

# Memo

To: Aircraft Noise Community Consultative Group

From: Matthew Dugmore – Statutory Planner Auckland Airport

Date: 14 September 2020

Subject: Noise Mitigation Programme – 2020 Quarter 3 Report

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Auckland Airport is required to manage and mitigate the effects of aircraft noise generated by its operation. Condition 10 of Auckland Airport Designation 1100 sets out the requirements for how Auckland Airport should manage the effects of aircraft noise through the implementation of a Noise Mitigation Programme.

Auckland Airport monitors the implementation of the Noise Mitigation Programme. The purpose of this memo is to provide the Aircraft Noise Community Consultative Group (“**ANCCG**”) a quarterly update on the implementation of the noise mitigation programme. This report provides a summary for quarter 3 (July – September 2020).

## 1. COVID-19’s effect on Noise Mitigation Programme Implementation

The Noise Mitigation programme requires Auckland Airport staff and contractors to enter properties within the community to undertake pre-inspections, installations and occasional equipment maintenance. This typically involves engaging with homeowners and tenants, as well as cross-organisational interaction (i.e. 2 different contracting companies present at once). The level of interaction and engagement required by the Programme may pose a risk to the local community, Auckland Airport staff and its contractors. As result, the Programme has had to be put on hold during both Level 4 and 3 COVID-19 Alert levels.

The recent Level 3 COVID Alert level required the Programme to again be put on hold. While Auckland has now moved down to Level 2, Auckland Airport has considered whether the Programme can recommence at this level. The Airport have concluded that due to the level of interaction and engagement with the local community (where social distancing will be difficult to achieve) and the high number of properties currently involved in the Programme, the Programme will be on hold until Auckland reaches Level 1 to reduce the potential risk of spreading COVID-19 through the Programme.

## 2. Pre-inspections

Prior to homeowners formally accepting a Noise Mitigation offer, a pre-inspection of the property is undertaken to determine the most suitable system to be installed. Also, the total volume of the living area and habitable rooms is calculated to confirm the size of the ventilation system/s required to achieve the necessary air-changes per hour<sup>1</sup>. These pre-inspections are carried out by Hometech and attended by an Auckland Airport representative. There are 24 pre-inspections to be booked and undertaken at Level 1.

## 3. Acceptance of Mitigation Packages

Once the property has been inspected, a formal offer letter is sent to the homeowner who can either accept or decline the offer. In the last quarter, 3 packages have been accepted (one HANA property and two MANA properties).

## 4. Covenant Registrations

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<sup>1</sup> At least 1 air-change per hour in living area and 3 air-changes per hour in habitable rooms.

Once an offer has been accepted, the homeowner enters into a covenant with Auckland Airport which is registered on the certificate of title. The purpose of the covenant is to provide notice that the Noise Mitigation Package has been installed, that the effectiveness of the package cannot be lessened, and that the equipment cannot be removed without permission from Auckland Airport. An example of the covenant is included in Designation 1100 which is used by Auckland Airport. Currently, there are 12 properties awaiting covenant registration.

## 5. Installation of Mitigation Packages

When the covenant has been registered, the Airport then prepares an "Order to Proceed to Install". Following this, the packages on average are installed one month later. In the last quarter, no Noise Mitigation Packages have been installed. However, Auckland Airport have instructed its contractors to proceed with booking seven installations, all of which will be completed once Auckland reaches Level 1.

Installations are undertaken by Hometech, a company that specialises in ventilation systems. One team of contractors is specifically dedicated to pre-inspections and installations as this ensures consistency and better accountability. AIAL is happy with their services and their workmanship to date. All equipment installed is high quality and durable, and meets the technical requirements set out in Condition 10 of Designation 1100.

## 6. Auditing of Mitigation Packages

Following installation of noise mitigation packages, Auckland Airport regularly contacts homeowners/tenants to receive feedback and comments on the equipment and process. In September 2019, the Airport released a survey to homeowners who have had a noise mitigation package installed since 2016 (a total of 207 homeowners). Auckland Airport also sends the survey to homeowners who have had a package installed in the last quarter. Currently we have received 52 responses, and the feedback has been generally positive. The purpose of this survey is to identify areas for improvement within the Noise Mitigation Programme process. To date, a common trend is that homeowners do not know who to contact should they have any issues with the package or require maintenance. In response to this, Auckland Airport has prepared a post-installation folder which is provided to homeowners following the completion of the installation and includes important contact details for both the contractor and Auckland Airport.

