MARSHALL DAY Acoustics

CHRISTCHURCH AIRPORT NOISE MONITORING 2020 NOISE MONITORING REPORT

Rp 001 20201025 | 3 February 2021

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Project: **CHRISTCHURCH AIRPORT NOISE MONITORING**

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DEFINITIONS AND ACRONYMS

Definitions

Aircraft Operations	Also referred to as 'Operational Noise' (refer Section 6.1) a) the landing and take-off of aircraft; and b) aircraft flying along any flight path associated with a landing or take-off. For the purposes of Rule 6.1.6 Activity specific noise rules, it excludes: a) aircraft operating in an emergency for medical or national/civil defence reasons; b) air shows; c) military operations; d) Antarctic operations; e) helicopter operations; f) aircraft using the airport as an alternative to a scheduled airport elsewhere; g) aircraft taxiing; and h) aircraft engine testing.
Air Noise Compliance Contour	The 65 dB L_{dn} noise contour included in the Christchurch District Plan that cannot be exceeded. The determination of compliance or otherwise with this control is demonstrated by the preparation of the AANC for the preceding year's aircraft operations and reported annually.
Air Noise Boundary (ANB)	A composite line formed by the outer extremity of the 65 dB L_{dn} noise contour and the 95 dB L_{AE} noise contour. The Air Noise Boundary defines an area in which the future daily aircraft noise exposure from aircraft operations is sufficiently high as to require land use planning controls
Decibel (dB)	The unit of sound level. Expressed as a logarithmic ratio of sound pressure relative to a reference pressure
L_{AE}	The Sound Exposure Level. The sound level of one second duration which has the same amount of energy as the actual noise event measured. Usually used to measure the sound energy of a particular event, such as an aircraft flyover
L_{Aeq}	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level.
L_{dn}	The day night noise level which is calculated from the 24-hour L_{Aeq} with a 10dB penalty applied to the night-time (2200-0700 hours) L_{Aeq}
L_{AFmax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
Noise Calculations	Noise levels calculated using computer modelling software, typically to predict current and future noise levels. Noise measurements are used to verify accuracy of calculated noise levels.
Noise Measurements	In-situ noise measurements of actual noise levels using either semi-permanent noise monitoring terminals or hand-held equipment (sound level meters).
Noise Monitoring	Monitoring of noise levels (generally with respect to assessing compliance with the District Plan), using both noise measurements and calculated noise levels.
On-Aircraft Engine Testing	The testing of engines on aircraft.

Acronyms

AANC	Annual Aircraft Noise Contour
ANB	Air Noise Boundary
ANLC	Airport Noise Liaison Committee

CIAL	Christchurch International Airport Limited
ETMS	Engine Testing Management Software
INMP	Integrated Noise Modelling Program
NMP	Noise Management Plan
NMR	Annual Noise Monitoring Report
NZS 6805	New Zealand Standard NZS 6805:1992 “Airport Noise Management and Land Use Planning”
USAP	United States Antarctic Programme

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1.0 INTRODUCTION

Christchurch International Airport Limited (CIAL) are required to prepare an Annual Noise Monitoring Report each year in accordance with the provisions of Chapter 6 of the Christchurch District Plan (CDP).

This report has been prepared by Marshall Day Acoustics (MDA) on behalf of CIAL and provides an overview of the noise monitoring programme for 2020 including:

- Calculation of noise contours known as the Annual Aircraft Noise Contours (AANC) to determine compliance
- Calculation of engine testing noise level emissions at the Engine Testing Compliance Monitoring Positions (ETCMPs) to determine compliance
- Update of the Acoustic Treatment Programme (ATP) schedule of eligible dwellings

Because analysis of measured operational and engine testing noise levels (to verify the compliance calculations) occurred as part of the work associated with the 2019 Noise Monitoring Report, there is no requirement to repeat this process as part of the 2020 noise monitoring programme.

2.0 STATUTORY REQUIREMENTS

The full list of rules relating to airport noise compliance at Christchurch is given in Appendix A.

Rule 6.1.6.2.5 iv of the Christchurch District Plan requires CIAL to prepare and submit annually an aircraft operations noise monitoring report, including the following information:

- the calculated AANC;
- the results of the verification measurements;
- analysis of compliance with reference to Rule 6.1.6.2.5 a.i. and ii. (including the number of exceedances and the reasons for them); and
- a summary of complaints received over the previous year in relation to noise from aircraft operations, and any actions taken in response.

Rule 6.1.6.2.6 vi of the Christchurch District Plan requires CIAL to prepare and submit annually an on-aircraft engine testing noise monitoring report, including the following information:

- the results of verification measurements in accordance with activity standard v.B.; and
- analysis of compliance with reference to Rule 6.1.6.2.6 a.i.; and
- a summary of complaints received over the previous year in relation to noise from on-wing aircraft engine testing, and any actions taken in response.

Rule 6.1.6.2.7.2 of the Christchurch District Plan sets out the requirements for CIAL to implement an Acoustic Treatment Programme (ATP) and identify annually if additional dwellings become eligible for treatment within the AANC 65 dB L_{dn} contour.

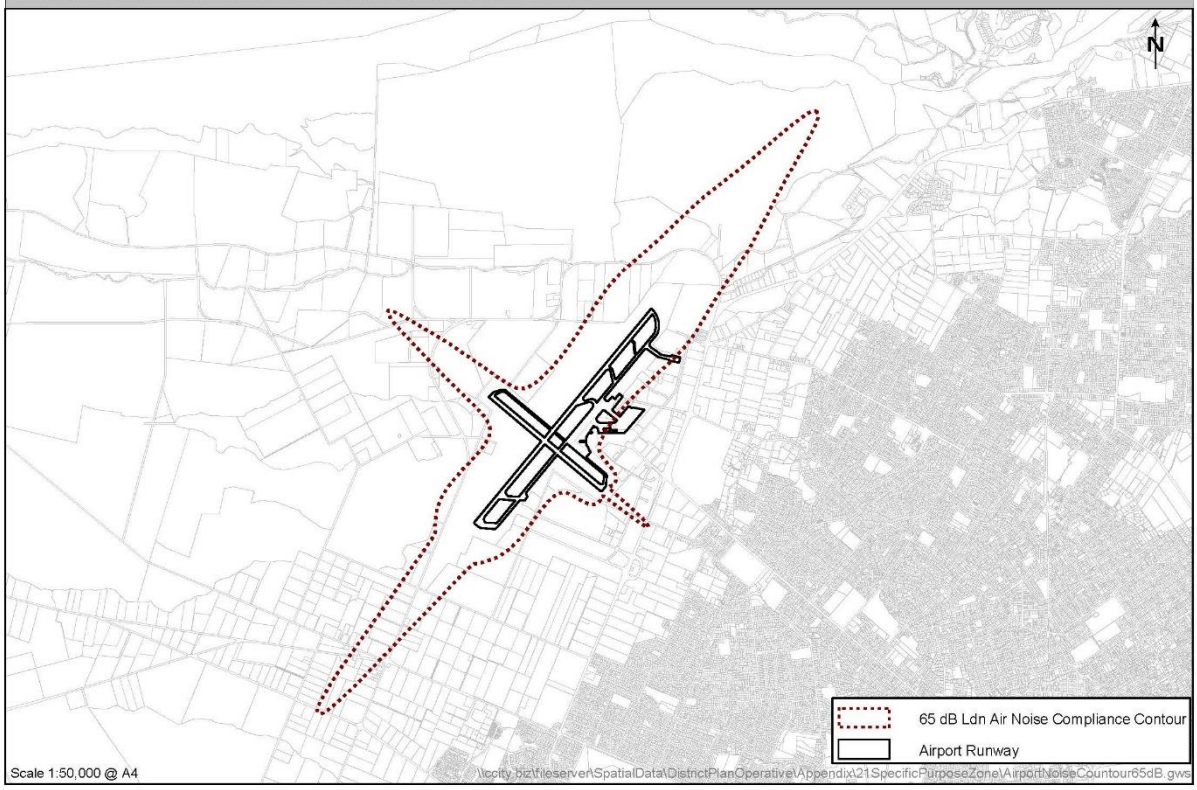
The following noise monitoring report details information required under both 6.1.6.2.5 (iv) (aircraft operations) and 6.1.6.2.6 (vi) (on aircraft engine testing) and provides an updated schedule of eligible dwellings for the ATP. The purpose of this report is to assess compliance of aircraft operations with rule 6.1.6.2.5 (a) and on-aircraft engine testing with rule 6.1.6.2.6 (a)(i) and (v) for the period of 1 January 2020 to 31 December 2020.

2.1 Noise Limits - Aircraft Operations

Aircraft operational noise limits are set in rule 6.1.6.2.5 (a) (i):

"Noise from aircraft operations shall not exceed 65 dB Ldn outside the 65 dB Ldn Air Noise Compliance Contour shown in Figure 1, other than as provided for in Rule 6.1.6.2.5 (a) (ii)."

Figure 1: Map of 65 dB Ldn Air Noise Compliance Contour



insert from rule 6.1.6.2.5 (a) (i) in the Christchurch District Plan.

Rule 6.1.6.2.5 (a) (iii) of the District Plan describes the noise monitoring required to determine compliance with rule 6.1.6.2.5 (a) (i).

2.2 Noise Limits - On Aircraft Engine Testing

Table 5 (refer to table 1 below) in rule 6.1.6.2.6 (a) of the District Plan outlines noise limits for on aircraft engine testing.

Table 1: On-aircraft engine testing noise limits

Noise Limit	Engine testing compliance monitoring positions (ETCMP) – refer Figure 2
65 dB Ldn, 7 day	8 points
55 dB Ldn, 7 day	8 points
75 dB L_{Amax} 22:00 to 07:00 only	Edge of residential zone – 3 points

Rule 6.1.6.2.6 (a) (v) of the District Plan describes the monitoring required to determine compliance with rule 6.1.6.2.6 (a).

3.0 OPERATIONAL NOISE

As defined in the Christchurch District Plan, Aircraft operational noise includes:

The landing and take-off of aircraft and aircraft flying along any flight path associated with a landing or take-off. Operational noise excludes aircraft operating in an emergency for medical or national/civil defence reasons, air shows, military operations, Antarctic operations, helicopter operations, aircraft using the airport as an alternative to a scheduled airport elsewhere, aircraft taxiing and aircraft engine testing.

3.1 Summary of Operational Aircraft Movements

Over the past 5 years, Christchurch Airport has had a total number of aircraft movements of 80,000-110,000 per year.

Based on information provided by Airways Corporation NZ, for the year 2020 there were;

- 49,084 scheduled commercial aircraft movements, and
- 79,634 total aircraft movements.

Scheduled commercial movements over the last 8 years are as shown in Table 1 below

Table 2: Scheduled Commercial Aircraft Movements

Aircraft Movements	2020	2019	2018	2017	2016	2015	2014	2013
Scheduled Commercial Movements	49,084	75,663	75,738	76,585	74,130	74,144	75,072	71,715

The busiest three months for scheduled aircraft movements in 2020 were January, February and March. The reduced number of aircraft movements in 2020 is due to the global Covid-19 pandemic and its impacts on travel (and therefore on the aviation industry) from mid-March onwards. Movement numbers dropped dramatically when the New Zealand borders were effectively closed in mid-March. Total aircraft movements started climbing again as domestic travel increased during periods of the year where local 'Lockdown' restrictions had eased (refer Table 4).

A summary of the movement data input into the Integrated Noise Model (INM) used to produce the 2020 Annual Aircraft Noise Contours (AANC) is provided in section 3.2 of this report.

3.2 COVID-19

The Covid-19 pandemic has had a significant negative impact on the demand for air passenger transport in New Zealand and around the world.

