Wellington Airport Noise Management Plan

Updated: November 2021

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Document available in the ANMC Dropbox

PART A

Noise Management Plan

1. Introduction

WCC District Plan Policy 10.2.5.4 requires that a Noise Management Plan is developed and implemented by Wellington International Airport Limited to assist all interested parties in complying with the objectives and rules in the District Plan.

The noise management plan will include:

- a statement of noise management objectives and policies
- details of methods and processes for remedying and mitigating adverse effects of airport noise including but not limited to:
  - improvements to Airport layout to reduce ground noise
  - improvements to Airport equipment (including provision of engine test shielding such as an acoustic enclosure for propeller driven aircraft) to reduce ground noise
  - aircraft operating procedures in the air and on the ground
- procedures for monitoring and ongoing review of the plan
- dispute resolution procedures
- a programme for immediate and ongoing refinement by way of shrinkage of the location of the Air Noise Boundary (ANB), with priority to be given to those areas which through further monitoring are found not to be exposed to forecast Ldn 65 dBA, with the intent that the programme be completed within two years
- consideration of land use measures which may mitigate adverse effects through changes to controls
- consideration of any need for insulation of existing houses within the ANB; the extent to which such insulation is appropriate, and the ultimate responsibility for cost
- details of methods and process for monitoring and reporting compliance with the District Plan rules, including but not limited to:
  - airnoise boundary and activity ceilings provided in the rules
  - engine testing
  - Auxiliary Power Units (APUs) Ground Power Units (GPUs)
  - curfew
- details for certification by WIAL of night curfew exempt aircraft.

2. Objectives and policies

Noise monitoring system

Objective/policy	To have a system of monitoring noise levels at and around the air-noise boundary which reliably and consistently • identifies source of the noise • measures the noise level in accordance with NZS6805:1992 • times duration of noise • provides a cumulative record of noise events/levels so that reliable and consistent data is available to all affected parties.
QA and management procedure	Develop and implement procedures which ensure that data from the noise monitoring terminals is collected, checked, analysed and reported to the committee.
Reporting	Identify frequency and form of presenting data collected by the noise monitoring system to the committee.
Consultation	Ongoing via committee - issues to be identified.

Air-noise boundary compliance

Objective/policy	Develop and implement method for monitoring compliance with air-noise boundary rules.
Rules	District plan
Reporting/ enforcement	Develop and implement methods of ensuring compliance, including • procedures to warn airlines of potential non-compliance • reporting of enforcement authority decisions to committee.
Complaints	See **Complaint handling** section
Consultation	Methods developed in consultation with affected parties via committee.

Curfew

Objective/policy	• To minimise disturbance to residents at night by means of a curfew • To promote education of airport users in curfew rules • To manage applications for exemptions from curfew

Rules	District plan
Procedures (local)	Develop and implement procedures • to ensure correct advice is given to operators - in conjunction with Air Traffic Control and airport users • to deal with breaches of curfew rules • to deal with residents' complaints (see **Complaint handling** section).
Reporting/ enforcement	Develop and implement procedures for reporting breaches, complaints (see **Complaint handling** section) and enforcement decisions/outcomes to committee
Consultation	Procedures developed in consultation with affected parties via committee

Engine testing

Objective/policy	To minimise and mitigate effects of noise from engine testing.
Rules	District plan
Procedures (local)	Develop and implement • procedures and guidelines to educate and assist airport users to comply with rules • procedures for operators to report engine tests.
Capital works	Investigate options (shielding/enclosure) to mitigate effects of scheduled maintenance run-ups.
Reporting/ enforcement	• Develop and implement reporting procedures for operators to report engine tests • Develop and implement procedures for reporting breaches, complaints (see **Complaint handling** section) and enforcement decisions/outcomes to committee.
Consultation	Procedures developed in consultation with affected parties via committee.

Ground power (APU/GPU)

Objective/policy	To minimise and mitigate effects of noise from APUs and GPUs
Rules	District plan

Procedures (local)	Develop • ground handling procedures consistent with the rules • reporting procedures for operators
Capital works	Continue implementation of ground power reticulation
Reporting/ enforcement	Develop and implement procedures for reporting breaches, complaints (see **Complaint handling** section) and enforcement decisions/outcomes to committee
Consultation	Procedures developed in consultation with affected parties via committee

Airside maintenance

Objective/policy	To minimise the amount of work carried out at night and mitigate the effects on residents of noise from work which can only be done at night
Rules	District plan
Situations where night-time work is appropriate	WIAL to consult on criteria which must be fulfilled to justify work performed at night
Procedures/ methods of work	Develop and implement procedures and work methods to reduce disturbance to residents.
Reporting/ enforcement	Develop and implement procedures for recording, monitoring and enforcement, including reporting at all stages to committee.
Complaints	See **Complaint handling** section
Consultation	Procedures to be developed in consultation via committee.

Complaint handling

Objective/policy	To receive, identify, respond to and record all complaints about airport noise
Procedure	Develop and implement procedures to • centralise complaint recording/receipt point • identify source/respond to complainant/follow up if appropriate • report to committee • analyse trends and correlations between complaints and noise events
Education	Promote community awareness of complaint/contact point

Consultation	Procedures and methods to be developed in consultation via committee

Operating procedures/flight tracks

Objective/policy	Promote best practices for mitigating noise effects during takeoff and arrival of aircraft, including • use of preferential runway • future development of approach and departure tracks/ performance criteria • adherence to flight paths consistent with the safe, orderly and expeditious flow of aircraft traffic
Rules (CAA/ACNZ)	• CAR part 93 • ICAO Annex 16, Annex 11 and Doc 444
Reporting/ enforcement	Develop and implement procedures for recording, monitoring and enforcement
Consultation	Best practices and procedures developed in consultation with airlines and ACNZ via committee

Education

Policy/objective	To improve awareness of affected parties of Wellington airport noise rules, current issues and noise management, and to advocate the use of quieter aircraft
Noise management plan	Identify organisations/companies/ people who would benefit from education about the NMP, formulate education ideas and plans and promote their adoption by interested parties.
Consultation	Committee to identify organisations/companies/people who would benefit from education about the noise management plan, and consult with them regarding education initiatives

3. Definitions

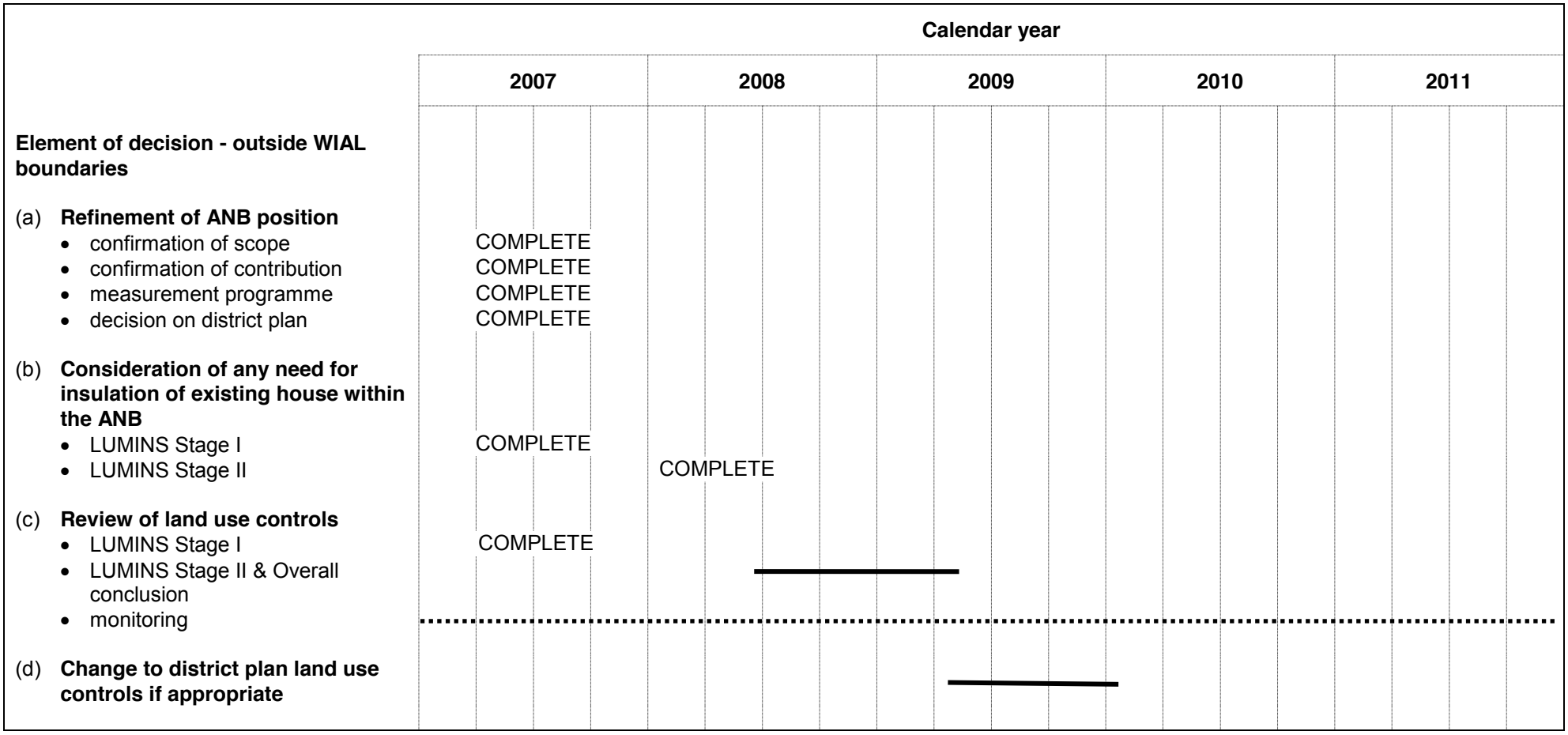
Alternate	Aircraft using the airport as planned alternative to landing at a scheduled airport. Note any aircraft landing at Wellington as an alternate during curfew hours cannot depart until 0600 hrs.
Arrival	Touchdown on landing
Departure	Start of take-off roll
Director	The Director of Civil Aviation Authority
Disrupted flight	A flight which is delayed on arrival or departure at Wellington through unforeseen circumstances that could not reasonably be catered for by prudent timetabling, such delay having originated at Wellington or within the previous 4 sectors, as a result of: • weather (at origin, en-route, or destination causing cancellations, diversions, delays, missed approaches or holding); or • Air Traffic Control (congestion, start delays, en-route holding or approach delays); or • closure of a departure or destination aerodrome; or • diversion for in-flight medical condition or flight safety reason to another aerodrome other than the flight planned aerodrome; or • aircraft unserviceability (e.g. mechanical breakdown); or • the aircraft being required to wait for crew from a flight delayed as a result of any of the above. Note: • An aircraft which has been substituted for an aircraft delayed as a result of any of the above also comes within the definition of disrupted flight • An aircraft may not depart Wellington Airport after midnight and before 0600hrs to act as a substitute aircraft for another that has become unserviceable at a location other than Wellington
Emergency	1. Aircraft landing in an emergency 2. The operation of emergency flights required to rescue persons from life-threatening situation or to transport patients, human vital organs or medical personnel in a medical emergency 3. The operation of unscheduled flights to meet the needs of a national civil defence emergency declared under the Civil Defence Emergency Management Act 2002

Statutory holiday period	(i)	The period from 25 December to January 2, inclusive. Where December 25 falls on either a Sunday or a Monday, the period includes the entire or previous weekend. Where New Year's Day fall on a weekend, the period includes he two subsequent working days. Where January 2 falls on a Friday, he period includes the following weekend.
	(ii)	The Saturday, Sunday and Monday of Wellington Anniversary weekend, Queens Birthday weekend and Labour weekend.
	(iii)	Good Friday to Easter Monday inclusive.
	(iv)	Waitangi Day
	(v)	Anzac Day
	(vi)	Where Waitangi Day or Anzac Day falls on a Friday or a Monday, the adjacent weekend is included in the period
	(vii)	The hours from midnight to 0600hrs immediately following the expiry of each statutory holiday period defined in (i) to (vi) above.

Noise terminology

Noise	A sound that is unwanted by, or distracting to, the receiver.
dB	Decibel The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 μPa i.e. dB = 20 x log(P/Pr)
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
dBA	The unit of sound level which has its frequency characteristics modified by a filter (Aweighted) so as to more closely approximate the frequency bias of the human ear.
$L_{Aeq(t)}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period
L_{dn}	The day-night sound 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_{den}	The day evening night noise level which is calculated from the 24 hour L_{Aeq} with a 5 decibel penalty applied to the evening (1800-2200 hours) L_{Aeq} and a 10 decibel penalty applied to the night-time (2200-0700 hours) L_{Aeq}.
SEL or L_{AE}	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 a train passby or an aircraft flyover

4. Implementation Programme (Revised as at April 2007)



Element of decision - within WIAL boundaries	Calendar year				
	2007	2008	2009	2010	2011
(a) **Provision of engine test shield**					
• confirm brief and objectives	COMPLETE				
• options paper	COMPLETE				
• consultation	COMPLETE				
• capital budget	COMPLETE				
• construct	COMPLETE				
(b) **Layout and operating procedures review**					
• ongoing policy and rule development					
• consultation and programme implementation	COMPLETE				
• monitoring programme					
(c) **Rule 11.1.1.1.6(h) - night curfew exemptions**					
• develop allocation options	COMPLETE				
• industry consultation	COMPLETE				
• implementation	COMPLETE				
• monitoring programme					
(d) **Rule 11.1.1.1.6(c)(iv) - engine test allocation and monitoring**					
• develop allocation options	COMPLETE				
• industry consultation	COMPLETE				
• implementation & monitoring					

	Calendar year				
	2007	2008	2009	2010	2011
Element of decision - system and processes					
(a) **Noise monitoring system(s)**					
• confirm system objectives	COMPLETE				
• confirm operational protocols	COMPLETE				
• confirm contributions	COMPLETE				
• develop tender TORs	COMPLETE				
• tender and evaluation	COMPLETE				
• capital budget	COMPLETE				
• implementation	COMPLETE				
• monitoring					
(b) **Compliance data capture**					
• military aircraft	COMPLETE				
• curfew and exemptions	COMPLETE				
• engine testing	COMPLETE				
• APU/GPU monitoring					
(c) **Complaints procedure**	COMPLETE				
Element of decision - Noise Management Plan structure and business processes					
(a) **Plan structure**					
• options (eg ISO, etc)	COMPLETE				
• consultation	COMPLETE				
• re-write (if needed and all future documentation)					
(b) **Monitoring & Review process**	COMPLETE				

(c) **Dispute resolution process defined**	COMPLETE

PART B

Rules and Regulations

1. Wellington City District Plan

1.1 Chapter 10 Airport and Golf Course Recreation Precinct

http://wellington.govt.nz/~/media/your-council/plans-policies-and-bylaws/district-plan/volume01/files/v1chap10.pdf?la=en

1.2 Chapter 11 Airport Precinct Rules and Golf Course Precinct Rules

http://wellington.govt.nz/~/media/your-council/plans-policies-and-bylaws/district-plan/volume01/files/v1chap11.pdf?la=en

1.3 Chapter 3.10 Definitions

http://wellington.govt.nz/~/media/your-council/plans-policies-and-bylaws/district-plan/volume01/files/v1chap03.pdf?la=en

1.4 Map 35 Air Noise Boundary

http://wellington.govt.nz/~/media/your-council/plans-policies-and-bylaws/district-plan/volume03/files/v3map35.pdf?la=en

2. Civil Aviation Rules

2.1 CAR Part 91: General Operating and Flight Rules

https://www.caa.govt.nz/rules/Rule_Consolidations/Part_091_Consolidation.pdf

2.2 CAR Part 93: Special aerodrome traffic rules and noise abatement procedures

https://www.caa.govt.nz/rules/Rule_Consolidations/Part_093_Consolidation.pdf

3. Noise abatement procedures

3.1 NZWN 31.3

http://www.aip.net.nz/pdf/NZWN_31.3_31.4.pdf

3.2 NZWN 31.4

http://www.aip.net.nz/pdf/NZWN_31.3_31.4.pdf

3.3 NZWN 31.5

http://www.aip.net.nz/pdf/NZWN_31.5_31.6.pdf

3.4 NZWN 31.6

http://www.aip.net.nz/pdf/NZWN_31.5_31.6.pdf

PART C

Noise Management Procedures and Controls

1. Noise Monitoring System

Purpose

To describe the collection and reporting of noise monitoring information used for demonstrating ANB compliance and investigating noise complaints.

