



## SECTION 32 REPORT ADDENDUM

### CHAPTER 6 - GENERAL RULES AND PROCEDURES - NOISE

#### APPENDIX 2.3 ENGINE TESTING PROVISIONS

##### 1. Overview

##### 1.1 Background

- 1.1.1 To gain some understanding of the noise effects of aircraft engine testing at Christchurch International Airport (CIA), it is necessary to first consider engine testing in the context of overall noise produced at the airport, and the response to this noise in Christchurch's District Plan.
- 1.1.2 The operative City Plan has contained policies and rules on aircraft noise, and modelled airport noise contours, since that Plan was proposed in 1995. As a result of new noise modelling in 2007 and 2008, by a group of noise experts for Environment Court cases concerning Selwyn District, the airport noise contours have expanded outwards along the western edge of the built up area of the City. The revised shapes and sizes of the three airport noise contour lines were based on updated assumptions about aircraft mix and the flight technology now used, and updated figures for ultimate capacity of the airport as a result of the proposed SIMOPs (simultaneous operation of both runways) mode of operation. This was reflected in the new 50 dB Ldn contour which was mapped in Chapter 6 to the Regional Policy Statement (RPS) and made operative via the LURP in December 2013. Council has to give effect to the RPS, and consequently the airport noise contour lines were shifted to their new modelled locations in the operative City Plan.
- 1.1.3 The airport noise contours cover aircraft operations ie noise from aircraft taking off and landing at the airport, and aircraft flying along any flight path associated with a landing or take off at CIA, and are based on noise data from the Integrated Noise Model (INM) and records of actual aircraft operations at CIA. (Rule 11.1.3.6 in Volume 3 of the operative Plan). The noise levels are calculated over the busiest three month period of the year. Some activities have always been excluded from the calculations eg aircraft operating in an emergency for medical or national / civil defence reasons, military operations not associated with the Antarctic programme and aircraft engine testing. Noise from engine testing (ground running of engines on the wing for maintenance purposes) has not been included in the noise limits on aircraft operations in the District Plan because it has a distinct and quite different noise profile, and affects a different area.
- 1.1.4 Instead, to date engine testing has been subject to the requirements of the Christchurch International Airport Bylaws Approval Order 1989, which is administered by CIAL. This bylaw states that locations of testing are to be either at the threshold of Runway 11 (the western end of the northwest or cross-runway) or in such other place as shall be approved in writing by the airport manager before the test commences. Night-time engine testing (between 11pm and 6 am) is limited to "testing necessary to provide an urgent scheduled flight", and the total duration of testing in respect of any aircraft is not to exceed 5 minutes. Testing operators have to report details of their night-time testing to the airport manager, on the day following.



- 1.1.5 The operative City Plan includes a "800m noise setback" around the testing site at the side of the western end of the cross-runway (Planning Map 23B), and a rule making new noise sensitive buildings or parts of buildings, non-complying in this testing area. (Rule 8.3.3.1 (c). Reasons for rules include that this location offers the least potential disturbance to persons living near the airport.
- 1.1.6 In 2003-2004, Pratt and Whitney joined with Air New Zealand Engineering Services to establish the Christchurch Engine Centre in Orchard Road, in an expanded aircraft maintenance operation. While aircraft engines tested had historically been mostly 737s, in recent years with changes in aircraft fleets, there has been a shift to testing mostly A320s. These cannot be run at the original testing site at the edge of the western end of the cross-runway because they have lower wings which suck up gravel. It is understood that following an overall increase in testing being undertaken, and concern about the cost and practicality of transporting aircraft between the hangar and runway 11, ANZES sought and received approval from CIAL to undertake nearly all of their testing on the City side of airport. Most testing other than that for a few large aircraft has taken place since then behind the Orchard Road maintenance buildings, in the open, on a thickened concrete pad.
- 1.1.7 The ANZES facility now routinely services about 10-15 aircraft each night at the end of their daily schedules. Turbo-prop aircraft are often serviced in the early evening as they tend to be noisy, with aircraft being serviced after 11pm being mostly A320s. Aircraft engines are run at a variety of power levels, from idling to medium power to full thrust; however running at idling power predominates. The orientation of the aircraft and therefore its engines (on the wing), depends on the prevailing wind. Consequently noise effects on surrounding areas depend on wind conditions, the type of aircraft and the power level it is tested to, as well as what barriers in the form of buildings or other structures exist between the noise source and the noise recipient. From the perspective of residents within hearing range, there are bursts of noise during the night which may be barely or not noticeable at all most of the time, or even most of the year, but which are much more audible at certain times, for example, when there are northwest winds or during atmospheric inversions (fog conditions).
- 1.1.8 The engine testing provisions in the operative City Plan are now largely irrelevant and outdated. Appeals by CIAL to the decisions version of the currently operative City Plan resulted in several Environment Court hearings and consent orders in the period between 2004 and 2006, and as part of those hearings, agreement was reached that CIAL would produce a non-statutory Noise Management Plan for the airport (ie a plan outside of the City Plan) and that this would cover several topics including "formalising the engine testing bylaw in the noise management plan".
- 1.1.9 Versions of the CIAL Noise Management Plan are now available on the CIAL website at <http://www.christchurchairport.co.nz/en/community-and-environment/the-environment/noise/>. The 2014 NMP (Version 10) describes engine testing noise monitoring software as similar in concept to the INM monitoring procedure for aircraft noise generally, in that is based on the records of the actual engine testing that has been carried out, which enables noise exposure levels to be calculated in the nearby community, and then verified. The current NMP states that the target date for completion of



