CHRISTCHURCH INTERNATIONAL AIRPORT

2014 AIRCRAFT OPERATIONS NOISE MONITORING REPORT

MARSHALL DAY Acoustics

CHRISTCHURCH AIRPORT bringing the world South

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1.0 INTRODUCTION

1.1 General

This Noise Monitoring Report is required to be prepared annually by Rule 1.2.4.2 in Part 11 of the Christchurch City Plan. The purpose of the report is to present the annual calculated noise contours and any associated monitoring results which have been prepared to assess compliance with the City Plan noise standard for aircraft operations at the Airport. This report for the 2014 calendar year includes the calculated noise contours, noise measurement results and information on engine testing activity.

Christchurch International Airport is the main gateway to the South Island with current total aircraft movements of between 90,000 to 100,000 per annum.

The total number of scheduled commercial aircraft movements for the 2014 calendar year was 75,072, as shown below. A summary of the movement data input to the INM computer model for producing the 2014 Aircraft Noise Contours is provided in section 2.1 of this report.

	2014	2013	2012	2011	2010
Total aircraft movements					
Domestic aircraft	**66,330**	63,042	63,956	65,552	68,441
International aircraft	**8,742**	8,673	9,228	9,977	10,575
Total aircraft movements	**75,072**	71,715	73,184	75,529	79,016

1.2 Noise Performance Standards – Aircraft Operations

The Christchurch City Plan refers to airport noise in a number of locations. Rule 11-1.3.6 refers to the Airport's requirement to not exceed 65 dB L_{dn} outside the airport noise contour shown in the City Plan (Volume 3, Part 2, Appendix 3 – 65 dB L_{dn} Airport Noise Monitoring contour - CIAL). The rule states:

"1.3.6 Aircraft Noise

Critical Standard

CIAL shall manage the Christchurch International Airport so that the noise from aircraft operations does not exceed L_{dn} 65 dBA outside the L_{dn} 65 dBA airport noise contour shown in Appendix 3 to Part II.

Noise from aircraft operations shall be based on noise data from the Integrated Noise Model (INM) and records of actual aircraft operations at CIA. The noise level shall be calculated over the busiest three month period of the year.

Aircraft operations means:

- *the landing and take off of aircraft at CIA*
- *aircraft flying along any flight path associated with a landing or take off at CIA*

The following activities are excluded from the definition of Aircraft Operations:

- *aircraft operating in an emergency for medical or national/civil defence reasons*
- *air shows*
- *military operations not associated with the Antarctic programme*
- *aircraft using the airport as an alternative to a scheduled airport elsewhere*
- *aircraft taxiing*
- *aircraft engine testing.*

Exceedance by up to 1 dBA of the noise limit is permitted provided CIAL demonstrates at the request of, and to the satisfaction of, the Council that any such exceedance is due to atypical weather patterns."

The Christchurch Airport 65 dB L_{dn} District Plan noise contour is contained entirely in the Christchurch City District. In 2007 a new set of District Plan noise contours were formulated, including the 50 dB L_{dn} and 55 dB L_{dn} contours used for land use planning purposes. These new contours have been implemented, and are operative in the Selwyn and Waimakariri District Plans.

For Christchurch City, the Land Use Recovery Plan has adopted the new contours for land use planning purposes but the rule relating to airport noise control (rule 1.2.4.2) refers to the old District Plan noise contours. In view of that, we will assess the 2014 Annual Aircraft Noise Contours (AANC) and 2014 monitoring results against the old District Plan noise contours in the Christchurch City District Plan.

It is anticipated that the new contours will be adopted formally as part of the Christchurch City Plan Review, and hence compliance in the future will be assessed using the new contours.

Rule 11 – 1.2.4.2 sets out the airport's obligation to provide annual calculations of the aircraft noise levels and the results of noise measurements where necessary.

"1.2.4.2 Aircraft noise monitoring

CIAL shall annually provide to the Council's Environmental Services Manager the result of calculations based upon monitored aircraft movements for the preceding year and the known noise characteristics of those aircraft. These calculations will be performed by a person with appropriate qualifications and experience in airport noise modelling and acoustic assessments. The provided result shall be verified by noise measurements and shall be in the form of a 65 dBA L_{dn} contour representing the noise created by aircraft operations over that year (other than movements of a kind excluded in the Aircraft Noise Rule 1.3.5) superimposed upon a copy of the plan forming Appendix 3 to Part II of this Plan. The measurement of aircraft sound exposure and the resultant derivation of a 65 dBA L_{dn} shall be in accordance with NZS 6805:1992."

2.0 ANNUAL AIRCRAFT NOISE CONTOURS

To ensure compliance is fully assessed, 2014 Annual Aircraft Noise Contours have been calculated based on the average daily movements over the busiest three months. In previous years another contour has been calculated which represents the busiest three months on Runway 29.

The purpose of calculating noise contours for the busiest three months on Runway 29 is to assess compliance for the period of time when the north-west winds are prevalent and aircraft utilise Runway 29 more than usual.

Although this is not expressly required by the District Plan, we believe that it is necessary as it provides a worst case scenario when confirming noise levels over the City within the 65 dB L_{dn} contours as identified in the city Plan (Volume 3, Part 2, Appendix 3 - 65 dB L_{dn} Airport Noise Monitoring Contour - CIAL).

A diagram of the Christchurch Airport runway system is included as Appendix A for reference.

2.1 INM Inputs

Both sets of 2014 annual contours have been calculated using the INM version 6.0c which is the same version used to prepare the existing Christchurch City District Plan noise contours.