Airport Noise and Operations Monitoring System (ANOMS)

Aircraft noise monitoring at Wellington Airport is provided under a Services Agreement between WIAL and WCC and Brüel & Kjær EMS Pty Ltd. The following components are delivered under this agreement:

- Hosted ANOMS service, including technology upgrades, software and data backup and software upgrades
- Lease of three 3639-A fixed noise monitoring terminals located on the Air Noise Boundary
  - NMT-1 Rongotai
  - NMT-2 Maupuia
  - NMT-3 Kekerenga
- Installation, commissioning and setup of supplied equipment and services
- NMT hardware insurance (fixed locations), fault repairs and preventative maintenance
- Monthly reporting as specified
- All equipment (including noise monitoring terminals and tilt masts) remain the property of Brüel & Kjær
- All data collected remains the property of WIAL

ANOMS data and reporting

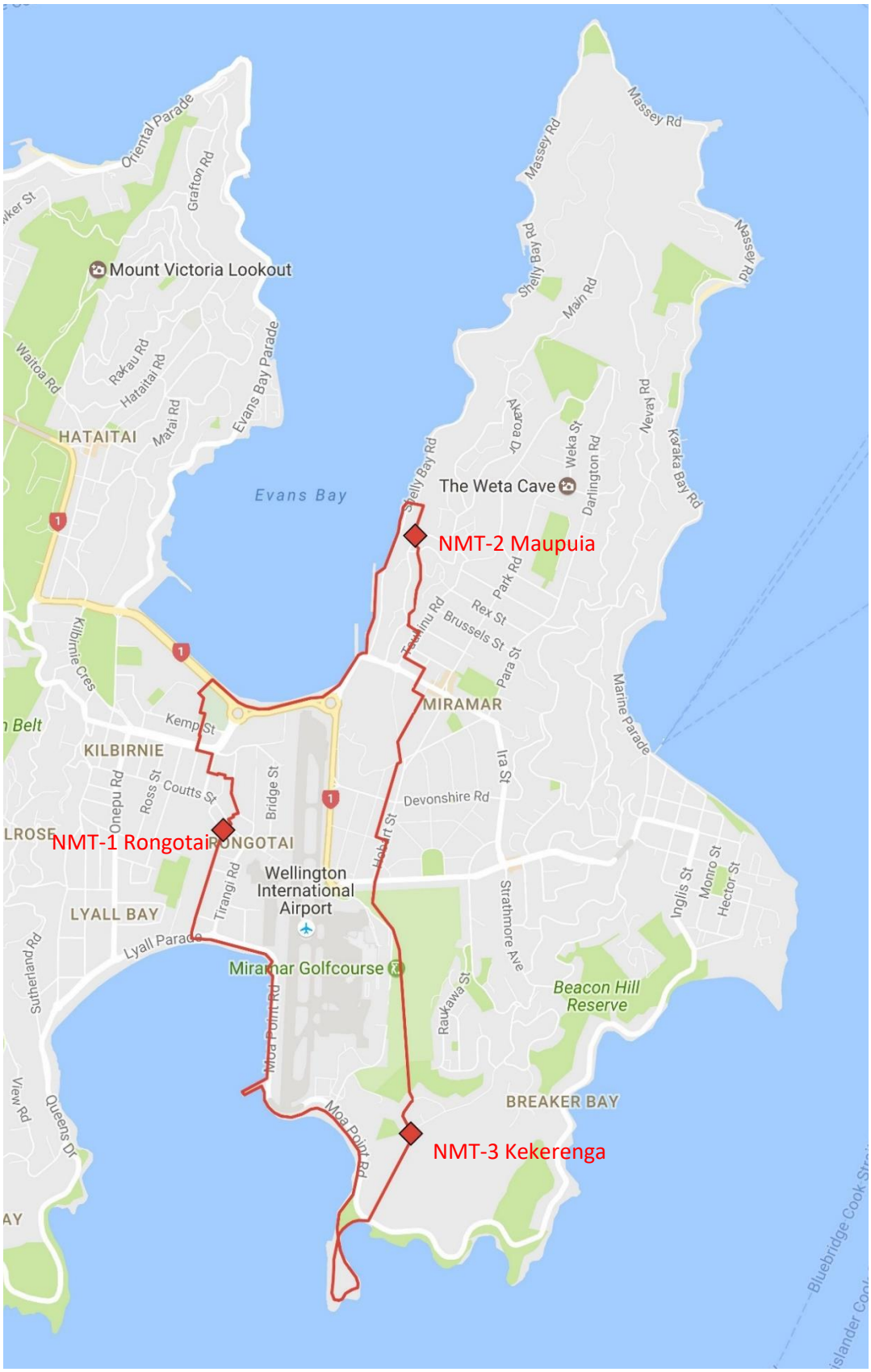
The following reports are produced monthly by Brüel & Kjær EMS Pty Ltd:

- 90 day LDN (by NMT)
- Daily LDN (by NMT)
- Night movement (curfew) report
- Aircraft Operations (operation type and aircraft type)
- Uncorrelated Aircraft Analysis
- Calibration report (by NMT)

These reports and graphs are included in the ANMC agenda.

The ANMC Curfew Reports incorporate flight observation data provided by ACNZ Tower re compliance with curfew provisions. ACNZ Tower observations confirm exempt flights (including medical), disrupts and international flights. Refer *Curfew Flight Observation* procedure.

1.1 Wellington Airport NMT locations



PART C Noise Management Procedures and Controls

MANAGING NOISE TO ENABLE AIRPORT GROWTH

ANOMS™

Brüel & Kjær

BEYOND MEASURE

AIRPORT NOISE AND OPERATIONS MANAGEMENT

Airport expansion, airspace redesign, changing community sensitivities and operational inefficiencies are increasingly affecting an airport's ability to grow.

In today's fast-paced and complex world, how you partner with your community is as important as what you're doing. ANOMS (Airport Noise and Operations Management System) provides 24/7 noise monitoring to help manage environmental impact and build community support.

The sophisticated system links a number of noise monitors located around the airport with radar and flight systems. ANOMS fuses the data to provide insight into:

- **Noise exposure** – Know the noise level of every aircraft arriving and departing the airport
- **Flight track compliance** – Identify which aircraft are flying and where, and detect which are failing to meet prescribed flight procedures
- **Operational and air traffic control reports** – Understand what's really happening to develop future policies and plans
- **Complaint handling** – Record every community enquiry and automatically compile a response that identifies which aircraft caused a complaint
- **Community relations** – Analyze data over time to report on trends, and know exactly how operations are changing to help set community expectations and build understanding

Measuring

ANOMS delivers top-quality, real-time and complete noise and track information that enables noise office staff to efficiently communicate with stakeholders.

Managing

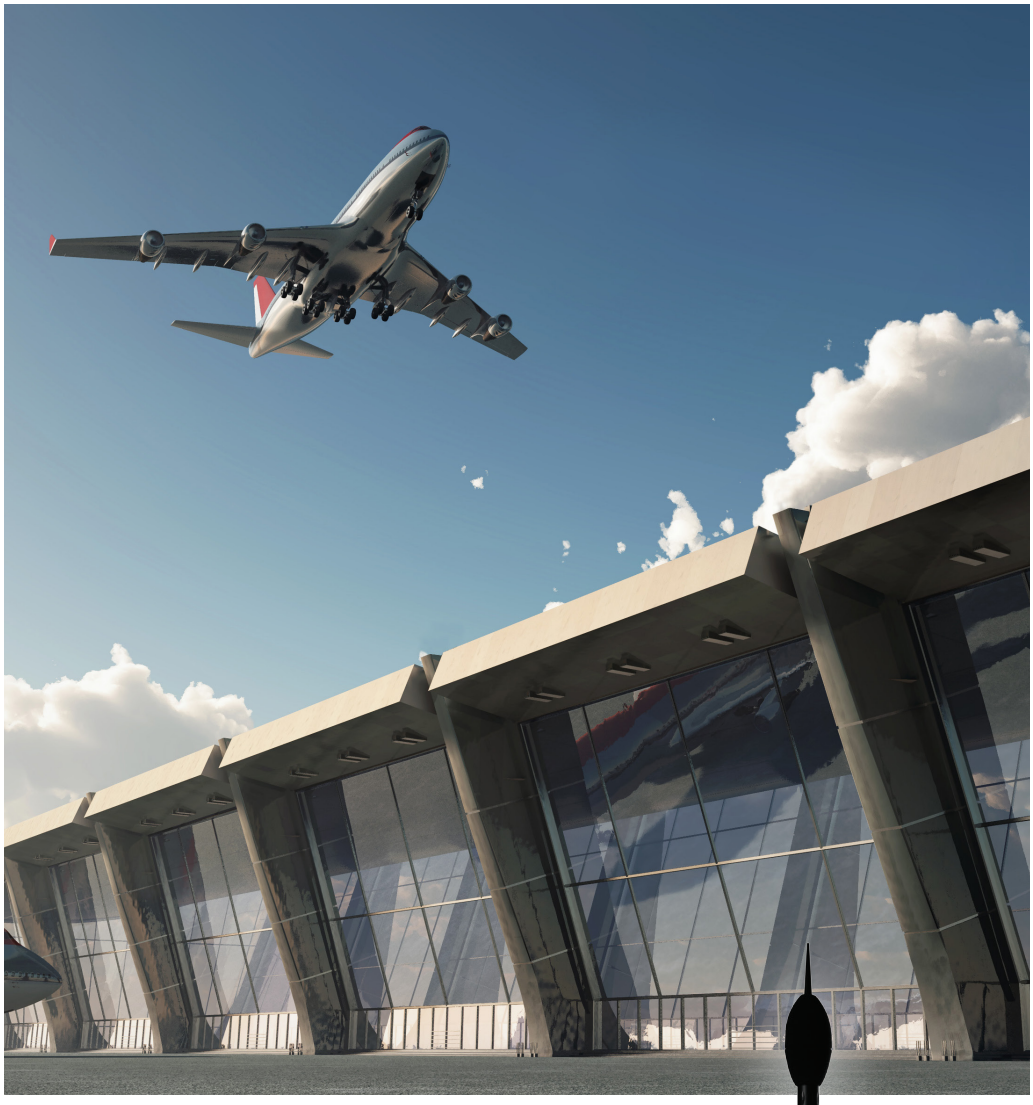
ANOMS' simple, tailored workflows help to quickly investigate issues and determine corrective action where appropriate for pilots violating noise abatement procedures.

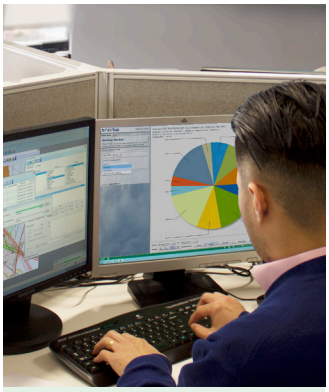
Reporting

ANOMS reports clearly show where you're meeting regulations and how well noise mitigation initiatives are working. The implications of non-standard operating procedures and performance of individual airlines are available at the press of a button.

Neglecting to reliably measure, manage and report on your environmental impact can result in operating restrictions and constrained growth.

You work hard to reduce aircraft noise, but if your community perceives things differently they may not support planned changes. Manage noise levels and keep stakeholders informed with ANOMS' market-leading best practices.





Brüel & Kjær

Brüel & Kjær is the global leader of solutions for the emerging new breed of noise management programs.

For more than four decades we've provided products and services built on unmatched R&D and best practices from more than 250 global clients.

Our cost-effective, extensive solution suite includes noise monitoring, community engagement, complaint management and operational efficiency solutions.

We offer tailored services and flexible delivery and financial models to meet individual needs. Join the Brüel & Kjær network and benchmark yourself against the best.

Best-practice approach

ANOMS is a result of decades of partnership with the industry. It helps some of the world's most forward-thinking airports maintain their licence to grow – maximizing their environmental capacity.

ANOMS works seamlessly with other products in our continually evolving airport suite, including WebTrak. WebTrak engages directly with the community by transparently sharing noise and flight track data online, which builds the public's knowledge and trust. ANOMS also works with a wide range of external solutions for noise modelling, receiving complaints and other functions.

www.bksv.com/ANOMS

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Local representatives and service organizations worldwide

BG 1810 – 13 12/2015

Brüel & Kjær

BEYOND MEASURE

PROCEDURE

Wellington Airport

Title:	**CURFEW FLIGHT OBSERVATIONS**		
Issue date:	5 August 1999	**Effective date:**	9 August 1999 Revised Apr 2007
		Expiry date (if any)	
Purpose:	WIAL is responsible for managing the airnoise management plan at Wellington. This includes monitoring flights during the curfew period , investigating all flights for compliance and advising the Wellington City Council of those which are technically considered to breach the curfew provisions. The ACNZ Tower fax to WIAL every day, details of flights that were conducted between the hours of 2400L to 0600L. The purpose of this procedure is to explain how this information is to be processed.		

Method:

1 The ACNZ Tower will email/fax a Curfew Observation Form each morning prior to 0800hrs local. This should be uplifted from the fax machine at some stage during the morning for processing.

2 Each flight should be reviewed to ensure that it strictly complied with the curfew provisions of the WCC District Plan ie. all flights complied without utilising the disrupt provisions.

3 The next stage is to segregate those flights that operated legally. Some flights are exempt because they are (a)medical/rescue flights or (b) they have an approved noise exemption which is operator/aircraft combination and landing only specific. The current exempt operators are shown as examples on appendix 2. Beside each corresponding line write down whether the flight is exempt by being an ambulance flight "med" or noise exempt "exempt".

4 Diverted flights are also exempt. In these circumstances write down next to each corresponding line applicable "Divert due" and the reason why it diverted here, eg fog in CHC.

5 Next identify the International flights to ensure that they complied. If they did write down next to each applicable corresponding line "Int"

6 For flights that have operated using the disrupt provisions, these must be

clarified to ascertain whether the explanations are acceptable. Refer Annex 1 for definition of disrupted flight. Disrupt provisions are mostly used by the International flights. The contact for these is the Air NZ DM. They can be contacted by email at "WLGDutyManagers@airnz.co.nz". Seek an explanation of the delay which must include details of the time delays and reasons for each, over the previous four flight sectors that contributed to the final total delay time. Attached is a copy of a request for information shown as appendix 3

7 Once an explanation is recieved ensure that each of the time delays is acceptable under the disrupt definition. If necessary deduct those delay times that are considered acceptable from the arrival or departure time. If at the end of this process the flight still flew within the disrupt provision period it is considered a "breach"

8 The same process applies to other operators except that explanations will need to be sought directly from those operators. Email is the best method.

9 If a flight is considered to have breached the curfew either because of exceeding the time or there explanation does not meet the definition of a disrupt, they must be brought to the attention of the Airside Services Manager. The Airside Services Manager will review the data and if confirmed will advise Mathew Borich of the WCC

10 Any matters that you are uncertain of should be raised with the Airside Services Manager or the Airport Planner.

11 Once this procedure is complete - the forms are to be forwarded each day to the Airside Operations Administrator for statistical reporting purposes and corelation with other noise data monthly from ACNZ.

12 If the process cannot be completed within one day - the form should be sent to the Airside Operations Administrator anyway with an explantion next to the corresponding line "being investigated"

13 A copy of the form and any data collected pending completion of an investigation should be kept in the noise management folder. If you started an investigation, it is your responsibility to ensure that it is completed and the Airside Operations Administrator and the Airport Planner advised of the outcomes.

Person issuing: Chris Dillon **Title:** Airport Planner

Distribution

Standard:		Others:
Airside Services Manager	☒	Airside Operations Administrator
Airside Operations Coordinator	☒	Airport Planner
Duty Managers	☐	
Airport Service Officers	☐	
Terminal Services Manager	☐	
Terminal Services Coordinator	☐	
Maintenance Manager	☐	
Chief Fire Officer	☐	
Crew Chief	☐	
Quality Assurance Manager	☐	

2. WCC Airport Area Rules – Noise

A. Aircraft operations in general

MEASURING AIRCRAFT NOISE

Aircraft noise is measured in accordance with NZS 6805:1992. It is based on the Day/Night Sound Level (Ldn) which measures the cumulative 'noise energy' produced by all flights (landing or take-off) during a typical day, evenly measured over a rolling 90 day period, with a 10 decibel penalty applied to flights from 10pm to 7am to take account of the increased disturbance caused by noise at night.

AIR NOISE BOUNDARY (MAP 35)

The Air Noise Boundary is the area around Wellington Airport identified in the Wellington City Council District Plan where it is projected that a noise limit of 65dBA Ldn will fall in 2020, as based on projected aircraft volumes and types, growth estimates, topography etc.

The noise boundary is defined by the future 65dB noise contour, but mapped having regard to road and property boundaries.

Wellington Airport must manage aircraft operations so that sound exposure does not exceed 65dBA Ldn outside the Air Noise Boundary. The Ldn is calculated and modelled annually, with the Annual Noise Contour (ANC) representing the location of the 65dB Ldn contour for that year. Refer *Annual Noise Contours*.

NON-NOISE CERTIFIED JET AIRCRAFT OR CHAPTER 2 JET AIRCRAFT BAN COMPLIANCE

Effective Date: 6 Nov 2003

Any civil non Chapter 3 jet operation would firstly require an exemption from the Director of Civil Aviation (Section 37 Civil Aviation Act) from the provisions of CAA Rule Part 91.803.

Secondly, if the above requirement was met, the operator would require a Resource Consent. Civil non Chapter 3 jet aircraft would not comply with Wellington District Plan Rule 11.1.1.1.3. Activities that do not comply with this activity noise standard are a Discretionary Activity (Restricted) under Rule 11.3.1 in respect of noise.

Subsonic jet aircraft are classified in three categories, according to Chapter 1, 2 and 3 of International Civil Aviation Organisation Convention Annex 16.

Chapter 2 jet aircraft are those which are certified with noise levels defined in the International Civil Aviation Organisation Convention Annex 16.

Non noise certified jet aircraft are those which have no certification within the context of the International Civil Aviation Organisation Convention Annex 16 - Environmental Protection, Volume 1 (Aircraft Noise) Chapters 2 (second edition 1988) or United States Federal Aviation Regulations Part 36, Stage 2.

B. Night flying operations

CURFEW

The curfew at Wellington Airport applies to aircraft operations during the times below, subject to exemptions.

- Domestic operations (arrivals and departures)
  2400 to 0600
- International operations
  Departures 2400 to 0600
  Arrivals 0100 to 0600

CURFEW EXEMPT AIRCRAFT

Rule 11.1.1.1.6(h) allows certain quiet aircraft to operate at Wellington Airport during the curfew. Exempt aircraft under Rule 11.1.1.1.6(h) are:

- Cessna 406
- Cessna Caravan

Refer *Criteria for Curfew Exempt Operations* for exemption certification procedure.

REQUESTS FOR EXEMPTIONS FROM CURFEW

Effective date: 1 October 1998

The authority to grant any exemptions rests with Wellington City Council pursuant to the Resource Management Act 1991.

As a general rule, exemptions would only be contemplated when

- Circumstances are unusual, compelling, and are unlikely to be repeated
- The environmental effect is minor
- There are broad social or environmental benefits
- Where possible there has been a process of consultation.

Enquiries in the first instance should be directed to Planning Manager or Airside Services Manager, Wellington Airport.