assessment of engine testing noise effects is mid 2014, and that an assessment report will then be completed, to:

- discuss predicted engine testing noise levels in the community;
- assess engine testing noise level measurements;
- consider engine testing controls at other airports;
- make recommendations for appropriate noise level controls for Christchurch, and
- discuss the implications of adopting the assessment recommendations.

1.1.10 CIAL made submissions to the draft Land Use Recovery Plan in February 2013, and also to the preliminary LURP later in 2013, providing preliminary 50 and 55 dB Ldn 7day engine testing noise contours, and seeking that the LURP direct CCC to include the 50 dBA contour in its District Plan as a contour within which there should be no new residential or rural/residential zoning, to protect Christchurch Airport from reverse sensitivity effects (complaints). It was also stated that CIAL needed to be able to provide for the safe and efficient operation and further development of the Airport including the engine testing facility.

1.1.11 Engine testing was considered by the LURP partners to be a matter which would be better addressed in the District Plan. Subsequently CIAL made a submission to Stage 1 of the replacement District Plan seeking the inclusion of the new "engine testing area", with land use restrictions for activities in close proximity to the engine testing area, as contained in the operative City Plan.

## **1.2 Key stakeholder discussions**

1.2.1 In December 2014 CCC requested GIS versions of the preliminary contours that had been included in CIAL's previous submissions, and began to consider what rules might be appropriate in Stage 2 of the Plan. CIAL's noise consultants stated that contours supplied previously in pdf form should not be used as they needed further work, and did not provide for future growth of the engine testing business. Separately, CCC's noise consultant raised concerns about the metric used and sought discussion on possible mitigation measures.

1.2.2 CCC and CIAL representatives met in late December to discuss the issues. CIAL's noise consultants then undertook further work over the Christmas period, and the contour results were supplied to CCC in January. The remodelled set of 4 contours (50, 55, 60 and 65dB Ldn) were not substantially different in shape to those initially provided, (eg there is still a "bulge" in the vicinity of the end of Harewood Road because of the effect of the northwest wind) but they are larger, to allow for future increase in engine testing noise.

1.2.3 Information provided with the contours indicated that the boundaries represent worst case engine testing noise emissions that have occurred at the airport over the last five years, with an allowance for operational growth of testing activity, consistent with that allowed for under the expert panel revised general airport contours. (this would mean approximately a doubling of throughput of engines). CIAL indicated that prior to notification of the contours, they would provide a summary of how the contours were formulated. They also indicated at that stage that their advice was that there might be



some difficulty in adopting the same approach to engine testing that the operative Plan currently takes to the Ldn contours relating to takeoff and landings.

