary of land zoned Waikato District GRUZ and Hamilton City Future Urban Zone. At the site boundary of land zoned Hamilton City Residential Zone.	The nominated assessment locations reflect the approach adopted by the WDP OiP and HCP.
Time Periods	Day (7am to 7pm) Evening (7pm to 10pm) Night (10pm to 7am)	Morning (6am to 7am) Day (7am to 6pm) Evening (6pm to 10pm) Night (10pm to 6am)	Three distinct Time Periods: Day (7am to 7pm) Evening (7pm to 10pm) Night (10pm to 7am)	The nominated time periods reflect the varying sensitivity of receivers to noise, with greater protection provided during the evening and night-time periods. While the HCP includes a separate morning period between 6am and 7am, the nominated framework applies the more restrictive night-time limits until 7am, providing a greater level of protection for noise sensitive receivers.
Limits	50 dB LAeq (Day) 45 dB LAeq (Evening) 40 dB LAeq (Night)	45 dB LAeq (Morning) 50 dB LAeq (Day) 45dB LAeq (Evening) 40 dB LAeq (Night)	50 dB LAeq (Day) 45 dB LAeq (Evening) 40 dB LAeq (Night)	The nominated limits are based on the WDP OiP General Rural Zone provisions and are generally equivalent to, or more stringent than, the corresponding HCP limits. Compliance with the nominated limits would achieve the noise outcomes sought by both district plans and provide an appropriate level of protection for surrounding existing and future noise sensitive activities.

4.1.2 Noise Received Within TKE

Industrial and Non-industrial Activities (including Neighbourhood Centre)

TKE currently comprises a single property and would be developed as a series of individual allotments accommodating industrial activities, non-industrial⁵ activities, and ancillary residential units. To manage potential noise effects within the development, it is recommended that the consent also includes limits between activities located within TKE.

Activity noise limits for within the site have been developed to maintain compatibility between the various activities anticipated within the development. The recommended limits have been developed having regard to noise limits commonly applied within industrial and business environments throughout the Waikato region and New Zealand.

⁵ Non-Industrial Activities comprise the Non-Industrial Land Use Precinct and Neighbourhood Centre demarcation in the Master Plan.



The nominated noise limits are:

- A noise limit of 65 dB LAeq(15-minute) is recommended at the allotment boundary of another industrial allotment, refer to Condition N.4. This limit would apply at all times.
- A noise limit of 60 dB LAeq(15-minute) is recommended at the allotment boundary containing a non-industrial activity⁵, refer to Condition N.4. This limit would apply at all times.

The proposed limits recognise that industrial activities are expected to operate within an industrial acoustic environment while also providing a slightly higher level of acoustic amenity for non-industrial activities located within the Non-Industrial Land Use Precinct and Neighbourhood Centre.

A limit of 65 dB LAeq(15-minute) is commonly applied between industrial activities and recognises the operational characteristics of industrial land uses. For example, the HCP Industrial Zone (Rule 25.8.3.7(c)) adopts a noise limit of 65 dB LAeq(15-minute) between industrial sites, while the WDP OiP permits noise levels of up to 75 dB LAeq between sites within the General Industrial Zone (NOISE-R17) and Horotiu Industrial Park (NOISE-R19).

A limit of 60 dB LAeq(15-minute) provides an additional 5 dB reduction at interfaces with the non-industrial activities, recognising that activities within the Neighbourhood Centre may have a greater expectation of acoustic amenity while remaining part of an integrated industrial development. A limit of 60 dB LAeq(15-minute) is commonly associated with business and mixed-use environments – examples include the HCP applies a daytime noise limit of 60 dB LAeq(15-minute) within the Te Awa Lakes Business 6 Zone (Rule 25.8.3.7 d), while the WDP OiP adopts daytime noise limits of 65 dB LAeq(15-minute) within the Local Centre Zone (NOISE-R14), Commercial Zone (NOISE-R15) and Town Centre Zone (NOISE-R16). Accordingly, the nominated limit provides an intermediate level of acoustic protection between the industrial and commercial environments anticipated within TKE.

Compliance with the recommended Condition N.4 would maintain compatibility between activities within TKE, support the efficient operation of industrial activities, provide an appropriate level of acoustic amenity for non-industrial activities, and reduce the potential for reverse sensitivity effects as TKE develops over time.

