Appendix B

Revised Marshall day Noise Assessment dated 11 November 2020

MARSHALL DAY Acoustics

BBC TECHNOLOGIES RELOCATION
NOISE ASSESSMENT

Rp 001 20200634 | 11 November 2020

MARSHALL DAY Acoustics

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Project: **BBC TECHNOLOGIES RELOCATION**

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Approved	-		03/09/20	Beth Paxton	James Bell-Booth
Approved	R01	Clarifications to address WDC comments	11/11/20	Beth Paxton	James Bell-Booth

SUMMARY

Our assessment confirms that the proposed development can comply with the relevant operational noise limits contained in the operative Waipa District Plan (WDP).

BBC Technologies and their parent company TOMRA applied for resource consent for a new research and manufacturing campus on land at the corner of Airport Road and Lochiel Road, Rukuhia. In processing the application, Waipa District Council has requested further information on site noise sources and emissions.

In response to the further information request from Council, BBC Technologies has engaged Marshall Day Acoustics to carry out an assessment of noise compliance for the proposal.

We have used the operational noise limits in rule 4.4.2.15 of the WDP in our assessment.

We have calculated operational noise levels for the closest receivers. Our modelling indicates that the development will comply with the daytime noise limits. At night-time the calculated noise levels are compliant noise limits except during the night-time peak hour.

During the night-time peak hour, the calculated noise level at the notional boundary of 8 Lochiel Road exceeds the 40 dB L_{Aeq} noise limit by 3 dB. This exceedance is of little significance given the brief period of the exceedance and the (calculated) level of other noise sources in the area.

We recommend that a condition of consent is included to ensure the detailed design of mechanical plant includes appropriately designed noise attenuation so that cumulative noise levels from the site achieve the District Plan noise limits.

Appendix A contains a glossary of terminology used in this report.

TABLE OF CONTENTS

1.0 INTRODUCTION

BBC Technologies and their parent company TOMRA provide turnkey solutions for sorting, optimising and packing small fruit. They have outgrown their existing site (34 Ingram Road) and propose to establish a new research and manufacturing campus on land at the corner of Airport Road and Lochiel Road, Rukuhia.

A Resource Consent Application for the development has been submitted. Waipa District Council have made a Section 92 request for further information. With respect to noise, they wish to know:

(i) the principal noise sources associated with the activity,

(ii) the level of noise emissions from these sources,

(iii) the nature of activities that are likely to be undertaken during the night-time period.

(iv) noise mitigation in terms of orientation of building and location of closest neighbours, noise sensitive receivers, and

(v) noise from cars and vehicles accessing the site and the parking and manoeuvring area, particularly in terms of the 170veh/hr peak hour generation and the residential dwelling on the opposite side of Lochiel Road.

Marshall Day Acoustics has been engaged to carry out a noise assessment for the proposed facility to address the Section 92 request.

2.0 PROPOSED SITE

The proposed site will occupy part of two adjacent plots at 326 Airport Road and 35 Lochiel Road. Grass Ventures Limited have acquired these two plots and are applying to subdivide the land into three lots. The site owned by Grass Ventures is shown outlined in red in Figure 1. The lot proposed to be operated by BBC Technologies is outlined in purple. The use of the other two lots will continue to be rural residential.

The site is bounded by rural residential properties to the north, east and south. The applicant has obtained written approval from the residential properties at 326 Airport Road and 35 Lochiel Road owned by Grass Ventures. The nearest residential properties not owned by Grass Ventures are at 326A Airport Road to the north and 8 Lochiel Road to the south.

The site and surrounding residential properties are zoned Rural in the Waipa District Plan. Land to the west of the site across Airport Road is part of the Airport Business Zone. To the south of the site is the Mystery Creek Events Zone. Figure 1 shows the District Plan zoning.

We understand that the activity status of the development is discretionary for reasons other than noise.