Beginning in Feb 2019, the NZ government began restricting visitors from China and other countries, leading to the complete closure of international borders to incoming travellers in late March 2020. Most international passenger flights were halted, with the exception of those to repatriate passengers to their country of origin. Community spread of the virus within New Zealand during March 2019 led to a nationwide lockdown from 26 March resulting in all but essential air traffic being halted for 6 weeks. The Covid-19 pandemic has had a significant negative impact on the demand for air passenger transport in New Zealand and around the world.

Beginning in Feb 2019, the NZ government began restricting visitors from China and other countries, leading to the complete closure of international borders to incoming travellers in late March 2020. Most international passenger flights were halted, with the exception of those to repatriate passengers to their country of origin. Community spread of the virus within New Zealand during March 2019 led to a nationwide lockdown from 27 March resulting in all but essential air traffic being halted for 6 weeks.

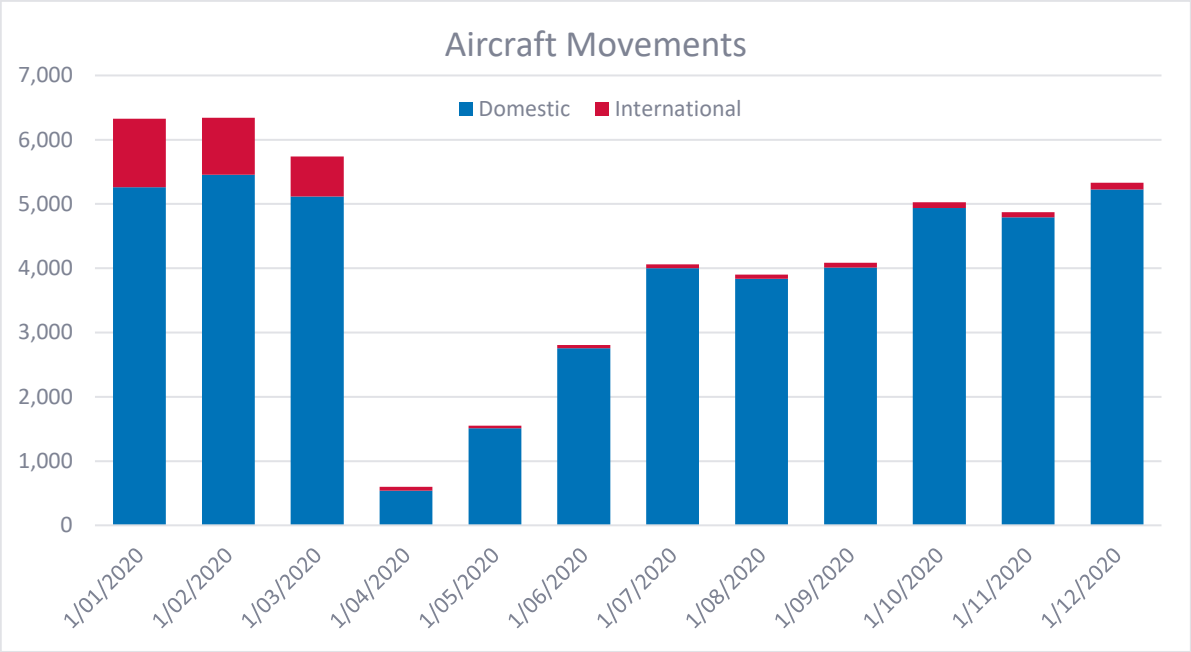


Figure 3.1: Graph showing Operational Aircraft Movements from 2020 at CIA

Domestic air routes recovered at different rates after travel restrictions were removed. Regional routes which are which are primarily operated by turboprop aircraft, rebounded to almost pre-covid levels within a few months. Trunk routes between the main domestic centres have significantly more jet aircraft operating, but recovery on these routes was slower than the regional centres. As a result domestic jet movements saw a more significant reduction than turboprop movements.

The closure of international borders meant international traffic was reduced to repatriation flights and freight. Due to time-zone differences and scheduling requirements, historically international passenger services have contributed heavily to the total number of night time aircraft movements, and international air traffic is almost exclusively operated by jet aircraft. The lack of international passenger flights has resulted in significantly less night-time jet flying, and fewer widebody aircraft movements at CIAL.

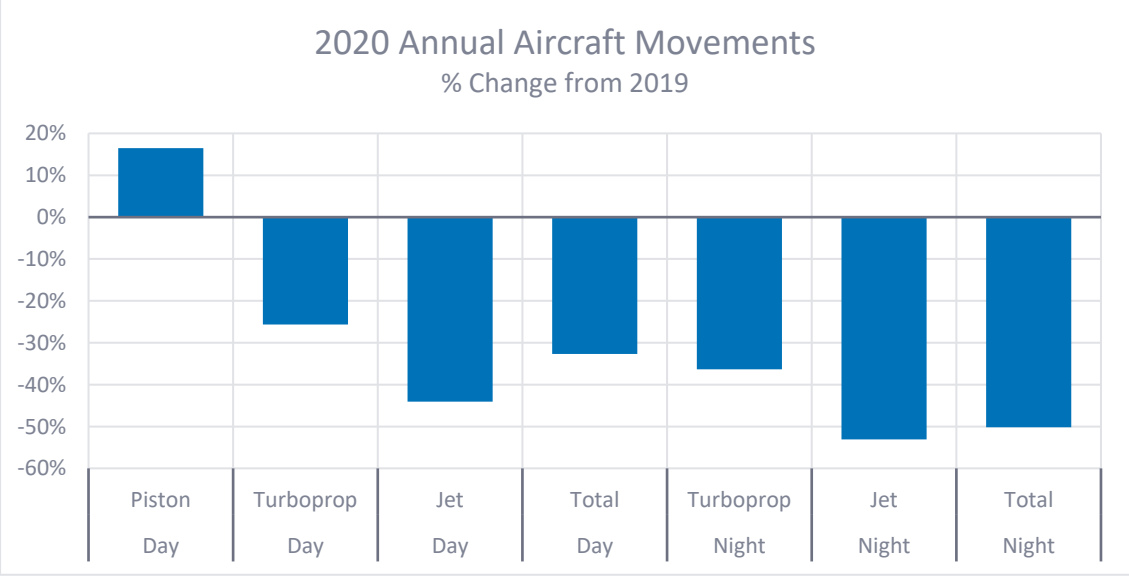


Figure 3.2: Graph % change from 2019 for Operational Aircraft movements at CIA

3.3 Modelling Methodology

To ensure consistency with the 65 dB L_{dn} Air Noise Compliance Contour in the Christchurch District Plan, the 2020 AANC has been calculated using version 7 of the Integrated Noise Model (INM) developed by the US Federal Aviation Authority.

The INM software (like most software), has been upgraded regularly over the last 10 years. Each update to the INM program has resulted in slightly different calculation results. As the District Plan contour and AANC are both used for noise control purposes, and as the District Plan contours are used as the basis of determining appropriate land use planning controls and the selection of mitigation treatment, it is therefore considered that the same software version should be used to prepare the AANC.

The 2020 AANC is based on aircraft movements provided by Airways Corporation NZ. The definition of aircraft operations in the Christchurch District Plan (given in Appendix A) excludes military, Antarctic and helicopter movements therefore these are not included in the AANC calculation. The busiest three months were determined by the scheduled commercial movements.

The busiest consecutive three months for scheduled commercial movements in 2020 was January, February and March 2020 in accordance with rule 6.1.6.2.5 (iii) (b).

A diagram of the Christchurch Airport runway system is included in Appendix B for reference

The 65 dB L_{dn} Air Noise Compliance Contour in the Christchurch District Plan was developed without inclusion of GA operations. Therefore, the AANC are also prepared without inclusion of GA movements.

Based on the nature and frequency of GA flights at the time of preparing the 65 dB L_{dn} Air Noise Compliance Contour, it was considered that GA aircraft noise would not significantly affect the extent of the noise contours. It was also noted that GA aircraft are generally light aircraft.

The 2009 CIAL noise monitoring report confirmed that noise from light aircraft does not contribute significantly to overall noise levels within the 65 dB L_{dn} contour, this conclusion was confirmed in all subsequent noise monitoring reports to date. A review of the annual number of GA movements between 2008 and 2020 shows that GA activity is still at a lower relative level (compared with scheduled commercial operations) than 2009 so this conclusion remains valid, even taking into account the drop off of International movements relative to domestic flights. MDA has previously calculated the effect of GA operations on the AANC and conclude that GA operations typically contribute less than 0.1 dB to the noise contours which is a negligible difference.

The movements for the modelled scenario are shown in Table 3 as well as a breakdown of the day and night-time movements. Night-time movements are those that occur between 10pm and 7am. The number of night-time movements is relevant as night-time activity has an associated +10 decibel adjustment.

Table 3 Summary of Modelled Aircraft Movements

	Busiest 3 Months (Jan-Feb-Mar 2020)
Total Movements	18,407
Day Time Movements	16,397
Night Time Movements	2,010

A summary of the total aircraft movements by month is shown in Table 4, and a breakdown of the average daily aircraft movements by aircraft type and runway is included in Table C1, Appendix C.

Table 4: Summary of 2020 scheduled aircraft movements

Month (2020)	Monthly total	Consecutive 3 months total
Jan	6,325	
Feb	6,343	
Mar	5,739	18,407
Apr	598	12,680
May	1,550	7,887
Jun	2,808	4,956
Jul	4,059	8,417
Aug	3,899	10,766
Sep	4,087	12,045
Oct	5,027	13,013
Nov	4,874	13,988
Dec	5,330	15,231

Data provided by Airways includes actual runway usage data which has been used in the preparation of the 2020 AANC. In 2020 the main runway was used 96% of the time compared with the crosswind runway. For the busy three months, the main runway was also used 96% of the time which is identical to the annual average use.

The flight tracks used in the model include the same regular flight tracks as were used for the development of the 65 dB L_{dn} Air Noise Compliance Contour. These noise model flight tracks were comprehensively reviewed by Airways in 2014 and annually since 2018 as part of the NMR process, as set out below.

A meeting to discuss flight tracks flown in 2020 and those to be used in the 2020 AANC was held between representatives of Airways NZ, CIAL and MDA in December 2020.

The only additional flight track changes of appreciable significance were the introduction of GOMA or 15/15 tracks for all departure operations (refer section 6). These commenced on 26 March 2020 and as a result there were 5 days where these departure tracks were flown exclusively. Despite not being a significant number of days, the model accounts for all departures flown between 26 and 31 March using these 15/15 tracks.

Also included in the model are the Performance Based Navigation (PBN) tracks developed for use by aircraft in 2018 flying PBN approaches.

It was concluded that there were no other significant changes to flight paths and air traffic management in 2020 and therefore Airways NZ concluded the flight tracks in the noise model remain a reasonable approximation of long-term average flight tracks flown.

3.4 Verification Noise Measurements

Rule 6.1.6.2.5a iii d of the Christchurch District Plan sets out that the calculated AANC shall be verified by noise measurements carried out in accordance with the Airport Noise Management Plan (NMP).

Section 6.1.2 of the NMP states that verification measurements are to be carried out no less than every three years and the location of the NMT is be decided in consultation with the ANLC.

CIAL chose to undertake noise measurements in 2019 and therefore no further noise measurements were conducted in 2020. The results of the noise verification process conducted as part of the work to prepare the 2019 NMR remain valid. In accordance with section 3.5.1 of the 2019 NMR, the 2020 AANC, as detailed in the following section, was prepared using the calibrated noise model.

3.5 2020 Annual Aircraft Noise Contour

The 2020 AANC is shown below and as Figure 1, Appendix D.

Overall, the 2020 AANC demonstrates 2020 aircraft operations comply with the 65 dB L_{dn} Air Noise Compliance contour.

Towards the north-east of RW02/20, the 2019 AANC is 3-4 decibels less than the CDP Air Noise Compliance Contour.

Towards the south-west of RW02/20 the 2019 AANC is 2 decibels less than the CDP Air Noise Compliance Contour.

On the RW11/29 on centreline the 2019 AANC is 5 or more decibels less than the CDP Air Noise Compliance Contour.