Accordingly, compliance with these limits would support the efficient operation of industrial activities and maintain appropriate amenity expectations within the development.

Ancillary Residential Units

Ancillary residential units are enabled throughout TKE as an ancillary component of industrial or commercial activities, i.e., caretaker accommodation. As a noise sensitive activity, occupants may be exposed to noise from surrounding industrial, commercial, and transport activities.

Neither the Waikato District Plan nor the Hamilton City Plan contains specific internal noise standards for ancillary residential units located within an industrial zone. However, both plans adopt internal noise criteria for noise sensitive activities located within higher noise environments (for example HCP Rule 25.8.3.10 and WDP OiP Appendix 1 provisions relating to the State Highway and Rail Corridor Noise Control Boundary), with internal design criteria generally ranging between 35 dB LAeq and 40 dB LAeq depending on the receiving environment. The WDP OiP State Highway and Rail Corridor Noise Control Boundary provisions require mechanical ventilation where windows must remain closed to achieve the relevant internal noise criteria.

On this basis, it is recommended that habitable rooms within potential future ancillary residential units within TKE be designed and constructed to achieve an internal noise level not exceeding 40 dB LAeq(24hour). This is recommended to be based on the permitted levels for the area and the road traffic noise level from either State Highway as shown in the WDP



OiP Road Traffic Noise Control Overlay. Where windows are required to remain closed to achieve this criterion, habitable rooms should be provided with mechanical ventilation in accordance with the approach adopted by the WDP OiP Appendix 1 acoustic insulation provisions while maintaining compliance with the New Zealand Building Code.

The recommended Condition N.5 would provide an appropriate level of internal acoustic amenity for occupants and assist in managing reverse sensitivity effects within TKE.

4.2 Meeting the Noise Standards

4.2.1 Outside TKE

The closest neighbouring noise sensitive receivers are concentrated along Te Kowhai Road and Onion Road. Meeting the performance requirements identified above at these receivers is likely to influence the location, design, and operation of future activities establishing within TKE.

The land closer to sensitive receivers is generally more suitable to certain types of activities. These are likely to include those without night-time operations, which do not generate high levels of daytime noise and which are able to locate noisy activities within built structures or on the opposite side of their allotment to use their built structures or specifically constructed screens to provide acoustic screening.

Activities involving substantial outdoor operations, loading and unloading, outdoor storage, fixed plant, container handling, manufacturing, logistics activities, and similar higher noise generating activities are likely to locate away from boundaries with sensitive receivers. This is a common outcome in industrial areas across New Zealand, where noise limits are used to influence the location of noise activities to maintain a reasonable level of residential amenity at adjoining sensitive receivers. A range of standard acoustic design measures are also available to manage operational noise effects, including building orientation, activity distribution, acoustic treatment of fixed plant, and operational controls relating to the timing and location of activities.

Having regard to the scale of TKE, the separation distances incorporated within the master plan, and the range of mitigation measures and BPO available, compliance with the nominated noise limits is considered achievable.

4.2.2 Within the TKE

The Non Industrial Land Use Precinct may accommodate activities including community, recreational, commercial, and service activities such as a childcare facility within the Neighbourhood Centre.

Where required, site specific design measures may be implemented to achieve the nominated noise limits. Such measures may include building orientation, activity layout, screening, separation distances, acoustic barriers, or operational controls. These are common controls implemented across New Zealand in similar use areas.

4.2.3 Ancillary Residential Units

Ancillary residential units may be exposed to noise from surrounding industrial and commercial, activities within the TKE. Some of these units could also be located within the WDP OiP State Highway Noise Control Boundary, meaning these future ancillary residential units may also be exposed to traffic noise from State Highway 1C.

Based on the recommended industrial to industrial noise limits of 65 dB LAeq, meeting the recommended internal noise criterion of 40 dB LAeq(24hour) would be readily achievable with typical building constructions and windows closed. By way of example, typical constructions



may include fibrous insulation in wall and ceiling cavities, internal plasterboard lining and double glazing.

5.0 Recommended Conditions

The following conditions are recommended to provide suitable control of noise and vibration levels.