A record of the aircraft activity for 2014 has been provided by CIAL for input in to the INM in the form of monthly movements by aircraft type, operation, runway and time of day. This data is recorded by Airways Corporation and includes all movements of aircraft that are fitted with a transponder. As some general aviation (GA) aircraft do not have transponders, not all GA movements are accounted for.

Noise from these light aircraft does not contribute significantly in terms of noise levels within the 65 dB L_{dn} contour. For that reason, the nature and frequency of GA flights on the overall noise exposure would not affect the location of the 65 dB L_{dn} noise contour significantly. The effect of general aviation aircraft on the overall noise exposure and compliance with the District Plan noise contours is identified in Appendix E.

MDA has analysed the movement data and determined that the busiest three consecutive months were July, August, September. The busiest three months for Runway 29 were September, October, November.

The annualised total movements for both modelled scenarios are shown in Table 1 as well as a breakdown of the annualised day and night time movements. The number of night time movements is relevant as night time activity has an associated + ten decibel adjustment. A breakdown of the average daily aircraft movements by aircraft type and runway for each of the modelled scenarios is included as Appendix B.

Table 1: Summary of Modelled Aircraft Movements

	Busiest 3 Months	Busiest 3 Months RW 29
Annualised Total Movements	109607	107118
Annualised Day Time Movements	96816	93769
Annualised Night Time Movements	12791	13349

The aircraft movement data provided by CIAL does not contain explicit runway usage data, rather the runway is defined as either the main runway (02/20) or the crosswind runway (11/29). Historical records of aircraft movements at the airport have been analysed to determine the predominant runway usage at the airport. Based on these records the historical runway usage is as follows:

Main Runway: RW 02 = 64 %
RW 20 = 36%

Crosswind Runway: RW11 = 0%
RW 29 = 100%

In the model, aircraft movements have been distributed across flight tracks which were developed in 2007 during the review of the airport noise boundaries. The contour outcomes of the 2007 review are implemented in Change 1 to the Regional Policy Statement.

It is noted that for the purpose of modelling the location of the 65 dB L_{dn} contour, the flight track details beyond 4 km from the runway are irrelevant as the contour does not extend further than this. Therefore the approach taken is considered to be robust, valid and appropriate.

2.2 Calculated Contours

The calculated 65 dB L_{dn} contour for 2014 activity, as described above, is shown in Figure 1, Appendix C for the busiest 3 months and Figure 2, Appendix C for the busiest 3 months on runway 29, both compared with the Christchurch City District Plan 65 dB L_{dn} noise contour.

The Christchurch City District Plan 65 dB L_{dn} noise contour is not exceeded. Accordingly, this report identified compliance with the requirements of Rule 11-1.3.6 'Aircraft Noise'.

3.0 MONITORED NOISE LEVELS

3.1 Site Locations

Marshall Day Acoustics airport noise monitor was located at 521 Avonhead Road, Christchurch from 13 October 2014 to 20 January 2015 for the purpose of measuring L_{dn} noise levels from aircraft operations. The site is approximately 900 metres from the end of the crosswind runway (RWY 29) and on approximate centreline. The site location relative to the Christchurch City District Plan 65 dB L_{dn} noise contour is shown in Figure 1 and Figure 2, Appendix C.

3.2 Airport Noise Monitoring Equipment

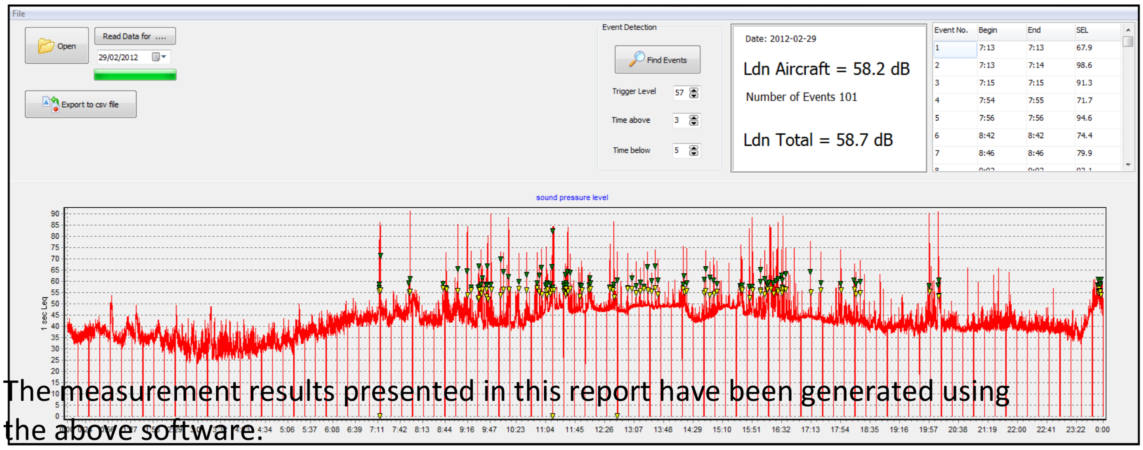
Noise monitoring was carried out in general accordance with New Zealand Standard NZS 6805:1992 "*Airport Noise Management and Land Use Planning*". The Marshall Day Acoustics airport noise monitor consists of a Norsonic 1225 sound level meter with an outdoor microphone kit. Data is stored on a memory card and downloaded through the Noise and Weather website. The noise monitoring equipment and set-up is shown below.

Figure 3: Noise Monitor Set-up

The system normally uses the aircraft identification software in post processing to isolate any events with aircraft characteristics.

The analysis software allows calculations to be undertaken over a wide range of parameters, and provides graphical noise level traces that can be used in the analysis process. Figure 5 shows a typical screenshot of the software analysis module.

Figure 5: Analysis Software Screenshot



The measurement results presented in this report have been generated using the above software.