Figure 1: Site location, Waipa District Plan zoning, noise-sensitive receivers

3.0 PROPOSED ACTIVITIES

The proposed development consists of:

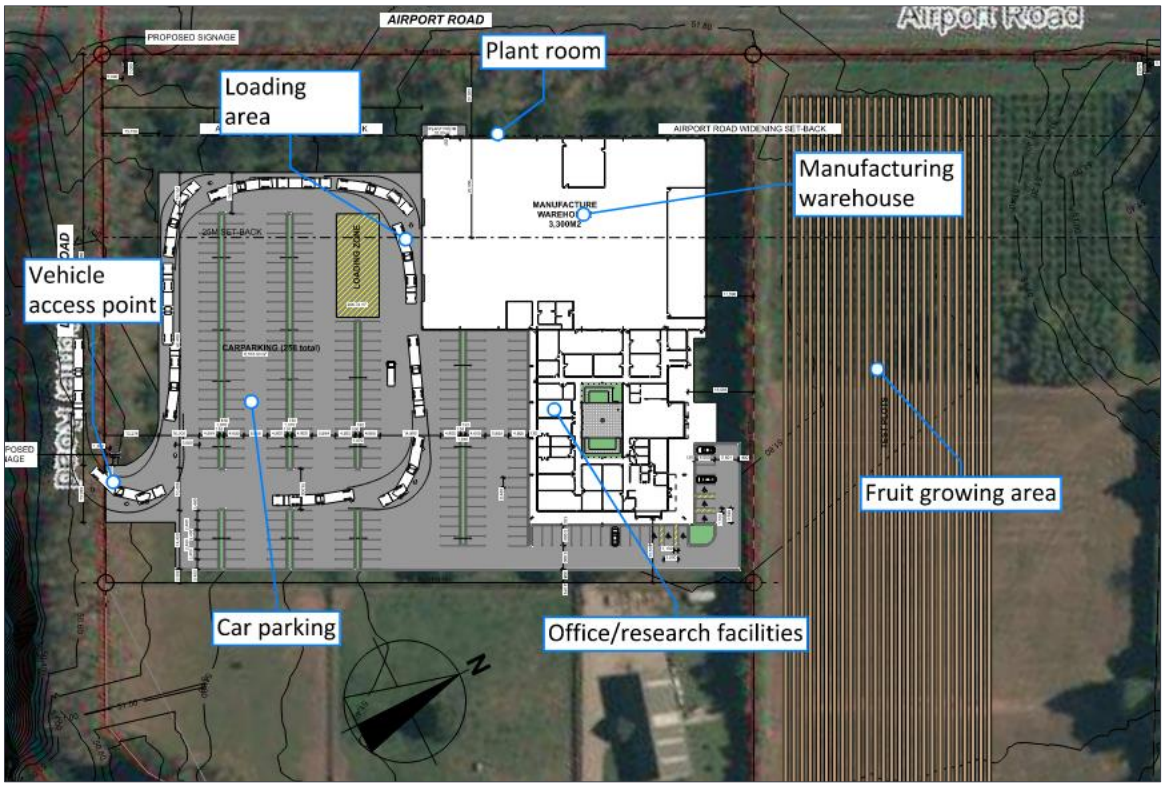
- A new building containing a manufacturing warehouse, office/research facilities and ancillary spaces
- Car parking with space for 258 vehicles and
- An outdoor area for growing fruit.

The proposed activities with the greatest potential for noise generation are:

- Car parking and vehicle movements on site
- Deliveries and loading;
- External plant and building services
- Noise break-out from manufacturing activities within the building.

Figure 2 (overleaf) shows the site layout.

Figure 2: Site layout



3.1 Car Parking and Vehicle Movements

The site will have a single access point on Lochiel Road. Most vehicles accessing the site will be staff working on site.

Gray Matter has prepared a transport assessment for the site (*326 Airport Road Proposed Research Campus Integrated Transport Assessment, Issue 1, 2 June 2020*). Estimated numbers of peak hour and daily vehicle movements are provided in the Gray Matter report.