N.1. Construction Noise

Construction noise shall not exceed the limits in Table N.1 when measured and assessed in accordance with NZS 6803:1999 *Acoustics – Construction Noise*.

Table N.1 Construction Noise Limits received at residential zones and dwellings in rural areas

Time of Week	Time Period	Long-term Duration Noise Limits	
		LAeq	L _A max
Weekdays	6:30am to 7:30am	55	75
	7:30am to 6:00pm	70	85
	6:00pm to 8:00pm	65	80
	8:00pm to 6:30am	45	75
Saturdays	6:30am to 7:30am	45	75
	7:30am to 6:00pm	70	85
	6:00pm to 8:00pm	45	75
	8:00pm to 6:30am	45	75
Sundays and public holidays	6:30am to 7:30am	45	75
	7:30am to 6:00pm	55	85
	6:00pm to 8:00pm	45	75
	8:00pm to 6:30am	45	75

N.2. Construction Vibration

Construction vibration shall comply with the cosmetic damage criteria for residential buildings specified in DIN 4150-3:2016 *Structural Vibration – Effects of Vibration on Structures*.



Table N.2 Construction Vibration Guideline Levels to avoid potential cosmetic damage in structures

Line	Type of Structure	Guideline values for v_i in mm/s				
		Short-term Vibration			Long-term Vibration	
		Vibration at the foundation at a frequency			Vibration at horizontal plane of highest floor at all frequencies	Vibration at horizontal plane of highest floor at all frequencies
		1-10Hz	10-50Hz	50-100Hz		
1	Commercial type building	20	20-40	40-50	40	10
2	Residential type building	5	5-15	15-20	15	5
3	Listed buildings and sensitive to vibrations	3	3-8	8-10	8	2.5

N.3. Construction Noise and Vibration Management Plan

The consent holder must submit a Construction Noise and Vibration Management Plan (CNVMP), prepared by a suitably qualified and experienced acoustic specialist, prior to the commencement of site preparation works of the TKE.

The objective of the CNVMP is to set out the Best Practicable Option for the management of noise and vibration effects. The CNVMP must be prepared with reference to Annex E of NZS6803:1999 *Acoustics – Construction noise*. The CNVMP must include the following matters as a minimum:

- Details for providing written advice of the works to neighbours.
- Neighbour consultation and engagement procedures.
- The construction noise and vibration limits for the project.
- The limitations on working days and hours.
- Details of practicable noise and vibration mitigation measures to be applied during the various stages of the construction project.
- Requirements and specifications for any mitigation proposed.
- Scheduling of noisy works at times to cause the least disturbance.
- A procedure for responding to any noise and vibration complaints.
- A procedure for noise monitoring during the works and applying any corrective actions that may be required.
- Procedures for ensuring that all contractors and operators on site are aware of the requirement to minimise noise and vibration effects as far as practicable on neighbouring sites.

Any subsequent amendment of the certified CNVMP which comprises material changes to construction methodology must also be prepared by a suitably qualified and experienced acoustic specialist. The revised CNVMP shall be submitted to the Council for certification.

The construction works must be carried out in accordance with the certified CNVMP, and a copy of the certified CNVMP must be made available to authorised Council staff during monitoring inspections.



N.4. Activity Noise Limits

Operational noise generated by activities within TKE must comply with the noise limits in Table N.4.

Table N.4 Activity Noise Limits

Receiving Environment	Time Period	Noise Limit	Assessment Location
Receivers Outside the Site			
Noise Sensitive Activities	Daytime (7:00 am to 7:00pm)	50 dB LAeq	Notional boundary
	Evening (7:00pm to 10:00pm)	45 dB LAeq	
	Night-time (10:00pm to 7:00am)	40 dB LAeq	
		65 dB LAmax	
Receivers within the Site			
Non-Industrial Activities	At all times	60 dB LAeq(15-minute)	Allotment boundary
Industrial Activities	At all times	65 dB LAeq(15-minute)	Allotment boundary

Noise 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*.

N.5. Ancillary Residential Units within the Site

Any ancillary residential units shall be designed and constructed to achieve an internal noise level not exceeding 40 dB LAeq(24hour) within all habitable rooms. This level is to be achieved based on the permitted levels in **Condition N.4** and, where applicable, road traffic noise from State Highway when within the Waikato District Plan (Operative in Part) State Highway Noise Control Boundary.