3.3 Monitoring Results

A total of 99 full days of data were recorded, of this 36 days were contaminated by extraneous noise (high levels of rainfall or wind events). These days were not used in the assessment and thus 63 days were analysed. We consider that the data is sufficient to provide a robust and reliable assessment of the Airport's operating noise level.

The average, maximum and minimum daily number of noise events is also shown in Table 2.

Table 2: Summary of Noise Measurement Results

	Measured Noise Levels (dB L_{dn})	Number of Events
Minimum	40	45
Maximum	66	200
Average	**54**	145

The overall measured noise levels are also shown graphically in Appendix D.

We consider that this data is sufficient to provide a reliable assessment of the Airport's operating noise level. This is because the measured noise level is generally consistent over the monitoring period, suggesting that the monitoring is accurate.

Based on the Christchurch City District Plan 65 dB L_{dn} noise contour as shown on Figure 1 and 2, the noise level at the monitoring site is approximately 2 decibels below the level at the Christchurch City District Plan 65 dB Ldn noise contour.

The maximum measured L_{dn} noise level for aircraft events occurred on a day with high runway 29 usage. This measured noise level is not typical of noise levels measured on other high runway 29 usage days. It is considered to be a one off event. In any case the average measured L_{dn} noise level over the monitoring period (3 months), including the noise contribution from this day, was 58 dB L_{dn}. This is well below the 65 dB L_{dn} noise limit.

Overall, the measured noise levels are consistent with the predicted noise levels of Figure 1, verifying that the predictions are an accurate representation of noise levels received in the community.

Based on the above, the monitoring results demonstrate that noise from aircraft operations during the monitoring period comfortably complied with the relevant noise limit.

4.0 ENGINE TESTING

The Noise Management Plan discusses the methods used to manage noise from engine testing at Christchurch Airport. The Noise Management Plan States:

> *"3.0 Engine Testing*
>
> *Under the by laws and the Airside operations Agreement details of each night-time engine testing event are recorded by the aircraft operator and forwarded to CIAL. CIAL will record the details of each event in a purpose made engine testing noise monitoring application. This software will be used to calculate noise levels in the wider community resulting from night time 'on wing' engine testing. The noise levels received at the most affected dwellings shall be calculated and monitored over a period of not less than 3 months for the purpose of carrying out an assessment of engine testing noise effects. Following the assessment of noise effects, consideration will be given to developing additional or alternative controls on engine testing and land use management should the outcome of the assessment signal that this is appropriate. The target completion date of the assessment of engine testing noise effects is March 2014."*

The software referred to in the NMP has been developed by MDA over the last 4 years and is now being used to collect and analyse engine testing data. The MDA software (Engine Testing Monitoring Software - ETMS) is being used to calculate and assess the noise levels emitted over the period November 2010 to the present time (where Air New Zealand (ANZ) records are available).

These historical noise emissions will be compared with appropriate engine testing noise limits. At present there is no actual requirement in the Christchurch International Airport By-Laws Approval Order 1989 regarding engine testing noise levels. This is the reason that the software is being used in reviewing the calculated noise levels in relation to controls used elsewhere in NZ.

A report is expected to be prepared on the results in 2015, including an opinion on the magnitude of the noise exposure. It intended to pause at this point to allow discussions between CIAL and ANZ over the outcome of the study and to determine what, if any, further work in determining appropriate controls is required. The report will include a comparison of the historical noise emissions with various noise controls with respect to ground running of aircraft engines in the Russley area and an opinion on the noise exposure for residents surrounding the airport.

Engine testing noise control and actual calculated noise levels are anticipated to be presented in this Noise Monitoring Report from 2015 onwards. It is likely that by this time the Christchurch City Plan Review will be advanced and engine testing noise controls will be in place.

4.1 Measured Engine Testing Noise Levels

As a result of noise complaints from a resident in the Russley area, a data logger was set up at 31 Stableford Green, a noise investigation was carried out using noise measurements and analysis. The aim was to identify aircraft engine testing noise events that may have given rise to the complaint.

In summary the results show that although engine testing noise levels would be audible at the house (based on the actual measured noise level and the characteristics of the noise), engine testing noise is acceptable in the context of the existing environment and the overall noise level.

Full details are presented in Appendix F.

5.0 COMPLAINTS

Noise Complaints are occasionally received as a result of both general airport operations and specifically related to engine testing. CIAL currently investigate complaints in the following manner:

The CIA Noise Complaints Procedure provides individuals with the ability to express, and have recorded, their concerns about aviation noise (activities) or to ask questions regarding noise at CIA.

Noise complaints may be made by calling the CIAL Integrated Operation Centre (IOC) office which is manned 24 hours a day (on phone 353 7777). IOC staff document noise complaints by obtaining information from the caller about the nature of the complaint, time of the occurrence, location of callers residence and the activity that caused disturbance. This information is used to determine the probable activity that was responsible for the complaint.

CIAL firstly screens complaints to determine if the complaint can be dealt with in-house or if further investigation or analysis of data by Marshall Day Acoustics needs to be undertaken in order to provide a satisfactory outcome.

A follow up phone call will be made followed by a written response / e-mail if requested by the caller detailing the complaint and details of the activity responsible, the meteorological conditions and the runway in use at the time of the disturbance. A notice of action taken by CIAL in respect of the complaint will be included. Typically it will take CIAL staff up to 2 days to make a follow up phone call and up to 7 days to respond in writing if where required

The following is a summary of noise complaints received in 2014:

Complaints Type	Number
General Aviation (GA)	4
Low flying jets	9
Engine testing	2

5.1 Specific Complaint investigation

No Specific noise complaint investigations were carried out in 2014, as no specific complaint response investigation was deemed necessary. Where required, desktop complaint responses were provided by CIAL in accordance with the provisions of section 5, above.

