# APPENDIX H

## AIRCRAFT NOISE ASSESSMENT

*Spectrum Acoustics*

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Ref: 171414/7212

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## RE: ANAMBAH REZONING – AIRCRAFT NOISE ASSESSMENT

This report presents the results of an acoustic investigation into a rezoning application for land to the east of Rutherford Aerodrome (Aerodrome), NSW, being Part Lot 71 D.P. 714785 and part of Lots 721 and 722 D.P. 1191240, Anambah Road. The location of the land is shown, schematically, as "A" in **Figure 1**.

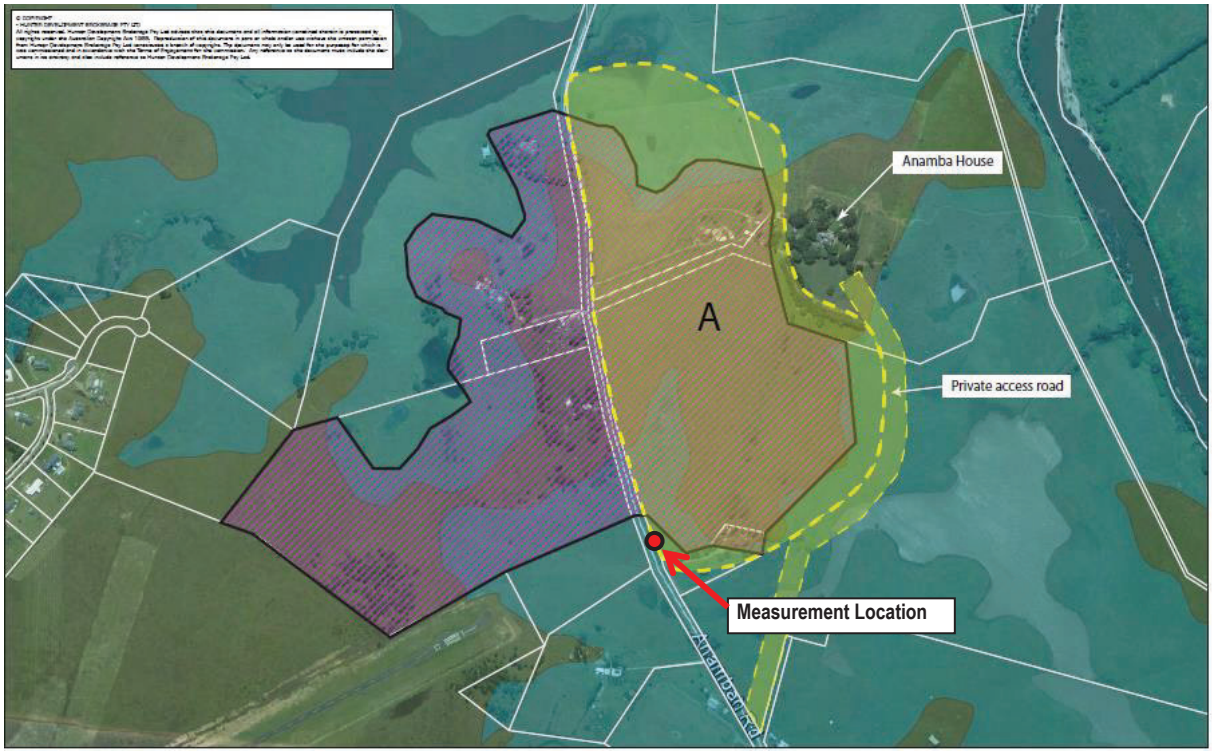


**Figure 1. Site Location Plan.**

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## ACCEPTABLE NOISE LEVELS

Acceptability categories for residential building sites are given in Appendix E *"Method for determining building site acceptability for light general aviation aerodromes without ANEF charts"* of Australian Standard AS2021-2000, reproduced as **Table 1**.

As the Aerodrome does not fall within the scope of the main body of AS2021, but rather a "light general aviation aerodrome without ANEF charts", Appendix E of the Standard is directly applicable. The noise levels in the table refer to dB(A)S Lmax noise levels (i.e. "slow" weighting response).

**TABLE 1**

**Building site acceptability based on aircraft noise levels**

| Building site | Aircraft noise level expected at building site, dB(A) | | | | | |
|---|---|---|---|---|---|---|
| | 15 to 30 flights per day | | | Greater than 30 flights per day | | |
| | Acceptable | Conditionally acceptable | Unacceptable | Acceptable | Conditionally acceptable | Unacceptable |
| House, home unit, flat, caravan park | <80 | 80 to 85 | >85 | <70 | 70 to 75 | >75 |

The main runway of the Aerodrome caters for more than 30 flights per day. Whilst the aerodrome doesn't have published ANEF contours it does have published ANEC contours. The ANEC for the Aerodrome is shown in **Figure 2**.