C. Engine testing

Further to Rule 11.1.1.1.6 procedures for engine testing at Wellington Airport have been developed in consultation with ANMC. Refer *Engine Testing Policy*.

D. Ground power and auxiliary power units (GPUs/APUs)

2.2 Curfew Procedure

Night flying operations at Wellington International Airport must comply with the Wellington City Council (WCC) District Plan rules.

The restrictions in place for the curfew at Wellington International Airport mean that aircraft operations must not occur during the following hours:

DOMESTIC OPERATIONS: From 00:00hrs to 06:00hrs

INTERNATIONAL DEPARTURES: From 00:00hrs to 06:00hrs

INTERNATIONAL ARRIVALS: From 01:00hrs to 06:00hrs

For the purpose of the curfew rule 'operations' means the start of a take-off roll or touch down on landing.

EXCEPTIONS TO THE CURFEW RULE

While the curfew restrictions apply to the majority of aircraft operations, there are number of exceptions provided for in the District Plan.

The Curfew restrictions <u>are amended</u> in the following situations:

A. DISRUPTED FLIGHTS

In the case of disrupted flights, operations are permitted for an additional 30 minutes beyond the applicable time.

A disrupted flight is defined in the Noise Management Plan as:

A flight which is delayed on arrival or departure at Wellington through unforeseen circumstances that could not reasonably be catered for by prudent timetabling, such delay having originated at Wellington or within the previous 4 sectors, as a result of:

- Weather (at origin, en-route, or destination causing cancellations, diversions, delays, missed approaches or holding); or
- Air Traffic Control (congestion, start delays, en-route holding or approach delays); or
- Closure of a departure or destination aerodrome; or
- Diversion for in-flight medical condition or flight safety reason to another aerodrome other than the flight planned aerodrome; or
- Aircraft unserviceability (e.g. mechanical breakdown); or

- An aircraft being required to wait for crew from a flight delayed as a result of any of the above.

Note:

- An aircraft which has been substituted for an aircraft delayed as a result of any of the above also comes within the definition of disrupted flight
- An aircraft may not depart Wellington Airport after midnight and before 0600hrs to act as a substitute aircraft for another that has become unserviceable at a location other than Wellington

B. STATUTORY HOLIDAY PERIODS

The start time of the curfew is also extended by 60 minutes during statutory holiday periods. Aircraft operations are permitted during the following hours:

DOMESTIC OPERATIONS: Permitted between 06:00hrs and 01:00hrs

INTERNATIONAL DEPARTURES: Permitted between 06:00hrs and 01:00hrs

INTERNATIONAL ARRIVALS: Permitted between 06:00hrs and 02:00hrs

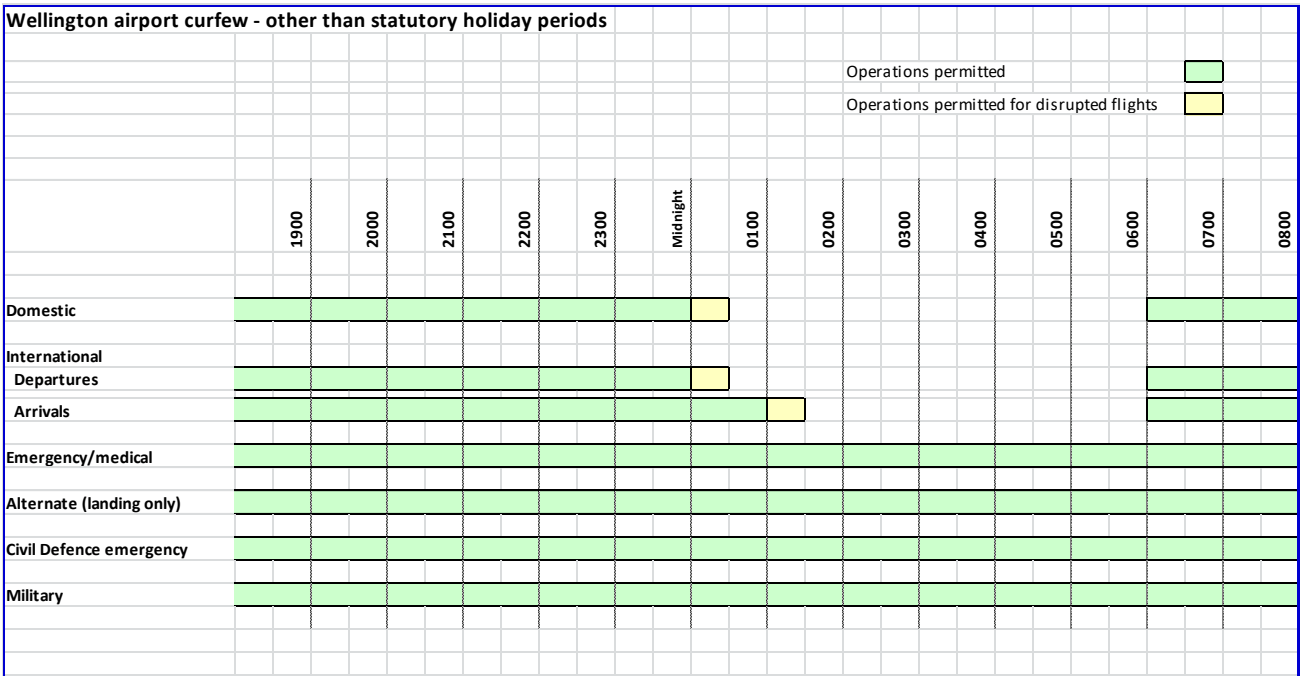
Statutory holiday period means:

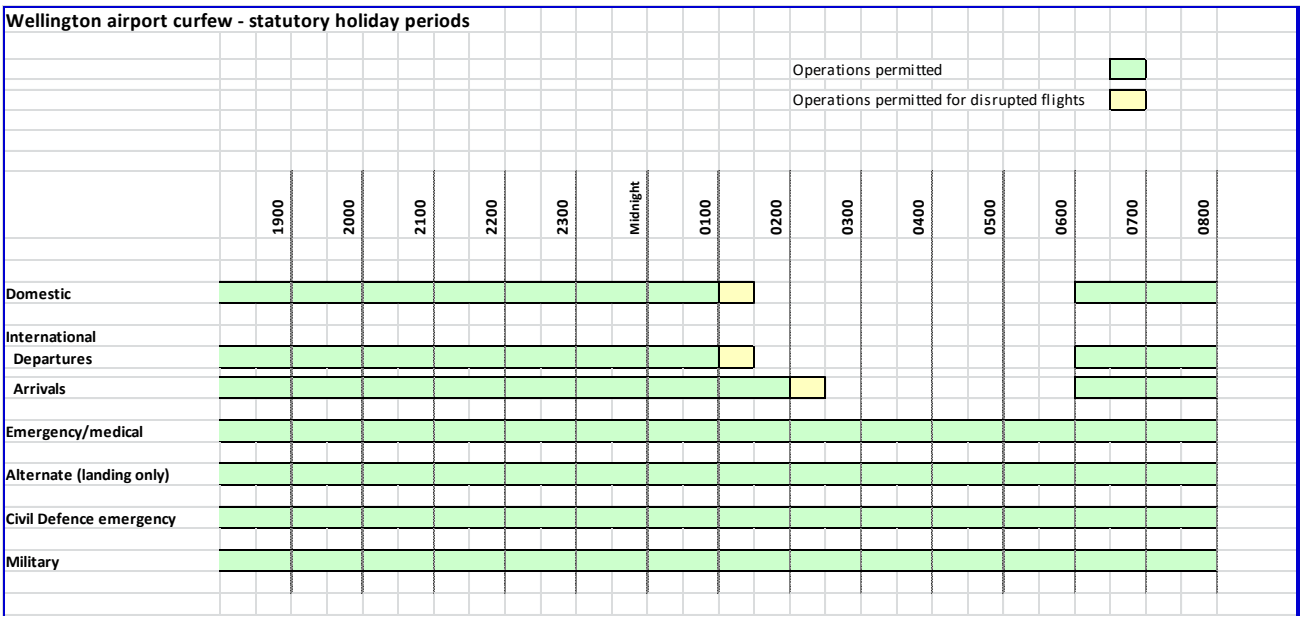
1. The period from 25 December to 02 January inclusive. Where 25 December falls on either a Sunday or Monday, the period includes the entire of the previous weekend.
2. The Saturday, Sunday and Monday of Wellington Anniversary weekend, Queens Birthday weekend and labour weekend.
3. Good Friday to Easter Monday inclusive.
4. Waitangi Day.
5. ANZAC Day.

   Where Waitangi Day or ANZAC Day falls on a Friday or a Monday, the adjacent weekend is included in the statutory holiday period.

6. The hours from midnight to 06:00am immediately following the expiry of each statutory holiday period defined above.

Curfew Restriction Diagram





2.3 Curfew exempt operations

Curfew exempt operations

Rule 11.1.1.1.6(h) of the WCC District Plan allows 4 aircraft movements per night that meet the established noise criteria. These slots are allocated to operators by the Wellington Air Noise Management Committee.

Criteria for curfew exempt operations under Rule 11.1.1.1.6(h)

The criteria below assume the aircraft has measured compliance with the rules.

ANMC Technical Committee needs to codify testing and revalidating standards.

Requests for Curfew Exempt Operations, confirmation of allocation and supporting Noise Investigation Reports for exempted aircraft are held on the Master Copy of the NMP.

1. Must be aircraft and operator specific, e.g., C208 operated by SoundsAir.
2. Purpose of the activity is not relevant.
3. In assessing priority if demand exceeds available slots the following rules apply:
   - 3.1 priority will be given to aircraft/operator combination with best acoustic performance.
   - 3.2 parties with existing complying operations have precedence over new applicants
   - 3.3 local operator or operator with other infrastructure at WIA has priority over non-local
4. Exemption certificate will lapse in the event of:
   - 4.1 operator ceasing trading
   - 4.2 operator failing compliance check on 3 separate occasions.

Curfew exempt operations effective March 2017

As at 22 March 2017 one of the four available slots is allocated to:

- Soundsair (1 slot), for 1 landing per night, specific to the C208 aircraft only.
  Effective 27 July 1999

2.4 Engine Testing Procedures

As part of the Noise Management Plan at Wellington International Airport, there a number of restrictions on both the time and location of testing for aircraft propulsion engines and the operation of Auxiliary Power Units (APU).

Engine testing at Wellington Airport is governed by the Wellington City Council District Plan (WCDP), with specific restrictions in respect of timing, noise levels generated and location.

PRIOR TO ANY ENGINE TESTING:
The operator must call the WIAL Integrated Operations Centre to ensure compliance with Time and Location and Assessment Restrictions (refer below)
Phone: 04 385 5124

ON COMPLETION OF ENGINE TESTING:
The operator is required to complete the Aircraft Engine Test Form which must be emailed to
Engineruntest@wellingtonairport.co.nz

Engine Testing Time Restrictions

Aircraft propulsion engines may be run for the purpose of engine testing:

06:00hrs to 20:00hrs – No restrictions (refer to *Location Restrictions and Aircraft Engine Testing Chart*)

20:00hrs to 23:00hrs – To carry out essential unscheduled maintenance only. The aircraft operator must confirm with WIAL Integrated Operations Centre that the purpose of the engine test is for essential unscheduled maintenance.

23:00hrs to 06:00hrs – Only under the following circumstances as per Rule 11.1.1.1.7(c) of the WCDP:

1. WIAL Integrated Operations Centre has been contacted

and

2. The aircraft operator has confirmed that the engine testing can be carried out in compliance with all of the following conditions:
    - Measured noise levels do not exceed Leq (15mins) 60 dBA at or within the boundary of any residential zoned site

- Measured noise levels do not exceed Lmax 75 dBA at or within the boundary of any residentially zoned site
- Noise levels shall be measured in accordance with NZS6801:1991 'Measurement of Environmental Sound'
- The total number of engine test events carried out under this rule does not exceed 18 in any consecutive 12 month period
- The total duration of the engine test will be no more than 20 minutes

The responsibility to comply with the above conditions lies with the aircraft operator.

Engine Testing Location Restrictions

- No engine testing is to be undertaken in the vicinity of Stand R2 (engine testing prohibited by WCDP) or in the area adjacent to Freight Drive Gate. These locations are identified in red on the Aircraft Engine Testing Location Map.
- Refer to the Aircraft Engine Testing Chart and Location Map for the locations and procedures for all engine testing.
- Contact WIAL Integrated Operations Centre for any aircraft type that is not listed on the Aircraft Engine Testing Chart.
- Contact WIAL Integrated Operations Centre for any engine testing that will exceed the maximum duration stated on the Aircraft Engine Testing Chart.

Engine Testing Assessment

In addition to the above requirements to comply with the WCDP, operational and safety requirements must be considered by the aircraft operator in advance of any engine testing at Wellington Airport.

This includes, but is not limited to, the following matters:

- Environmental conditions
- Operational safety
- Infrastructure requirements
- Public safety

The aircraft operator must assess the above in liaison with WIAL Integrated Operations Centre.

Power Setting	Aircraft Type	Location	Actions
IDLE	Before commencing all engine runs contact WIAL Integrated Operations Centre (385-5124). See Note 1		
	A350/B777/B757/B787/A330	TWY Alpha South of TWY B10	Advise Wellington Ground (121.9 mHZ), Maximum run duration 12 minutes
	A320/A321	On Stand	Advise Wellington Ground (121.9 mHZ), Maximum run duration 12 minutes
	B737	On Stand	Advise Wellington Ground (121.9 mHZ), Maximum run duration 12 minutes
	ATR	On Stand	Advise Wellington Ground (121.9 mHZ), No engine ground runs Stands 78 & 79, Maximum run duration 12 minutes
	Dash 8 (Q300)	On Stand	Advise Wellington Ground (121.9 mHZ), No engine ground runs Stands 78 & 79, Maximum run duration 12 minutes
	Jetstream 31/32	On Stand	Advise Wellington Ground (121.9 mHZ), No engine ground runs Stands 78 & 79, Maximum run duration 12 minutes
	Metroliner	On Stand	Advise Wellington Ground (121.9 mHZ), No engine ground runs Stands 78 & 79, Maximum run duration 12 minutes
	Pilatus PC12	On Stand	Advise Wellington Ground (121.9 mHZ), No engine ground runs Stands 78 & 79, Maximum run duration 12 minutes
	Cessna C208	On Stand	Advise Wellington Ground (121.9 mHZ), No engine ground runs Stands 78 & 79, Maximum run duration 12 minutes
	SAAB340	On Stand	Advise Wellington Ground (121.9 mHZ), No engine ground runs Stands 78 & 79, Maximum run duration 12 minutes
Medium Power	Before commencing all engine runs contact WIAL Integrated Operations Centre (385-5124). See Note 1		
(Up to 70%)	A350/B777/B757/B787/A330	On TWY A South of TWY B10	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	A320/A321	On TWY B south of Taxilane Romeo	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	B737	On TWY B south of Taxilane Romeo	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	ATR72	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	Dash 8 (Q300)	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	SAAB340	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	Jetstream 31/32	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	Metroliner	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	Pilatus PC12	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	Cessna C208	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
High Power	Before commencing all engine runs contact WIAL Integrated Operations Centre (385-5124). See Note 1		
(70% & above)	A350/B777/B757/B787/A330	On TWY Alpha South of TWY B10	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position , Maximum run duration 5 minutes
	B737	On TWY Alpha South of TWY B10	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position , Maximum run duration 5 minutes
	A320/A321	On TWY Alpha South of TWY B10	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position , Maximum run duration 5 minutes
	ATR	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	Dash 8 (Q300)	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	SAAB340	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	Jetstream31/32	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	Metroliner	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	Pilatus PC12	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position
	Cessna C208	On TWY B south of Taxilane Romeo or South End of the Western Apron	Advise Wellington Ground (121.9 mHZ) before towing to and from engine run position

AIRCRAFT ENGINE TEST FORM

To: WIAL Integrated Operations Centre
Company: Wellington International Airport Limited
Email: engineruntest@wellingtonairport.co.nz

From: _____

Date: _____

Page 1 of: _____

Airline: _____

Aircraft Registration: _____ Type of Aircraft: _____

Date: _____ Assessment: Yes ☐ No ☐

Reason for Test: _____

_____

_____

EVENT DETAILS – TEST# 1

Time start: _____ Time end: _____

Power setting used: _____

Variance at 100% torque *(If applicable)*

Port Engine: _____

Starboard Engine: _____

SUBSEQUENT TESTS

Duration: _____mins _____mins _____mins _____mins_____

mins Power setting: _____% _____% _____% _____% _%

Time completed: _____

POSITION OF AIRCRAFT ON AIRPORT

Location: On stand #: _____ OR

(tick) ETB ☐ TWY A South of TWY B10 ☐ TWY B South of Taxilane R ☐ Other ☐

If using ETB, was test successful: *(tick)* Yes ☐ No ☐

Orientation: *(tick)* North ☐ South ☐

Comments: _____

_____

_____

Scheduled ☐ Non-Scheduled ☐ *(tick one)*

Name: _____ Signature: _____


Propulsion engine testing prohibited in this area (WCDP Map 35)
Freight Drive Gate
TWY B South of Taxilane R
TWY A South of TWY B10
South end of Western Apron
Engine Testing Bay (ETB)
Engine Testing Procedures – Location Map
0
100
METRES
Mar-18

2.5 GPU Compliance Certifications

GPU Indicative Noise Compliance Certificate
WELLINGTON INTERNATIONAL AIRPORT

Malcolm Hunt Associates
Noise & Environmental Consultants
P O Box 11-294, Wellington

Operator: ANSETT NEW ZEALAND

GPU Engine Make:
1. Ansett GPU Serial no. ZQE842
2. Ansett GPU Serial no. ZQE739

Certificate Number: 98008

Assessed By: Malcolm Hunt Associates
Report dated 30/4/98

On the basis of measured noise emission levels, this document certifies that the above two (2) Ground Power Units operated by Ansett NZ Ltd can be operated within the area shown (hatched) on the attached map in compliance with WCC District plan rule 11.1.1.1.8 under normal operating parameters.