6.0 CONCLUSION

Noise contours have been calculated and in-field monitoring carried out to establish whether noise from aircraft operations at Christchurch International Airport during 2014 complied with the Christchurch City District Plan 65 dB L_{dn} noise contour limit. Both the contouring exercise and the noise monitoring results confirm that noise from aircraft operations in 2014 comfortably complied with the 65 dB L_{dn} limit.

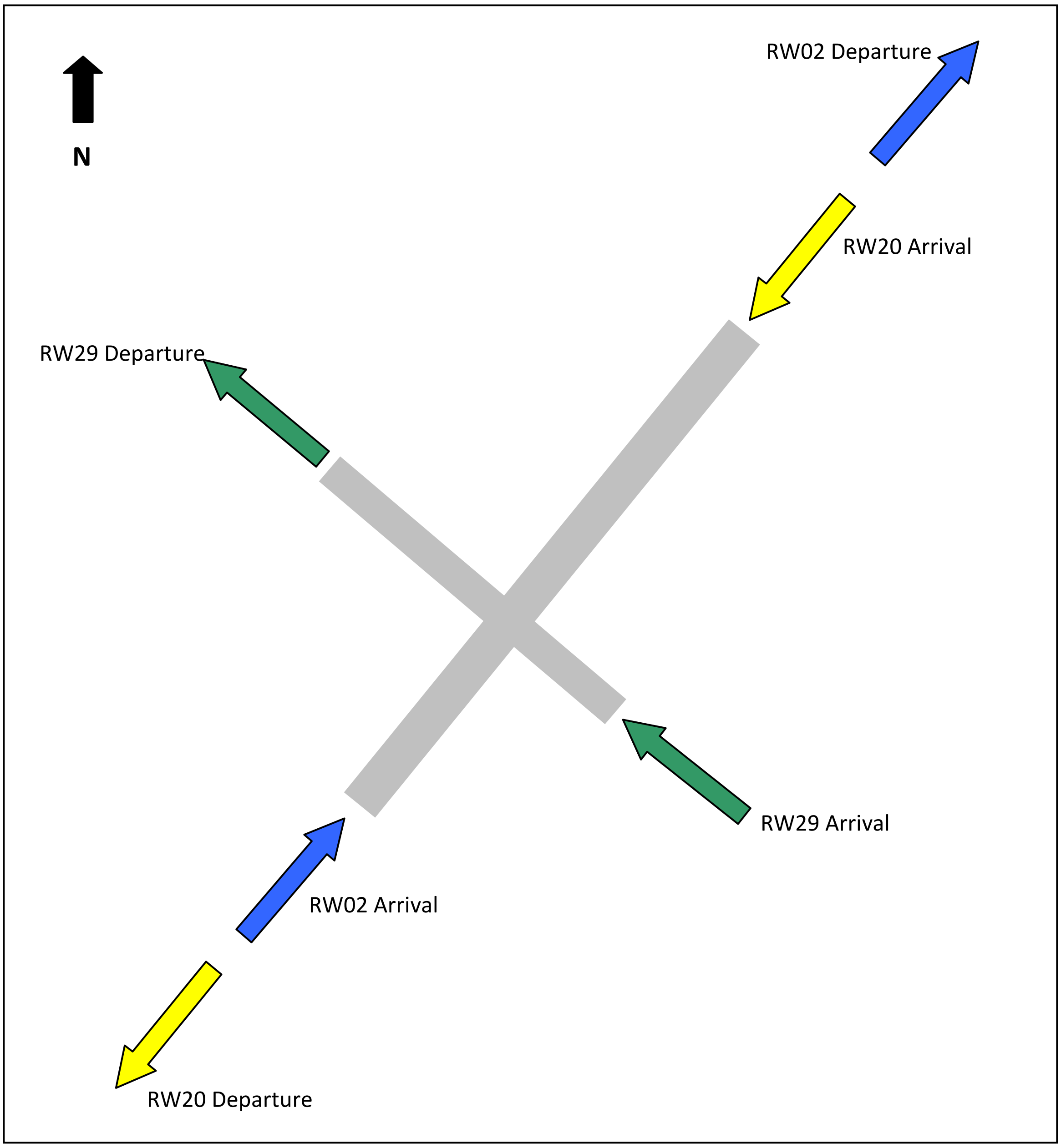
Engine testing noise levels are currently being assessed and will be reported on in as part of the City Plan Review process.

APPENDIX A: 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 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 B: MODELLED AIRCRAFT MOVEMENTS

Aircraft movements for busiest three month contour (Figure 1)