1.2.4 Because of the very short time frame between receipt of the contours, and the need to include them in draft Planning Maps to be sent to CERA and the Minister at the end of February, a draft of the rules proposed by CCC and CCC's noise consultant, was sent to CIAL at the end of January. The rules did adopt the same approach to engine testing as for the operative Plan, as a starting point and placeholder, recognising that iterations might well be required. At that time no background material had been received from CIAL to justify a different approach. Further information on how the contours were formulated was sought from CIAL for the purposes of the section 32 report.

1.2.5 However, CIAL responded in February 2015 expressing concerns about the content of the draft rules, and seeking further discussion. Their concerns appeared to be:

- a) Lack of time to discuss the rules with ANZES and their planning consultants and develop their own position on what rules might be appropriate;
- b) Concern about the implications for their own land of prohibited activity status for noise sensitive activities within the 65 dB Ldn engine testing contour;
- c) Concern about the proposed compliance rule, whether modelling undertaken to date is robust enough to support this, difficulties in demonstrating compliance and concern about what the consequences of breach of a compliance rule might be.

## **2. Resource management issues**

### **2.1 Issue 1**

<b>RESOURCE MANAGEMENT ISSUE 1: Is there a need for revised engine testing rules in the replacement Plan?</b>
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<p>CIAL has stated that they now receive few complaints, compared to the past when there was noisy, long duration engine testing. They state that engines have become quieter over time because of high bypass fan aircraft engines.</p>
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<p>Council also receives some complaints about engine testing noise directly, but it is Council's position that the number of complaints received is unlikely to be an adequate reflection of nuisance caused, as the vast majority of people who find noise sources "a nuisance" do not formally complain, especially if the noise is intermittent.</p>
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The circumstances of aircraft engine testing have changed significantly in recent years with engine testing being shifted to the City side of the airport, much closer to a larger population, and increasing night-time throughput of engines tested may have cancelled out the benefits of quieter engines. In addition until recently there has been no modelled prediction or measurement of actual noise levels produced, so it is difficult to know what the scale of "nuisance" actually is, other than from anecdotal accounts of residents in adjoining areas being woken at night, sometimes repeatedly, especially during northwesterly winds, and if they have single glazing. Now that some work has been undertaken on this issue, CIAL itself is suggesting in effect that a nuisance does or could exist, by noting the possibility of reverse sensitivity effects if more people come to live in noise affected areas in the future.

It is the Council's view that in allowing the testing operation to move to the City side of the airport, little weight has been placed on the potential effects of night-time noise for neighbours. It further considers that the CIAL Bylaw is outdated, and that it is now appropriate to seek a better balance between the needs of the noise generator and the needs of the nearby communities, by including noise contours and supporting rules in the Plan, as is being done for other intermittent noise producers such as Ruapuna Speedway.

While CIAL have sought a rule limiting intensification of development in the engine testing area, development in these areas is already limited by the airport 50 dBA Ldn noise contour, which now acts as a significant barrier to rezoning for urban uses in this vicinity, for example ensuring that 4 ha lots remain the minimum lot size permitted upon subdivision. Noise insulation has been required for some years for new residential units within the main airport 55 dBA Ldn contour. The modelled 55 engine testing noise contour does extend out beyond this in particular areas eg the end of Harewood Road, so it appears that acoustic insulation could well be beneficial in these additional areas, especially if throughput at the testing facility increases significantly in the future.

As well as being concerned to limit people's exposure to engine testing noise, Council considers that it is appropriate to impose an upper limit on the amount of noise able to be produced at the facility, in the same way as since 2005, there has been a Plan rule limiting operational noise emitted at the airport to no more than 65 dB Ldn outside the modelled 65 dB Ldn contour line. CIAL is required to report to Council regularly on airport operational noise, demonstrating that it is complying with this limit. It is accepted that controls are necessary to safeguard the continued operation and development of facilities at the International Airport, which make a huge contribution to the development and economic well-being of the City, region and nation. Similarly, surrounding landuses also need protection from the adverse effects of facilities such as these, which are required to operate on a continual basis.

**2.2 Issue 2**

**RESOURCE MANAGEMENT ISSUE 2- What engine testing rules would be appropriate?**

Assuming that there is a need for engine testing rules in the District Plan, then the question is, what rules would be appropriate?