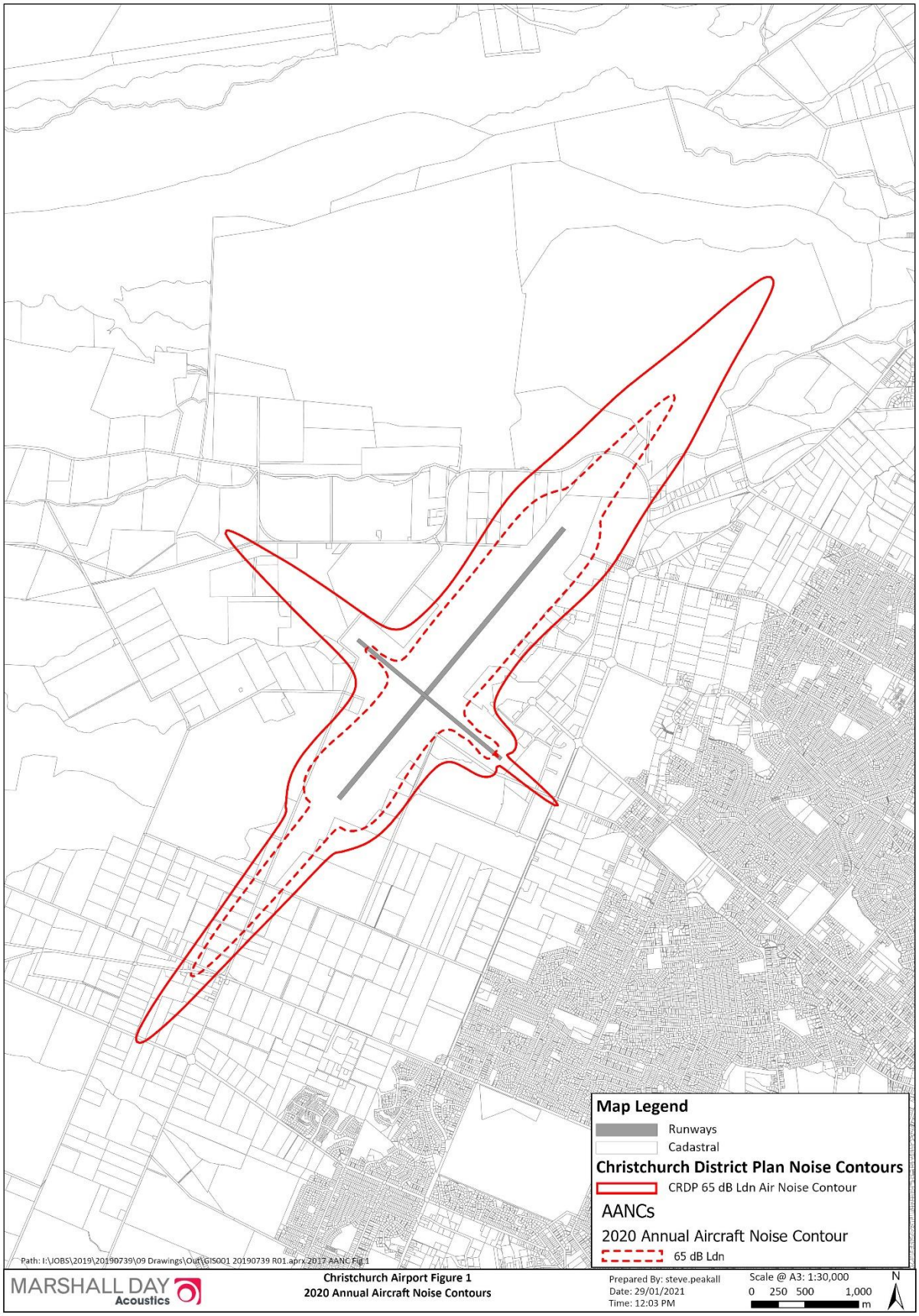
When compared to the 2019 AANC, the 2020 AANC is approximately 1 to 2 decibels smaller in extent. This equates to 25% to 40% fewer movements. The 2020 AANC is smaller than the 2019 AANC primarily because of the global Covid-19 pandemic and its impact on air travel. It is also noted that movements in the other months of the year are also lower than historic averages for the same reason.

CIALs Noise Management Plan (Rev D, dated May 2019) states in section 6.1.1: "*Where the AANC are calculated to be within 2 decibels of the District Plan compliance contour, Christchurch Airport will conduct an initial summary review as to the extent and cause of this margin. The Compliance and Development Manager and Acoustic Engineer will be responsible for making the decision to conduct the initial summary review and any further analysis that may be required*."

For 2020, there is no requirement to conduct such a summary review,

Overall, the 2020 AANC is considered an accurate representation of aircraft noise exposure around the airport in 2020.

In accordance with the rule contained in Appendix 6.11.4 a.ii.C of the CDP, the 2020 AANC showing 1 dB increments from 55 dB to 70 dB L_{dn} is shown in Figure 2, Appendix E.



***2020 AANC and* 65 dB L_{dn} Air Noise Compliance contours**

The noise modelling, aircraft movement analysis and AANC calculation was conducted by a person suitably qualified and experienced in airport noise modelling and acoustics assessments, in accordance with rule 6.1.6.2.5 (iii) (c). The person who undertook the airport noise modelling, acoustical assessment and preparation of the technical content of this 2020 NMR is the author of this report, Steve Peakall of Marshall Day Acoustics.

4.0 ON AIRCRAFT ENGINE TESTING

As defined in the Christchurch District Plan on aircraft engine testing includes the testing of engines on aircraft.

4.1 Summary of On-Aircraft Engine Testing

Based on information obtained from the ETMS, for the year 2020 there were;

- 1045 total on-wing engine tests
- 657 ATR tests
- 308 A320 tests
- 80 other tests

The total number of recorded engine testing events over the last 7 years is as follows.

Table 7: Engine Testing Events by year

Engine Testing Events	2020	2019	2018	2017	2016	2015	2014
Total number of events	1045	1114	1369	1384	1023	805	663

4.2 Verification Noise Measurements

Rule 6.1.6.2.6 (v) (B), in the CDP states that the engine testing calculations "*shall be verified by measurements undertaken with reference to at least four ETCMPs for a sample of at least two different on-aircraft engine test configurations*".

As has been agreed between CIAL and CCC, the definition of the engine test configuration simply means consideration of two different engine test events with at least one of the following being different between the tests; aircraft type, location of test, orientation or power setting.

The rule requires that this be undertaken "*at least once every two years*". Because the last engine testing measurements were conducted in 2019, there was no requirement to repeat the measurements in 2020. In addition, because of the global Covid-19 pandemic, it was anticipated there would be a lower number of operations and correspondingly a lower number of required engine tests. The conclusions outlined in the 2019 NMR regarding the accuracy of the ETMS are assumed to remain valid.

That is, there is good agreement between the ETMS and the noise measurements on site and that the ETMS is still an appropriate tool to use for engine testing noise compliance analysis at Christchurch Airport.

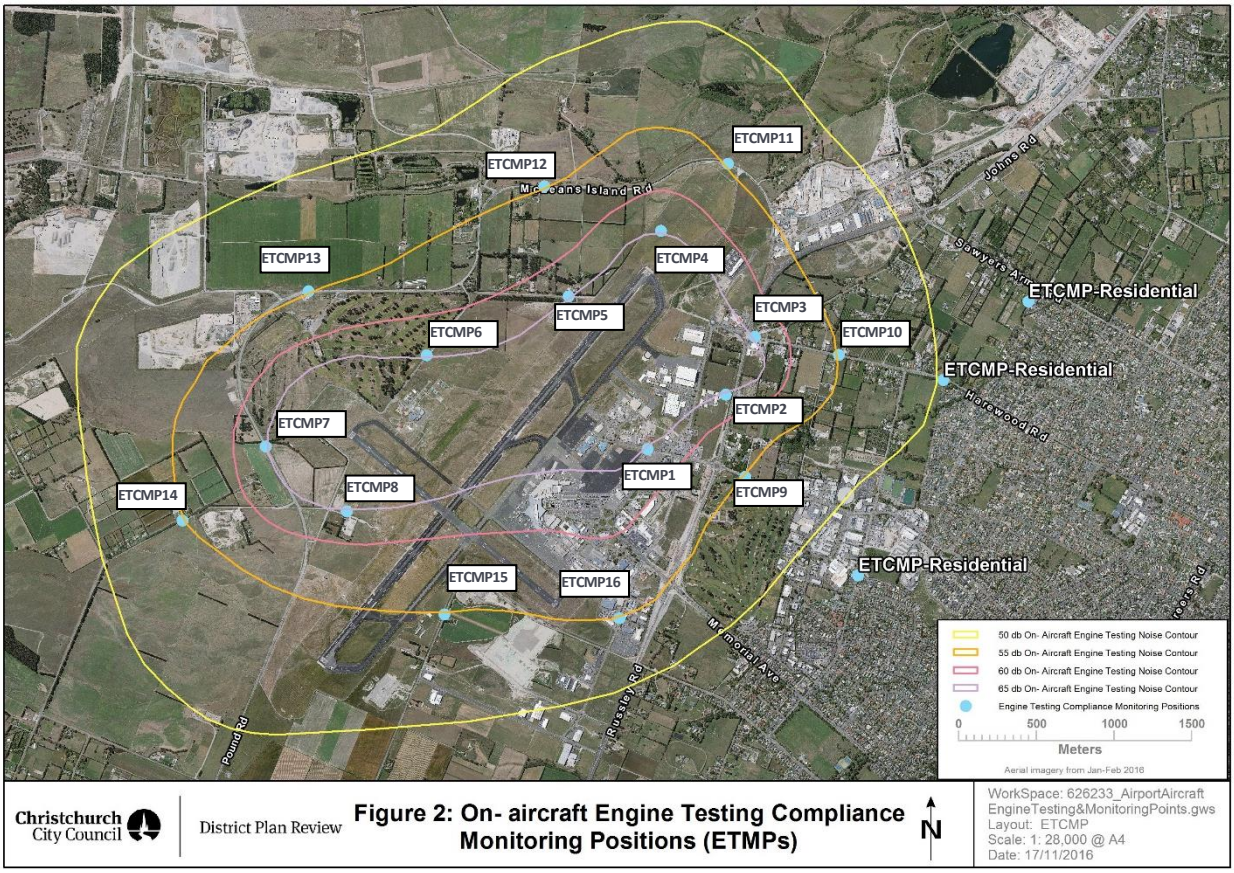
4.3 Engine Testing Management Software

The Engine Testing Management Software (ETMS) is used to calculate noise levels emitted from on aircraft engine testing and calculate the 7-day rolling average. CIAL have used the ETMS since 2010, in July 2017 this software was updated to meet new provisions in the District Plan including:

- The requirement to calculate the 7-day rolling average;
- Development of the ETMS on a web-based platform and;
- Initial 6-month period of verification of the ETMS calculated noise levels at the Engine Testing Compliance Monitoring Positions (ETCMP) locations, using in-situ noise measurements and thereafter biannual verification measurement (2017 and 2019)

4.3.1 Compliance of Calculated Noise Levels

Calculated noise levels for 2020 generated from the ETMS at the ETCMPs are detailed in Table 8 (65 dB L_{dn} limit) and Table 9 (55 dB L_{dn} limit) below. The location of the ETCMPs is shown below.



Insert from CDP On-Aircraft Engine Testing Compliance Monitoring.

Table 8 and 9 below identify calculated noise levels generated using the ETMS are compliant with noise limits detailed in rule 6.1.6.2.5 (a) (i).