		Runway 02		Runway 20		Runway 29	
Aircraft Type	Aircraft	Day	Night	Day	Night	Day	Night
Scheduled Jets	737300	14.26	4.47	8.02	2.51	0.48	0.12
	737700	0.01	0.01	0.00	0.00	0.00	0.00
	747400	0.07	0.00	0.04	0.00	0.00	0.00
	757RR	0.07	0.00	0.04	0.00	0.00	0.00
	767300	0.06	0.84	0.03	0.47	0.00	0.00
	777200	2.54	0.02	1.43	0.01	0.03	0.00
	777300	0.03	0.00	0.02	0.00	0.00	0.00
	A320	27.12	7.02	15.26	3.95	0.97	0.16
Scheduled Turbo-Props	ATR72	24.32	0.83	13.68	0.47	1.42	0.01
	BAEJ31	0.18	0.01	0.10	0.01	0.04	0.00
	BEC190	6.42	0.01	3.61	0.00	2.02	0.01
	CVR580	1.04	4.26	0.58	2.40	0.01	0.13
	DHC6	0.03	0.00	0.02	0.00	0.00	0.00
	DHC830	26.79	0.02	15.07	0.01	1.79	0.00
Other	CNA172	0.42	0.00	0.23	0.00	0.00	0.00
	CNA180	0.30	0.00	0.17	0.00	0.00	0.00
	CNA210	0.07	0.00	0.04	0.00	0.00	0.00
	CNA441	0.01	0.00	0.01	0.00	0.00	0.00
	CNA500	0.06	0.00	0.03	0.00	0.00	0.00
	PA31T	0.33	0.00	0.18	0.00	0.00	0.00
	PA44	0.01	0.00	0.01	0.00	0.00	0.00
	SA226	0.88	1.04	0.49	0.59	0.03	0.02
	CL600	0.03	0.00	0.02	0.00	0.00	0.00
	BEC58P	6.33	0.19	3.56	0.11	0.27	0.01
	C185	0.08	0.00	0.05	0.00	0.00	0.00
	GASEPF	31.74	1.25	17.86	0.70	0.00	0.00
	GASEPV	21.42	2.10	12.05	1.18	0.02	0.00
	GIIB	0.22	0.01	0.13	0.01	0.00	0.00
	IA1125	0.13	0.03	0.07	0.02	0.00	0.00
	LEAR35	0.03	0.00	0.02	0.00	0.00	0.00
Military	A4C	0.01	0.00	0.01	0.00	0.00	0.00
	C130	0.05	0.00	0.03	0.00	0.04	0.00
	C17	0.06	0.01	0.04	0.01	0.00	0.00
	P3A	0.02	0.00	0.01	0.00	0.00	0.00
	PROVOS	0.06	0.00	0.03	0.00	0.00	0.00

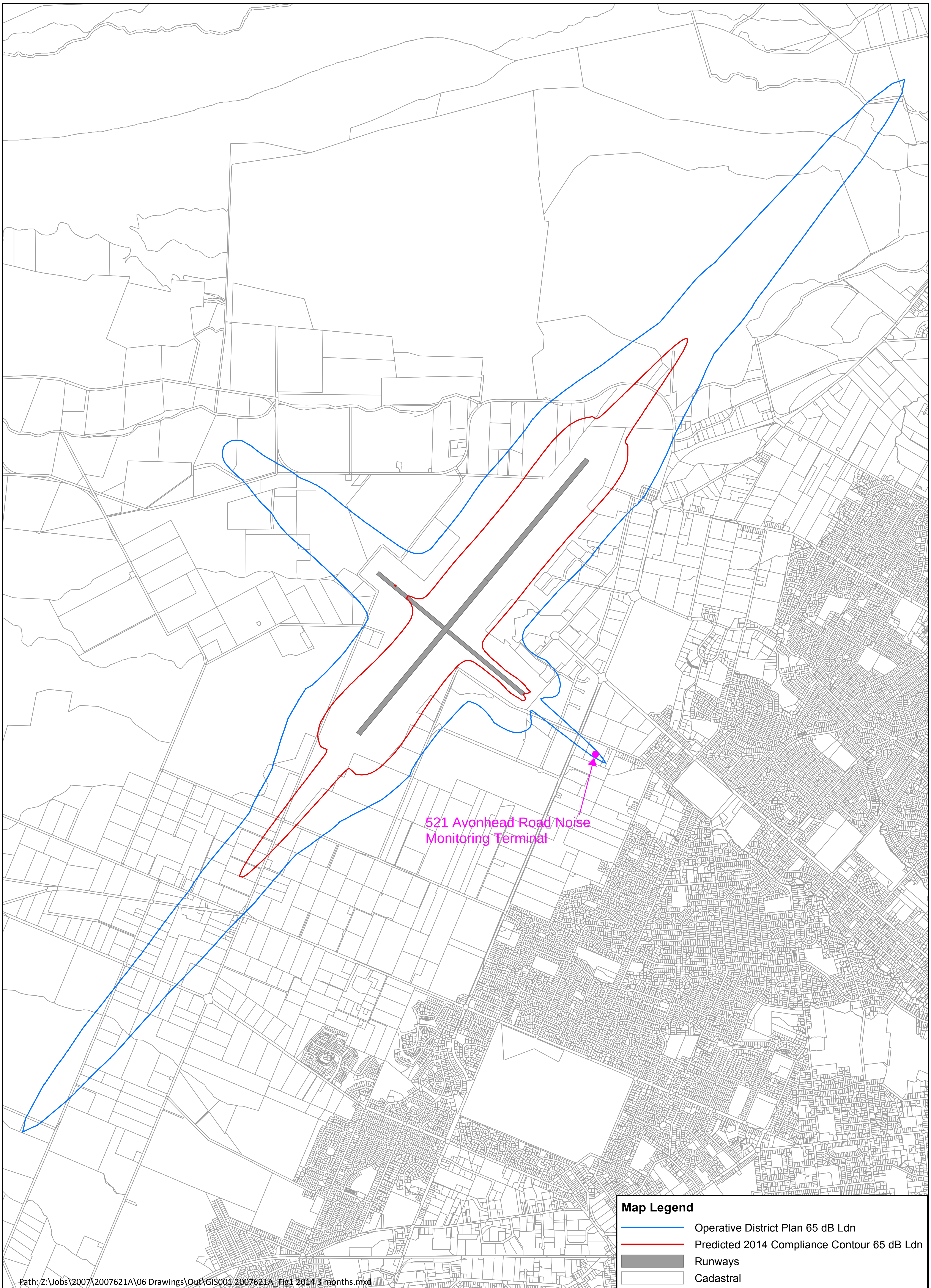
Aircraft movements for busiest three month-Runway 29 contour (Figure 2)