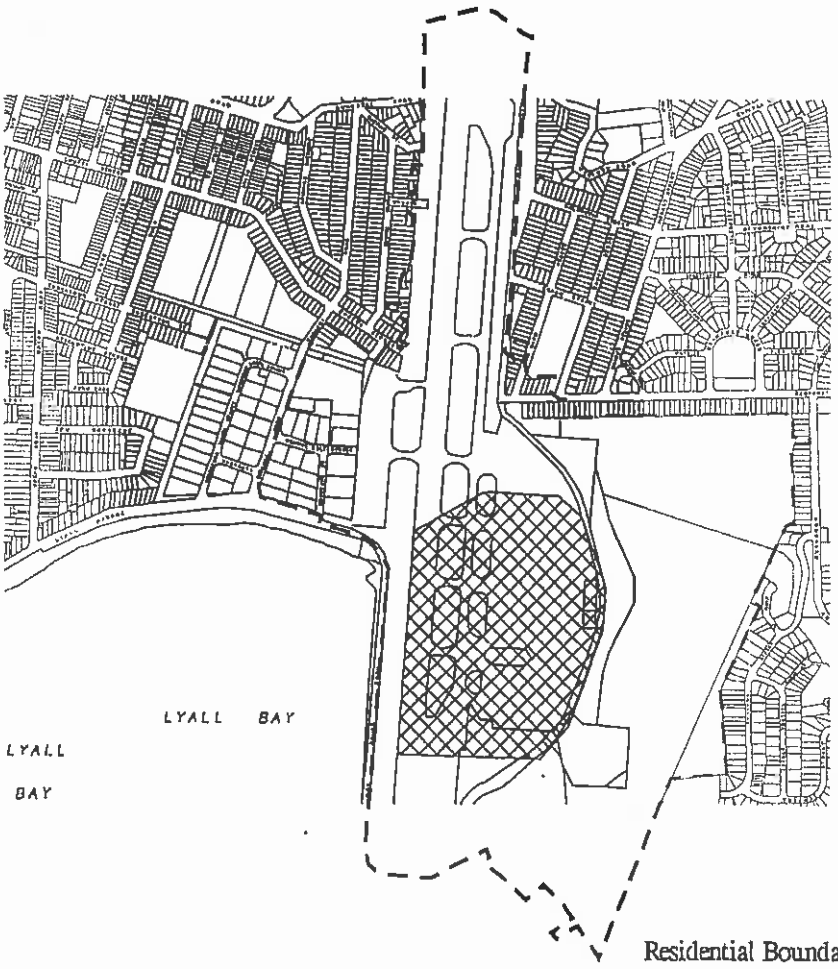
This certificate is based on indicative compliance only and it shall be the responsibility of the operator to ensure the equipment is maintained and operated so that GPU noise emissions do not exceed L10 45 dBA at, or within, any residentially zoned site between the hours of 10 pm to 7 am and all day Sundays.

Attached map document no. 98008-1

Signed: M J Hunt
Malcolm Hunt

Dated: 1/7/98

Map Showing Area for GPU Compliance



mapgpu.sf

Document No. 98008-1

GPU Indicative Noise Compliance Certificate
WELLINGTON INTERNATIONAL AIRPORT

Malcolm Hunt Associates
Noise & Environmental Consultants
P O Box 11-294, Wellington

Operator: ANSETT New Zealand

GPU Engine Make:
1. Number 1 Hobart Serial No. ZQE 842
2. Number 2 Hobart Serial No. ZQE 739

Certificate Number: 98008

Assessed By: Malcolm Hunt Associates
Report dated 17/9/98

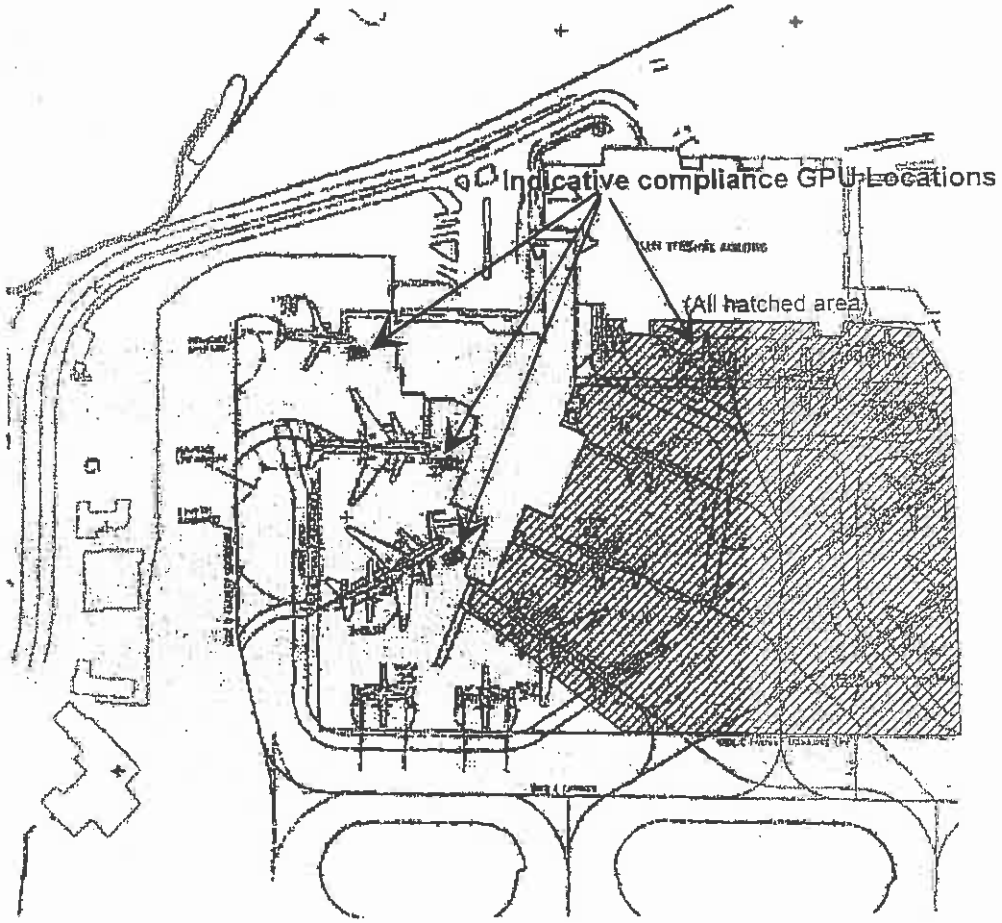
On the basis of measured noise emission levels, this document certifies that the above two (2) Ground Power Units operated by Ansett New Zealand can be operated in compliance with WCC District plan rule 11.1.1.1.8 under normal operating parameters, at positions indicated on the attached maps.

This certificate is based on indicative compliance only and it shall be the responsibility of the operator to ensure the equipment is maintained and operated so that GPU noise emissions do not exceed L10 45 dBA at, or within, any residentially zoned site between the hours of 10 pm to 7 am and all day Sundays.

Signed:

Malcolm Hunt

Dated: 22/9/98


Indicative compliance GPU Locations
(All hatched area)

GPU Indicative Noise Compliance Certificate
WELLINGTON INTERNATIONAL AIRPORT

Malcolm Hunt Associates
Noise & Environmental Consultants
P O Box 11-294, Wellington

Operator: ANSETT New Zealand

GPU Engine Make:
1. Number 1 Hobart Serial No. ZQE 842
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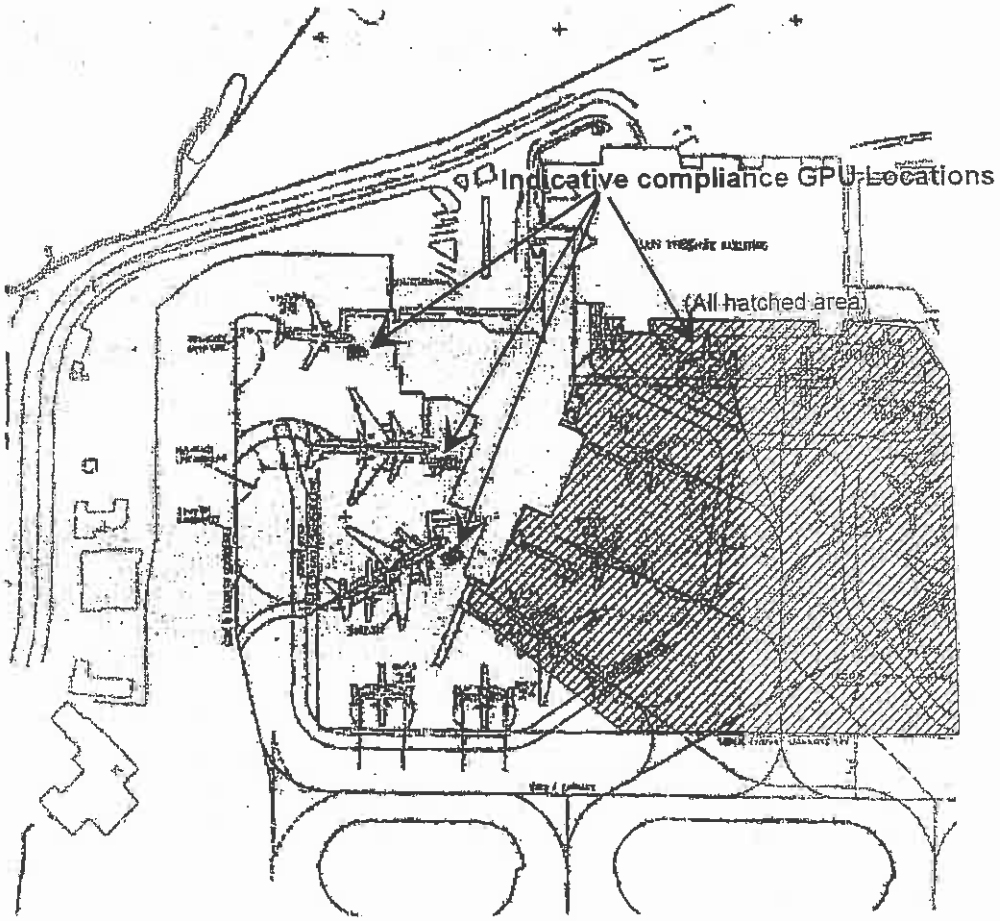
Signed:

Malcolm Hunt

Dated: 22/9/98


Indicative compliance GPU Locations
(All hatched area)

MARSHALL DAY ASSOCIATES
CONSULTANTS IN ACOUSTICS

File

Christopher W Day
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Keith Ballagh
B.Eng (Hons)
A Harold Marshall
B.Arch, B.Sc, Ph.D, FASA, FNZIA, FRAIA
Con Wassilieff
B.Sc, B, Sc (Hons), Ph.D

1st Floor, BNZ Chambers
Cnr Cuba & Manners Streets
PO Box 11 442
Wellington
New Zealand
Telephone 0-4-499 3016
Facsimile 0-4-499 3018

18 December 1998

Air New Zealand Terminal Services
PO Box 21 004
Wellington Airport

Attention: Steve Gosnell

REPORT ON NOISE SURVEY OF GROUND POWER UNITS AT WELLINGTON AIRPORT

Dear Steve

Further to our two noise survey of GPUs at residential boundaries around Wellington Airport, we would like to report as follows.

1.0 INTRODUCTION

Marshall Day Associates were asked by Air New Zealand Terminal Services to measure the noise levels of the various Ground Power Units (GPU) in use by Air New Zealand at Wellington Airport.

The Wellington City Proposed District Plan as at 03/03/1998 has the following noise rules in respect of noise from GPU's at Wellington Airport.

11A AIRPORT AREA RULES

11.1.1.1.8 Land based activities

Noise emission levels, from any activity within the Airport area, other than aircraft operations, engine testing and the operation of GPUs and APUs (as provided for in rule 11.1.1.1.9) when measured at any residential site shall not exceed the following limits:

Monday to Saturday 7am to 10pm	*55dBA L10*
At all other times	*45dBA L10*
All days 10pm to 7am	*75dBA Lmax*

(Noise measurements are made in accordance with New Zealand Standard NZS 6801:1991 "Measurement of Sound", and assessed in accordance with New Zealand Standard NZS 6802:1991 "Assessment of Environmental Sound".)

11.1.1.1.9 Ground power and auxiliary units (GPUs/APUs)

(a) GPUs are exempt from controls otherwise imposed by rule 11.1.1.1.8 until 31 December 1998. After 31 December 1998 GPUs must comply with the noise limits in rule 11.1.1.1.8

(b) With the exception of:

- *aircraft under tow*
- *the first 90 minutes after the aircraft has stopped on the gate*
- *60 minutes prior to scheduled departure*
- *the use of APUs to provide for engine testing pursuant to rule 11.1.1.1.7*

APUs must comply with the noise limits in rule 11.1.1.1.8

2.0 GPU LOCATIONS

The GPUs were located at Gate 10, 11 and 12, as being representative of the most exposed locations.

The noise level from five GPU's was measured:

Houchin 8302 (under load)
Hobart 8656 (under load)
Trilectron 3002 (no load)
Old 28volt diesel 8961 (no load)
Old 28volt diesel 8945 (no load)

3.0 NOISE SURVEY LOCATIONS

Two residential locations were chosen as being representative of residences most exposed to noise from GPU operation. These were:

- the west side of Nuku Street, opposite the carpark, approximately 450m east of Gate 11
- the west edge of the park at the end of Kekerenga Street, approximately 650m south of Gate 11.

Both of these locations directly overlook Gates 11 and 12. Gate 10 is slightly screened from Nuku Street by the South Pier.

4.0 WEATHER CONDITIONS

Wind direction affects the propagation of sound. In general, measurements should be made under either dead calm conditions, or alternatively slight downwind conditions in order that the noise levels are at their typical maximum. Noise levels measured upwind of a source are always lower than under calm or downwind conditions, because of an acoustical "shadow zone" created by the upwards refraction of sound, and thus may under-represent the noise levels.

Measurements were made on two occasions, under different wind conditions:

10 December 1998 (11pm-12pm), under light southerly wind.

Measurements were made at Nuku Street only, as Kekerenga Street on this occasion would have been upwind of the GPUs and hence the noise levels would have been much lower.

The temperature was cool, with cloud and some occasional light rain.

14 December 1998 (10pm-1am), under light northerly wind.

Measurements were made at both Nuku Street (to compare with the measurements made on the previous occasion), and Kekerenga Street. In this case Nuku Street was upwind of the GPUs, and Kekerenga Street was downwind of the GPUs.

Temperature was mild, with clear sky.

5.0 MEASUREMENT METHOD

A sound level meter meeting the requirements of IEC 651 for Type 1 instruments was used to measure the L10 noise level. L10 is the noise descriptor required in the Proposed District Plan. L10 is the noise level exceeded for 10% of the measurement period, and is very approximately a measure of the "average maximum" noise level.

At both measurement locations, the ambient noise (in the absence of GPU noise) was measured as soon as practicable to the actual measurement of the GPU noise. As the ambient noise level at these locations is only a few decibels lower than the (in the order of 40-45dBA), it will affect the noise measurements of the GPU's. In order to establish the actual noise level of each of the GPU's in turn, the ambient noise level must be logarithmically subtracted off the overall measurement to yield the noise level of the GPU in the absence of corrupting influences.

6.0 RESULTS

The ambient noise level was 44dBA, due to a combination of noise from the waste water treatment plant below Kekerenga Street, and distant activity. Nearby traffic noise was excluded from the measurements.

The ambient noise level at Nuku Street was around 40dBA on 14 December, and 44dBA on 10 December, due partly to wind noise in adjacent trees.

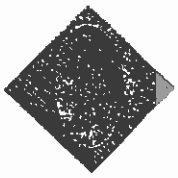
GPU	Load	Measurement location and date of test	Wind direction	Noise level including ambient	Noise level of GPU alone
Houchin 8302	Yes	Kekerenga Street (14 Dec)	Northerly	48dBA	46dBA
Hobart 8656	Yes	Kekerenga Street (14 Dec)	Northerly	47dBA	44dBA
Trilectron 3002	No	Kekerenga Street (14 Dec)	Northerly	46dBA	42dBA
28v diesel 8961	No	Kekerenga Street (14 Dec)	Northerly	46dBA	42dBA
Houchin 8302	Yes	Nuku Street (14 Dec)	Northerly	41	<41
28v diesel 8961	No	Nuku Street (14 Dec)	Northerly	41	<41
28v diesel 8961	No	Nuku Street (10 Dec)	Southerly	48dBA	46dBA
28v diesel 8945	No	Nuku Street (10 Dec)	Southerly	46dBA	42dBA

From measurements made at the closer distance of 10m from the *Houchin 8302*, the dependence of the noise level upon load could be determined. The noise level under no load conditions was 84.5dBA, whereas under load it increased to 85.0dBA. It seems reasonable to assume that the noise level of the other GPU's measured under no load conditions would also increase by a similar amount under load. This means that the levels in the table above could increase by up to 1dBA under load conditions.

7.0 DISCUSSION

The noise levels are dependent upon wind direction. Under typical wind conditions (northerly and north-easterly), all GPU's except the Houchin 8302 individually comply with the noise rule night time limit of 45dBA L10. The Houchin 8302 is only marginally in exceedance of this limit.

Under southerly conditions, the noise level from the 28 volt diesel 8961 is also marginally in exceedance of the allowable limit, because of the closer proximity of Nuku Street to Gates 10,11, and 12.



It is possible that some of the other GPU's may also exceed the allowable limit of 45dBA at Nuku Street under southerly wind conditions, although the opportunity to measure these was not available at the time, as these GPU's were in use in more sheltered locations where the noise was not audible.

