# APPENDIX H

# ACOUSTIC ASSESSMENT

# PROPOSED MIXED USE BUILDING
# 561 HOROTIU ROAD
# TE KOWHAI

for
**Quattro Property Holdings Ltd.**

# ACOUSTIC REPORT

**Prepared by**
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**For Resource Consent**

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**Ref J003176**

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## QUALITY ASSURANCE

**Document:** **561 Horotiu Rd, Proposed Mixed Use Building**
**Acoustic Report – For Resource Consent**

| Prepared by | Authorised by | Issue | Date | Rev |
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## 1. INTRODUCTION

This report has been prepared to establish whether the noise generated by the proposed commercial/retail building to be located at 561 Horotiu Rd in Te Kowhai would satisfy the District Plan standards.

- The commercial / retail will be located along the northern/eastern side of the site with vehicle parking spaces distributed over the western/southern portion of the site. Proposed building will be single storey.
- The report provides advice for reducing the noise received at the neighbours' boundaries to reasonable levels.

## 2. DESIGN CRITERIA – WAIKATO DISTRICT PLAN

The proposed development is to be located at 561 Horotiu Rd in Te Kowhai. The site is zoned *Country Living Zone*.

***Figure 1: Site Zoning***


The proposed activity is required to comply with the noise standards for Country Living Zones of the Waikato District Plan. The following Rules apply:

**25.19.17.1 Noise**

*Any activity is a permitted activity if it is designed and conducted so that noise from the activity measured at any other site does not exceed:*

a) *50dBA (L10), 7am to 7pm any day, and*
b) *45dBA (L10), 7pm to 10pm any day, and*
c) *40dBA (L10), and 65dBA (Lmax) at all other times.*

*Despite the above, construction noise, farming noise, forest harvesting noise, extractive industry noise, and emergency sirens are not subject to these standards and are permitted under this rule.*

## 3. SITE & ENVIRONS

The site is located on the eastern side of Horotiu Rd. The adjoining properties to the north, south, east and west are country living and include empty farmland and residential dwellings. The neighbouring properties further to the south are zoned living zone containing residential dwellings. Additionally the adjoining site to the south contains a consented café being established from a recently relocated church.

***Figure 2: Aerial View of Site***

**Operating Hours**

The proposed commercial activity will include a variety of activities with differing operating hours as follows:

- Takeaway – Pizza 10am to 10pm
- Retail and hair dressers will operate between 8am to 6pm.
- Superette will operate between 7am and 10pm.

## 4. BUILDING ENVELOPE CONSTRUCTION ASSESSMENT

The building envelope construction is assessed to verify its suitability from an acoustic perspective. The building envelope is required to reduce the noise emitted from the commercial units to the adjacent neighbours as per the limits identified in Section 2 of this report.

**Building Construction**

4.1 Glazing: No minimum requirements apply to the windows, with all windows being located on the western and north-western facades facing away from the neighbouring receivers.

4.2 Roof: The roofing system is currently unknown, however, appears to be longrun metal roofing complete with an assumed minimum of 10mm plasterboard ceiling lining and thermal insulation the STC rating will be above 45 which is acoustically suitable.

4.3 External Walls: The external building façade is currently unknown, however, appears to be a combination of concrete and timber weatherboard. Complete with 10mm standard plasterboard lining and thermal insulation these constructions will be rated above STC 40 which is acoustically suitable.

4.4 External Doors: Where doors on the eastern facades include glazing a minimum of STC 31 glazing is recommended to any space containing noisy activity. This may be achieved with 6mm single glazing or 6mm/6mm air space/6mm double glazing.

## 5. ASSUMPTIONS & ANALYSIS

### 5.1 Assumptions

The noise levels generated by the commercial activity will be limited to traffic movements, refuse collection, people noise, takeaway outdoor seating and mechanical plant sources. Based on the following assumptions, we calculated the noise levels at the site boundaries.

#### 5.1.1 Car Park Noise

Based on the proposed activity including retail, takeaway and the superette, a maximum traffic flow of 186 vehicles per hour of the peak hour period is estimated. This estimate has been provided by the CKL Integrated Transportation Assessment.

Provided a hard surface (such as the proposed asphalt driveway) is used for the car park, the noise from the light vehicles parking will be within acceptable noise levels relative to the design requirements of the District Plan.

The noise levels associated with truck movements, delivers and rubbish collection will require further restrictions. Rubbish collection is addressed more specifically below in section 5.1.4. Truck movements will be restricted to the daytime hours, 7am – 7pm and will occur primarily along the southern boundary accessing the designated loading zone. We have assumed no more than 2 trucks will visit the site over any given hour. This is considered to be a conservative estimate with trucks being an infrequent occurrence.