		Runway 02		Runway 20		Runway 29	
Aircraft Type	Aircraft	Day	Night	Day	Night	Day	Night
Scheduled Jets	737300	11.19	4.04	6.29	2.27	1.74	0.09
	737700	0.01	0.01	0.01	0.00	0.00	0.00
	757RR	0.13	0.00	0.07	0.00	0.04	0.00
	767300	0.15	0.84	0.08	0.47	0.00	0.02
	777200	2.51	0.01	1.41	0.00	0.04	0.00
	777300	0.03	0.00	0.02	0.00	0.00	0.00
	A320	27.71	6.27	15.59	3.53	4.57	0.34
Scheduled Turbo-Props	ATR72	24.97	0.95	14.04	0.53	5.42	0.14
	BAEJ31	0.17	0.01	0.09	0.01	0.00	0.00
	BEC190	5.53	0.00	3.11	0.00	2.45	0.04
	CIT3	0.03	0.00	0.02	0.00	0.00	0.00
	CL600	0.02	0.00	0.01	0.00	0.01	0.00
	CVR580	0.99	4.45	0.56	2.50	0.11	0.11
	DHC6	0.01	0.00	0.01	0.00	0.00	0.00
	DHC830	23.95	0.08	13.47	0.05	6.09	0.02
Other	CNA172	0.13	0.00	0.07	0.00	0.00	0.00
	CNA180	0.49	0.00	0.27	0.00	0.00	0.00
	CNA210	0.06	0.00	0.03	0.00	0.00	0.00
	CNA441	0.01	0.00	0.01	0.00	0.02	0.00
	CNA500	0.10	0.01	0.06	0.01	0.00	0.00
	BEC58P	5.16	0.32	2.90	0.18	0.76	0.03
	C185	0.03	0.00	0.02	0.00	0.00	0.00
	FK27	0.01	0.01	0.01	0.01	0.00	0.00
	GASEPF	28.12	1.58	15.82	0.89	0.00	0.00
	GASEPV	16.56	3.11	9.32	1.75	0.08	0.00
	GIIB	0.06	0.00	0.03	0.00	0.00	0.00
	GIV	0.01	0.01	0.01	0.01	0.00	0.00
	IA1125	0.07	0.00	0.04	0.00	0.00	0.00
	LEAR35	0.01	0.00	0.01	0.00	0.00	0.00
	PA24	0.01	0.00	0.00	0.00	0.00	0.00
	PA31T	0.33	0.00	0.19	0.00	0.00	0.00
	PA60	0.01	0.00	0.01	0.00	0.00	0.00
	SA226	0.93	0.99	0.52	0.56	0.04	0.03
Military	A4C	0.01	0.00	0.01	0.00	0.00	0.00
	C130	0.46	0.09	0.26	0.05	0.19	0.00
	C17	0.30	0.07	0.17	0.04	0.02	0.01
	HAWK	0.13	0.00	0.07	0.00	0.00	0.00
	P3A	0.01	0.00	0.01	0.00	0.00	0.00
	PROVOS	0.20	0.00	0.11	0.00	0.00	0.00

APPENDIX C: NOISE COMPLIANCE CONTOURS

Figure 1: Noise from Aircraft Operations – 2014 AANC

Figure 2: Noise from Aircraft Operations 2014 (busiest 3 months of Runway 29 use)



MARSHALL DAY Acoustics

Christchurch Airport
2014 Annual Aircraft Noise Contours

Prepared By: SJP
Date: 8/04/2015
Time: 3:50:18 p.m.

Scale @ A3: 1:30,000
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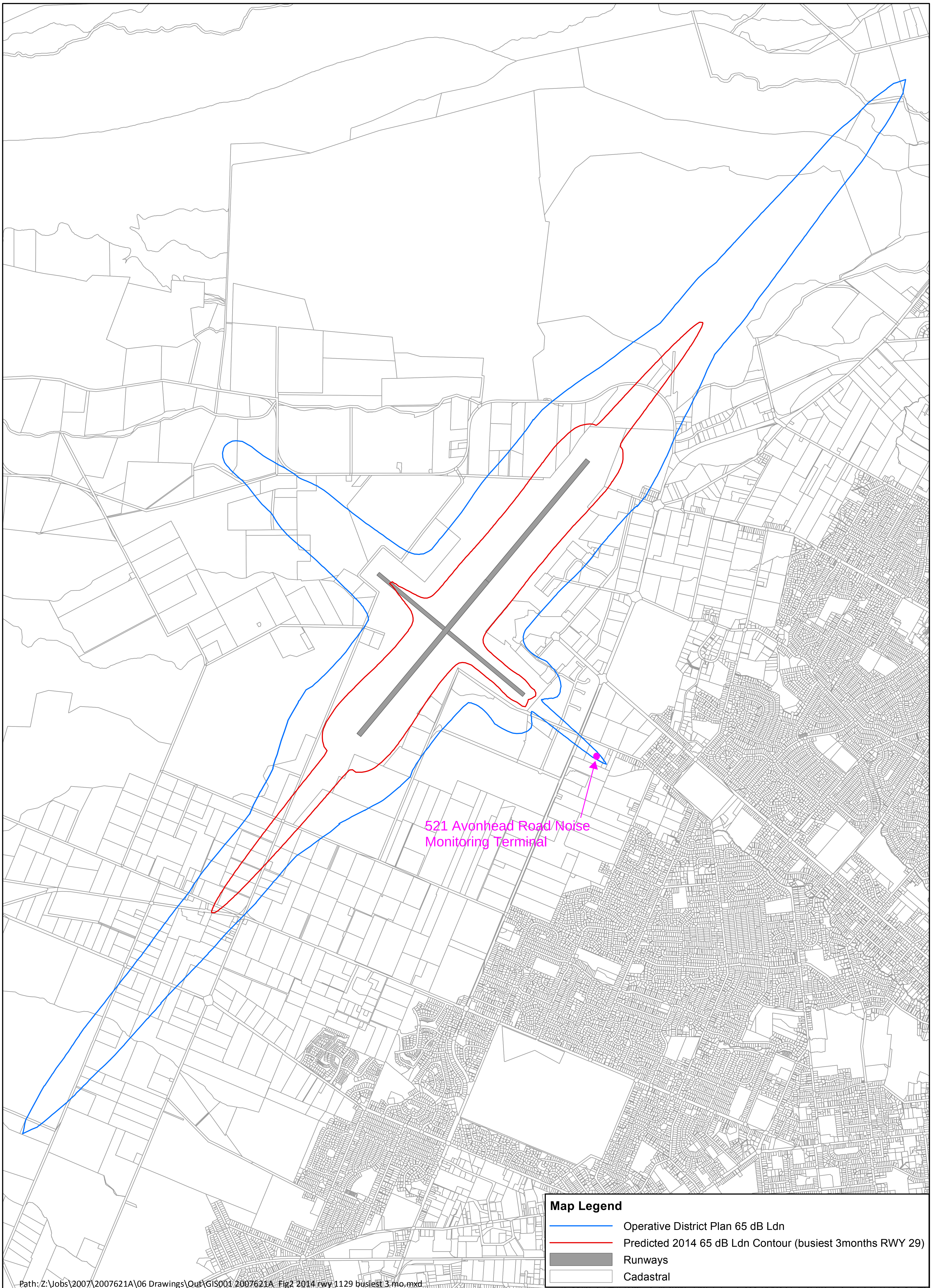