Table 8: ETMS Prediction Results - 65 dB L_{dn} limit – Highest 7 Day L_{dn} Rolling Average

ETCMP Location	Min	Max	Median	Average
1	>25	59	55	55
2	>25	53	48	48
3	>25	58	53	53

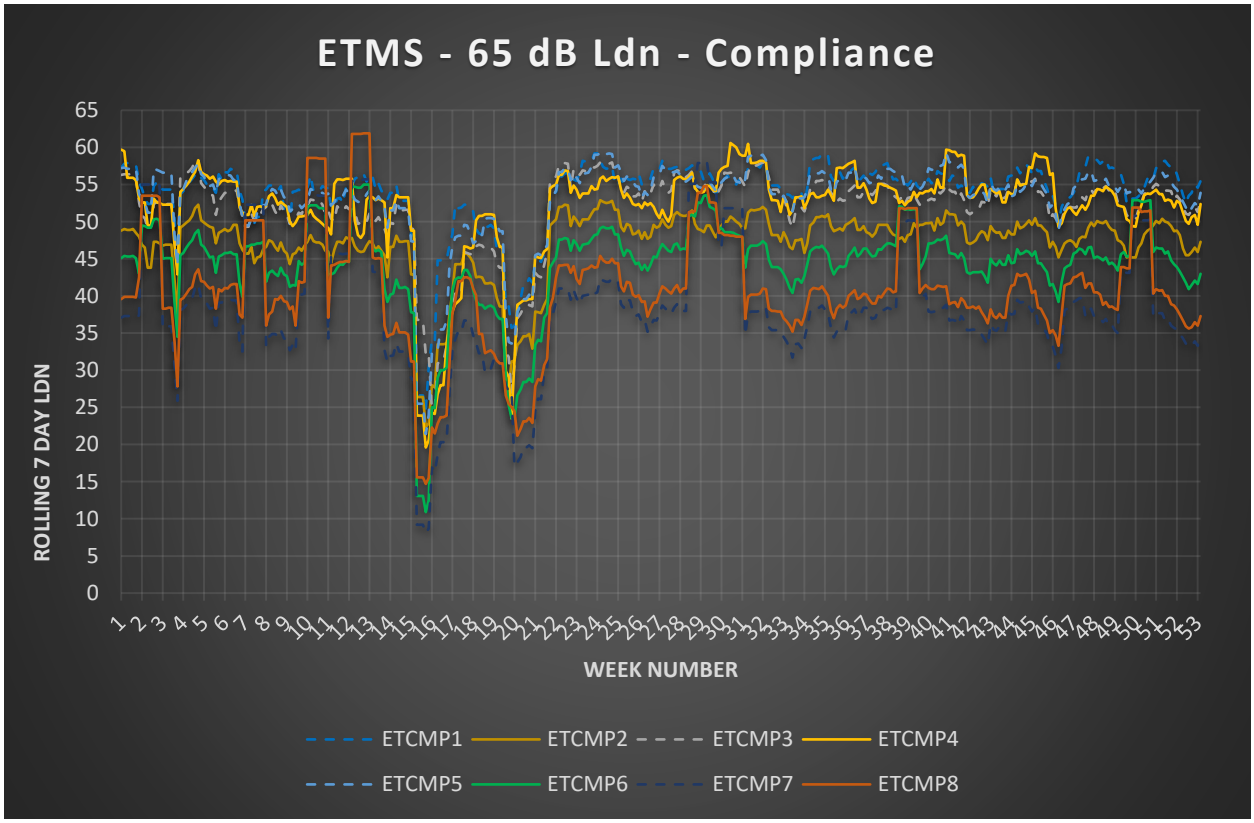
ETCMP Location	Min	Max	Median	Average
4	>25	61	54	54
5	>25	60	55	54
6	>25	55	45	46
7	>25	58	37	40
8	>25	62	39	42

Table 9: ETMS Prediction Results - 55 dB L_{dn} limit – Highest 7 Day Rolling Average

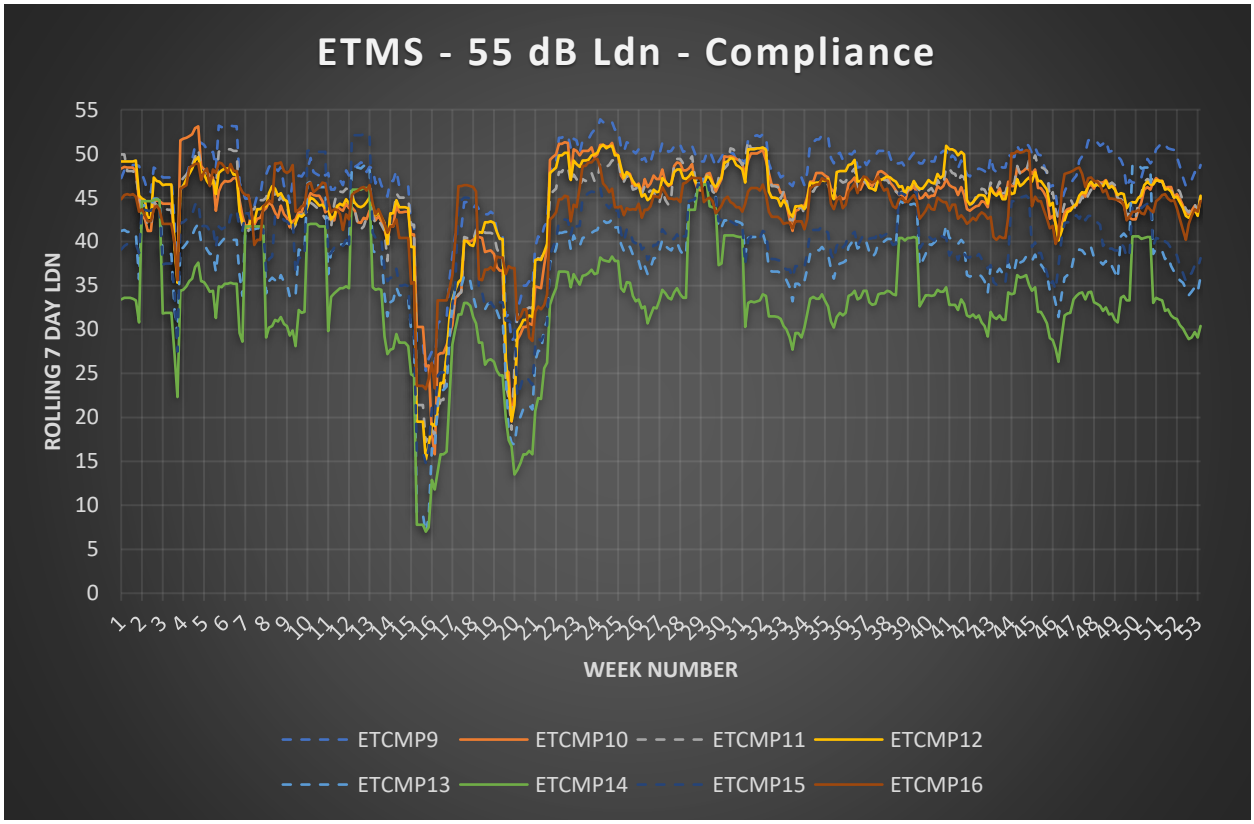
ETCMP Location	Min	Max	Median	Average
9	>25	54	47	49
10	>25	53	44	45
11	>25	52	44	46
12	>25	51	44	46
13	>25	49	38	39
14	>25	47	33	33
15	>25	52	40	40
16	>25	50	43	44

Maximum noise levels at ETCMP 17, ETCMP 18 and ETCMP 19 were all below the noise limit of 75 dB L_{AFmax} contained in rule 6.1.6.2.5 (a) (i). The maximum noise level for each of these was 63, 70, 64 dB L_{AFmax} respectively.

Graphs 4.1 and 4.2 below display the 7-day rolling average calculated noise levels at each of the ETCMPs for 2019. As shown in the two graphs, compliance was predicted to be achieved at all Engine Testing Compliance Monitoring Positions (ETCMPs) during the engine testing events in that period.



Graph 4.1: ETMS predicted 2020 noise levels for ETCMP 1 to ETCMP 8, located on the 65 dB L_{dn} engine testing contour



Graph 4.2: ETMS predicted 2020 noise levels for ETCMP 9 to ETCMP 16, located on the 55 dB L_{dn} engine testing contour.

The figures identify a variation in calculated noise levels with some distinct peaks for some of the ETCMPs. These peaks are a result of noise emissions from a given test; notably, high power runs in close proximity to the ETCMP. It can also be seen that during the strictest nationwide Covid-19 lockdown in April, engine testing noise levels fell considerably.

5.0 COMPLAINTS

5.1 Complaints Summary

In accordance with 6.1.6.2.5 a.iv.D & 6.1.6.2.6 a.vii.C the noise complaints summary below details:

- Complaints received over the previous year in respect to aircraft operations and on-aircraft engine testing
- Any actions taken in response to these complaints

All names and addresses have been omitted for privacy purposes.

Complaints have been grouped by the type of operation and aircraft; the actions taken for each complaint are included in the table. In summary, 20 complaints were received from 16 individuals from the period 1 January to 31 December 2020.

Type of Operation	Type of Aircraft	No of Complaints	Actions Taken
Low Flying Aircraft	Jet	1	Complainant has contacted the airport on three earlier occasions (in 2019) regarding the new PBN flight path that avoids most of West Melton but is closer to any residents located further west of the main West Melton township. Complainant was called to explain the path and how noise is shared across all paths in this area. Complainant is understanding but displeased about the new path which she feels brings traffic closer to her home. On this occasion, complainant was concerned by planes overflying their home in the evening. CIAL provided screenshots of the flight paths of the day in question and the following morning to provide a visual reference to what is occurring. All flights between 5pm and 8am that transited near her home were following either visual approach paths or standard instrument procedures and not PBN routes so would be similar to what was experienced before PBN was introduced.
		1	Complainant contacted CIAL about an Emirates jet arrival that occurred under Covid alert level 3 when the airport began to experience a reduction in aircraft movements. He believed that due to the impending lockdown he should not be experiencing any noise. CIAL explained that the plane heard was a regularly scheduled daily flight that was still occurring at that stage but that due to COVID-19 traffic would be significantly reduced. As this complainant has previously lodged several noise complaints CIAL welcomed him to discuss his concerns with us post lockdown or over the phone. Complainant has not been in contact.
Type of Operation	**Type of Aircraft**	**No of Complaints**	**Actions Taken**
Low Flying Aircraft (Contd.)	Jet	1	Complainant concerned about a low flying jet aircraft flying on the cross runway (11/29). CIAL explained that the flight was a regularly scheduled freighter taking off from the cross runway due Airfield maintenance works. Runway 02 was closed for 30 minutes which resulted in one flight requiring the use of the cross runway. The complainant responded to ask why the freighter took off towards the east (city side). CIAL explained that the freighter was unable to taxi to the other end of the runway due to the airfield works and that this was a rare event as freighters rarely use the cross runway but are permitted to do so if required. As this complainant has made a number of noise complaints, he was again invited to meet with CIAL in person or via video conference (due to COVID-19) but is yet to take up CIAL's offer.
		1	Complainant was concerned about a jet aircraft flying low over his property at night.