The peak daytime hours will occur during the morning between 07:30 and 08:30 hours and during the evening between 17:00 and 18:00 hours. The peak hours in the night-time period will occur when day shift factory staff arrive prior to 06:30 hours and leave after 00:00 hours.

Estimated numbers of peak daytime hour, peak night-time hour and daily vehicle movements are summarised in Table 1.

Table 1: Trip generation rates (Source: Gray Matter)

Situation	Estimated number of trips generated
Peak daytime hour	170
Peak night-time hour	67
Total daily	840

3.2 Deliveries and Loading

There will be approximately 8 deliveries to site or dispatches from site per day.

These will be fairly evenly distributed throughout standard business hours of 08:00 to 17:00.

Delivery / dispatch vehicles will generally be courier vans or small to medium size trucks from local suppliers, with occasional B-trains for delivery or pick up of containers.

A forklift truck will generally be used to unload deliveries.

3.3 Mechanical Plant

3.3.1 Manufacturing plant

The main items of plant associated with the manufacturing activities in the warehouse will be an air compressor and a dust extraction system. This plant will be relocated from the existing site. It will be located within a plant room at the western side of the building.

3.3.2 Other Plant

Other mechanical systems (e.g. HVAC for the office) have not yet been designed. These systems would be similar to those used in other facilities of similar size. The plant may be expected to operate at night, so the night-time criteria are the most stringent.

With suitable attenuation installed, we expect that noise from all mechanical plant will comply with the noise limit.

We recommend that the design and location of any mechanical plant is reviewed by a recognised acoustical consultant.

3.4 Internal Activities

The manufacturing warehouse will mostly be used for the assembly of equipment which is mostly manufactured elsewhere.

The main noise-generating activities within the warehouse will be:

- the operation of the duct extraction system and
- use of power tools, including drills and grinders.

These activities will take place within dedicated welding and deburring rooms.

We understand that the building envelope of the warehouse and plant room will be profiled steel cladding.

We do not expect noise break-out from activities within the research and office accommodation to contribute to the total noise levels at the site boundary.

Music in the proposed gym will be played at a sufficiently quiet level to not contribute to site noise emissions.

3.5 Fruit Growing

The outdoor test plot / fruit growing area is for fruit production associated with the research and development activities on the site.

Fruit growing activities are permitted in the rural zone and the Waipa District Plan rural zone noise rule excludes consideration of noise generating activities from agricultural vehicles, agricultural machinery and equipment. Therefore, we have not assessed noise associated with fruit growing.

There will be no frost fans or bird scaring devices in the external fruit growing areas.

4.0 DISTRICT PLAN NOISE LIMITS AND OTHER GUIDANCE

4.1 Waipa District Plan Performance Standards

Noise rule 4.4.2.15 of the Waipa District Plan contains the relevant noise rules for the site. The rule requires that noise generating activity (excluding farming associated activities) should not exceed the following limits within the notional boundary of any dwelling (not within a mineral extraction site):

- Daytime – 07:00 to 22:00 hours – 50 dB L_{Aeq}
- Night-time – 22:00 to 07:00 hours – 40 dB L_{Aeq} and 70 dB L_{Amax}.

Noise levels shall be measured and assessed in accordance with NZS 6801:2008 *Acoustics – Measurement of environmental sound* and assessed in accordance with NZS 6802:2008 *Acoustics – Environmental noise*.

Activities that fail to comply with the Rural Zone noise rule require a resource consent for a discretionary activity.

4.1 Resource Management Act

Under the provisions of the RMA there is a duty to adopt the best practicable option to ensure that noise (including vibration[1]) from any development does not exceed a reasonable level. Specifically, Sections 16 and 17 reference noise effects as follows.