In order to comply with the daytime noise limits from trucks and night-time noise limit from cars acoustic fencing a minimum of 1.8m high will be required along the southern boundary, unless written approval is obtained from the adjoining southern neighbour. For the purposes of predictions acoustic fencing is included in the predictions, however, inclusion of acoustic fencing will result in compliance with the 50dB $L_{A10}$ daytime noise limit.

We note that this is based on the operative district plan standards, however, the subject site and neighbouring site to the south will be rezoned to Business Zone. Under the proposed district plan the applicable noise limit will be 65dB LAeq 7am – 11pm and the noise level from all activities on site will comply without acoustic mitigation.

#### 5.1.2 Mechanical Plan Noise

It is understood that the mechanical plant will be located either centrally on the roof, with the ducting going through the centre of the buildings and will be selected to comply with the district plan noise

limits. The mechanical plant shall be complete with the necessary acoustic treatment in the form of attenuation and/or screening.

Additionally, external heat pump units, extractor fans and chillers may produce noise originating from ground level along the eastern side of the building.

These noise sources are required to be designed/selected to produce no more than:

- Central Rooftop Mechanical Plants:
    - Each unit producing no more than $L_{Aw}$ 78dB
- Ground Level Mechanical Plants:
    - Each unit producing no more than $L_{Aw}$ 71dB

These maximum sound power levels assume each unit will have a mechanical plant on the roof and rear of the building. Where units (such as the hairdressers or retailers) do not have significantly noisy mechanical plants the neighbouring units may produce an additional 2dB of noise.

Additionally these sound power levels are based on meeting the lower evening noise limit, where a mechanical plant is only used during the daytime (7am – 7pm) period the sound power level may be increased by 5dB.

### 5.1.3 People and Takeaway Noise

The noise associated with people and the outdoor seated area of the takeaway are assumed to produce conversational noise levels similar to a relatively quiet café. For the purposes of this assessment the noise level assessed at the perimeter of the outdoor seating area may produce up to 65dB $L_{A10}$.

### 5.1.4 Refuse Collection

Rubbish collection, particularly the pickup of recycling, is required to occur between 7am and 7pm. The rubbish and recycling collection will occur in designated area in the south-eastern portion of the site.

The noise levels are predicted to comply with the district plan $L_{A10}$ noise limits at the neighbouring receivers. We note that due to the short duration of rubbish collection which can be completed in under a minute any loud impulsive noise (e.g. banging and crashing of glass) will not contribute to the $L_{A10}$ level, as it will constitute less than 10% of any given assessment period.

### 5.2 Noise Predictions

**Modelling & Methodology**

An environmental model has been constructed for the proposed facility using CadnaA version 4.3 computer modelling program. The modelling method for noise propagation over distance is based on the international standard ISO 9613: "Acoustics – Attenuation of sound during propagation outdoors" methodology.

- The model allows importing digital ground elevation contours and data to define the topography and data for each of the noise sources. This feature is currently unavailable for the Waitkato area.
- The program then calculates the $L_{A10}$ dB level, which is the basis of the district plan noise limits.
- No adjustment is applied for the averaging over the operation period.

***Table 1: The Predicted Cumulative Noise Levels ($L_{A10}$ dB) at the Neighbouring Properties:***

| *Location* | *Predicted noise level ($L_{A10}$ dB)* | | *Noise Limit $L_{A10}$ (dB)* | *Comments* |
|---|---|---|---|---|
| | *Day* | *Evening* | | |
| 557 Horotiu Rd | 45 | 45 | 50/45 | Complies |
| 571 Horotiu Rd | 49 | 45 | | |
| 714 Te Kowhai Rd | 40 | 40 | | |
| 560C Horotiu Rd | 36 | 34 | | |
| 560A Horotiu Rd | 41 | 40 | | |
| 564A Horotiu Rd | 42 | 42 | | |
| 8 Westvale Lane | 44 | 44 | | |