MARSHALL DAY Acoustics

Christchurch Airport

Annual Aircraft Noise Contours - Busiest 3 Months RWY 29

Prepared By: SJP
Date: 8/04/2015
Time: 3:52:59 p.m.

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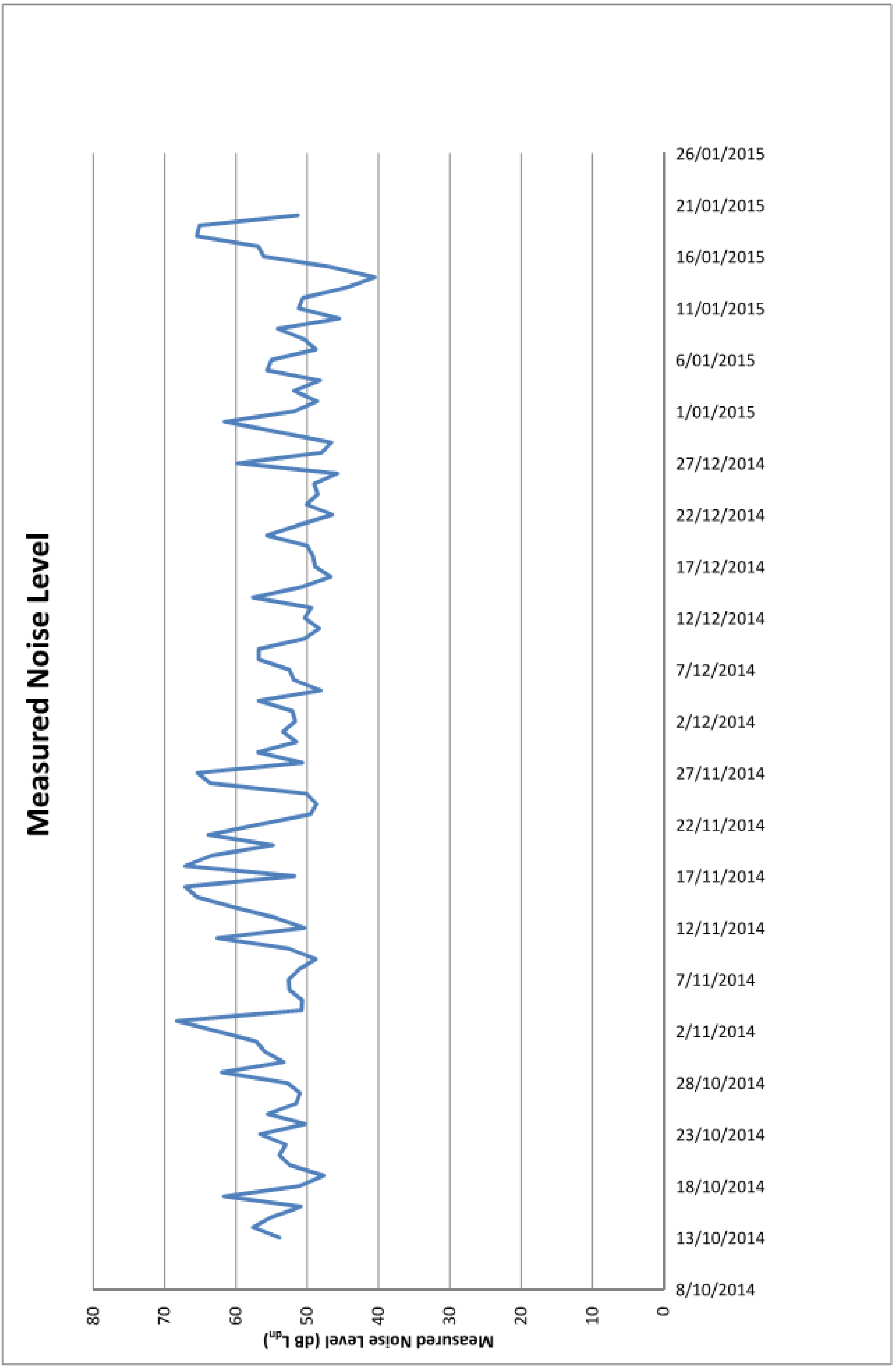
APPENDIX D: MEASURED NOISE LEVELS – 521 AVONHEAD ROAD