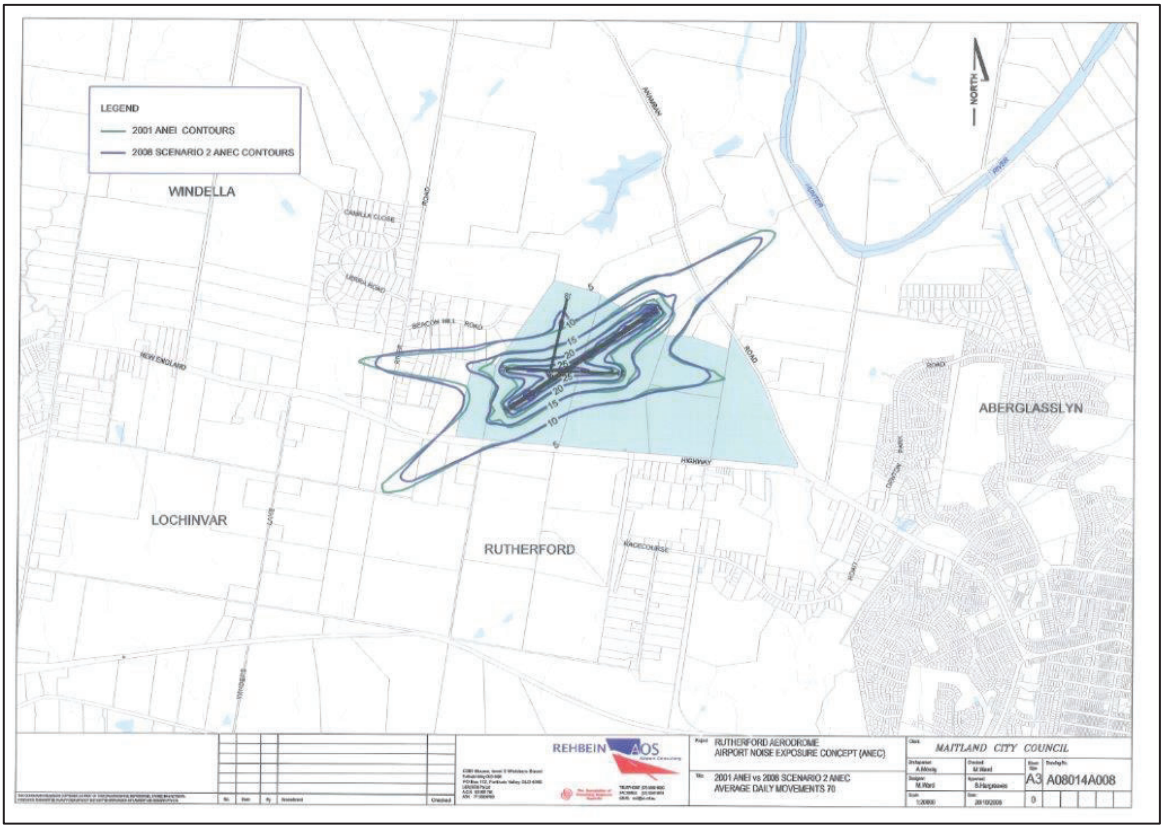


**Figure 2. Rutherford Aerodrome ANEC.**

The ANEC contours are scenario contours which are used to produce 'what if' contours, for example, in the process of examining flight path options around an airport. In most cases the ANEC may be approximated to an ANEF. The ANEF is generally regarded as being approximately equivalent to the Leq noise level minus 35.

The ANEC for Rutherford show that the majority of the current subject land is located outside of the ANEC 10 contours. A relatively small portion of the land is located inside the ANEC 10 to 15 zone.

AS2021 details the acceptability of various building types in different ANEF zones as reproduced below in **Table 2**.

**TABLE 2**
**BUILDING SITE ACCEPTABILITY BASED ON ANEF ZONES**
**(To be used in conjunction with Table 3.3 of AS2021)**

| Building type | ANEF zone of site | | |
|---|---|---|---|
| | Acceptable | Conditionally acceptable | Unacceptable |
| House, home unit, flat, caravan park | Less than 20 ANEF (Note 1) | 20 to 25 ANEF (Note 2) | Greater than 25 ANEF |
| Hotel, motel, hostel | Less than 25 ANEF | 25 to 30 ANEF | Greater than 30 ANEF |
| School, university | Less than 20 ANEF (Note 1) | 20 to 25 ANEF (Note 2) | Greater than 25 ANEF |
| Hospital, nursing home | Less than 20 ANEF (Note 1) | 20 to 25 ANEF | Greater than 25 ANEF |
| Public building | Less than 20 ANEF (Note 1) | 20 to 30 ANEF | Greater than 30 ANEF |
| Commercial building | Less than 25 ANEF | 25 to 35 ANEF | Greater than 35 ANEF |
| Light industrial | Less than 30 ANEF | 30 to 40 ANEF | Greater than 40 ANEF |
| Other industrial | Acceptable in all ANEF zones | | |

NOTES:

1 The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside but near to the 20 ANEF contour.

2 Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A).

3 There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (e.g. an office in an industrial building). In these cases Table 2.1 should be used to determine site acceptability, but internal design noise levels within the specific spaces should be determined by Table 3.3.