			CIAL called and left a message and then followed up with an email. CIAL explained that the jet was a Cathay Pacific B747 freighter diverted from Auckland Airport as they were undertaking Runway Pavement works at the time. CIAL shared Auckland Airport's media release for more information regarding the works. CIAL explained that the reason why the plane was redirected to depart from Christchurch Airport was that larger aircraft with heavy loads require a longer runway length for take-off. CIAL assured that this was an unusual occurrence for Christchurch Airport. The complainant responded to enquire about flight paths, noise contours and how the airport manages this. CIAL explained the role of the Christchurch District Plan, how this sets noise limits which the airport cannot exceed and explained that the contour sets limits of the amount of noise that can be generated but it doesn't set the flight paths themselves. CIAL went on to explain the variation in flight paths and provided a visual representation showing 1 days' worth of departures. The complainant was welcomed to get in touch with CIAL directly if he had any other queries or wished to discuss further. No further response has been received.
		2	Complainant was concerned about a low flying aircraft in the early morning. CIAL investigated and explained that the aircraft was a Qantas freighter which is regularly scheduled to depart at this time. However, it departed toward the north so quite far from the complainant's home. The aircraft was formerly a B767 and is now an A320 so CIAL suggested that this coupled with wind conditions may have caused the disturbance. The complainant was welcomed to get in touch with CIAL directly if she wished to discuss further or had any other queries. No further response has been received.
		1	Complainant was concern about a low flying jet plane and asked for more detail about the flight in question. CIAL investigated and explained that the aircraft was a Royal NZ Air Force C130 which completing a circuit over the western side of the city before landing onto Runway 20 in a Southerly/Southwest wind. CIAL explained that the flight was within CAA guidelines and provided the complainant with a picture of the flight path. The complainant was welcomed to get in touch with CIAL directly if she wished to discuss further or had any other queries. No further response has been received. No further response has been received.
Type of Operation	**Type of Aircraft**	**No of Complaints**	**Actions Taken**
Low Flying Aircraft	Turboprop	1	Complainant enquired about a turbo-prop aircraft transiting near her home. This complainant has contacted CIAL on several occasions and is generally displeased with aircraft operational noise. CIAL explained the nature of the flight, a turbo-prop flying from Dunedin to Christchurch and turning west of her home to land on the main runway. There was not anything out of the ordinary with this flight. CIAL explained the different regulatory bodies and rules which govern where planes can fly in the sky, covering the Civil Aviation Authority (CAA) flying rules, the Christchurch City Council (CCC) and the Christchurch District Plan (CDP) rules and; how CIAL demonstrates compliance to the CDP via the annual Noise Monitoring Report.

			CIAL also explained the variation in flight paths and the reasons for the variation. Similarly, CIAL included a visual representation of a full days' worth of flight path data to show that variation. The complainant was invited to meet with CIAL to discuss her concerns. The complainant is yet to respond or to take up CIAL's offer to meet.
	Light aircraft	1	Complainant was concerned by a small piper plane completing multiple passes near her home. CIAL found this that this event was in relation to the Mid Canterbury Aero Club Training school, based in Ashburton, where students are required to complete night flying training as it is a requirement to obtain their pilot's licence. Normally these flights are conducted in the Ashburton area however, night flying occurs around twice a month in Christchurch or Timaru during autumn and winter. Students to do a night cross country flight to experience a different flying environment in a well-lit city. The students are required to train in all types of conditions to ensure that they are competent in all situations. Where possible they restrict their flights over the populated areas of the city to finish before 11pm to avoid disturbing residents. Complainant was appreciative of the response and pleased to understand it was a rare occurrence.
		1	Complainant contacted the airport regarding a small aircraft completing circuits in the nearby area. CIAL called and followed up with an email with more information. CIAL explained that the noise was related to 4 piper planes from the Canterbury Aero Club (CAC) completing pilot training as part of the NZ Civil Aviation Authority's (CAANZ) requirements for professional pilots' licences. The CAC often complete training in this area however on this occasion there were a few compounding factors that may have contributed to the increase in noise. There were the students were engaging in one of their first lessons where students generally depart towards Selwyn (Lake Ellesmere) to learn to manoeuvre their aircraft by completing a series of turns and loops over the water using the spit as a visual aid and winds were tending North/ North west and between 15-35km/h so relative to the aircraft's location, the high winds were blowing directly towards the complainant home. CIAL also provided details regarding flying height rules to demonstrate that the flights were within CAA guidelines. The complainant was welcomed to get in touch with CIAL directly if he wished to discuss further or had any other queries. No further response has been received.
Type of Operation	**Type of Aircraft**	**No of Complaints**	**Actions Taken**
Low Flying Aircraft	Helicopter	1	Complainant concerned about a helicopter flying near his home for 16-30 minutes. CIAL explained that the helicopter in question flew multiple different flight paths in the afternoon and early evening and was a visiting iterant from Kaikoura Helicopters completing pilot training in a built-up area. CIAL explained that the operators that are based at Christchurch Airport are part of the neighbourhood friendly programme and are mindful of Christchurch residents and reduce holding times to reduce noise disturbance. This iterant was not aware of this programme as they do not normally fly in this area. CIAL explained to Mike

			that they would work with this iterant to ensure that they carry out more noise reducing activities when in the Christchurch Airspace. The complainant was welcomed to get in touch with CIAL directly if he had any other queries or wished to discuss further. No further response has been received.
		3	Complainant was concerned about a helicopter circling in his area. CIAL found that there were no helicopter movements on the day in question and called to inform the complainant. The complainant then explained that he would like the past few days investigated as he wasn't sure of the exact time or date. CIAL investigated and found that there were a few helicopter movements near his home including two rescue helicopters on different occasions and one Garden City Helicopter flight, but all were passes only with no apparent hovering. The complainant was welcomed to get in touch if he would like further investigation or had any other queries. No further response has been received.
		1	Complainant was concerned about multiple helicopters flying over his home during Saturday midday of Cup and Show weekend. CIAL explained that there were several scenic helicopter flights moving between Riccarton Racecourse and Hagley park. CIAL explained that this is a more common occurrence in Cup and Show weekend. On this occasion the flights were completed by an iterant not based at Christchurch Airport who was less familiar with the neighbourhood friendly policy. The iterant was operating from Christchurch Helicopters, and the Christchurch Helicopters team explained the policy to the iterant however there was 1 hour of time where flights were more frequent causing an increase in noise at this time. It was explained that this event occurs once a year and independent helicopter company are now aware of the impact of their operations on residents and will work to prevent this from becoming an annoyance in future years. The complainant responded to thank CIAL for the response.
Flight Path Change (Divergent GOMA Protection)	Multiple	1	12/05/20 - These complainants contacted the airport as they were concerned that new runway 20 departures have a significantly detrimental effect on their properties and business. The amended flight path tracks move aircraft closer to or overhead of their properties. The complainant asked to work with Airways, Airport and themselves to implement a change/amendment that would work for all relevant parties. Over the following 8 months, CIAL and Airways met with the complainant several times. Firstly, to understand the complainant's concerns and to explain in detail GOMA divergent tracks, their purpose, why they were implemented and the Aerodrome specifics which drive CIA GOMA divergent tracks. The ANLC Chair also met the complainant's as per CIAL noise disputes procedure and to assist with understanding and investigations of the complaints concerns. During the meetings the complainant put forward several alternative solutions to the published 15/15 GOMA divergent track, following from this both Airways and CIAL undertook thorough investigations into the

			proposed alternatives. Investigations identified the proposed alternatives were not viable for a number of reasons, principally they conflicted with the objective of GOMA divergent approaches to increase safety, predictability and efficiency of aircraft movement in the event of a missed approach. CIAL communicated findings of the investigation to the complainant and invited them to present to the ANLC and has not had any feedback.
Type of Operation	**Type of Aircraft**	**No of Complaints**	**Actions Taken**
Engine Testing	Jet	2	Complainant was concerned that loud engine testing during the day was negatively affecting her and her children at a nearby school. Complainant also contacted the CCC regarding this noise event. CIAL explained the details of the engine testing, an idle power C130 (USAP Skier Hercules) test that was run three adding up to 4 ½ hours. CIAL explained that this is a reasonably unusual occurrence and is largely the result of lack of maintenance over the COVID-19 lockdown period. The tests were all scheduled in day time hours and will continue to be so, where possible, as noise is particularly disruptive at night. CIAL explained that these aircraft are used to transfer supplies for the next Antarctic Deployment and explained the restrictions on engine testing as per the Christchurch District Plan. The complainant was welcomed to get in touch with CIAL directly if she had any other queries or wished to discuss further. No response has been received.
	Turbo-prop	1	Complainant was concerned about engine testing occurring early in the morning. CIAL responded to detail the several engine tests completed in the evening/ early morning of the day in. There were a number more engine tests than usual on this occasion as one aircraft was experiencing several faults that required additional engine checks. CIAL explained the type of maintenance that occurred necessitating the testing and the operational requirements for testing ahead of departures early in the morning. The complainant thanked CIAL for the response but is dissatisfied that any engine testing occurs at night/ early morning. There has been no further correspondence to date
		1	Complainant was concerned about engine testing heard in the early morning. CIAL investigated and explained the details of the engine test. CIAL explained that the prevailing winds likely played a part in directing the noise towards the city. CIAL explained the Engine Testing Management system (ETMS), the rules in the Christchurch District Plan and provided a link to view the ETMS tests on CIAL's public facing website. The complainant was welcomed to get in touch with CIAL directly if he wished to discuss further. No response was received.

6.0 POLICE HELICOPTER TRIAL

CIAL received 13 complaints from 11 individuals in the community in relation to the police helicopter trial. All complaints received were responded to via call and/or follow up email explaining the trial, the rules the police helicopter is governed by and their complaints were passed on to the police to respond to directly.

7.0 DIVERGENT GO AROUND AND MISSED APPROACH (GOMA)

The commercial aviation flight sector is moving towards planned and predictable procedures that allow Flight Management System support and the most recent procedure update is Divergent Go-Around and Missed Approach (GOMA) (informally referred to as 15/15 departures at CIAL).

GOMA is a flight path enhancement implemented by Airways and expected to be rolled out at major aerodromes across the country. It is designed to reduce likelihood of confliction between departing and inbound flights in the event of a missed approach. Site-specific GOMA procedures are developed; local topography, location of urban populations and climb profiles are all inputs in the design of the procedure.

In very simple terms GOMA results in departing aircraft making a 15-degree divergence off the centreline from departure, and in the event of a missed approach, the inbound aircraft makes a 15-degree divergence off centreline in the opposite direction (refer to figure 7.1 below for GOMA flight tracks). GOMA provides an increase in safety and predictability in the event of a missed approach and also provides for increase in capacity and more efficient use of airport infrastructure.

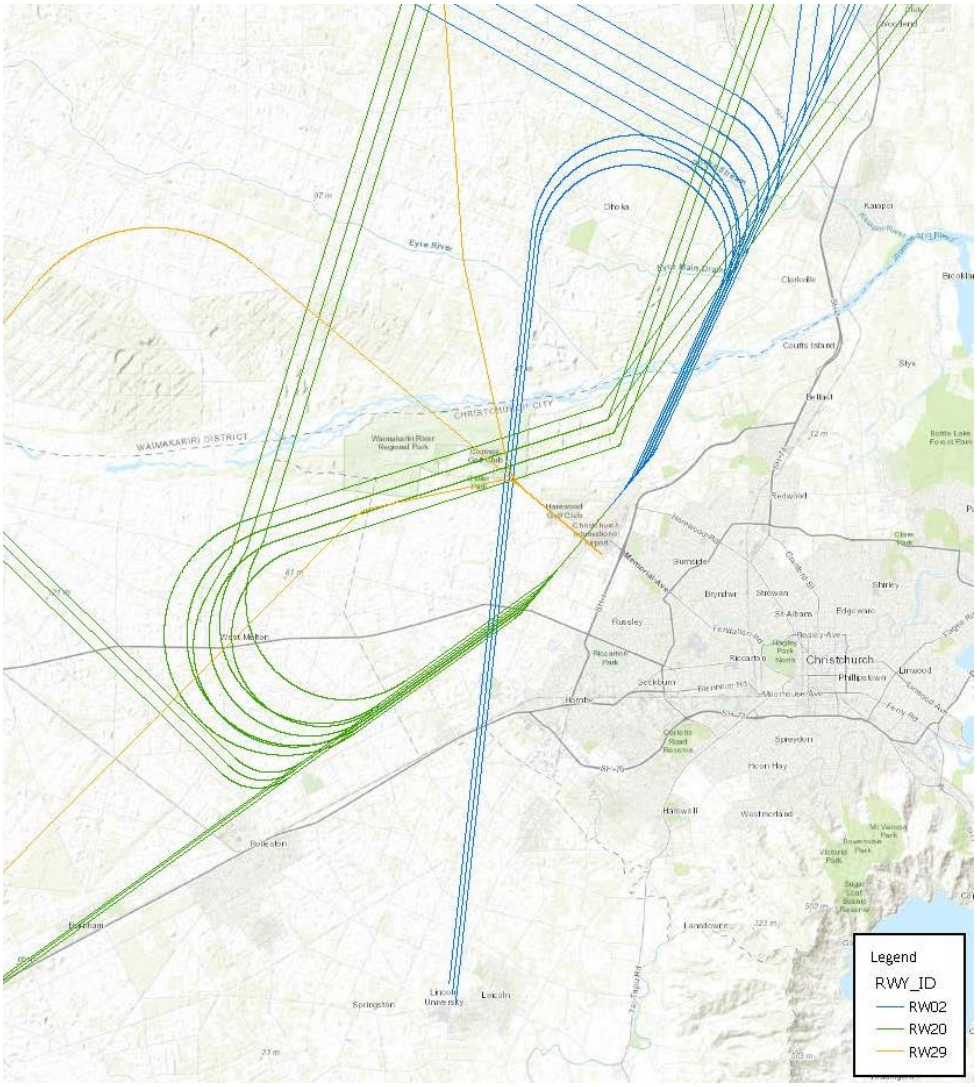


Image 7.1: GOMA flight tracks for RW02, RW20 and RW29 departures

Prior to the flight path change and as part of the approval process CIAL, Airways and Marshall Day Acoustics investigated the impact of GOMA on the annual compliance contour and on-going compliance. Investigations included updating flight paths in the AANC to include GOMA, calculating the "2025" AANC based on 2.1% per annum growth of the busiest three months of 2018. Investigations identified that compliance with the 65 Ldn dBA would be achieved.