Section 16 states that "every occupier of land (including any premises and any coastal marine area), and every person carrying out an activity in, on, or under a water body or the coastal marine area, shall adopt the best practicable option to ensure that the emission of noise from that land or water does not exceed a reasonable level".

Section 17 states that "every person has a duty to avoid, remedy, or mitigate any adverse effect on the environment arising from an activity carried on by or on behalf of the person, whether or not the activity is in accordance with –

(a) Any of sections 10, 10A, 10B and 20A; or

(b) A national environmental standard, a rule, a resource consent, or a designation"

This report uses the guiding principles of Section 16 and 17 of the RMA as noted above in assessing effects and recommending mitigation measures.

[1] RMA 1991 Part 1 Section 2 Interpretation: Noise includes vibration

5.0 CALCULATED NOISE LEVELS

5.1 Assessment Scenarios

We have calculated noise levels for the following scenarios:

1. **Daytime peak hour** – 170 light vehicle movements at the beginning and end of the office shift (08:00 to 17:00 hours), internal activity noise break-out and plant, no deliveries
2. **Daytime delivery**[2] – B-train delivery unloaded by forklift, internal activity noise break-out and plant
3. **Night-time peak hour** – 67 light vehicle movements at the beginning of the factory daytime shift (06:30 hours) or end of the night-time factory shift (00:00 hours)
4. **Night-time working hours** – internal activity noise break-out and plant only.

These scenarios represent worst-case for the daytime and night-time periods.

5.2 Source Noise Levels

We have measured manufacturing activity noise levels and noise levels of plant at the existing site that is to be relocated. Details of the noise survey are presented in APPENDIX A.

From the measurements we have derived the following source sound levels, which are used in our calculations:

- Deburring and welding rooms – reverberant sound pressure level of 81 dB L_{Aeq}
- Plant room (which will contain the relocated dust extract plant and air compressor) – reverberant sound pressure level of 80 dB L_{Aeq}
- Dust extraction system exhaust – sound power level of 69 dB L_{WA} and
- Air compressor exhaust – sound power level of 86 dB L_{WA}

5.3 Modelling Assumptions

We have assumed the following in our calculations:

- A reverberant sound pressure level of 70 dB L_{Aeq} in the warehouse (other than the welding and deburring rooms). This assumption is based on our discussions with TOMRA staff and observations of activities in the existing facility.
- The loading bay doors to the warehouse should remain closed except to allow the passage of goods and vehicles.
- The dust extraction system and air compressor inlets/outlets will be ducted west, away from the nearest residential receivers.
- Source noise levels for car parking activities, deliveries and loading based on our previous measurements of these activities.

[2] We have calculated a conservative delivery scenario in which a B-train truck arrives, is unloaded by forklift and departs within 15-minutes. We note that large deliveries to the site are only occasional and that most delivery vehicles will be smaller trucks or courier vans. We assume that large deliveries are unlikely to coincide with peak times. The Gray Matter report anticipates 77 non-staff trips per day. Therefore, we have not considered the cumulative effects of deliveries with other light vehicle movements

5.4 Results

Table 2 presents the calculated noise levels for each scenario.

Table 2: Calculated Noise Levels

Assessment Scenario	Noise Level (dB $L_{Aeq, 15\ min}$) at Notional Boundary			
	8 Lochiel Road	326A Airport Road	35 Lochiel Road[1]	326 Airport Road[1]
Daytime peak hour [2]	47	31	37	33
Daytime delivery[2]	55	31	43	35
Night-time peak hour	43	13	33	27
Night-time working hours	37	30	28	28

1. Written approval has been obtained for these properties.
2. Subject to averaging in accordance with NZS 6802:2008. No averaging correction applied to these noise levels.

The highest calculated maximum noise level at any of the receivers is 55 dB $L_{Amax.}$ This level is predicted at the notional boundary of 8 Lochiel Road, from a car door closure at the nearest parking space to the boundary.