Of all of the GPU's measured, the Houchin 8302 is the one with the highest noise emission levels. The bulk of the noise appeared to radiate mostly from the cooling air discharge. It may be possible to reduce the noise level by a few decibels with some additional sound attenuating treatment.

We trust this report contains sufficient information for your present requirements. If you require further assistance please do not hesitate to contact us.

Yours sincerely
MARSHALL DAY ASSOCIATES

Con Wassilieff
Associate

3. Construction noise

Construction noise monitoring

Effective: October 2016

Further to consultation with ANMC on managing construction noise effects, a construction noise monitor was installed in October 2016. The logger is located on the golf course, nearest the closest residential boundary. The logger measures sound level statistics and frequency spectra in 15-minute intervals, and short term (1-second) LAeq sound level profile. The data is available in real time, and as an archived data package.

WIAL Construction Noise Management Plan

Effective: August 2017

Further to consultation with ANMC on managing construction noise effects and review of WIAL procedures for construction and maintenance projects, an airport-wide construction noise management plan was developed.

The CNMP forms part of the WIAL Noise Management Procedures to assist in complying with the objectives and rules of the Wellington City District Plan.

The purpose of the CNMP is to develop and implement procedures and strategies with the aim to minimise the disturbance to residents and other noise sensitive receivers caused by airport construction and maintenance works. The CNMP establishes the approach to considering and managing the effects of construction noise for WIAL construction and maintenance projects.

AECOM

Wellington International Airport
Construction Noise
Wellington International Airport Limited
17-Aug-2017

WIAL Construction Noise Management Plan

WIAL Construction Noise Management Plan

Client: Wellington International Airport Limited

Co No.: 396240

Prepared by

AECOM New Zealand Limited
Level 2, 2 Hazeldean Road, Addington, Christchurch 8024, P O Box 710, Christchurch MC, Christchurch 8140, New Zealand
T +64 3 966 6000 F +64 3 966 6001 www.aecom.com

18-Aug-2017

Job No.: 60521044

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

Quality Information

Document	WIAL Construction Noise Management Plan
Ref	60521044
Date	17-Aug-2017
Prepared by	Darran Humpheson
Reviewed by	Michael Smith

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
R0	17/8/17	As issued		

Table of Contents

Abbreviations and Glossary

Abbreviation	Description
ASNS	Activity Specific Noise Schedule
BPO	Best Practicable Option
CNMP	Construction Noise Management Plan
NZS	New Zealand Standard
WIAL	Wellington International Airport Limited

Term	Definition
dB	A unit of measurement on a logarithmic scale, often used to describe the magnitude of sound pressure with respect to a reference value (20 μPa)
$L_{Aeq(t)}$	The A-weighted time-average sound level over a period of time (t), measured in units of decibels (dB)
L_{AFmax}	The maximum A-weighted noise level with a 1/8 second or 'Fast' time constant (indicated by a 'F'), measured in units of decibels (dB)
ppv	Peak Particle Velocity mm/s

1.0 Introduction

This Construction Noise Management Plan (CNMP) has been prepared by AECOM New Zealand Limited on behalf of Wellington International Airport Limited (WIAL).

The CNMP forms part of the WIAL Noise Management Procedures to assist in complying with the objectives and rules of the Wellington City District Plan.

The purpose of the CNMP is to develop and implement procedures and strategies with the aim to minimise the disturbance to residents and other noise sensitive receivers caused by airport construction and maintenance works. The CNMP establishes the approach to considering and managing the effects of construction noise for WIAL construction and maintenance projects.

The objectives of this CNMP are:

- Establish an airport-wide approach to construction noise management
- Develop and implement procedures and strategies to reduce noise impacts on the local community
- Identify appropriate noise and vibration limits and performance standards which balance residential noise amenity and the need to undertake works efficiently
- Provide a framework for project-specific noise management plans for WIAL maintenance works and major infrastructure projects
- Monitor and report on the effectiveness of the mitigation measures implemented in the CNMP

Construction vibration is not anticipated to be an issue due to the setbacks between constructions activities and offsite receivers. Nevertheless, appropriate vibration limits and controls are included in this CNMP for completeness.

This CNMP is an evolving document and will be updated as applicable.

2.0 Airport-wide CNMP

WIAL regularly undertakes construction and maintenance works within the airport precinct shown in Figure 1, including:

- Capital work projects such as new/replacement buildings
- Pavement construction and resurfacing
- General maintenance works to the runway/taxiway infrastructure, which includes vertical structures and ground level (and below) works
- Airfield Ground Lighting installation and maintenance
- Work on Marine Defence Systems including seawalls and structures

Further to consultation with the Wellington Air Noise Management Committee (ANMC) on managing construction noise effects and review of WIAL procedures for construction and maintenance projects, an airport-wide approach to construction noise management is recommended.

WIAL has extensive experience of undertaking construction works and is mindful of the close proximity of residents and other noise sensitive receivers to the airport boundary. Figure 1 shows the residential areas near the airport - Miramar to the north east, Strathmore Park to the South East, and Rongotai to the west.

While it is acknowledged that operational constraints at the airport may require works to be carried out during the flight curfew (1am to 6am), this CNMP requires management and physical strategies to be implemented to avoid or mitigate adverse effects where practicable.

The scope of this CNMP includes:

- Assessment of construction noise and vibration impacts from works within the airport boundary
- WIAL project coordination to ensure cumulative effect of noise generation is addressed
- Mitigation measures and control of noise and vibration during works, including physical and management techniques
- Engagement and notification with affected parties (external).

The requirements of this CNMP do not restrict the delivery of emergency construction and maintenance works at WIAL. The delivery of emergency works must consider methods to manage noise effects. Any emergency works carried out that involve noisy works shall be notified to the Airport Planner within 24 hours.

WIAL has developed this CNMP in accordance with best practice as detailed in New Zealand Standard NZS 6803:1999 'Acoustics – Construction Noise'.

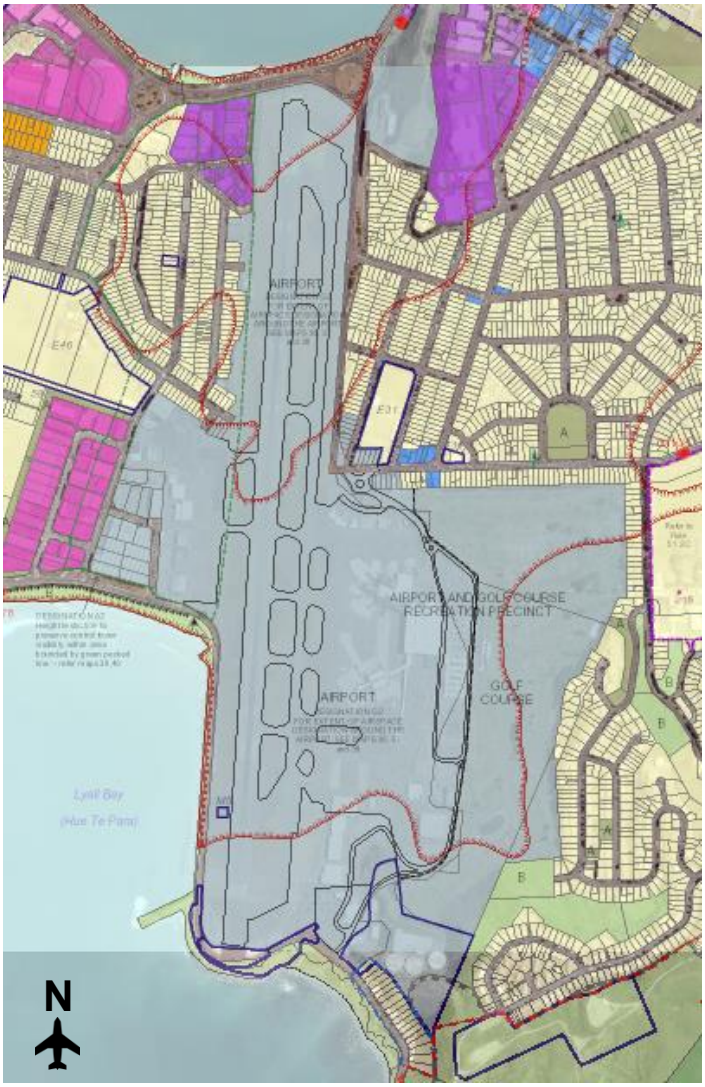


Figure 1 Airport (and Golf Course Recreation) Precinct shown in Grey; suburban zone (residential) in yellow

3.0 WIAL Construction Noise and Vibration Management Procedure

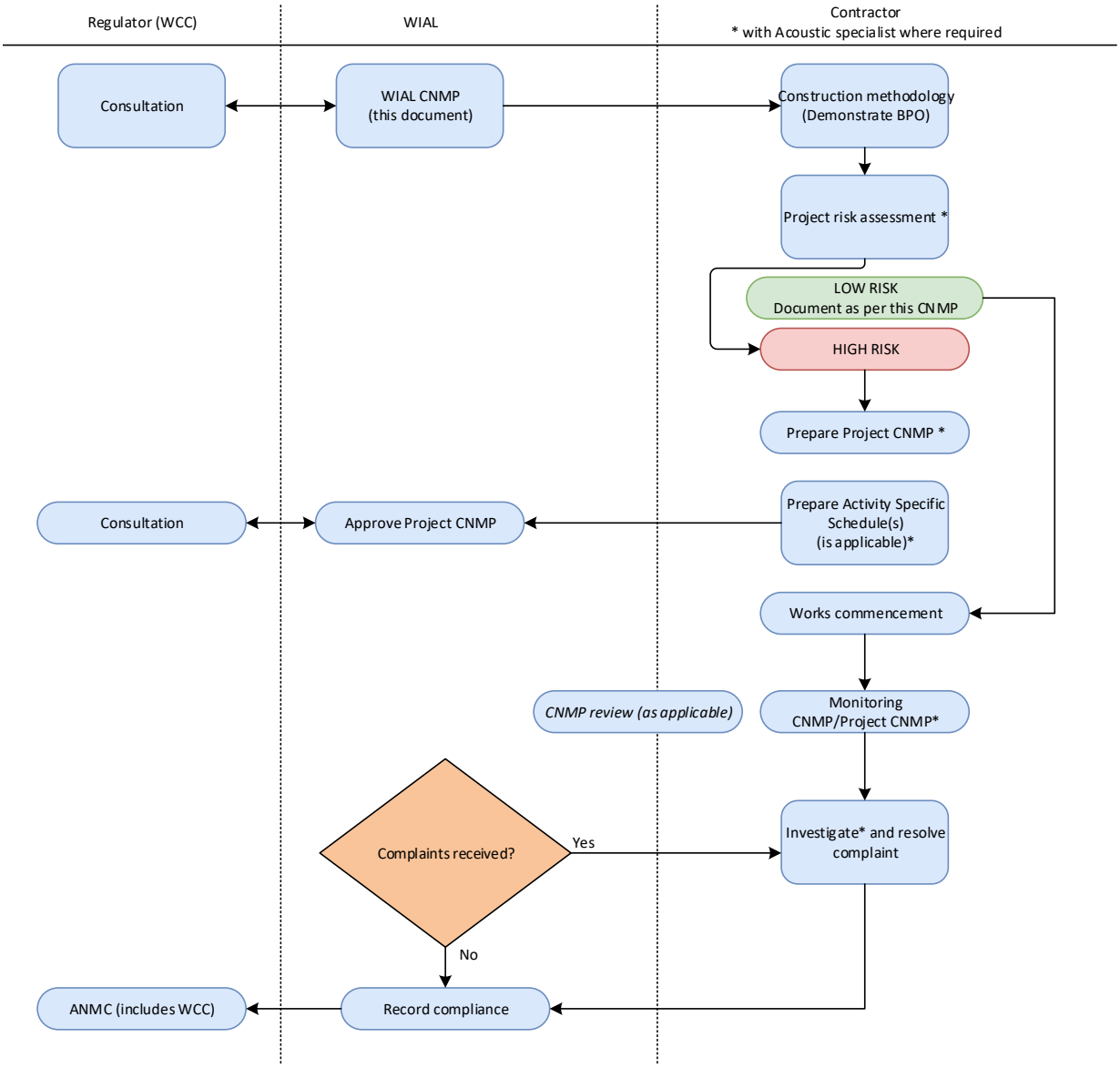


Figure 2 WIAL Construction Noise and Vibration Management Procedure

3.1 Construction methodology: Duty to avoid unreasonable noise

There is a duty on all persons carrying out construction activity to adopt the Best Practicable Option (BPO) to ensure noise does not exceed a reasonable level. This underpins WIAL's approach to all construction projects.

The effects of construction noise can be mitigated using both management and engineering controls. Mitigation measures should be planned and implemented for all projects in a structured hierarchy depending on the extent of predicted effects.

The hierarchy should be in the order of the following:

1. Is there anything preventing the works being done during normal work hours (7.30am to 6pm Monday – Saturday)?
2. Is it imperative that night-time works are undertaken, or can works be rescheduled to daytime?
3. Can the works be sequenced to avoid sensitive times for neighbouring residents/businesses?
4. Have equipment and methodologies been chosen that reduce the overall noise from the activity? Can quieter alternative equipment or methodologies be practicably implemented?
5. All moving plant within the construction site must have broad band reversing alarms installed.
6. Use of quietest equipment and methodology available to minimise noise. This may include a balance between the overall level of noise and the duration of the noise. In some situations it may be preferable to undertake short term noisy works rather than having lower noise levels which may occur for a significant period of time.
7. Scheduling noisy works outside, for example performing concrete cutting during the day and then breaking and resurfacing at night, and providing respite periods from noisy works.
8. Can temporary construction noise barriers or screens be erected that provide effective acoustic shielding of the equipment/activity?
9. Use of multiple items of plant to shorten the construction period, e.g. two items of plant may halve the duration of the activity but at most only lead to a 3 dB increase in noise level.
10. Use of equipment and construction techniques in accordance with manufacturer's instructions / site protocols (method statements).

The project construction methodology shall document application of the above principles and the reasoning behind the approach adopted to demonstrate adoption of BPO to managing construction noise effects.

3.2 Project Noise Risk Assessment

All construction and maintenance activities at Wellington Airport have the potential to generate noise and potentially result in a disturbance to residents and other noise sensitive receivers. A noise risk assessment is required to ensure there is a comprehensive assessment of potential adverse effects. Each project will need to be ranked according to the noise risk as follows:

- Low – predicted noise levels are not considered to be significant and are at least 3 dB lower than the relevant performance noise standard
- High – predicted noise levels without enhanced mitigation are likely to meet or exceed the performance noise standard and/or significant night time works are planned.

To make this assessment, each project will need to be screened against the performance standards using the WIAL Construction Noise Management Tool (see below and Appendix B).

Note that the noise risk for the project should be determined based on the highest risk type of construction activity and take account of concurrent construction works if applicable, i.e. the cumulative effects of multiple projects.

The risk rating should also take into account the duration of the works; a single night will be less of a disturbance compared to works spanning consecutive nights.

Screening assessment	Risk
Detailed noise assessment predicts noise level at least 3 dB below performance standard.	LOW
Detailed noise assessment predicts noise level is within 3 dB of the performance standard, or is higher than the performance standard.	HIGH
Night works are required within 100 m of residential (or other sensitive land use) neighbours of the Airport.	HIGH
Works involving impact piling, percussive concrete breaking or vibratory compaction within 50m of vibration sensitive receptor	HIGH

The project noise risk assessment will determine whether a Project-specific CNMP is required.

3.3 Contractor Management plan

Where required, the appointed contractor shall prepare and implement a project specific CNMP throughout the entire construction period of the Project. The CNMP must describe the measures adopted to seek to meet the NZS 6803 noise limits, where practicable. Where it is not practicable to achieve those performance standards, alternative strategies should be described to address the effects of noise.

The CNMP shall be provided to WIAL for approval prior to commencement of the construction project.

The CNMP shall, as a minimum, address the following:

- Description of the works, anticipated equipment/processes and their scheduled durations.
- Hours of operation, including times and days when construction activities causing noise and/or vibration would occur.
- The applicable construction noise performance standards for the project.
- Identification of affected dwellings and other sensitive locations where noise limits apply.
- Mitigation options, including alternative strategies where full compliance with the relevant noise limits cannot be achieved.
- Management schedules containing site specific information where applicable.
- Construction equipment operator training procedures and expected construction site behaviours.
- Methods and frequency for monitoring and reporting on construction noise.
- Procedures for maintaining contact with stakeholders, notifying of proposed construction activities and handling noise complaints.

Where vibration risk is identified, the Project CNMP shall also include the following:

- The construction vibration limits for the project.
- Identification of affected dwellings and other sensitive locations where vibration limits apply.
- Methods required to mitigate adverse construction vibration.

An example project CNMP is included at Appendix C.

3.4 Activity Specific Noise Schedules

For significant activities a schedule to the CNMP should be prepared once details of construction equipment and locations have been confirmed. These Activity Specific Noise Schedules (ASS) will set out specific conditions relating to a defined activity in a pre-determined location. Generally, ASNSs are developed for activities that have been identified as likely to exceed the Project's noise or vibration performance standards.

Site personnel will be briefed on the requirements of the ASNS, prior to the activity commencing. This would normally be undertaken at either induction or during a tool box talk.

3.5 Engagement

Effective stakeholder engagement is a critical part of managing construction and maintenance noise and vibration. Stakeholder engagement can have a greater bearing on acceptance of the works and complaints than the actual noise and vibration levels. Neighbours who understand what, when and why the works are happening are often able to adjust their activities accordingly and are generally more tolerant of construction noise and vibration.

Stakeholder engagement for construction and maintenance noise and vibration should be integrated with the wider project requirements.

In general, neighbours should be informed at least one week before work starts and any local issues should be identified.

For larger projects, stakeholder engagement should commence during the planning and mobilisation phases. Residents can be informed about work using a variety of means, including letter drops, visits or meetings, advertising, site signboards, posters and notices on websites. When work continues for long periods, regular updates are important.