8.0 SCHEDULE OF ACOUSTIC TREATMENT

In accordance with Rule 6.1.6.2.7.2 of the Christchurch District Plan, CIAL has developed an Acoustic Treatment Programme (ATP) whereby dwellings existing as at 6 March 2017 within Rural Urban Fringe and Rural Waimakariri Zones become eligible for acoustic treatment.

There are three circumstances when owners are to be offered the opportunity for acoustic treatment,

- Dwellings located within the 65 dB L_{dn} Annual Aircraft Noise Contour;
- Dwellings located within the 65 dB L_{dn} Engine Testing Contour; and

- Dwellings located within the 60 to 65 dB L_{dn} Engine Testing Contour (mechanical ventilation only).

Unlike the Annual Aircraft Noise Contour, the Engine Testing Contour has been fixed by the District Plan. Therefore, there is no change to the number of eligible dwellings inside these noise contours. For engine testing. There are ten dwellings eligible for the installation of mechanical ventilation.

For operational noise, a schedule of eligible dwellings is maintained and updated annually when the AANC is prepared. The schedule contains a complete list of 'Existing Dwellings' located within the Future Aircraft Operations Contour (65 dB L_{dn}) and each year the AANC is mapped to identify which of these Existing Dwellings fall within the 65 dB L_{dn} AANC and hence become eligible for treatment.

The 2020 AANC incorporates no additional dwellings compared with the 2019 AANC. This is because the 2020 AANC is smaller than the 2019 AANC.

Therefore, no additional mitigation offers are required this year,

9.0 CONCLUSION

Marshall Day Acoustics has prepared a compliance report with regards to aircraft operations and on-aircraft engine testing at the Christchurch International Airport. The report has been prepared in accordance to Rules 6.1.2.1.5 and 6.1.2.1.6. The main conclusions are:

- The aircraft noise model has been calibrated with noise measurements reviewed and assessed as part of the 2019 NMR. The calibrated noise model was then used to prepare the 2020 AANC
- The 2020 AANC demonstrates compliance with the 65dB L_{dn} Air Noise Compliance Contour contained in the CDP, and is smaller in extent than the 2019 AANC, primarily due to the impact on air travel as a result of the global Covid-19 pandemic
- Verification of the ETMS occurred in 2019 using noise measurements at the ETCMPs. The ETMS is still considered an appropriate tool to use for engine testing noise compliance analysis at Christchurch Airport
- Predictions using the ETMS software shows compliance with noise limits detailed in the CDP
- Because the 2020 AANC is smaller than the 2019 AANC, no additional dwellings have become eligible for acoustic treatment

APPENDIX A REGULATORY REQUIREMENTS

6.1.2.1.5 Policy – Airport Noise

a. Require the management of aircraft operations and engine testing at Christchurch International Airport, so that:

i. noise generated is limited to levels that minimise sleep disturbance and adverse effects on the amenity values of residential and other sensitive environments so far as is practicable;

ii. where practicable, adverse noise effects are reduced over time.

b. Mitigate adverse noise effects from the operations of the Christchurch International Airport on sensitive activities, by:

i. prohibiting new sensitive activities within the Air Noise Boundary and within the 65 dB Ldn engine testing contour; and

ii. requiring noise mitigation for new sensitive activities within the 55 dB Ldn air noise contour and within the 55 dB Ldn engine testing contour; and

iii. requiring Christchurch International Airport Limited (CIAL) to offer appropriate acoustic treatment in respect of residential units existing as at 6 March 2017 within the 65 dB Ldn Annual Airport Noise Contour, and within the 60 dB Ldn engine testing contour.

Note: Policy 17.2.2.10 also mitigates noise effects from the operations of Christchurch International Airport on rural land.

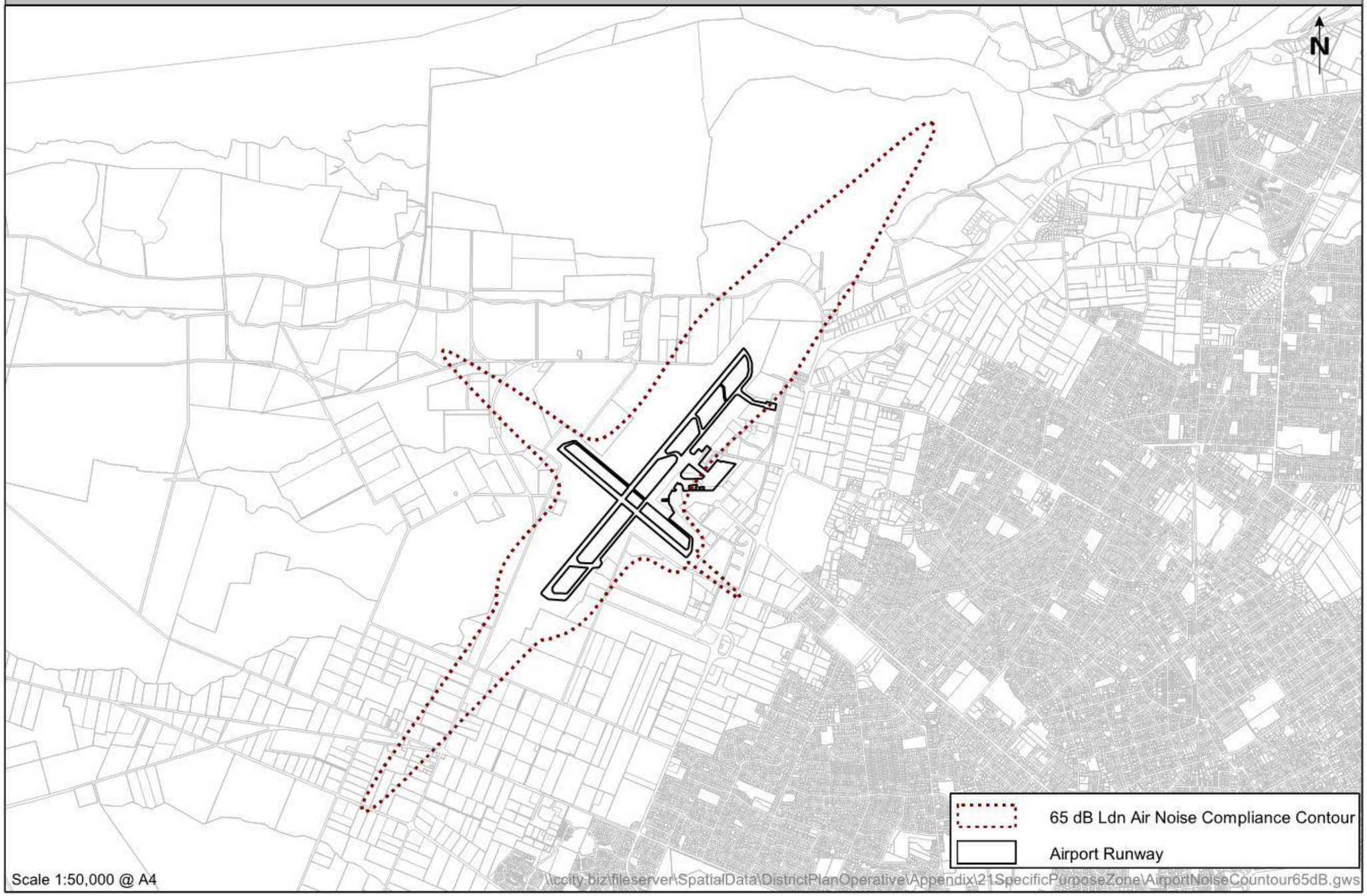
The relevant rules relating to aircraft operation and engine testing noise are given in 6.1.6.2.5 – 6.1.6.2.7.1 and Appendix 6.11.14. They state:

6.1.6.2.5 Aircraft operations at Christchurch International Airport

a. Aircraft operations at Christchurch International Airport shall meet the following activity standards:

i. Noise from aircraft operations shall not exceed 65 dB Ldn outside the 65 dB Ldn Air Noise Compliance Contour shown in Figure 1, other than as provided for in Rule 6.1.6.2.5 a.ii..

Figure 1: Map of 65 dB Ldn Air Noise Compliance Contour



ii. *Noise from aircraft operations may exceed the aircraft noise limit in Rule 6.1.6.2.5 a.i by not more than 2 dB, provided that such exceedance is due to atypical weather, national flight disruption, natural disaster or other unplanned circumstances.*

iii. *Monitoring and determining compliance with activity standards i. and ii. above shall be as follows:*

A. *Noise monitoring of aircraft operation shall be based on calculations from an operational aircraft noise model, and records of actual aircraft operations at Christchurch International Airport over the previous year's aircraft operations.*

B. *Noise from aircraft operations shall be calculated as the Annual Aircraft Noise Contour (AANC), over the busiest three month period of the previous year.*

C. *The calculations shall be performed by a person with appropriate qualifications and experience in airport noise modelling and acoustics assessments.*

D. *The calculated results shall be verified by noise measurements carried out in accordance with the Airport Noise Management Plan required under Rule 6.1.6.2.7.1.*

E. *The measurement of aircraft sound exposure levels and the derivation of the 65 dB Ldn contour shall be in accordance with NZS 6805:1992.*

iv. *An Aircraft Operations Noise Monitoring Report shall be provided annually by the airport operator to the Council, with the first required by the 6 March 2018. The report shall include:*

A. *the calculated AANC;*

B. *the results of the verification measurements;*

C. *analysis of compliance with reference to Rule 6.1.6.2.5 a.i. and ii.(including the number of exceedances and the reasons for them); and*

D. *a summary of complaints received over the previous year in relation to noise from aircraft operations, and any actions taken in response.*

v. *The additional activity standards in Rule 6.1.6.2.7 for aircraft operations at Christchurch International Airport shall be met.*

Definition: Aircraft operations

means:

a. *the landing and take-off of aircraft; and*

b. *aircraft flying along any flight path associated with a landing or take-off.*