To confirm the noise mitigation packages are compliant, Auckland Airport has engaged Marshall Day Acoustics to measure the internal noise environment of 4 properties (two MANA and two HANA) which have had a Noise Mitigation Package installed in the last 12 months. One MANA property (which had a Noise Mitigation package installed on 15 October 2018) has been measured and the results reported show the internal noise level of the property with the windows and doors closed is 37 dBA  $L_{dn}$  (which is below the noise level required by Designation 1100 of 40 dBA  $L_{dn}$ ). A copy of the report prepared is included in **Attachment 1**.

One HANA property (which had a Noise Mitigation Package installed on 23 April 2019) has also been measured and the results reported show that if future aircraft noise levels reach the allowable limit at this property (67 dB  $L_{dn}$ ), then the indoor levels would range from 32 to 39 dB  $L_{dn}$  with the windows and doors closed (which is below the noise level required by Designation 1100 of 40 dBA  $L_{dn}$ ). A copy of the report prepared is included in **Attachment 2**.

Auckland Airport looks to complete the remaining two noise measurements in the upcoming months.

### Attachments

Attachment 1 – MANA Noise measuring results [REDACTED]  
Attachment 2 – HANA Noise measuring results [REDACTED]

|                   |  |                         |                   |                     |    |
|-------------------|--|-------------------------|-------------------|---------------------|----|
| <b>Project:</b>   | Auckland Airport Noise Mitigation Verification | <b>Document No.:</b>    | Ca 001            |                     |    |
| <b>To:</b>        | Auckland International Airport Ltd             | <b>Date:</b>            | 19 September 2019 |                     |    |
| <b>Attention:</b> | Mr Matthew Dugmore                             | <b>Cross Reference:</b> |                   |                     |    |
| <b>Delivery:</b>  | Matthew.Dugmore@aucklandairport.co.nz          | <b>Project No.:</b>     | 20181512          |                     |    |
| <b>From:</b>      | Laurel Smith                                   | <b>No. Pages:</b>       | 2                 | <b>Attachments:</b> | No |
| <b>CC:</b>        |  |                         |                   |                     |    |
| <b>Subject:</b>   | [REDACTED] Verification Measurements           |                         |                   |                     |    |

## INTRODUCTION

Auckland International Airport Limited (AIAL) has engaged Marshall Day Acoustics (MDA) to measure the sound insulation performance from aircraft at the below address since treatment was installed under the Airport's Noise Mitigation Programme:

|                                    |                            |
|------------------------------------|----------------------------|
| <b>Address</b>                     | [REDACTED]                 |
| <b>Aircraft Noise Area</b>         | Moderate (MANA)            |
| <b>Future Aircraft Noise Level</b> | 64 - 65 dB L <sub>dn</sub> |

## DWELLING DESCRIPTION

The property is a single level duplex with three bedrooms and an open plan living/kitchen/dining room. We observed the following construction materials during the verification measurements on Thursday 1 August 2019:

|                        |  |
|------------------------|--|
| <b>Roofing/Ceiling</b> | Pitched roof with pressed metal tile roofing. Fibreglass batts ceiling insulation. Flat ceilings of plasterboard (softboard tiles in Bedroom 3). |
| <b>Walls</b>           | Fibre-cement weatherboard on timber framing and plasterboard internal linings.   |
| <b>Joinery</b>         | Aluminium joinery with 4-5mm single glazing. Latches and seals generally in good condition.  |

## TREATMENT DESCRIPTION

This property is inside the MANA and therefore the noise mitigation treatment included a ventilation system for habitable rooms and a heat pump in the main living space. The existing ducted range hood was not replaced at the owner's request.

The Noise Mitigation Programme does not define a sound insulation performance standard for houses in the MANA. Houses in the High Aircraft Noise Area (HANA) have a design criterion of 40 dB L<sub>dn</sub> in habitable rooms. In both the HANA and the MANA, ventilation systems are subject to noise performance standards.

## MEASUREMENT RESULTS

We carried out measurements of aircraft flyovers simultaneously indoors and outdoors with doors and windows closed to determine the sound insulation performance of the house. We measured on Thursday 1 August between 9:30am and 11:00am, capturing six turbo-prop and four jet aircraft arrival flyovers.