Compliance shall be demonstrated by an acoustic assessment prepared by a suitably qualified and experienced acoustic specialist. The assessment shall identify the building construction, glazing specification, ventilation system, and any other acoustic design measures required to achieve the internal noise criterion.

Where windows are required to remain closed to achieve the internal noise criterion, the building shall be provided with a mechanical ventilation system that:

- meets the requirements of Clause G4 of the New Zealand Building Code;
- is capable of achieving the internal noise criterion in Condition N.5 with windows closed;
- provides cooling and heating that is controllable by the occupant and capable of maintaining an indoor temperature between 18°C and 25°C; and
- generates no more than 35 dB LAeq(30s) when measured 1 m from any grille or diffuser.



6.0 Conclusion

The proposal seeks to develop the area referred to as TKE for the staged establishment of industrial allotments, supporting commercial activities, transport infrastructure, stormwater infrastructure, open space areas and associated development activities. This assessment has considered the potential construction noise, construction vibration and operational noise effects associated with the proposal.

Construction noise and vibration effects are expected to be temporary in nature and can be appropriately managed through meeting the recommended construction standards. Generally, this will not require mitigation due to the distance from the site to neighbours. Implementation of Best Practicable Option measures through a Construction Noise and Vibration Management Plan may be required for works closest to the boundaries, following which compliance is readily anticipated.

Proposed operational noise limits have been identified to manage noise effects within the proposal and at surrounding receivers. These limits are consistent with the relevant provisions of the Waikato District Plan and Hamilton City Plan and seek to provide an appropriate level of amenity for surrounding noise sensitive receivers while enabling future industrial development.

The proposal includes buffer separation where feasible to separate activities from the surrounding properties. Compliance with the proposed operational noise limits is able to be achieved through the application of standard acoustic design principles and site specific mitigation measures where required.

Subject to compliance with the recommended conditions of consent, noise and vibration effects associated with the proposed development are anticipated to be reasonable.

SLR Consulting New Zealand Limited

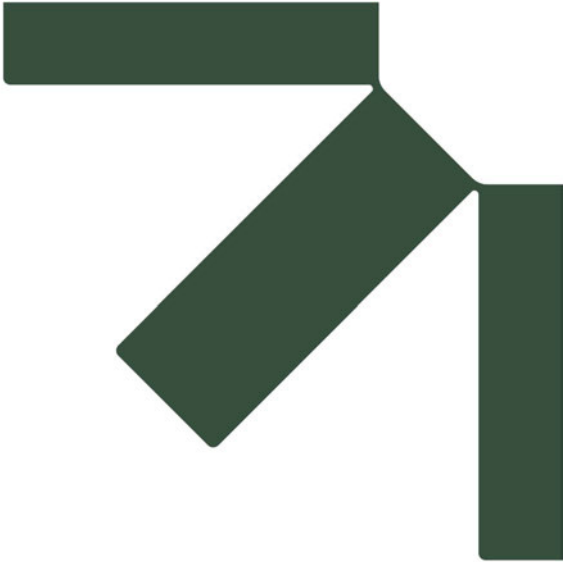


LJ Jansen
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Peter Runcie
Technical Director – Acoustics & Vibration





Appendix A Relevant Acoustic Performance Standards

Acoustic Assessment

Te Kowhai East Industrial Development

Te Kowhai East Limited Partnership

SLR Project No.: 810.032016.00002

28 August 2026

A.1 Waikato District Plan (Operative in Part) – Relevant Noise Rules

Policy

NOISE-P3 - Noise and vibration in the GRUZ - General rural zone.

- (1) Manage the adverse effects of noise and vibration by:
- (a) Ensuring that noise and vibration levels do not compromise rural amenity;
 - (b) Limiting the timing and duration of noise-generating activities to the extent practicable and appropriate;
 - (c) Maintaining appropriate separation between high noise environments and noise sensitive activities;
 - (d) Ensuring frost fans are located and operated to minimise to the extent practicable noise effects on other sites;
 - (e) Managing the location of sensitive land uses, particularly in relation to lawfully-established activities;
 - (f) Requiring acoustic insulation where sensitive land uses are located within high noise environments, including the Airport Noise Outer Control Boundary, Huntly Power Station, Te Rapa Site Noise Boundary and the Gun Club Noise Control Boundary;
 - (g) Managing the adverse effects of vibration from quarrying activities by limiting the timing and duration of blasting activities and maintaining sufficient setback distances from residential units or identified building platforms on another site; and
 - (h) Managing noise to minimise as far as practicable effects on existing noise sensitive activities.