4 This Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2. For residences, schools, etc., the effect of aircraft noise on outdoor areas associated with the buildings should be considered.

In no case should new development take place in greenfield sites deemed unacceptable because such development may impact airport operations

Based on the detail in Table 2, and assuming a correlation between the ANEF and the published ANEC for the Aerodrome, all of the land that is subject to the current proposal would be regarded as "Acceptable" for residential development (i.e. House, home unit, flat). The details also show that the land would be "Acceptable" to all other building types.

The management and daily operating procedures of the Aerodrome are detailed in a "Community Operational Undertaking" (COU). The COU states that, in 2001, Maitland City Council and Royal Newcastle Aero Club (RNAC) co-funded an independent assessment of noise impacts which produced a Noise Impact Study, by AOS Airport Consulting (2002). This was considered a detailed and comprehensive assessment of existing operations at the Aerodrome.

The starting point for all contours produced in the Noise Impact Study was based on 2001 movements and operations. Several other scenarios were mapped including, twice and three times the 2001 movements and 2001 movements with various operating differences including reduced circuit heights and runway use patterns.

The modeling for the Aerodrome indicated that, based on 2001 aircraft movement numbers and patterns, the 20 ANEC contour would not extend outside the Aerodrome boundary (see Figure 2). The COU stated that "as part of RNAC's commitment to the Community, RNAC undertakes to manage activities in such a way as to retain operational noise levels within those indicated by the noise contours indicated by the attached ANEC diagram marked attachment "B" (as shown in Figure 2).

## NOISE MEASUREMENTS

To further gauge any possible impacts on the proposed subdivision, a series of measurements of aircraft noise were made at the most potentially affected location in the subdivision as shown on Figure 1. The location was by the roadside at a point approximately in line with the western end of the main runway at the Aerodrome. At the time of the measurements atmospheric conditions were cool and clear with a light westerly wind at 2 to 2.5 m/s.

The noise measurements were made with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and has current NATA calibration. Field calibration was carried out at the start and end of each monitoring survey.

A-weighted noise levels were measured on 27th June, 2017, over an approximately three hour period between 11.30 am and 2.30 pm. Data was acquired at 1 second statistical intervals with the meter set to "slow" response. Each 1 second measurement was accompanied by a third-octave band spectrum from 20 - 20k Hz. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

The measurement procedure conformed to the requirements of Section 3.2.1 of AS 2021.

Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of all significant noise sources to the overall level. This analysis procedure allows for the aircraft noise levels to be accurately determined.

During the monitoring period a total of 14 planes passed over the measurement location, but it was not possible to determine plane types. The measurements included planes circling overhead, and also approaching to land on the runway.

The range and average of the noise levels from the 14 plane noise measurements is shown in **Table 3**.

**TABLE 3**
**Measured aircraft noise levels (dB(A)S)**

| Leq Range | Leq (average) | Leq (average duration) | Lmax Range | Lmax |
|---|---|---|---|---|
| 37 - 58 | 46 | 47 seconds | 41 - 66 | 66 |

The results in Table 3 show that the worst case measured noise levels are within the "Acceptable" range as detailed in Table 1.

## AIRCRAFT NOISE ASSESSMENT

For determination of typical noise control requirements for various building types, the assessment of aircraft noise impacts is based on design indoor aircraft noise levels as specified in Table 3.3 of AS 2021 as shown in partial extract in **Table 4**.

**TABLE 4**
**Extract from Table 3.3 of AS 2021**

| Building type and activity | Indoor design sound level, dB(A)S,Lmax |
|---|---|
| *Houses, home units, flats, caravan parks* | |
| Sleeping areas, dedicated lounges | 50 |
| Other habitable spaces | 55 |
| Bathrooms, toilets, laundries | 60 |

The design levels in Table 4 show that, based on the worst case measured noise level, the façade of a residence subjected to that noise would need to attenuate up to 16 dB(A) of aircraft noise. That is, as the Aerodrome may be used at night (prior to 7am) the potential noise impacts on sleeping areas need to be considered. That is, a noise reduction from 66 dB(A) outside the residence to 50 dB(A) inside (per Table 4). The requirement is 11 dB(A) for living areas and 6 dB(A) for service areas.

Under most circumstances standard building construction will readily achieve these required noise reductions.

## CONCLUSION

An acoustic investigation has been undertaken into a rezoning application for land to the east of Rutherford Aerodrome, NSW, being Part Lot 71 D.P. 714785 and part of Lots 721 and 722 D.P. 1191240, Anambah Road.

The results of the investigation and noise measurements made on site, have shown the area proposed for rezoning may be classified as “Acceptable” as per the requirements of AS 2021.

An analysis of data from noise measurements made on the site shows that, based on the worst case measured levels, standard building construction methods could be used to achieve an adequate internal noise amenity in dwellings.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please do not hesitate to contact the undersigned.

Yours faithfully,

**SPECTRUM ACOUSTICS PTY LIMITED**

Ross Hodge (MAAS)
Principal/Director