- a) What metric should be used to measure engine testing noise



At this stage CIAL are proposing to use the Ldn metric over the busiest rolling 7 day period of the year. This is the metric used at Auckland Airport, where engine testing noise levels are not to exceed Ldn 55 on a 7 day rolling average in the Main Residential Zone (Manukau District Plan 2002,). There is also an Lmax within the residential zone of 75 dB Ldn between 10pm and 7am, reflecting the intermittent nature and peaks of noise, separated by periods of no noise. Hamilton airport (Waipa District Plan, Appeals version, July 2014) uses 7 day rolling average Leqn and Lmax measures. Auckland airport also has a rule about cumulative noise from aircraft operations plus engine testing.

Further debate is needed on the appropriate measure(s) in the circumstances of Christchurch International Airport. One of the influences on measure(s) adopted could be the cost and time involved in validation, which would desirably be minimised.

- b) Are there management or mitigation measures which would reduce the noise emitted or enable it to be emitted at different locations or at different times?

To date CIAL representatives have stated that a solid enclosure within which testing could occur (eg around the concrete testing pad) would be too costly. However the degree of nuisance has yet to be properly established and weighed against such a cost. If the costs did turn out to outweigh the benefits in terms of protecting amenity, or even if this is not conclusively established, it is considered that there still needs to be further discussion about alternative management or mitigation measures.

The information Council currently has about the engine testing regime at the airport may be inadequate or out-of-date. Once a better picture of the testing regime has been provided, discussion with ANZES may result in the identification of other mitigation options, eg opportunities to do some ground running in locations which produce less noise, or consideration of the cumulative "dose" of engine testing noise within a certain time period or during certain wind conditions. Identification of such options is likely to take some time, and may well be better done within the Noise Management Plan update process.

However in the meantime and with the timing constraints on producing a replacement District Plan, Council wishes to put the issue on the table, propose some placeholder rules, so that the implications can be debated, and begin the process of deciding on an appropriate planning response through the submission process.

- c) Are rules proposing prohibited activity status on new noise sensitive activities within the 65 dB Ldn contour appropriate, or would non-complying activity status be better?

At the time of writing Council had yet to receive information or evidence to indicate that prohibited activity status would be inappropriate within the inner, 65 dB Ldn contour, for new noise sensitive activities. This status already exists for new noise sensitive activities within the 65 dB Ldn operational airport noise contour. While the 65 dB Ldn engine testing contour provided to Council in January covers more of the airport land than the equivalent operational airport noise contour, eg more of the general business land within the Airport zone, it also covers more privately owned land outside the airport. The currently modelled location of the 65 contour would not prohibit backpackers accommodation in the location which has been proposed by CIAL. It also does not cover the location of the Sudima Hotel.



### **3. Scale and significance**

#### 3.1 Description of Rules

3.1.1 The rules proposed at this stage for airport engine testing are based on those for airport operational noise, ie;

- i. Three contours are mapped - the 50 dB Ldn, the 55 dB Ldn and the 65 dB Ldn. The basis for the contours is the current worst case noise over a 7 day period, with an allowance for increase in noise over time as the engine testing facility grows its business.
- ii. The 50 dB Ldn contour is used as an "awareness area" and has no rules directly associated with it.
- iii. The 55 dB Ldn contour is used as the outer boundary of the area requiring acoustic noise insulation. (proposed Rule 6.1.5.1.4, NC2). This area is largely within the 55 dB Ldn airport operational noise contour, and it may well be that acoustic insulation for the effects of one noise source adequately mitigates the effects of the other, although expert evidence is not yet available on this question. There are two areas where the 55 dB engine testing contour bulges out beyond the 55 dB airport noise contour; the largest is mostly between Wairakei and Harewood Roads and extends across Nunweek Park to the subdivision beyond, and there is another small area on land owned by Isaacs Construction north of McLeans Island Road.
- iv. The 65 dB Ldn contour is used as the area within which new noise sensitive activities should not be permitted. (Rule 6.1.5.1.5 PA2). Much of this area is on airport land, where activities provided for are primarily airport related, service commercial and light industrial in nature, but some is on private rural land to the east of Johns Road between Wairakei and Harewood Roads.
- v. The 65 dB Ldn contour is also used as the line at which engine testing noise should not exceed the modelled levels. (worst case plus additional allowance for growth in business). (Rule 6.1.4.2.7 a ii). There is a proposed rule about monitoring (Rule 6.1.4.2.7 c) which would require a report to Council annually on measured noise in the preceding year.