The results are summarised in Table 1 below. All rooms performed well with outside to inside noise reductions ranging from 28 to 34 decibels. The open plan living area did not perform as well as the bedrooms, which we expect is due to there being more hard surfaces and fewer soft furnishings in the living area which means sound energy wouldn't be absorbed and dissipated as quickly. If future aircraft noise levels reach the allowable limit at this property (64 – 65 dB L<sub>dn</sub>), then the indoor levels would range from 31 to 37 dB L<sub>dn</sub>. This is below the 40 dB L<sub>dn</sub> design criterion for houses in the HANA although we note that no internal criterion applies in the MANA.

**Table 1: Measured Noise Reduction from Aircraft Flyovers**

| Room                  | Future Outdoor Aircraft Noise Level (dB L <sub>dn</sub> ) | Average Measured Noise Reduction | Future Indoor Aircraft Noise Level (dB L <sub>dn</sub> ) |
|-----------------------|---|----------------------------------|--|
| Bedroom 1             | 65  | 33                               | 32   |
| Bedroom 2             | 65  | 33                               | 32   |
| Bedroom 3             | 65  | 34                               | 31   |
| Kitchen/Dining/Living | 65  | 28                               | 37   |

## VENTILATION SYSTEM NOISE

Under the noise mitigation programme, ventilation systems are required to be designed and installed to create no more than:

- 40 dB L<sub>Aeq</sub> in the principal living room
- 30 dB L<sub>Aeq</sub> in the other habitable rooms
- 40 dB L<sub>Aeq</sub> in any hallway.

In some cases it is not possible to measure as low as 30 dB L<sub>Aeq</sub> during the day when there are high background noise levels from other outdoor noise sources. In this situation, we make a subjective quality assessment of the ventilation noise, checking for high levels or unsatisfactory character.

Table 2 summarises the results from this address. Noise from the ventilation system measured in all the rooms achieved the relevant criterion. We didn't measure in the hallway, however our subjective assessment was that the volume and quality of sound from the ventilation system in the hallway was satisfactory.

**Table 2: Measured Ventilation Noise Levels**

| Room                            | Criterion (dB L <sub>Aeq</sub> ) | Measured Noise Level (dB L <sub>Aeq</sub> ) | Achieves Criterion?             |
|---------------------------------|----------------------------------|---|---------------------------------|
| Bedroom 1                       | 30                               | 28  | Yes                             |
| Bedroom 2                       | 30                               | 28  | Yes                             |
| Bedroom 3                       | 30                               | 29  | Yes                             |
| Open plan kitchen/dining/living | 40                               | 33  | Yes                             |
| Hallway                         | 40                               | -   | Passed subjective quality check |

We trust this information is satisfactory. Please feel free to contact us if you have any questions.

|                   |  |                         |               |                     |    |
|-------------------|--|-------------------------|---------------|---------------------|----|
| <b>Project:</b>   | Auckland Airport Noise Mitigation Verification | <b>Document No.:</b>    | Ca 002        |                     |    |
| <b>To:</b>        | Auckland International Airport Ltd             | <b>Date:</b>            | 30 March 2020 |                     |    |
| <b>Attention:</b> | Mr Matthew Dugmore                             | <b>Cross Reference:</b> |               |                     |    |
| <b>Delivery:</b>  | Matthew.Dugmore@aucklandairport.co.nz          | <b>Project No.:</b>     | 20181512      |                     |    |
| <b>From:</b>      | Pranaya Thaker                                 | <b>No. Pages:</b>       | 3             | <b>Attachments:</b> | No |
| <b>CC:</b>        |  |                         |               |                     |    |
| <b>Subject:</b>   | [REDACTED] Verification Measurements           |                         |               |                     |    |

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Auckland International Airport Limited (AIAL) has engaged Marshall Day Acoustics (MDA) to measure the sound insulation performance from aircraft at the below address since treatment was installed under the Airport's Noise Mitigation Programme:

|                                    |                       |
|------------------------------------|-----------------------|
| <b>Address</b>                     | [REDACTED]            |
| <b>Aircraft Noise Area</b>         | High (HANA)           |
| <b>Future Aircraft Noise Level</b> | 67 dB L <sub>dn</sub> |