For the purposes of Rule 6.1.6 Activity specific noise rules, it excludes:

c. *aircraft operating in an emergency for medical or national/civil defence reasons;*

d. *air shows;*

e. *military operations;*

f. *Antarctic operations;*

g. *helicopter operations;*

h. *aircraft using the airport as an alternative to a scheduled airport elsewhere;*

i. *aircraft taxiing; and*

j. *aircraft engine testing.*

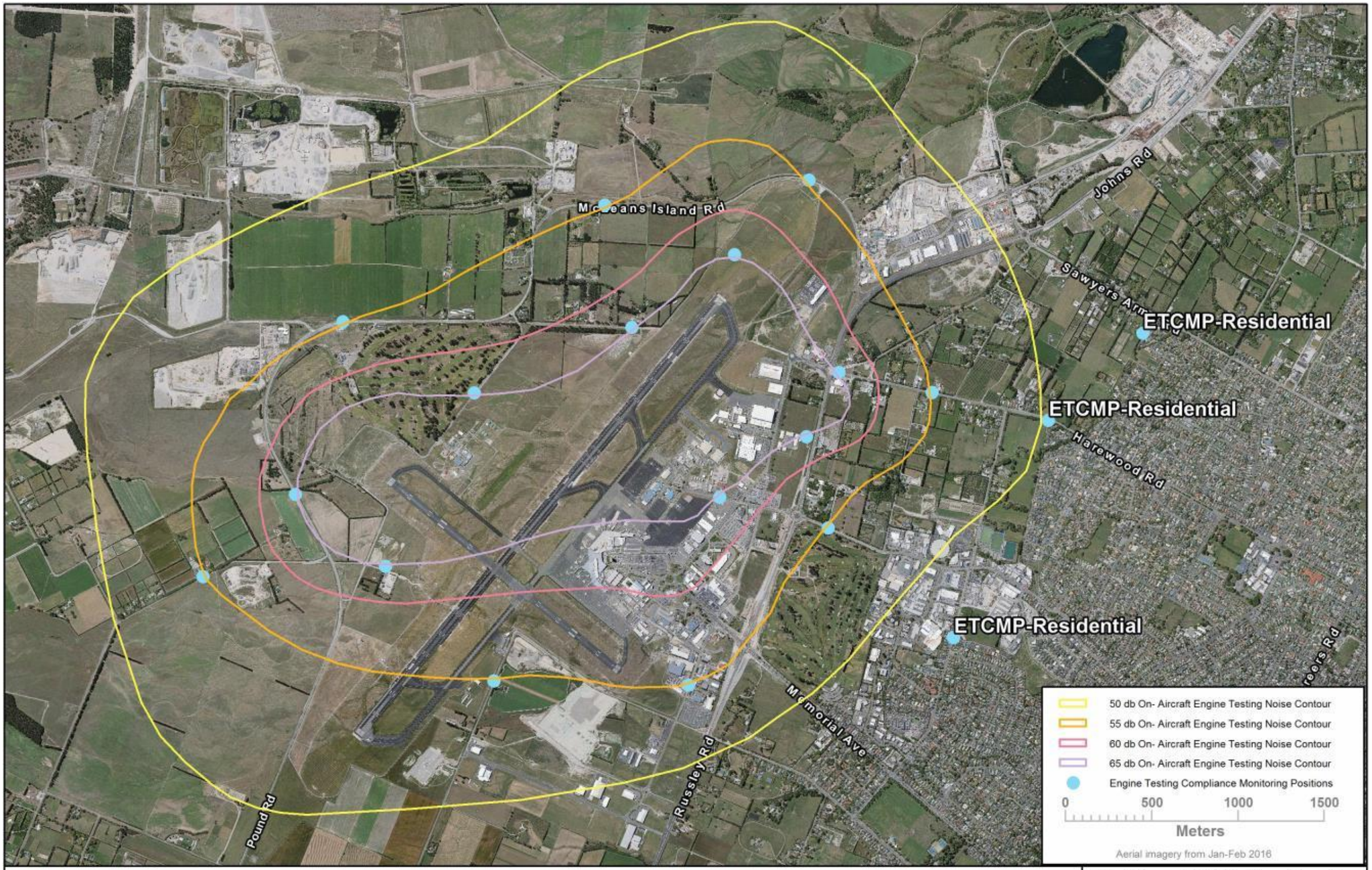
6.1.6.2.6 On-aircraft engine testing at Christchurch International Airport

a. The testing of engines on aircraft at Christchurch International Airport shall meet the following activity standards:

i. Noise from testing of engines on aircraft shall not exceed the noise limits shown in Table 5 below at the engine testing compliance monitoring positions (ETCMPs) shown in Figure 2.

Table 5: On-aircraft engine testing noise limits

Noise Limit	***Engine testing compliance monitoring positions (ETCMP) – refer Figure 2***
65 dB Ldn, 7 day	*8 points*
55 dB Ldn, 7 day	*8 points*
75 dB L_{Amax} 22:00 to 07:00 only	*Edge of residential zone – 3 points*



ii. *All high power testing of jet engines on an aircraft shall occur between the hours of 07:00h and 22:00h, except that a maximum of 5 unplanned engine testing events within any three month period, up to a maximum of 12 unplanned engine testing events per annum, may occur between the hours of 22:00h and 07:00h.*

iii. *Testing of turbo prop engines on an aircraft between the hours of 22:00h and 07:00h, when the total duration of testing at high power is five minutes or more per aircraft, shall be conducted in the vicinity of the threshold of Runway 11 (i.e. the north-western end of the cross-runway).*

iv. *The following exclusions apply:*

   A. *The testing of engines on an aircraft used for Antarctic operations, is excluded from activity standards i.-iii..*

   B. *The testing of engines on any aircraft is excluded from activity standards i.-iii., where such work is necessary to satisfy an airworthiness direction or other like safety requirement issued by the Minister of Transport, the Director of Civil Aviation or the Civil Aviation Authority, as is any other unplanned engine testing arising from an aircraft operator's identification of a safety issue relating to an aircraft fleet, or required as a result of a natural disaster including volcanic eruption.*

   C. *The testing of turbo prop engines on an aircraft is exempted from activity standard iii. When Runway 11/29 is in use.*

v. *Monitoring and determining compliance with activity standard a.i. above shall be as follows:*

   A. *Compliance or otherwise with activity standard a.i. shall be demonstrated by calculations of on-aircraft engine testing noise emissions based on the actual on-aircraft engine testing events and calculations of noise emissions for the engine testing events and configurations in question. The noise level (Ldn, 7 days) shall be calculated as a 7 day rolling average.*

   B. *The calculations in activity standard a.v.A. shall be verified by measurements undertaken with reference to at least four ETCMPs for a sample of at least two different on-aircraft engine test configurations. Verification measurements shall be carried out for an initial period of 6 months from 6 March 2017 and subsequently be undertaken at least once every two years.*

vi. *An On-aircraft Engine Testing Report shall be provided quarterly by the airport operator to the Council, with the first covering the period ending the 30 June 2017 and provided to the Council by the 15 July 2017. The report shall include:*

   A. *a summary of all on-aircraft engine testing activities undertaken in the quarter; and*

   B. *identification of all tests undertaken both in accordance with activity standard a.i. and those excluded by activity standard a.iv., including reasons for the tests excluded an any measures taken to manage noise effects during those excluded tests.*

vii. *An On-aircraft Engine Testing Noise Monitoring Report shall be provided annually by the airport operator to the Council by 6 March 2018, and annually thereafter. The report shall include:*

   A. *the results of verification measurements in accordance with activity standard v.B.; and*

   B. *analysis of compliance with reference to Rule 6.1.6.2.6 a.i.; and*

   C. *a summary of complaints received over the previous year in relation to noise from on-aircraft engine testing, an any actions taken in response.*

viii. *The additional activity standards in Rule 6.1.6.2.7 for on-aircraft engine testing at Christchurch International Airport shall be met.*

6.1.6.2.7 Additional activity standards for aircraft operations and on-aircraft engine testing at Christchurch International Airport

a. The following additional activity standards apply to aircraft operations and to the testing of engines on aircraft at Christchurch International Airport.

6.1.6.2.7.1 Airport Noise Management Plan

a. Within 12 months of 6 March 2017, noise from aircraft operations and on-aircraft engine testing at Christchurch International Airport shall be managed in accordance with an Airport Noise Management Plan prepared by a suitably qualified and experienced person on behalf of the airport operator and in consultation with the Airport Noise Liaison Committee, in accordance with the requirements set out in Appendix 6.11.14. The Airport Noise Management Plan shall be reviewed, and updated if required, at least once every two years.

b. The Airport Noise Management Plan shall:

i. demonstrate how compliance with the following noise limits will be achieved:

A. for aircraft operations – Rule 6.1.6.2.5; and

B. for on-aircraft engine testing – Rule 6.1.6.2.6.

ii. provide the details of the noise monitoring programme;

iii. incorporate a procedure for transparently and expediently responding to any compliance received in relation to noise from aircraft operations and on-aircraft engine testing; and

iv. incorporate a procedure for transparently and expediently presenting, in a publicly accessible forum, the following:

A. the Aircraft Operations Noise Monitoring Report, On-aircraft Engine Testing Report, and On-aircraft Engine Testing Noise Monitoring Report required by Rules 6.1.6.2.5 and 6.1.6.2.6;

B. a 7-day rolling report of noise from on-aircraft engine testing against the requirements of Rule 6.1.6.2.6 a.; and

C. a daily LAmax report of noise from on-aircraft engine testing against the requirements of Rule 6.1.6.2.6 a. at the edge of the residential zone.

Appendix 6.11.14 Airport Noise Management Plan

a. The Airport Noise Management Plan required by Rule 6.1.6.2.7.1 shall:

i. document noise management actions including ongoing investigations, methods, processes and resources to provide for:

A. the management of aircraft operations and on-aircraft engine testing to ensure comp liance with Rules 6.1.6.2.5 a.i. and ii. and 6.1.6.2.6 a.i.-iv.; and

B. consideration of alternative methods of noise management and mitigation to achieve the reduction of noise effects from all aspects of aircraft operations including on-aircraft engine testing; and

C. engine maintenance ground run procedures to be implemented in conjunctionwith all aircraft operators or their agents, including:

i. compliance with Rule 6.1.6.2.6 a.i.-iv., including documentation required by Rule 6.1.6.2.6 a.v.-vii.; and

ii. procedures which will encourage Antarctic and NZDF engine testing on the win g to occur between the hours of 07:00 to 19:00.

ii. provide the details of a noise monitoring programme to maintain compliance with Rules 6.1.6.2. 5 a.iii.-iv. and 6.1.6.2.6 a.v.-vii. and, in particular, the following:

A. the monitoring, recording, verification and calculation of aircraft operation and On-aircraft Engine Testing noise levels;

B. the preparation of the annual Aircraft Operations and On-aircraft Engine Testing Nois e Monitoring Reports and quarterly On-aircraft Engine Testing Report;

C. the preparation of the AANC maps, showing actual noise contours in 1 dB increments from 55 dB to 70 dB Ldn; and

D. the review of the software used for predicting aircraft operation noise and the software used for predicting engine testing noise, at least once every five years to determine whether the models and/or software require updating.

iii. establish dispute resolution procedures.

iv. establish a procedure for transparently and expediently responding to any complaints received in relation to noise from aircraft operations and on-aircraft engine testing.

v. require the maintenance of a website that provides for the transparent and accessible display of

A. the current version of the Airport Noise Management Plan as required by Rule 6.1.6.2. 7.1;

B. the Aircraft Operations Noise Monitoring Report, On-Aircraft Engine Testing Report, a nd On--Aircraft Engine Testing Noise Monitoring Report for the previous year, required by Rules 6.1.6.2.5 and 6.1.6.2.6, including a summary of noise monitoring conducted, and the AANC;

C. A 7-d-ay rolling report of noise from On-Aircraft aircraft engine testing over the previous seven days updated daily and identifying all tests undertaken both within the Ldn limits and those exempted, including reasons for the tests exempted;

D. a summary of complaints received annually and a description of actions taken to addr ess complaints.

vi. document schedules of:

A. acoustic treatment implemented over the past calendar year as required by Rule 6.1.6.2.7.2; and

B. *acoustic treatment offered, where the conditions of the offer required by section b. of Appendix 6.11.15 have not yet been met.* ETCMPs positions