3.1.2 It is recognised that the proposed rules are a placeholder only at this stage and may need amendments to better reflect information yet to be provided.

3.1.3 Possible alternatives to the rules proposed, and the environmental, economic and social effects of the provisions will need to be further fleshed out in evidence at the hearing. Engine testing noise is not likely to be at such a level, so frequently, that it adversely affects people's health, but is more likely to be an issue for the amenity of the local area, and an additional constraint on the possibilities for future land use change or intensification in this area.

#### **3.2 Objectives, policies and rules**



3.2.1 The objective of the noise section of Chapter 6 General Rules and Procedures is:

"Adverse noise effects on the amenity or health of people and communities are minimised, consistent with the anticipated outcomes of the receiving environment".

3.2.2 There are three supporting policies, on "managing noise effects", "noise during night hours" and "activities in key locations", all of which are relevant to and provide a framework for considering engine testing noise. These are further discussed in the evaluation of options below.

3.2.3 None of the statutory higher order planning documents which provide guidance for the District Plan, touch on this particular issue, although several (LURP, the RPS and the Strategic Direction chapter decision of the Panel) contain related policies which stress the benefits of and need to protect strategic infrastructure such as the airport, and require the avoidance of noise sensitive activities within the airport operational 50 dB Ldn contour, other than in existing residentially zoned areas and specified other areas. In the Strategic Directions chapter decision, the Infrastructure policy does note that adverse effects of infrastructure on the surrounding environment need to be managed, having regard to the economic benefits and technical and operational needs of such infrastructure.

#### **4. Evaluation of proposed objective**

4.1 Section 32(1)(a) of the Act requires the Council to evaluate the extent to which the objectives are the most appropriate way to achieve the purpose (Section 5) of the Act.

It is not proposed to evaluate the general noise objective here, as this objective is evaluated in the overall section 32 report for the Noise section. Engine testing rules fit appropriately under this objective.

"Adverse noise effects on the amenity or health of people and communities are minimised, consistent with the anticipated outcomes of the receiving environment".

#### **5. Evaluation of proposed policies, rules and methods**

##### **5.1 Evaluation of Planning Methods to be Used for Engine Testing**

Rules/Method(s) Most Appropriate	Effectiveness and Efficiency
<p><b>Option 1: Proposed Contours and Rules</b></p> <p>(i) Indicative Noise contours representing the worst case noise week from the last 5 years, and providing an allowance for future growth of testing activity.</p> <p>(ii) Rules requiring noise insulation in those areas beyond the existing airport noise acoustic insulation area, where engine testing noise could reach similar levels in terms of average noise "dose", and prevention of additional noise sensitive activities in the most noise affected area.</p> <p>(iii) Rules limiting the noise emitted to certain upper levels and requiring annual noise monitoring reports to be provided to Council.</p>	<p><b>Effectiveness</b></p> <ol style="list-style-type: none"> <li>The proposed rules are a balanced package which recognise the benefits of the noise generating activity and allow it to grow in scale, but also avoid a situation of significant decrease in amenity. There will be an upper limit to the noise that can be generated.</li> <li>Landowners and occupiers are given appropriate warning about engine testing noise on the face of the Planning Maps.</li> </ol> <p><b>Efficiency</b></p> <ol style="list-style-type: none"> <li>It is possible that there are other ways of achieving a similar outcome, by managing particularly noisy testing in a slightly different manner eg in terms of timing or location. However it is unclear what the costs of mitigation measures might be and therefore it is difficult to comment on efficiency.</li> <li>The costs of the proposed rules do not appear high, as there is significant flexibility for the operator to generate more noise. New noise sensitive buildings in most of the area worst affected is already required to incorporate noise insulation.</li> </ol> <p><b>Benefits</b></p> <ol style="list-style-type: none"> <li>Those living in the worst affected area have some assurance that there is an upper limit on how much noise can be produced at night-time.</li> <li>Over time, as a best case scenario, with more specific attention by operators to this issue, sleep disturbance at night-time could be reduced.</li> <li>Council is seen to be fair and reasonable in considering engine testing noise as well as operational airport noise.</li> </ol> <p><b>Costs</b></p> <ol style="list-style-type: none"> <li>Additional rules in the Plan (but against this, they are relatively simple rules).</li> <li>Costs to CIAL and ANZES of noise modelling</li> </ol>