APPENDIX E: THE EFFECT OF GA ACTIVITY ON THE NOISE CONTOURS

General Aviation (GA) aircraft are light piston powered propeller driven aircraft typically operated by small businesses, private operators and aero club members. There are a considerable number of GA aircraft operating from Christchurch Airport but the noise emission of a GA aircraft is significantly lower than a commercial jet. Neither the existing City Plan noise boundaries nor the recently developed 'Expert Panel' noise boundaries include GA activity in the modelling. The Expert Panel agreed that the contribution of GA aircraft to the Airport's noise contours was insignificant and therefore it was not necessary to include this activity in the modelling.

To validate this assertion, the noise contours for the busiest three months in 2008 were calculated both with and without GA activity. The actual aircraft type for each GA movement was not identified in the available records therefore the calculations were based on the noisier GA aircraft types operating at the airport. The inclusion of GA in the model resulted in an increase of approximately 0.1 dB in Ldn which is considered to be a negligible change. Due to the small contribution to overall noise from the GA aircraft, it is considered reasonable to exclude this activity from the INM calculations.

The effect that GA activity has on the noise contours in the future will depend on the ratio of GA movements to large commercial aircraft movements. To monitor any significant change in this ratio, the table below lists the annualised busiest three months of airport operations by aircraft category. Each year the table will be updated in order to develop a historical record and highlight any significant changes in GA activity ratios.

Annualised Busiest Three Months of Aircraft Movements by Aircraft Category

	Jet	Turbo-Prop	General Aviation
2008	47,000	40,000	30,000
2009	39,000	40,000	54,000
2010	37,000	40,000	47,000
2011	39,000	35,000	44,000
2012	42,000	44,000	42,000
2013	36,000	51,000	37,000

Note: Figures are rounded to the nearest 1000 movements and are not exact

APPENDIX F: COMPLAINTS INVESTIGATION AND CIAL RESPONSE

As a result of noise complaints from a resident in the Russley area, a data logger was set up at 31 Stableford Green. A noise investigation was carried out using noise measurements and engine testing ground run analysis. The aim was to identify aircraft engine testing noise events that may have given rise to the complaints. Noise measurements were undertaken on-site between 19 February 2014 and 7 March 2014.

A comparison was made between records of engine testing activity (prepared by the engine testing ground run engineers and compiled by CIAL) and measured noise levels at the site.

This has been undertaken using the CIAL Engine Testing Monitoring Software (ETMS). MDA has previously developed the ETMS that will be used in the future to undertake engine testing noise assessment. The software comprises two aspects;

ETMS Inputs –Aircraft engineers performing engine tests input details of the type of test, engine power settings, duration, aircraft location and orientation into the software database.

ETMS Outputs – Noise levels are calculated for 16 key receiver locations based on the use of the input data (above). These receivers have been chosen as the reasonable worst case locations relative to engine testing noise levels.

For this complaint investigation, the input data has been extracted to examine correlation between actual engine test events and noise levels as measured at 31 Stableford Green.

Measured engine testing noise levels for all identified events ranged between 39 – 59 dB L_{Aeq} for the duration of the event. When compared with the typical measured background noise level at the residence, it is noted that these engine testing noise levels would be noticeable and that some events would also be clearly audible at night.

The testing of aircraft engines is an activity which is vital to the operational viability of a commercial airport, and like aircraft movements, it cannot normally be accommodated within standard District Plan noise rules. As such engine testing often requires a specific noise assessment. The approach adopted here is generally in line with that used at other New Zealand airports for engine testing. The assessment uses the L_{dn} metric measured over the daytime and night-time periods.

The measured noise level from each correlated engine test event has been used to calculate the daily noise exposure from engine testing noise at the site. The data recorded at the noise monitor has also been analysed more simply to compare the overall noise exposure at the residence (ambient L_{dn}; including road traffic noise, residential activity etc) with engine testing noise alone.

Calculated noise exposure levels are shown in Table 1 below:

Table 3: Calculated noise exposure levels

Day	Engine testing noise level (dB L_{dn})	Community noise level (dB L_{dn})
19/02/2014	36	55[1,]
20/02/2014	36	53
21/02/2014	42	53
22/02/2014	44	54
23/02/2014	46	60
24/02/2014	49	57
25/02/2014	33	54
26/02/2014	39	54
27/02/2014	No tests occurred	53
28/02/2014	50	59
1/03/2014	42	56
2/03/2014	45	56
3/03/2014	33	58[1]
4/03/2014	47	67[2]
5/03/2014	50	63[2]
6/03/2014	32	55
7/03/2014	34	53[1]

[1]Community noise levels calculated for these days on the basis of an estimate of night-time contribution. Noise levels were not measured during the night on these days because of equipment issues or logger deployment or retrieval. Noise levels were estimated based on night-time noise levels occurring on other days in the monitoring period

[2]Measured community noise levels on these days were adversely affected by high winds and rain, and are therefore not considered representative of the typical noise environment at this dwelling.

Overall, the measured community noise levels are in the normal range expected for a residential noise environment. It is also observed that engine testing noise exposure is significantly less than the community ambient noise at this location.

The results show that although engine testing noise levels would be audible at the house for short durations (based on the actual measured noise level and the characteristics of the noise), the engine testing noise is regarded as acceptable in the context of the overall ambient noise level.