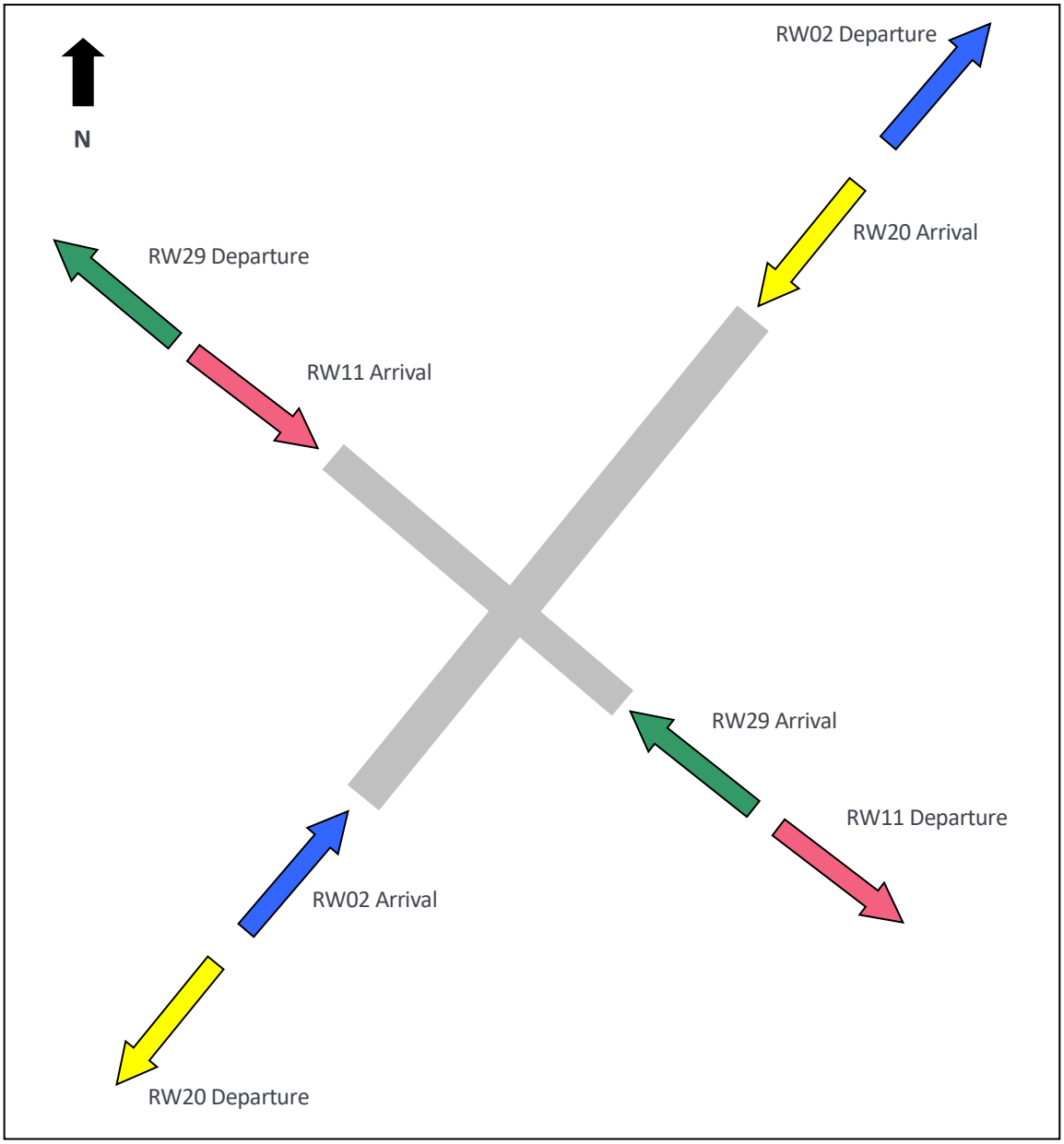
APPENDIX B CHRISTCHURCH AIRPORT RUNWAY VECTORS

Runway 02 refers to operations using the main runway with a heading of 20 degrees from true north i.e. arrivals from the south west landing in a north easterly direction and departures towards the north east.

Runway 20 refers to operations using the main runway with a heading of 200 degrees from true north i.e. arrivals from the north-east landing in a south westerly direction and departures towards the south west.

Runway 11 refers to operations using the crosswind runway with a heading of 110 degrees from true north i.e. arrivals from the north-west landing in a south easterly direction and departures towards the south east.

Runway 29 refers to operations using the crosswind runway with a heading of 290 degrees from true north i.e. arrivals from the south-east landing in a north westerly direction and departures towards the north west.

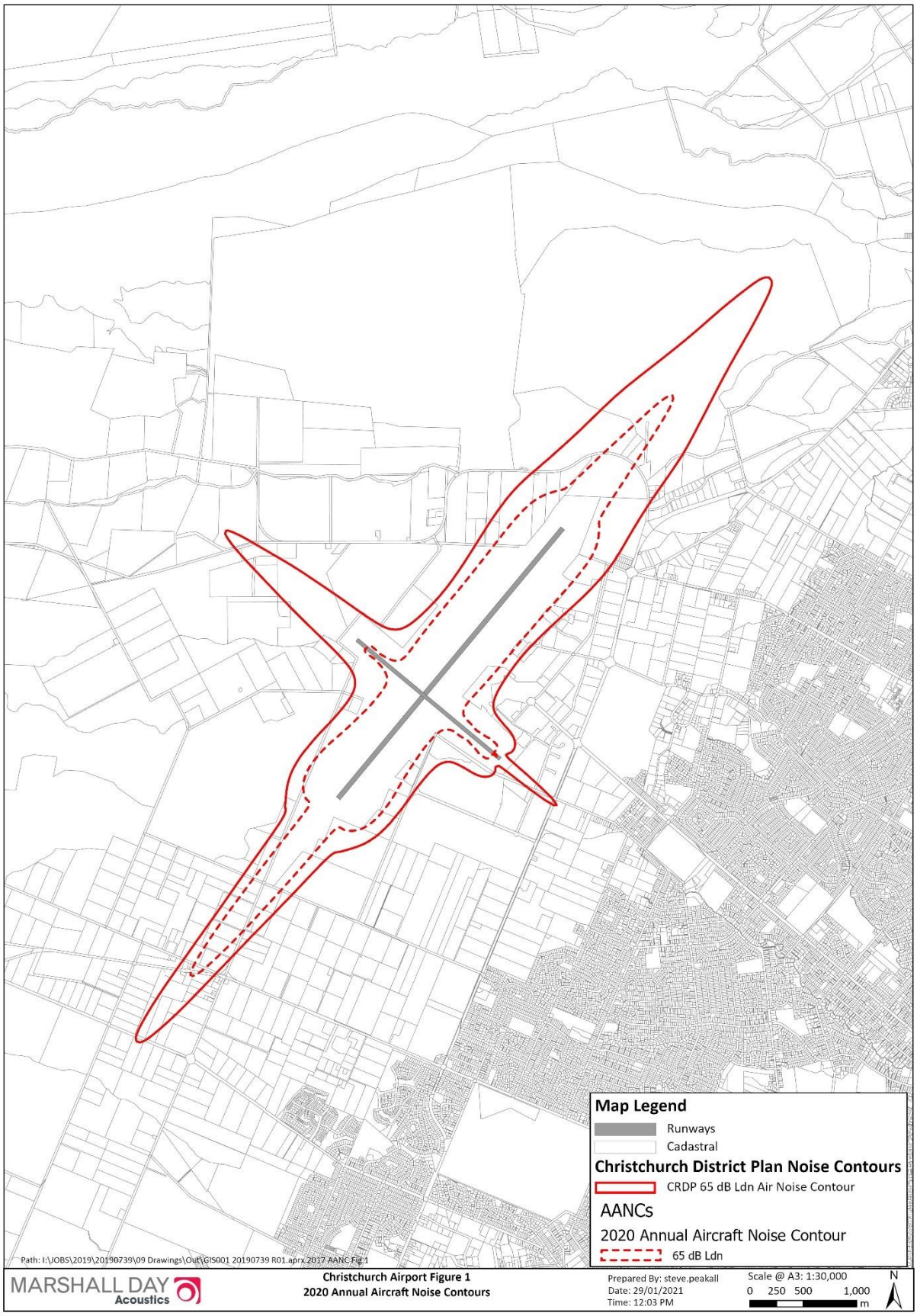


APPENDIX C MODELLED AIRCRAFT MOVEMENTS

Table C1: Modelled Aircraft Movements by Runway

		Total per day (91 days)							
		Runway 02		Runway 11		Runway 20		Runway 29	
Aircraft Type	**Aircraft**	**Day**	**Night**	**Day**	**Night**	**Day**	**Night**	**Day**	**Night**
Scheduled Jets	A20N	1.44	0.37	0.00	0.00	0.80	0.16	0.08	0.01
	A21N	2.97	1.75	0.00	0.03	1.14	0.89	0.10	0.08
	A320	32.11	2.12	0.04	0.00	14.08	1.07	1.56	0.08
	A332	0.02	0.05	0.00	0.00	0.07	0.08	0.00	0.00
	A333	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00
	A359	1.78	0.02	0.00	0.00	0.80	0.03	0.00	0.00
	A388	1.33	0.00	0.00	0.00	0.54	0.00	0.00	0.00
	B733	0.04	0.15	0.00	0.00	0.08	0.31	0.00	0.00
	B734	0.80	2.47	0.00	0.11	0.29	1.48	0.00	0.20
	B737	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	B738	3.88	3.31	0.00	0.03	1.96	1.62	0.13	0.12
	B744	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00
	B748	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
	B763	0.12	0.52	0.00	0.00	0.07	0.36	0.00	0.00
	B772	0.07	0.00	0.00	0.00	0.03	0.00	0.00	0.00
	B77L	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
	B77W	0.44	0.23	0.00	0.00	0.05	0.07	0.00	0.00
	B789	0.90	0.04	0.00	0.00	0.55	0.07	0.00	0.00
Scheduled TPs	AT75	1.70	0.00	0.01	0.00	0.77	0.00	0.18	0.00
	AT76	52.42	1.81	0.38	0.00	23.96	1.02	2.78	0.05
	CVLT	0.11	0.07	0.00	0.00	0.18	0.09	0.00	0.00
	DH8C	13.67	0.10	0.20	0.00	6.13	0.05	0.73	0.00
	PC12	2.98	0.00	0.00	0.00	1.37	0.00	0.16	0.00
Scheduled Piston	PA31	0.14	0.00	0.00	0.00	0.08	0.00	0.00	0.00
Non-scheduled + other	A319	0.00	0.03	0.00	0.00	0.01	0.00	0.00	0.00
	A320	0.04	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	AT75	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.00
	B738	0.04	0.07	0.00	0.00	0.03	0.03	0.00	0.00
	B763	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BE20	0.44	0.04	0.00	0.00	0.40	0.00	0.01	0.00
	BE30	0.09	0.01	0.01	0.00	0.07	0.01	0.00	0.00
	BE40	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BE9L	0.54	0.00	0.01	0.00	0.29	0.00	0.04	0.00
	C441	0.24	0.01	0.01	0.00	0.13	0.00	0.01	0.00
	C510	0.07	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	C680	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CVLT	0.04	0.33	0.00	0.01	0.00	0.22	0.00	0.05
	E190	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	GLEX	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
	JS32	0.20	0.03	0.00	0.00	0.13	0.02	0.00	0.00
	LJ45	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LJ60	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
	P28A	0.08	0.00	0.00	0.00	0.01	0.00	0.00	0.00
	P68	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PA34	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SF34	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
	SW4B	0.18	0.00	0.00	0.00	0.02	0.00	0.00	0.00

APPENDIX D NOISE COMPLIANCE CONTOURS



APPENDIX E: 2020 AANC (1 DECIBEL BANDS)