Information provided should include the:

- Reason for the works
- Reason for the construction methodology proposed
- Overall timeframe and timing of specific noisy or vibration producing activities
- Reason for any night or weekend works
- Expected noise and/or vibration effects
- Point of contact including name and phone number

The extent of notification will be determined by the Construction Noise Management Tool.

3.6 Monitoring

Noise / vibration monitoring should be performed as follows:

- When works start and any new major items of construction plant or a new technique is used. Measurements should be undertaken at a set distance of 10 m from the activity and frequency data in octave or 1/3rd octave bands should also be recorded.
- At monthly intervals throughout construction. Attended monitoring during construction hours at identified dwellings on a rotation basis for a period of at least one hour at identified dwellings.
- As required by any ASNS.
- In response to reasonable complaints being received.

For any major project lasting more than a six months, which includes significant periods of night working, consideration should be given to the use of remote, permanent noise monitoring. The advantage of this method over attended measurements is that real time noise level data can be captured and used to either investigate complaints or to proactively manage construction where noise levels are high.

3.7 Project CNMP review

The CNMP and individual management plans are live documents and should a change occur then the plans must be updated to reflect amended method statements, programme, etc. It is essential that regular reviews and audits are undertaken by the appointed environmental project manager for each project to track performance and to benchmark best practice in all aspects of the project.

3.8 Responsibilities

WIAL, in conjunction with its consultants and contractors, will be responsible for ensuring that the relevant management plan(s) are correctly implemented. They will review all documentation relating to construction noise and vibration before it is issued.

If required, specific training will be provided for site personnel.

The CNMP Procedure (Figure 2) show the responsibilities throughout a construction project for construction noise management.

3.8.1 Contractor

The contractor for each project shall:

- Prepare and implement, when required, a project specific CNMP in accordance with the management plan (an example project CNMP is included at Appendix A).
- Engage an acoustic specialist if complex noise calculations are required or the project has a high risk rating.
- If the project has a high noise risk rating, notify the WIAL project manager as soon as possible.
- Monitor at the beginning of the project and when methodology or plant changes.
- Liaison with the WIAL project manager on any complaints received and undertake investigation and reporting on complaints as required by the WIAL Project Manager.
- Ensure all staff including subcontractors participate in an induction training session on the CNMP, including:
    - team roles and responsibilities for management of noise matters
    - noise mitigation and management procedures
    - sensitivity of receivers to noise and any operational requirements or constraints identified through communication and consultation
    - complaints management procedure

Awareness of current noise matters on, or near active worksites, will be addressed during site meetings and/or toolbox training sessions

3.8.2 Acoustic Specialist

If engaged by the contractor:

- Undertake complex noise calculations
- Undertake, or provide advice on noise monitoring.
- Providing advice on additional mitigation measures appropriate for high risk projects.

3.8.3 WIAL Project Manager

- Identify and communicate across project teams actual/potential concurrent projects
- Undertake consultation with the community, particularly potentially affected residents and businesses prior to works being undertaken.
- Direct the contractor to undertake investigations, monitoring and methodology changes if required in light of monitoring results of complaints.

Appendix A

Construction Limits

Introduction

Wellington City Council requires construction noise emission levels to comply with the Wellington City District Plan's noise standards which refer to the construction noise standard NZS 6803, acknowledging that NZS 6803 does not fully address the issue of construction work that cannot be done during the day and therefore provides exemptions for construction work as follows:

> *Noise from construction, maintenance and demolition activities, including those associated with the urgent repair of utilities to maintain continuity of service, on any site or on any road shall comply with, and be measured and assessed using, the recommendations of NZS6803:1999 Construction Noise except:*
>
> - *work on public highways, railways and the Airport; ….*

This 'exemption' does not remove the duty placed on WIAL to adopt the 'Best Practicable Option' (BPO) to ensure that the emission of noise does not exceed a reasonable level. This is consistent with the requirements of Section 16 of the Resource Management Act 1991. Accordingly, WIAL will endeavour to comply with the requirements of the construction noise standard in ensuring that resulting noise levels are "reasonable".

Performance Standards

The recommended limits for construction noise as established in NZS 6803:1999 will guide WIALs approach to managing the effects of construction noise. The construction noise limits in NZS 6803 are deemed the upper limits for the reasonable protection of health and amenity to the receiving community, varying depending on land use, time of day and duration of the construction work.

NZS 6803 includes two table of recommended upper noise limits for construction noise, which depend on the time of day and the duration of construction noise. These noise limits vary throughout the day, with morning and evening shoulder periods, as well as restrictive night-time noise limits. Limits are specified in terms of a time average level ($L_{Aeq(t)}$) and a maximum level (L_{AFmax}) which addresses individual events. Works at WIAL must consider the duration of works across the WIAL site when referencing the applicable noise limits of NZS 6803 Table 1 and Table 2. This consideration must also consider the cumulative impacts of individual projects which are occurring concurrently.

NZS 6803 limits apply at the building facades and are recommended on the basis that resulting effects are reasonable.

Table 1 Recommended upper limits for construction noise received in residential zones (NZS6803 Table 2)

Time of Week	Time Period	Duration of work					
		Typical duration (dBA)		Short-term duration (dBA)		Long-term duration (dBA)	
		Leq	Lmax	Leq	Lmax	Leq	Lmax
Weekdays	0630-0730	60	75	65	75	55	75
	0730-1800	75	90	80	95	70	85
	1800-2000	70	85	75	90	65	80
	2000-0630	45	75	45	75	45	75
Saturdays	0630-0730	45	75	45	75	45	75
	0730-1800	75	90	80	95	70	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75
Sundays and public holidays	0630-0730	45	75	45	75	45	75
	0730-1800	55	85	55	85	55	85
	1800-2000	45	75	45	75	45	75
	2000-0630	45	75	45	75	45	75

Table 2 Recommended upper limits for construction noise received in industrial and commercial areas for all days of the year (NZS 6803 Table 3)

Time period	Duration of work		
	Typical duration	Short-term duration	Long-term duration
	Leq (dBA)	Leq (dBA)	Leq (dBA)
0730-1800	75	80	70
1800-0730	80	85	75

Irrespective of the noise limits and ability to comply, construction noise effects should be minimised where possible.

Where the above noise limits cannot be achieved, enhanced management will be required to mitigate noise effects. Where practicable, engineering controls should be used to reduce noise levels. However, for some tasks (e.g. piling) this will not be possible and effects will need to be managed by limiting operating hours, providing respite periods, and ongoing consultation and communication with affected parties.

Impacts from vibration may result in perception of vibration and structural/cosmetic damage of a building. An initial screening exercise has been undertaken and only piling works, percussive concrete breaking and vibratory compaction within 50 m of a vibration sensitive receptor are likely to result in an adverse impact. The following vibration limits apply.

Table 3 Vibration limits

Receiver	Location	Details	Category A	Category B
Occupied dwellings	Inside the building	Night time (2000-0630h)	0.3 mm/s ppv	1 mm/s ppv
		Day time (2000-0630h)	1 mm/s ppv	5 mm/s ppv
Other occupied buildings	Inside the building	Day time (2000-0630h)	2 mm/s ppv	5 mm/s ppv
All other buildings	Building foundation	Transient	5 mm/s ppv	Table 4
		Continuous		50% of Table 4

Construction impacts should be managed to comply with the Category A limits. If measured or predicted vibration levels exceed the Category A limits then a suitably qualified expert should be engaged to assess and manage construction vibration to comply with the Category A limits as far as practicable. If the vibration exceeds the Category B limits then the construction activity shall only proceed if there is appropriate monitoring of vibration levels and any associated effects on the building structure.

Table 4 Transient vibration guide values for cosmetic building damage

Building type	Peak component particle velocity in frequency range of predominant pulse, at base of building
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above
Unreinforced or light framed structures Residential or light commercial buildings	(maximum displacement of 0.6 mm below 4 Hz) 15 mm/s at 4 Hz, 20 mm/s at 15 Hz, 50 mm/s at 40 Hz and above

*Guide values would be reduced for continuous rather than transient vibration

Appendix B

Construction Noise Management Tool

Appendix B Construction Noise Management Tool

Introduction

A construction noise management tool (CNMT) has been developed for use by WIAL and its contractors. The CNMT is a screening calculation tool which allows project details including works location, equipment type, duration and mitigation to be entered and the likely noise levels and hence risks rating of the project to be determined.

The tools takes into account the local topography surrounding the airport but does not take into account the shielding afforded by non-airport buildings (i.e. residential dwellings).

The CNMT should be used to assess the potential noise risk rating of all projects. If complex projects (long term, multiple worksites or extensive night time works) are proposed then an acoustic specialist should be engaged, and a detailed noise assessment undertaken.

The tool allows a notification list of affected properties to be produced.

The CNMT has been developed from a CadnaA noise model which uses the following noise model settings and these should be used for any computer predictions.

WIAL Construction noise model settings

Parameter	Setting/source
Software	Any recognised package
Algorithm	ISO 9613-2
Reflection model	Ray tracing, 1 order of reflections
Temperature	10°
Humidity	70%
Ground absorption	G = 0 (water/pavement), 0.5 elsewhere
Terrain contour resolution	1 m
Receiver height	1.5 m (4.5 m upper floors) - most exposed façade
Receivers	Façade (add 3 dB correction to any free field receivers)

For complex noise calculation, the standardised construction noise levels below should be used, unless actual measured data is available. The data presented overleaf provides an inventory of activities with associated octave band sound pressure levels measured at a distance of 10 m from the source.

Construction noise source levels

Activity	Description	Reference	Octave band sound pressure level (dB at 10 m)								L_{Aeq}, dB at 10 m
			63	125	250	500	1k	2k	4k	8k	
Piling	Impact hammer	contractor	93	93	93	93	93	93	93	93	100
	Tracked mobile crane (55t)	BS 5228-1 C.3.29	81	77	69	67	62	60	61	51	70
	Drop hammer pile rig power pack	BS 5228-1 C.3.7	77	78	73	66	63	57	50	42	69
Demolition	Petrol hand-held circular saw cutting concrete floor slab (3kW)	BS 5228-1 C.4.70	72	89	81	80	80	82	86	85	91
	Backhoe mounted hydraulic breaker (69kW)	BS 5228-1 C.5.6	90	79	75	78	78	83	91	92	88
	Tracked excavator (35t)	BS 5228-1 C.5.18	76	79	75	75	76	73	70	65	80
	Dump truck idling	Estimate	63	63	63	63	63	63	63	63	70
	Angle grinder grinding steel (2.3 kW)	BS 5228-1 C.4.93	57	51	52	60	70	77	73	73	80
	Diesel generator (4 kW)	BS 5228-1 C.4.85	69	69	67	60	59	60	56	53	66
Paving	Vibratory roller (8.9t)	BS 5228-1 C.5.20	90	82	73	72	70	65	59	54	75
	Asphalt paver + tipper lorry (18t)	BS 5228-1 C.5.31	72	77	74	72	71	70	67	60	77
General civil works	Tracked mobile crane (55t)	BS 5228-1 C.3.29	81	77	69	67	62	60	61	51	70
	Hand-held welder (welding piles)	BS 5228-1 C.3.31	67	68	69	68	69	66	61	56	73
	Diesel generator(4 kW)	BS 5228-1 C.4.85	69	69	67	60	59	60	56	53	66

Appendix C

Project CNMP Example

4. Noise enquiries

NOISE COMPLAINT PROCEDURE

Effective Date: 1 July 1999

FOR REVIEW

REVIEW NOTES

- 0508 AIR NOISE (voicemail) and airnoise@wellingtonairport.co.nz
- Contact details included on all notification (eg construction works) and WIAL website
- 3 working day response line to all enquiries
- WIAL 2017 website review includes online noise enquiry form
- Correspondence (details of enquiry, response, action if any) filed
- WebTrak

5. LUMINS – Land Use Management and Insulation for Airport Noise Study

History

The Land Use Management and Insulation for Airport Noise Study (LUMINS) finds its origins in the 1997 Consent Order which inserted into the District Plan a requirement for a Noise Management Plan for the Airport to be prepared. This plan is non statutory but sits alongside and complements the District Plan and its package of mechanisms, and aims to encourage the co-existence of the airport and the surrounding community. The Noise Management Plan requires:

- Consideration of land use measures which may mitigate adverse effects through changes to controls (Stage 1).
- Consideration of any need for insulation of existing houses within the ANB; the extent to which such insulation is appropriate, and the ultimate responsibility for cost (Stage 2).

LUMINS Stage 1

Stage 1 of LUMINS considered:

- The extent to which residential and other noise sensitive activities are likely and able to intensify within the ANB;
- Whether people's health would be affected by airport generated noise and if so what the extent of that effect was; and
- Whether, based on the findings of Stage 1, LUMINS should proceed with Stage 2.

In its conclusion, Stage 1 identified that there was a need to proceed to Stage 2 of LUMINS because:

- Residential and other noise sensitive development could significantly intensify within the ANB under the existing District Plan provisions.
- The extent of the effect of aircraft noise on the future population likely to be residing inside the ANB could be significant.

Consequently, it was recommended to the ANMC in August 2007 to progress to Stage 2 of the LUMINS Study.

Refer *Land Use Management and Insulation for Airport Noise Study (LUMINS) 2006*

LUMINS Stage 2

The purpose of the LUMINS Stage 2 Land Use was to:

- Examine the land uses within the ANB that are incompatible with the prevailing and forecast noise environment
- Determine the effectiveness of existing planning instruments in promoting compatible land uses and minimising incompatible land uses
- Determine the changes required to planning instruments to promote more compatible land uses within the ANB.

The LUMINS study made the following recommendations for land use change and management:

1. The existing land use measures within the Air Noise Boundary (ANB) of the District Plan were inadequate and required amendment
2. That where the sound exposure exceeds L_{dn} 75dB residential properties should be purchased over time and residential (noise-sensitive) use be terminated
3. There is a need to insulate existing noise-sensitive activities (residential and educational facilities) within the ANB.

Refer *Land Use Management and Insulation for Airport Noise Study (LUMINS) Stage 2, 2009*

LUMINS Actions

WCC District Plan land use controls

The majority of the identified planning issues were addressed through Plan Changes 72 and 73 to the District Plan and review of the Airport and Golf Course Precinct provisions.

WIAL are identified as an affected party to any resource consent application for subdivision or residential activity within the ANB. WIAL actively engages with WCC on such applications and enquiries with respect to residential activity (new or intensification) are forwarded to the Airport Planner.

Purchase and removal of residential dwellings located within the L_{dn} 75dB contour

LUMINS Stage 2 identified a total of 44 residential properties on Bridge Street, Cairns Street and Calabar Road within the L_{dn}75 dB contour to be acquired and decommissioned from residential use.

All WIAL-owned dwellings were removed following the LUMINS recommendation, and WIAL's Fair Valuation and Purchase Programme has been offered to home owners since 2009. The Quieter Homes noise mitigation package will not be offered to these properties.

Refer *WANT House Purchase Programme map*
https://drive.google.com/open?id=1u3BhINapBq1kP43Dr00xcU43fa4&usp=sharing

Acoustic mitigation (insulation) project

The Acoustic Mitigation Implementation Report (Impact Project Management 2013) scoped the LUMINS implementation project, identifying a number of principles to guide the implementation, procedural requirements and recommendations for a Trial of the implementation project. These recommendations were adopted by ANMC on 11 November 2013.

The Trial Phase was implemented on six Airport owned houses that best represented building construction types within the ANB. The acoustic mitigation works trialled different products and construction techniques to identify which performed best with respect to noise reduction, aesthetic and cost. The Trial Phase was completed in October 2014.

A comprehensive review of the Trial Phase findings and project costings was undertaken in early 2015. Consideration of the alternative acoustic treatment products installed in the Trial Phase was undertaken and the preferred acoustic treatment options, based on an assessment of quality, performance and cost, identified. This informed a Certified Standard Package of Acoustic Treatment – a priority order of acoustic treatments options, including an initial assessment of risks to consider prior to commencing design and construction (pre-design).

An Audit Phase was proposed to test and refine the acoustic treatment options and installation process under "real life" conditions prior to the programme roll out across the ANB.

The acoustic treatment package was successfully installed in three privately owned homes in early 2016.

Quieter Homes

The phased roll out of the "Quieter Homes" acoustic mitigation project commenced in April 2016. The phased roll out is managed by area, starting with those properties that experience the highest exposure to aircraft noise.

ANMC is regularly updated as to the progress of the Quieter Homes roll out.

Refer *Quieter Homes phased roll out map* and https://www.wellingtonairport.co.nz/corporate/safety-and-environment/quieter-homes/ for detail.

LAND USE MANAGEMENT AND INSULATION FOR AIRPORT NOISE STUDY (LUMINS)

1. Executive Summary

1.1 The Land Use Management and Insulation for Airport Noise Study (LUMINS) finds its origins in the 1997 Consent Order which inserted into the District Plan a requirement for a Noise Management Plan for the Airport to be prepared. This plan is non statutory but sits alongside and complements the District Plan and its package of mechanisms, and aims to encourage the co-existence of the airport and the surrounding community. There are two outstanding issues the Noise Management Plan identifies that have as yet not been addressed:

- **Consideration of land use measures which may mitigate adverse effects through changes to controls.**
- **Consideration of any need for insulation of existing houses within the ANB; the extent to which such insulation is appropriate, and the ultimate responsibility for cost.**

1.2 The Study to confront these two matters has been separated into two parts. This report deals only with Stage 1. Stage 2, a more detailed investigation would only be advanced to if it is considered there is sufficient merit to do so.