Construction Noise

Waikato District Plan – Operative in Part



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.	



Operational Noise

Waikato District Plan – Operative in Part



To: Department of Transport & Infrastructure

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	



A.2 Hamilton City Council Operative District Plan – Relevant Noise Rules

Policy

25.8.2 Objectives and Policies: Noise and Vibration

Objective	Policies
25.8.2.1 Activities have minimal adverse noise and vibration effects on other activities and sites, consistent with the amenity values of the receiving environment.	25.8.2.1a The amenity values of the surrounding neighbourhood and adjoining activities, especially noise-sensitive activities, shall be protected from the effects of unreasonable noise.
	25.8.2.1b Construction, maintenance and demolition activities shall be required to minimise potential adverse effects on the surrounding neighbourhood and adjoining activities.
	25.8.2.1c Noise effects arising from new and altered roads should be managed using best practicable options to ensure noise levels received by existing premises and facilities that are sensitive to noise are reasonable.
	25.8.2.1d Commercial, industrial and community activities shall ensure that noise received at the boundary of Residential is consistent with the residential noise environment.
	25.8.2.1e Noise from non-residential activities in residential
	areas shall not unduly adversely affect residential amenity values. 25.8.2.1f Temporary events shall minimise noise impacts on residential activities when taking into account the level and duration of the noise.
Explanation	
The policies ensure that noise levels will be appropriately managed to protect the amenity values of receiving environments. Management of the interface between areas is important to ensure that noise is within a reasonable expectation for the zoning and noise levels meet accepted minimum standards for the receiving environment. Within industrial and commercial areas, higher noise levels are accepted, but will be controlled to prevent unreasonable noise from transferring between sites. The policies will capture changes to the noise environment arising from new and altered roads. The Plan aims to limit people's exposure to traffic noise from new transport corridors by reducing noise at the source, and requiring insulation for new development beside busy transport corridors (see Objective 25.8.2.2). Many construction activities are inherently noisy but methods are available which can control the emission and impact of this noise. Noise experienced during construction is of a temporary nature and provided that noise at inconvenient times can be mitigated or avoided, reasonable levels of construction noise can be accommodated.	



Construction

25.8.3.2 Construction Noise

- a. 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

- a. 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.

Operational Noise

25.8.3.1 Measurement and Assessment of Noise

- a. 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.

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

- a. Activities in all Zones except Major Facilities, Knowledge, Open Space, Ruakura Logistics and Ruakura Industrial Park Zones, and sites in Industrial Zones that have a common boundary with the Te Rapa Racecourse Medium-Density Residential Precinct, shall not exceed the following noise levels at any point within the boundary of any other site in the:
 - i. Residential Zone except the Te Rapa Racecourse Medium Density Residential Precinct.
 - ii. Special Character Zone.

Time of day	Noise level measured in $L_{Aeq} [15 \text{ min}]$	Noise level measured in L_{AFmax}
iii. 0600 — 0700 hours	45 dB	75 dB
iv. 0700 — 2000 hours	50 dB	-
v. 2000 — 2300 hours	45 dB	-
vi. 2300 — 0600 hours	40 dB	75 dB
vii. 2300 — 0600, within that part of Te Awa Lakes Medium-Density Residential zone located within 200m of	45dB	75 dB