## 6. CONCLUSIONS

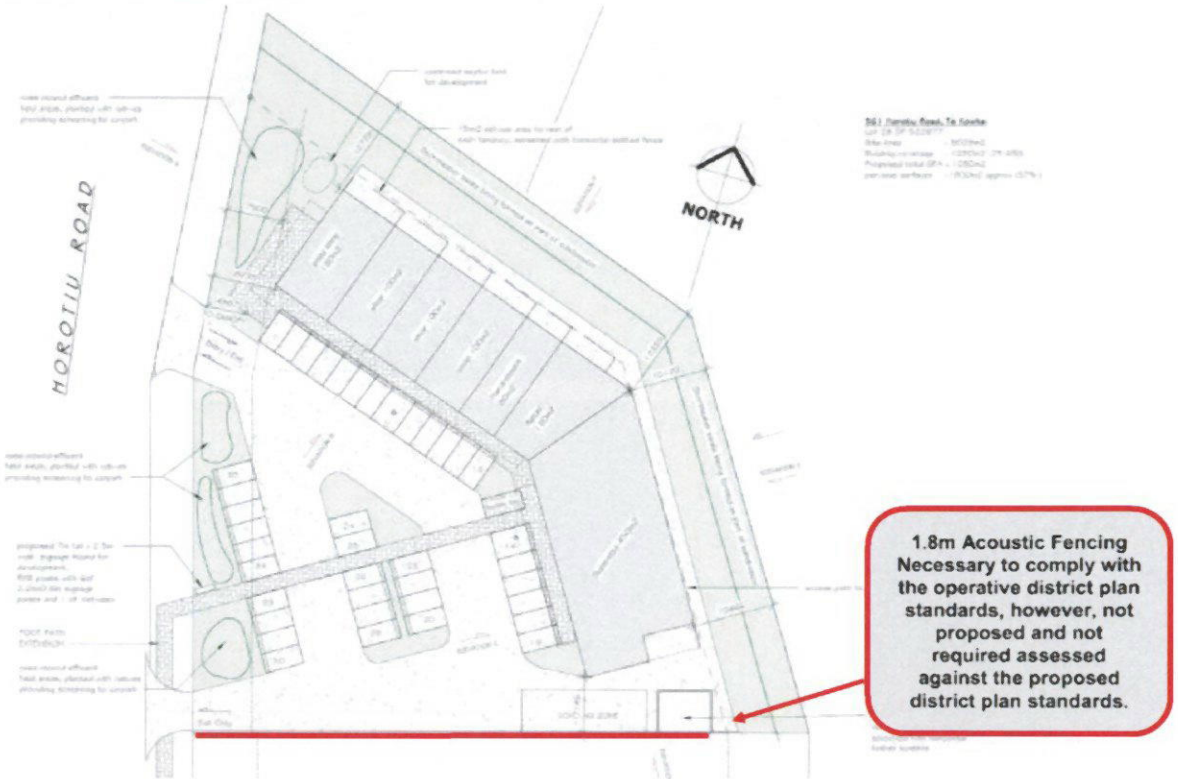
The noise levels generated by the proposed commercial activity will comply with the district plan noise limits provided the recommendation on this report are applied.

Acoustic fencing is required along the southern boundary to reduce night-time traffic noise levels and daytime noise from trucks. The acoustic fencing is recommended to be 1.8m high. The acoustic fencing is required to have a minimum density of 10kg/m2, suitable constructions include but are not limited to timber boards complete with battens to cover the gaps, steel, concrete, stone, 6.38mm laminate glass and 12mm acrylic panels.

However, we note that the requirements for acoustic fencing and mitigation is based on the operative district plan standards, with a daytime and evening noise limit of 50dB and 45dB LA10 respectively. Under the proposed district plan the subject site and 571 Horotiu Rd will be rezoned to Business Zone, under which the applicable noise limit at the boundary of 571 Horotiu Rd will be 65dB LAeq during the hours of operation. For this reason acoustic fencing is not proposed to mitigate the traffic noise, as the noise levels without acoustic fencing will be compliant when assed against the proposed district plan standards.

Appendix A

*Figure A1: Potential Acoustic Fence Location*



## Appendix B - Glossary & Standards

**Noise**

A sound that is unwanted by, or distracting to, the receiver.

**Ambient Noise Ambient**

Noise is the all-encompassing noise associated with any given environment and is usually a composite of sounds from many sources near and far.

**A-Weighting (e.g. the A in $L_{Aeq}$)**

A measurement of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.

**Leq**

The time averaged sound level (on a logarithmic/energy basis) over the measurement period (normally A-weighted).

**L90**

The sound level which is equalled or exceed for 90% of the measurement period. L90 is an indicator of the mean minimum noise level and is used in New Zealand as the descriptor for background noise (normally A-weighted).

**L10**

The sound level which is equalled or exceeded for 10% of the measurement period. L10 is an indicator of the mean maximum noise level and is used in New Zealand as the descriptor for intrusive noise (normally A-weighted).

**Lmax**

The maximum sound level recorded during the measurement period (normally A-weighted).

**Lw**

Sound power level.

**STC**

Sound Transmission Class.

**NZS 6801:2008**

New Zealand Standard NZS 6801:2008 "Acoustics - Measurement of Environmental Sound".

**NZS 6802:2008**

New Zealand Standard NZS 6802:2008 "Acoustics - Environmental Noise".

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