1.3 Some of the more salient points to emerge out of the investigations undertaken as part of Stage 1 are:

- **There are now over 700 residential units located inside the Air Noise Boundary (ANB)**
- **Most of the housing stock is of good quality**

- **There appears to be only a weak correlation between housing value and proximity to the airport**

- **The numbers of residential units are predicted to increase significantly inside the ANB within the forecast period (to 2020)**

- **The average ANB dwelling's construction is reasonably effective at retarding aircraft noise when windows are closed**

- **Under any growth scenario where windows are open all residential units inside the ANB will be subjected to 'undesirable' levels of aircraft noise. Where windows are closed the number of dwellings so exposed drops but remains significant.**

- **The Airport is in the optimal location compared to several other potential locations in the Wellington Region**

- **The Airport is a significant contributor in direct and indirect terms to the Wellington Region's economy**

- **Noise generated by the Airport has subsided significantly from the peak at 1988 while overall activity has increased substantially, illustrating the effect of investment in quieter technology.**

- **Noise is permitted to increase to levels substantially greater than experienced presently (about 5 dBA L_{dn} more than present)**

1.4 The results of the investigations provide confirmation that sufficient merit is accumulated to warrant progression through to the second stage of the Study.

1.5 A recommendation is therefore made to advance to Stage 2 of the LUMINS study.

2. Introduction

2.1 This report summarises the results for the investigation of Stage 1 of the Land Use Management and Insulation for airport Noise Study (LUMINS), and assesses whether there is merit in advancing to the second stage of the Study. The report has been prepared within the framework provided by the Terms of Reference for Stage 1. The report proceeds in the following manner:

1. It provides a background to the Study and present planning controls in and around the Airport, inside the 'Air Noise Boundary' (ANB, the capacity quota set for the airport at the 65 dBA L_{dn} noise contour. The Boundary is shown on attached Map 1).

2. It examines in detail the purpose and objectives of the Terms of Reference for Stage 1.

3. It summarises the results of each of the steps that the Stage 1 investigation is broken into.

4. It assesses those results to determine whether there is sufficient merit in advancing to the more detailed investigations of Stage 2.

5. Finally the report makes a recommendation on advancement to Stage 2.

2.2 The final decision on advancement rests with the Air Noise Committee, to which these reports are presented to assist them in their deliberations. As such these reports are presented as draft documents – it is the Air Noise Committee's prerogative to confirm them as final.

2.3 The Air Noise Committee is made up of representatives from the following organisations and groups:

- Residents
- Board of Airline Representatives New Zealand (BARNZ)
- Local non BARNZ operators
- Airways New Zealand
- Wellington International Airport Limited
- Wellington City Council
- Technical adviser to resident representatives
- New Zealand Defence Force

3. Rongotai and the Airport, the Airport and Wellington

3.1 Although the current airport as we know it was primarily created in 1959, the area has been associated with aviation activity since 1910. Following the First World War the wide sweeping beach of Lyall Bay and the adjoining Lyall Bay Recreation Ground were used as a base for pleasure flights. In 1929 an area of 19ha was levelled to form a municipal aerodrome. The aerodrome was used for commercial services and by the time the Second World War broke out in 1939 had expanded to 35ha. During the war it was used by the RNZAF and was further enlarged.

3.2 Construction of a new airport began in 1952 and was completed in 1959. The work involved large scale excavation and reclamation of both Lyall Bay and Evans Bay, massive sea protection and the removal or demolition of around 180 houses. The new airport initially had a runway length of 1750m, but this was extended in 1972 to 1936m.

3.3 The residential and commercial areas currently surrounding the Airport were generally established before the creation of the present Airport, probably between 1910 and the beginning of the Second World War. Residential dwellings had spread across the northern part of the Rongotai isthmus, including the hill that was removed for the northern end of the runway, and over into Miramar. The location of industrial uses in Miramar has generally remained constant up to the present day – behind Wexford Hill and on Ropa Lane, although the former gas works site on the corner of Tahi and Tauhinu Street has now been converted to retail and residential uses.

3.4 The exceptions are the industrial land centred on Cairns and Rongotai Roads which was created when the area was reclaimed for the Airport, and the land to the west of the airport that was formerly occupied by the 1940 Centennial Exhibition Showgrounds. The presence of the Airport mainly determined the development pattern and uses found in these areas now. The suburb of Strathmore is also largely post war and post airport.

3.5 In 1992 WIAL commissioned a report[3] on the viability of alternative locations for an airport within the Wellington region. Seven different sites were evaluated: Ohariu Valley, Horokiwi, Mana Island, Paraparaumu, Te Horo, the Wairarapa and Pencarrow. The report concluded:

> "*The topography of the Wellington Region constrains alterative sites to be high cost, operationally poor or located at a distance which penalises users and business activity. No site offers a better alternative to Wellington International Airport at the present time.* "

3.6 In 1997 a report[4] was prepared on the economic contribution of Wellington Airport to the economy of Wellington. According to the report the airport was responsible for direct and indirect benefits to Wellington in the order of $276 million per year, and for the direct and indirect creation of around 2800 jobs. While the data is somewhat dated it illustrates the considerable contribution and flow-on effect of the airport to Wellington's economy (then, about 1.2% of regional output).

4.0 History of Planning Controls

4.1 Wellington's first district scheme was made operative in 1972. This was reviewed in 1979, the review becoming the operative plan in 1985. This 1985 plan was the forerunner to the present District Plan.

4.2 There was a notable absence of noise-related controls on the airport and on the uses surrounding it in the historical planning documents. (The curfew was first introduced in 1975 and administered by the Civil Aviation Authority's precursor and was independent of Wellington City Council controls.) This possibly betrays a certain coexistence that had evolved, probably a reflection of the relatively low numbers of aircraft using the airport at that time, albeit that these older aircraft were considerably noisier than their modern counterparts.

4.3 The zoning pattern of the 1985 plan for the most part corresponds with that of the present plan. However the Airport did not have its own zoning, this was split between residential in the north and industrial in the south, but with a designation for airport purposes laid over the top of both. The Golf Course had a mixture of zonings – retail, industrial and residential.

4.4 Events overtook the development of these somewhat benign planning instruments with the advent of Ansett New Zealand into the domestic market in the mid 1980's. Not only was there a very substantial increase

[3] "Wellington International Airport Ltd – Alternative Airport Locations Study", Works Consultancy Ltd, November 1992

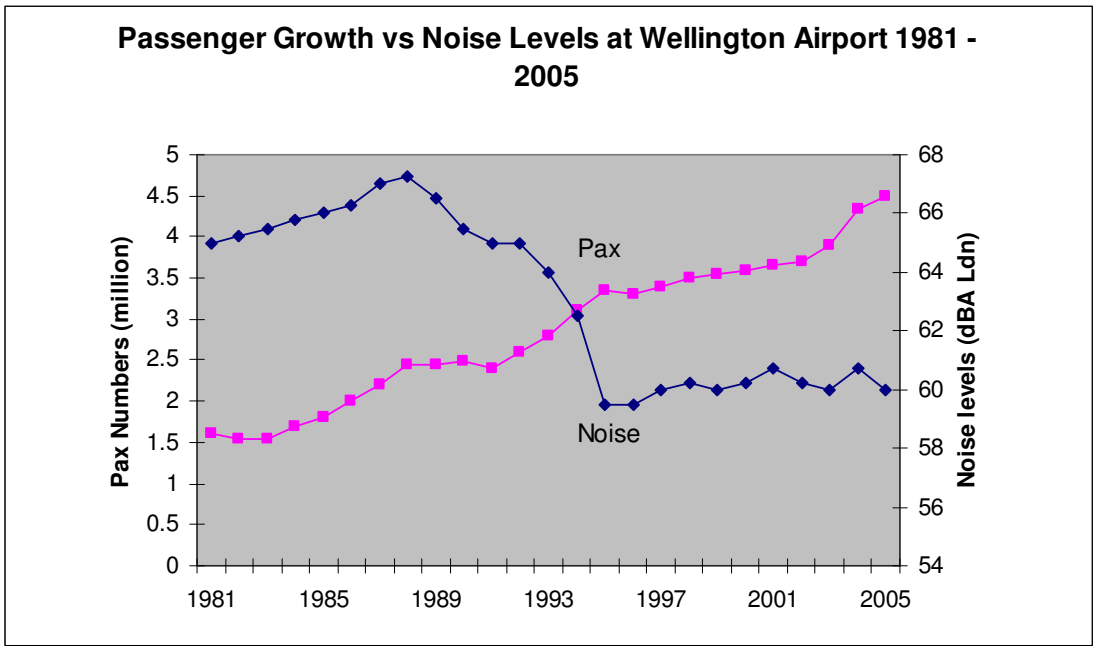
[4] "The Economic Impact of Wellington International Airport", Business & Economic Research Ltd, July 1997.

in the numbers of flights, but Ansett began its operations with old and noisy Boeing 737-100 planes.

4.5 In the late 1980s this exacerbated the pressure on the Council to regulate aircraft noise. It decided that even if it could change the 1985 plan in the face of the existing Airport designation, there was likely to be a very lengthy hearings and appeals process. The Council decided instead to deal with the problem by way of two bylaws. The first controlled engine testing, the second noisy aircraft.

4.7 Interestingly, while noise generated by the airport has subsided significantly since its peak at 1988 (67 dBA[ϒ] L_{dn} at Rongotai College) to around 60 dBA L_{dn} today, overall airport activity has increased extensively. This is illustrated in Figure 1 below with airport activity represented by number of passengers using the airport per year. The number of passengers using the airport in 1988 was approximately 2.5 million with noise reaching 67 dBA L_{dn}, yet in 2005 4.5 million passengers used the airport with noise levels pegged back to 60 dBA L_{dn}. What this shows is the effect of substantial investment in new technology by the airlines and the Airport, such as the replacement of old noisier aircraft with newer quieter planes like the Bombadier Dash 8 Q-300. Figure 1 below and the Noise over the Years figure included in the report on Step 1(c) illustrate the effect of investment by the airlines and airport to drive noise down from its historic peak.

Figure 1: Passenger Growth versus Noise levels generated at Wellington Airport, 1981 - 2005



[ϒ] An illustration putting the noise values stated throughout this report in context is attached as Appendix 1.

4.8 The introduction of the Resource Management Act 1991 and the requirement that a completely new district plan be prepared provided the opportunity to thoroughly re-examine the Airport's status within the context of the planning system. The designation was removed and replaced with the current Airport Precinct, which allowed much greater control to be exerted on the Airport's operations through the District Plan's provisions (a designation essentially 'sits outside' the plan shielding the designated use from its controls).

4.9 The designation's removal, and the full exposure of the Airport to the District Plan was only one part of a two pronged approach – noise management controls on the one hand, land use planning controls on the other. The District Plan introduced for the first time restrictions on the type and intensity of residential development that could establish in areas subject to significant levels of airport noise. This approach represented a 'pact' between the community and the Airport – that it was fair and equitable that both parties should bear part of the burden of lowering noise to an acceptable standard.

4.10 The final details of this arrangement contained in the proposed District Plan could not be agreed upon by all the parties, and three Environment Court appeals against it were lodged by WIAL, BARNZ and RANAG.

5. 1997 Decision & the District Plan

5.1 The current planning provisions relating to the Airport find their origin in the 1997 Environment Court Decision and Consent Order on these appeals.

5.2 The parties agreed on a package of air noise provisions, confirmed through consent order comprising:

- An airnoise boundary
- A ban on non-noise certified and chapter 2 aircraft
- A curfew
- Ground noise controls
- Land use controls

5.3 The one remaining issue that could not be agreed upon was the status of new residential development in the Suburban Centres zone. BARNZ and

WIAL sought non–complying status, WCC unrestricted discretionary – the current status.

5.4 The parties also agreed on a framework within which outstanding issues and concerns can be resolved, given expression through the Noise Management Plan (NMP). The following is taken from the District Plan, which in turn is obtained directly from the 1997 Consent Order:

A noise management plan (NMP) will immediately be implemented by Wellington International Airport Limited (WIAL) to assist all interested parties in complying with the objectives and rules in the District Plan.

The noise management plan will include:

1. *A statement of noise management objectives and policies.*

2. *Details of methods and processes for remedying and mitigating adverse effects of airport noise including but not limited to:*

    - *Improvements to Airport layout to reduce ground noise.*

    - *Improvements to airport equipment (including provision of engine test shielding such as an acoustic enclosure for propeller driver aircraft) to reduce ground noise.*

    - *Aircraft operating procedures in the air and on the ground.*

3. *Procedures for monitoring and ongoing review of the plan.*

4. *Dispute resolution procedures.*

5. *A programme for immediate and ongoing refinement by way of shrinkage of the location of the air noise boundary (ANB), with priority to be given to those areas which through further monitoring are found not to be exposed to forecast Ldn 65 dBA, with the intent that the programme be completed within two years.*

6. ***Consideration of land use measures which may mitigate adverse effects through changes to controls.***

7. ***Consideration of any need for insulation of existing houses within the ANB; the extent to which such insulation is appropriate, and the ultimate responsibility for cost.***

8. *Details of methods and process for monitoring and reporting compliance with the District Plan rules, including but not limited to:*

   - *Airnoise boundary and activity ceilings provided in the rules.*
   - *Engine testing.*
   - *Auxiliary Power units (APUs Ground Power Units (GPUs).*
   - *Curfew.*

9. *Details for certification by WIAL of night curfew exempt aircraft.*

5.5 All of these matters have been completed and included in the NMP, with the exceptions of items 6 and 7. This report addresses aspects of these two outstanding items.

6. Terms of Reference

6.1 In August 2004 Terms of Reference were agreed upon by the Air Noise Management Committee for a study into items 6 and 7, attached as Appendix 2. It was decided to combine the matters together into one study given insulation for air noise and land use management are in many ways closely connected, presenting a strong synergy.

6.2 The Terms of Reference separate the Study into 'Initial' and 'Subsequent' investigations, corresponding with Stage 1 and Stage 2 respectively.

6.3 Stage 1 is focused on what is going on inside the Air Noise Boundary at the present time, and what could happen under the existing District Plan regime. Using this information it then inquires and forms conclusions on the effect of noise exposure on the existing and potential future populations inside the ANB. Stage 1 could be summarised as:

1. To what extent are residential and other noise sensitive activities likely and able to intensify within the ANB.

2. Is people's health being adversely affected by exposure to aircraft noise, and if so what is the extent of the effect and the numbers of people affected?

6.4 The assessment of these matters is divided into 5 items or steps. The items are in many ways interrelated, building on each other, and in combination seek to provide answers to the above two questions.

6.5 Item (a) looks at the nature of residential development, including temporary accommodation and schools that exist inside the ANB at the moment. This is termed 'the baseline'.

6.6 Item (b) requires an assessment of the degree to which residential and other noise sensitive development could intensify or change under existing planning rules. This is termed 'the future' – what could happen inside the ANB over the next 15 years.

6.7 Item (c) provides a context to noise levels currently being experienced by comparing them with those at historic peak (around 1987), the time of the Environment Court Decision in 1997 and the levels permitted by the District Plan.

6.8 Item (d) is an examination of noise levels that can be expected to be experienced inside typical dwellings found within the ANB. This is acquired by the measurement of the noise-reducing characteristics of typical dwellings.

6.9 Item (e) brings together items (b), (c), (d) in forming statements on the noise effects that are and will be experienced by people living in the ANB now and in the future.

6.10 A summary of the results produced for each of those items is set out below.

7. Summation to Steps 1(a) to 1(e)

7.1 Step 1(a)

(a) *'An accurate measure of the changes to ownership, number, condition and type of construction of residential buildings (dwellings, apartment blocks and other uses including short stay accommodation and schools) within the Air Noise Boundary – the baseline.'*

7.2 There are two stand-out features from the investigation carried out for step 1(a).

7.3 The first is the total number of residential units inside the Air Noise Boundary. Partly on the basis of evidence adduced to the Environment Court in the past there was a general consensus there were about 650 residential units inside the ANB. The WCC and Valuation data has however allowed a detailed analysis to be conducted, revealing the higher figure of 728 residential units in total. This includes the 32 units established inside the Suburban Centres zone. It is possible that previous

counts underestimated recent infill and failed to include some blocks of flats dating from the seventies in the western sector of the ANB.

7.4 The second feature is the seeming lack of correlation between the presence of the Airport and the changes to ownership, condition and type of construction of the residential units inside the ANB. There would seem to be no discernible pattern to these factors that would be attributable to the airport's presence. Instead ownership change appears to be fairly uniform across the ANB and does not decrease away from the Airport. The same holds for the quality of housing, expressed through the condition map.

7.5 This finding is reinforced by the capital value map which shows that values are evenly distributed on the flat either side of the airport within the ANB, and are perhaps more influenced by views and elevation such as on Maupuia Ridge and at Moa Point where values can be seen to increase markedly (However it may be that the somewhat coarse gradations of the capital value map may obscure more subtle differences in value, as values are grouped in increments of $150 000).

7.6 What is clear is that proximity to the airport and its noise is not perceived by the market place to be a key constraining factor to the residential development of the area. Residential development is taking place inside the ANB, despite and perhaps with little regard to the airport's presence.

7.7 There could be several explanations for this – the property boom of the eastern suburbs, quieter aircraft etc – this study does not attempt to explain why. It is also possible that the airport is having an effect but it cannot be made out over such a relatively small area like the ANB. Nevertheless it is difficult to contrast the ANB area with another as a comparison becomes flooded with variables, inevitably resulting in a likening of apples with oranges.

7.8 The findings of the examination carried out into step 1(a) can be summarised as follows:

- There is an average turnover of 45% within the ANB between 1999-2005, although any correlation between proximity to the airport and turnover is weak.
- There is a total of 728 residential units inside the ANB.
- The condition of residential buildings is generally 'above average'.
- The most common type of house construction is wooden walls and iron roof

- The two short stay accommodation sites and the two educational facilities inside the ANB are in good condition. There are two childcare centres within the ANB, a Samoan preschool within Mirimar South School and on the corner of Salek Street and Rongotai Road.