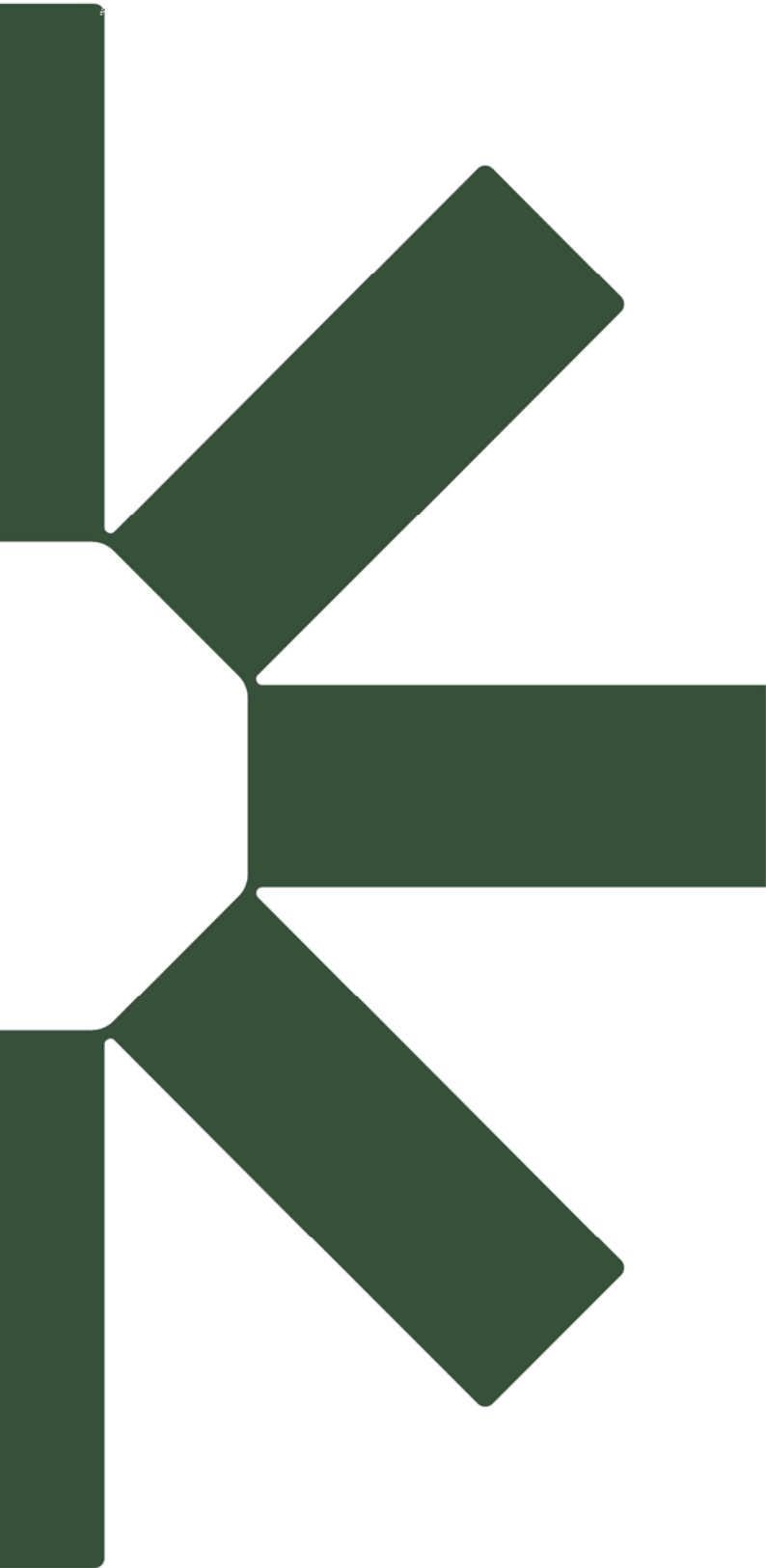
the carriageway of the Waikato Expressway		
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- b. Activities in all zones except the Major Facilities, Knowledge and Open Space Zones shall not exceed the following noise levels at any point within the notional boundary of any other site in the Future Urban Zone.

Time of day	Noise level measured in L_{Aeq} [15 min]	Noise level measured in L_{AFmax}
i. 0700 — 2200 hours	55 dB	-
ii. 2200 — 0700 hours	40 dB	75 dB

- c. Any activity within the Industrial and Te Rapa North Industrial zones shall not exceed a noise level of 65dBA (L_{Aeq} [15 min]) at any point within the boundary of any other site within that zone. This standard does not apply to sites held in common ownership with the site containing the activity generating the noise. This standard applies to Stage 1A of the Te Rapa North Industrial Zone, but does not apply to the remainder of the Te Rapa North Industrial Zone until such time as the Deferred Industrial Zone overlay is removed.





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