## DWELLING DESCRIPTION

The property is double level with three bedrooms, one study, and an open plan living/dining room. We observed the following construction materials during the verification measurements on Friday 28 February 2020:

|                        |   |
|------------------------|---|
| <b>Roofing/Ceiling</b> | Longrun steel roofing on approximately 150mm timber rafters. Skillion plasterboard ceiling to underside of rafters in upstairs bedrooms and mezzanine bedroom. No insulation in the 150mm cavity (building paper only) <sup>1</sup> . Ground floor rooms have flat plasterboard ceilings below upper level. |
| <b>Walls</b>           | Solid masonry exterior. Timber framing and plasterboard internal linings. Assumed no insulation in the wall cavities.   |
| <b>Joinery</b>         | Aluminium joinery with 4-5mm single glazing. Latches and seals generally in good condition. Two of the top level bedrooms have skylights with fixed double glazing.   |

## TREATMENT DESCRIPTION

This property is inside the HANA and therefore the noise mitigation treatment included a ventilation system for habitable rooms and a heat pump in the main living space.

Houses in the High Aircraft Noise Area (HANA) have a design criterion of 40 dB L<sub>dn</sub> in habitable rooms, with the ventilation system subject to specific noise performance standards.

<sup>1</sup> Established at a previous inspection in 2016

## MEASUREMENT RESULTS

We carried out measurements of aircraft flyovers simultaneously indoors and outdoors with doors and windows closed to determine the sound insulation performance of the house. We measured on Friday 28 February between 10:00am and 11:00am, capturing eight turbo-prop and five jet aircraft arrival flyovers.

The results are summarised in Table 1 below. All rooms performed well with outside to inside noise reductions ranging from 28 to 35 decibels. The open plan living area did not perform as well as the bedrooms, which we expect is due to the larger amount of glazing compared to the other rooms. Bedroom 1 (the master bedroom) also didn't perform as well as the other rooms, which we expect is due to the skylight. If future aircraft noise levels reach the allowable limit at this property (67 dB  $L_{dn}$ ), then the indoor levels would range from 32 to 39 dB  $L_{dn}$ . This is below the 40 dB  $L_{dn}$  design criterion for houses in the HANA and therefore this house meets the design standard.

**Table 1: Measured Noise Reduction from Aircraft Flyovers**

| Room          | Future Outdoor Aircraft Noise Level (dB $L_{dn}$ ) | Average Measured Noise Reduction | Future Indoor Aircraft Noise Level (dB $L_{dn}$ ) |
|---------------|--|----------------------------------|---|
| Bedroom 1     | 67   | 28                               | 39  |
| Bedroom 2     | 67   | 32                               | 35  |
| Bedroom 3     | 67   | 32                               | 35  |
| Study         | 67   | 35                               | 32  |
| Dining/Living | 67   | 28                               | 39  |

## VENTILATION SYSTEM NOISE

Under the noise mitigation programme, ventilation systems are required to be designed and installed to create no more than:

- 40 dB  $L_{Aeq}$  in the principal living room
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- 40 dB  $L_{Aeq}$  in any hallway.

In some cases it is not possible to measure as low as 30 dB  $L_{Aeq}$  during the day when there are high background noise levels from other outdoor noise sources. In this situation, we make a subjective quality assessment of the ventilation noise, checking for high levels or unsatisfactory character.

Table 2 summarises the results from this address. Noise from the ventilation system measured in all the rooms achieved the relevant criterion. We didn't measure in the hallway, however our subjective assessment was that the volume and quality of sound from the ventilation system in the hallway was satisfactory.

**Table 2: Measured Ventilation Noise Levels**

| Room      | Criterion (dB $L_{Aeq}$ ) | Measured Noise Level (dB $L_{Aeq}$ ) | Achieves Criterion? |
|-----------|---------------------------|--------------------------------------|---------------------|
| Bedroom 1 | 30                        | < 30                                 | Yes                 |
| Bedroom 2 | 30                        | < 30                                 | Yes                 |
| Bedroom 3 | 30                        | < 30                                 | Yes                 |

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|               |    |      |                                    |
|---------------|----|------|------------------------------------|
| Study         | 30 | < 30 | Yes                                |
| Dining/Living | 40 | < 40 | Yes                                |
| Hallway       | 40 | -    | Passed subjective<br>quality check |

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We trust this information is satisfactory. Please feel free to contact us if you have any questions.