6.0 COMPLIANCE ASSESSMENT

Our calculated noise levels comply with the daytime noise limits. At night-time we predict compliance except during the peak hour.

During the night-time peak hour, the noise level at 8 Lochiel Road is likely to exceed the 40 dB L_{Aeq} noise limit by 3 dB. This exceedance is of little significance for the following reasons:

- The exceedance occurs for a brief period at shift changeover
- The subjective difference of 3 dB between the calculated level and the noise limit is just perceptible
- The character of the sound exceedance (vehicles manoeuvring) is similar to the that of the ambient noise from traffic on State Highway 21 /Airport Road
- The level of the exceedance will likely be less than the ambient environment.
  We have calculated[3] that the noise level from traffic on State Highway 21/ Airport Road – received at 8 Lochiel Road would be:
  - around 49 dB L_{Aeq} at the midnight shift changeover, and
  - around 52 dB L_{Aeq} at the 0630 hrs shift changeover.
  - Furthermore, 8 Lochiel Road is inside the Hamilton Airport Outer Control Boundary (OCB) and subject to aircraft noise from Hamilton airport as well as from traffic.

[3] Based upon the following sourced from www.mobileroad.org:

- Average traffic flow figure of 7,125 vehicles per day (AADT).
- Vehicle Speed is 80 km/hr
- 10% heavy vehicles
- Stone mastic asphalt road surface

$L_{Aeq(1\ hr)}$ at 0630 and 0000 hours calculated from $L_{Aeq\ (24\ hr)}$ assuming typical hourly road traffic volume variation for rural highways.

GLOSSARY OF TERMINOLOGY

Ambient Noise	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
dB	Decibel The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 μPa i.e. dB = 20 x log(P/Pr)
dBA	The unit 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.
$L_{Aeq\ (t)}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
$L_{A90\ (t)}$	The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
$L_{A10\ (t)}$	The A-weighted noise level equalled or exceeded for 10% of the measurement period. This is commonly referred to as the average maximum noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
NZS 6801:2008	New Zealand Standard NZS 6801:2008 "Measurement of Environmental Sound"
NZS 6802:2008	New Zealand Standard NZS 6802:2008 "Assessment of Environmental Noise".
Rating Level	A derived level used for comparison with a noise limit. Takes into account any and all corrections described in NZS 6801 and NZS 6802, e.g. duration, special audible character, residual sound etc.
Special Audible Characteristics	Distinctive characteristics of a sound which are likely to subjectively cause adverse community response at lower levels than a sound without such characteristics. Examples are tonality (e.g. a hum or a whine) and impulsiveness (e.g. bangs or thumps).

APPENDIX A DETAILS OF NOISE SURVEY

Table 3: Octave Band Noise Level Results

Measurement Position	Measured Noise Levels (dB) Octave Band Centre Frequency (Hz)								Noise Sources and Comments
	63	125	250	500	1000	2000	4000	dBA	
Deburring area	71	72	69	65	69	70	76	81	Reverberant level measurement with three staff using handheld power tools
Dust extract fan / cyclone room	78	74	72	71	71	64	68	75	Reverberant level measurement in dust extraction plant area
Compressor room	70	72	77	74	74	71	68	78	Reverberant level measurement in compressor room
1 m from compressor exhaust	76	84	89	81	80	76	75	86	Exhaust located at ground level with plywood panelling behind
1 m from cyclone exhaust	78	75	68	64	64	59	56	69	Exhaust located high in wall of building

Date & Time	24 August 2020, 14:40 – 15:00
Personnel	James Bell-Booth of Marshall Day Acoustics
Methodology	Measurements were undertaken in general accordance with New Zealand Standard NZS 6801:2008 *"Acoustics – Measurement of environmental sound"*
Calibration	A calibration check was carried out prior to and post the survey period with no notably change in level.

Instrumentation

Sound Level Meter:	Brüel & Kjær Type 2250	SN 2590414	Calibration due 13/03/2021