	and monitoring.
<b>Rule/method options less or not as appropriate to achieve the Objectives and Policies:</b>	
<p><b>Option 2: Status Quo as in operative City Plan, and reliance on the CIAL bylaw.</b></p> <p>(i) Site at the western end of the cross-runway identified for engine testing, and an 800m "exclusion area" identified around it, within which new noise sensitive activities are a non-complying activity.</p> <p>(ii) No rules in the replacement District Plan limiting engine testing noise and reliance on the CIAL bylaw to specify where and how engine testing should take place.</p>	<p><b>Effectiveness</b></p> <ol style="list-style-type: none"> <li>1. The site identified in the operative Plan is rarely used for engine testing now, and the rule does not address the current issue. The reason for the rule is misleading as it states that "the majority of engine testing activities will take place within 200m of the "cross" identifying the Aircraft Engine Testing Area shown on Planning Map 23B". This is incorrect. If such a rule is to remain in the Plan, at the very least it needs to be updated to reflect the current situation.</li> <li>2. There is only one rule in the City Plan controlling sensitive activities in the vicinity of testing, and no corresponding limit on the potential increase in noise that could occur. At present the only control on noise emitted is section 16 of the RMA "Duty to avoid unreasonable noise". Every occupier of land shall ensure adopt the best practicable option to ensure that the emission of noise from that land does not exceed a reasonable level".</li> <li>3. The CIAL Bylaw has been interpreted loosely, and the operator has been authorised to carry out engine testing significantly closer to a much greater population of residents than previously.</li> <li>4. The current regime is not effective in balancing the need to test engines at night-time in order to protect public safety on flights the following day, with the amenity of residents in the surrounding area.</li> <li>5. It relies on residents' tolerance, and is not effective in planning for the future when engine testing noise may well increase.</li> <li>6. The current regime does not adequately implement the proposed objective on Noise in Chapter 6 of the replacement Plan.</li> </ol> <p><b>Efficiency</b></p>



	<p>7. From CIAL's point of view the current bylaw may be efficient because they administer it, and they have not required engine testing activity to be limited except in terms of test duration.</p> <p><b>Benefits</b></p> <p>8. Having no effective rule in the Plan addressing this issue is simple, and a benefit for the noise generator.</p> <p><b>Costs</b></p> <p>9. The amenity costs of engine testing noise have not been established, nor have the costs of management or mitigation options. Further work is required.</p>
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**Risk of Acting or Not Acting**

Some uncertainty attached to the proposal to include engine testing noise contours in the replacement Plan without the "considerable further discussion" that CIAL seeks. Changes may be needed to the location of the contour lines if the assumptions underlying them or the technical basis for calculating them changes. However the lengthy time period which has already elapsed since the airport noise appeals on the last City Plan were settled (2005-2006) and when engine testing noise was required to be covered in the non-statutory Airport Noise Management Plan, shows that time does not guarantee priority is given to this issue.

The risk of not acting is that people buy into the area without proper understanding of the noise effects of engine testing and find it to be a nuisance which could get worse over time. The risk of acting is that the some people have their concerns heightened unnecessarily. Preliminary advice has been received from Council's noise consultant, who indicates that in the timeframes attached to this Plan review, the information available is sufficient to inform the proposed provisions, and will enable the issue to be brought before the public and the residents of the area for submissions.

**Appendix 4.5.6.2 – Bibliography – Engine Testing**

Christchurch Airport Noise Management Plan March 2014, Version 10.  
Christchurch International Airport Bylaws Approval Order 1989.