7.9 Step 1(b)

(b). '*An assessment, as best as practicable, of the extent to which residential and other noise-sensitive development could intensify or change within the ANB area under existing district plan provisions. – the future, possibly develop some alternative scenarios.'*

7.10 The report for step 1(b) was divided into 3 broad areas of investigation:

1. An assessment of the total numbers of residential units that *theoretically could* be established inside the ANB

2. Tempering the above with a 'real-world' assessment of the numbers of residential units that are *likely* to be established inside the ANB

3. Because both of the above assessments are intimately informed by the provisions of the District Plan, an examination of the operation of the Plan provisions in those zones receptive to noise sensitive development was also carried out. This provides a holistic understanding of the functioning of the Plan and how it relates to growth inside the Air Noise Boundary.

Outer Residential Zone

7.11 The report concluded that in the Outer Residential Zone inside the ANB, an extra 276 residential units could theoretically be established, in conservative circumstances. In more favourable conditions, under a moderate growth scenario it is assumed an extra 474 residential units could be built. These figures represent increases of 40% and 68% respectively over the current 696 houses inside the Outer Residential zone in the ANB.

7.12 Remembering that an extra 276 - 474 units is hypothetical only but provides the background against which the magnitude of the likely scenarios can be evaluated.

7.13 Three likely growth scenarios were developed using a synthesis of two sets of growth projections– low, medium, and high which attained increases of 57, 91 and 184 respectively.

7.14 It is difficult to predict which of the likely growth scenarios will occur in the next 15 years. The District Plan objectives and policies emphasise urban containment, and infill housing is a steady trend across all residential areas of the city. The ANB has been no exception to this trend, as evidenced by the increase in dwelling numbers to the current 728. A factor may be the ability to undertake small housing developments, of one or two additional units, without difficulty under the present District Plan rules. Growth may also be sustained by the flat land, a relative scarcity in Wellington, proximity to desirable Seatoun, good public transport access and the views that parts of the ANB enjoys such as on Maupuia Ridge.

7.15 Balanced against this is the requirement for multi-unit housing developments (3 or more units) within the ANB to first acquire resource consent for a discretionary unrestricted activity, and the economy. While 15 years is a reasonable amount of time within which a lot of development can occur, recent growth is on the back of a long economic and property boom which is unlikely to continue indefinitely. Growth could ease back but not to historical levels. For these reasons it is considered that likely growth will fall somewhere between 57-184 additional residential units, probably around the middle of the range.

Suburban Centres Zone

7.16 The selection of a particular capacity figure for the Suburban Centres zone almost becomes irrelevant - all the capacity figures developed illustrate the huge potential of land zoned Suburban Centre to accommodate more residential units, even under 'constrained' conditions. The figures also demonstrate that potentially the Airport could be significantly more enclosed by uses very different, and very (much) more sensitive to noise than today.

7.17 Balanced with that is that land in the Suburban Centre zone is generally fully utilised by commercial activities. Any decision to develop these properties for residential will be dependent on business decisions to relocate, downsize (for example to ground level only) or close existing businesses and the attractiveness of those sites to other commercial activities. That will be more compelling in some areas of the zone where the value of land for residential would outweigh that of other competing uses, and less compelling in other parts. In any event it is acknowledged that the commercial sector, the primary driver of demand for land in the Suburban Centres zone, can be volatile. Presently demand is solid.

7.18 Four likely growth figures in residential units arose out of the four growth scenarios: low – 82 in total, medium – 157, high – 232, and 432 coming out of the 'Step shift' scenario.

7.19 It is not considered that the low scenario is reliable, there are already 32 residential units in the zone, 15 years is a reasonable amount of time and the recent Corrigan Decision effectively lessens the barriers to the construction of considerably more units on the western side of Maupuia Ridge at least.

7.20 It is also considered the 'high' and 'step shift' scenarios can be put aside. It is not anticipated that commercial and industrial uses sectors presently occupying most of the zone will collapse releasing substantial areas for residential development. Instead there is a good chance that the film industry, proximity to the Airport and CBD, and flat land will ensure the continuance of non-residential uses for the most part.

7.21 That notwithstanding there are some areas of the zone that are very likely to be developed for residential units – Maupuia Ridge in particular because the topography does not lend itself to commercial uses and in light of the recent Corrigan decision. The recent trend for sea side living will also probably mean that some parts of the zone close to Lyall Bay will be converted to residential units. Commercial uses there seem at present marginal, and the nearby Airport Retail Park has encouraged some uplift in the general area. It is considered that residential development on some part of Burnham Wharf is also a distinct possibility over the next 15 years. CentrePort has indicated its desire to promote substantial residential development around its port facilities in the Central City. It is likely that this development philosophy will be extended to Burnham Wharf, especially given its high amenity and proximity to the pleasant Shelly Bay coastline.

7.22 The upshot of all this is that a figure somewhere between 50 and 200 additional units is considered the most appropriate forecast for the Suburban Centres zone, between 82 and 232 in total (32 existing/already constructed) but probably tending towards marginally above the mid range.

Other Noise Sensitive Development

7.23 Determining capacities within the ANB for travellers' accommodation and childcare centres, other components of noise sensitive uses, is a bit difficult given the variables. However it is considered likely that a hotel will be constructed inside the Airport Precinct (it is anticipated in that zone's provisions). It is also likely a hotel could be established near the Burnham Wharf area, and an additional childcare centre in the Outer Residential zone, as this form of child care becomes more popular.

7.24 Step 1(c)

1(c): *'An assessment of current noise levels against those applied at historic peak, at the time of the Environment Court decision in 1997 and against the permitted noise levels of the District Plan.'*

7.25 This assessment was relatively straightforward, and is graphed on page 2 of the report for Step 1 (c). it shows that capacity levels are represented by the Air Noise Boundary which largely follows the L_{dn} 65 dBA noise contour.

7.26 Historic peak is confirmed as 2-3 dBA L_{dn} decibels louder than Capacity.

7.27 Current noise levels are 5 decibels less than Capacity.

7.28 1997 (Environment Court Decision) levels are also approximately 5 decibels less than Capacity.

7.29 In itself this Step provides a comparison and a setting for all the relevant noise levels. It should be noted that increasing noise levels from those received currently to Capacity equates to an approximate tripling of current annual aircraft movements (based on the assumption that the current mix of aircraft remains and flight numbers are increased evenly throughout the day. Capacity may be more quickly reached if more flights are concentrated at night time, due to the 10 dBA penalty accorded to all night flights.)

7.30 The information derived through the step 1(c) exercise also feeds into the other steps, particularly step 1(e).

7.31 Step 1(d)

1(d): `*Using available local and international information, provide estimates of expected indoor aircraft noise levels within ANB – buildings, based on the acoustic performance of existing buildings within the area and the level of aircraft noise anticipated by the ANB.'*

7.32 A detailed investigation into the sound reducing characteristics of houses inside the ANB was carried out over the winter of 2005. Noise meters were set up inside and outside 4 representative houses to record simultaneous noise levels received from jet aircraft movements (Noise levels were based on jet aircraft as these generate the majority of noise at the airport and form the basis on which the ANB is calculated).

7.33 The investigations determined that overall the noise received inside an existing average house inside the ANB is 26 decibels less than the noise experienced outside when windows and doors are closed. This reduces down to 17 decibels when windows are open. That is, the typical ANB dwelling possesses such noise reducing characteristics that reduce aircraft noise by 26 and 17 decibels when windows are closed and open respectively. Opening windows effectively diminishes much of the sound insulating characteristics of a dwelling, as it creates an unobstructed pathway for noise into the dwelling.

7.34 These results mirror those for a study conducted in the United States (also 26 and 17 decibels, p. 4 Step 1(d) report LUMINS) and closely approximate those for a similar study carried out in Auckland – 24-31 and 18 when windows are closed and open respectively.

7.35 The results from 1(d) investigations were a little surprising in that such a significant reduction with closed windows was slightly better than expected. The houses tested, like the majority of existing houses inside the ANB, date from the 1920's and '30's and contain very little insulation. Often there is nothing between the exterior cladding and interior walls. As predicted when windows are opened noise insulation reduces sharply.

7.36 The primary purpose of step 1(d) was to inform the analysis carried out for 1(e).

7.37 Step 1(e)

1(e): *'Using available local and international information on effects of aircraft noise, provide statements as to likely effects/impacts on the calculated noise exposed population and houses (baseline and future) at these predicted indoor exposure levels and determine the baseline and future population impacted.'*

7.38 As a starting point three main effects of environmental noise exposure are identified:

- Amenity, represented by the criterion L_{dn}
- Communication, represented by the criterion SEL
- Sleep disturbance, represented by the criterion L_{max}

7.39 Assessment was expanded beyond the use of the L_{dn} criterion alone since, as discussed under step 1(b) it is considered to not fully capture the full impact of aircraft noise. For example, because the L_{dn} is a time averaged measure one or two large noisy events at night causing significant disturbance can be masked by generally benign conditions predominating the rest of the time. The SEL and L_{max} measures take account of some of

these effects not picked up by L_{dn}, ie. communication interference and sleep disturbance.

7.40 Thresholds for the three criteria were then determined beyond which aircraft noise is considered 'undesirable'. An undesirable level is such that more than a small percentage of people are adversely affected (p. 12, Step 1(e) report LUMINS). The following thresholds for internal noise levels were identified and demarcated in that report:

Figure 2: Thresholds for internal noise levels

Amenity	L_{dn} > 45 dBA
Communication interference	SEL > 70 dBA
Sleep disturbance*	L_{max} > 54 dBA

* As defined by Griefahn, who does not take into account the benefit of curfewed operations such as exist at Wellington.

7.41 The thresholds were then combined with the general noise insulation qualities of existing houses inside the ANB, produced by the Step 1(d) investigations, to show the numbers of houses and people adversely affected by aircraft noise, now and in the future. The 'future' was based on the population growth scenarios identified in step 1(b) – 'low', 'medium', 'high', for both the Outer Residential and Suburban Centres zones.

7.42 This exercise results in the following tables, illustrating the number of people that will be exposed to undesirable internal noise levels where windows are opened and with windows closed. Population numbers are based on Department of Statistics' average occupancy per dwelling in the Rongotai and Miramar areas (2.6 persons/dwelling). Where windows are opened much of the effectiveness of any noise insulation is lost.

7.43 *Figure 3: Number of people exposed to undesirable internal noise levels, with windows open:*

Thresholds	Current noise and population	Future noise levels Population growth scenarios			
		None	Low	Medium	High
No. people > 45 L_{dn}	1214	1892*	2171*	2454*	2891*
No. people > SEL 70	1892*	1892*	2171*	2454*	2891*
No. people > L_{max} 54	1892*	1892*	2171*	2454*	2891*

An * denotes all people inside the ANB affected.

7.44 *Figure 4: Number of people exposed to undesirable internal noise levels, with windows closed*

Thresholds	Current noise and population	Future noise levels Population growth scenarios			
		None	Low	Medium	High
No. people > 45 Ldn	46	613	613	613	613
No. people > SEL 70	613	613	613	613	613
No. people > Lmax 54	1053	1053	1185	1307	1518

7.45 Translated into percentages, where windows are open and when the airport is operating at capacity, 100% of people and houses inside the

ANB will be adversely affected by undesirable noise levels. This is under all scenarios. When windows are closed this falls to between 20-32% (depending on the level of growth) for the annoyance and communication interference thresholds and 53-56% for sleep disturbance.

7.46 The results of the step 1(e) examination demonstrate the potential for significant numbers of people inside the ANB both currently and in the future when the airport is operating at capacity to be adversely affected by undesirable levels of aircraft noise. This is most pronounced when windows are open which effectively neutralises much of a dwelling's noise insulation properties, and remains substantial when windows are closed. There do not appear to be data or studies available that examine the amount of time windows would be open, not only for the Wellington context but in general. It is assumed for the purposes of this study that windows would be open for a reasonable amount of time, especially over the summer period.

7.47 It is observed from the results that where windows are closed the numbers of people subject to adverse levels of amenity and communication interference (represented by L_{dn} and SEL) remains constant over the various growth scenarios. That is because new dwellings, under current Plan provisions must be built in accordance with the Plan's 45L_{dn} internal noise environment, leaving only existing housing adversely affected.

7.48 However the number of people exposed to undesirable levels of noise in terms of the L_{max} measure does rise in parallel with the growth of dwellings. While new houses in the ANB will be required to be insulated to the Plan's 45 L_{dn} requirement, such insulation will not prevent the type of disturbance as represented by the L_{max} (this is because the L_{dn} measure averages all the sound energy over a certain period to provide an indication of accumulated annoyance, but will mask occasional significantly disruptive events).

7.49 Sleep disturbance is a particularly sensitive component of undesirable exposure to aircraft noise. At Wellington Airport the curfew works to minimise this type of disturbance, as there are virtually no aircraft movements between 1am and 6am. Nonetheless night time officially extends from 10pm to 7am, when ideally people can generally expect the minimum of interruptions to sleep. It is noted in the report that noise exposure in the latter stages of sleep is more likely to result in awakening than if the noise exposure occurs during the first 2-3 hours of sleep (p. 7, Step 1(e) report LUMINS). Operation of the Airport at capacity will result in an increase in flights in the period between 6-7am when people are more easily awoken. To lessen sleep disturbance effects Griefahn recommends progressively reducing the frequency of flights or concentrating flights at the beginning and end of the night to keep the

hours in between free. The curfew at Wellington ensures that a 5 hour period at least is preserved as uninterrupted each night.

7.50 The impact of airport noise on other travellers' accommodation has not been examined in the same depth as for residential units. It is considered the absence of a sustained domiciliary component to this activity significantly reduces occupants' exposure to aircraft noise. There is also much less inertia to people occupying traveller's accommodation – if the accommodation is unsuitable in terms of noise they can move.

7.51 Investigations into the internal noise levels received at Miramar South School revealed that aircraft noise is having some adverse effect on teaching in certain classrooms at the school. This noise sensitive activity (at least as it comprises parts of Miramar South School) therefore currently and in the future will suffer from adverse levels of aircraft noise exposure. The aviation sector is supportive of the inclusion of schools in the Study so associated problems can be addressed.

8. Tests for Merit

8.1 Where Stage 1 is a 'snapshot' of what is going on inside the ANB, Stage 2 will be focused on resolving any issues posed by the first stage. It looks at whether changes to the land use management regime inside the ANB are necessary and if noise insulation should be added to existing houses to protect occupants, and what the cost of this would be.

8.2 Stage 2 is not a natural corollary of Stage 1. At the end of Stage 1 it must be determined whether there is merit in proceeding to Stage 2. This is stated in the August 2004 Terms of Reference for this Study. A possible conclusion to Stage 1 investigations is that the Plan is working and will continue to work effectively in managing noise-sensitive uses inside the ANB, and the exposure of existing and future populations inside the ANB to aircraft noise is not adverse to their health. If that is the case the Study finishes there.

8.3 Advancement to Stage 2 is a major step – re-examining the District plan's approach and insulating houses for aircraft noise are potentially very expensive, challenging and time consuming, and are movers that cannot be undertaken lightly.

8.4 In the context of this study it is considered that the 'merit' of proceeding to Stage 2 should be determined by the responses to three sequential sets of enquiries:

1. Whether the extent to which residential and other noise sensitive uses inside the ANB could intensify under existing District Plan provisions will be significant, and

2. Whether the effects of aircraft noise on existing and future residents indoors will be significant

3. As a consequence, is there a need to advance to Stage 2, and is that advancement appropriate?.

8.5 These enquiries have been designed to provide rigour and transparency in the justification on whether or not to proceed to Stage 2. They find their origin in:

- The fundamental questions posed by the Noise Management Plan's two outstanding points **(Enquiries 1 and 2).**

- The Study's Terms of Reference which state the initial (Stage 1) focus will be on 'need' and 'appropriateness' **(Enquiry 3)**.

8.6 Evaluation through these three 'tests' will determine whether there is merit in advancing to Stage 2. The final decision on advancement is of course a matter reserved for the Committee.

First Enquiry

8.7 Whether the extent to which residential and other noise sensitive uses inside the ANB could intensify under existing District Plan provisions will be significant.

8.8 The presence of the airport is not a significant impediment to the ongoing intensifying urban development surrounding it. Development appears to be proceeding at a rate comparable to areas outside the ANB and there is a weak correlation between the proximity to the airport and value.

8.9 The number of dwellings has increased from 650 in 1997 to 728 in 2006 – representing a steady rate of growth in the ANB over this period.

8.10 Analysis of the technical reports indicate that there is considerable capacity for residential growth inside the ANB and that by 2020 there is likely to be:

- between 753 and 880 dwellings in the Outer Residential Area
- between 82 and 232 dwellings in the Suburban Centres zone.

8.12 While the technical analysis identifies growth for both zones, it is acknowledged that all future housing must be insulated against airport noise to the requirements of the District Plan. This will temper the effect

of the increase in residents somewhat. However as highlighted the L_{dn} 45 dBA standard does not completely capture the full effect of aircraft noise, as it does not accurately account for all aspects of disturbance, such as sleep interruption.

8.13 In summary - based on past development trends and likely future development scenarios under the existing District Plan, it is likely that residential and other noise sensitive development could significantly intensify within the ANB.

Second Enquiry

The extent of the effect of exposure to aircraft noise on people

8.14 The effects on people of exposure to aircraft noise is primarily dependant on:

- Levels of aircraft noise
- Effectiveness of the dwelling to insulate against aircraft noise

8.15 While current noise levels are below the permitted standard in the District Plan, it is anticipated that growth in air traffic to 2020 will increase the accumulative noise to a level close to the allowable maximum standard. Should this occur, noise levels within the ANB will increase by approximately 5dBA L_{dn}.

8.16 Technical analysis on the effectiveness of dwellings to insulate against aircraft noise indicates that a significant number of residents could be exposed to undesirable levels of aircraft noise – depending on whether windows are open or closed.

8.17 Where windows are closed around 613 people (236 dwellings) will be exposed to undesirable levels of amenity and communication interference. According to the research by Griefahn as referenced in the Step 1(e) report between 1185 and 1518 people would possibly be exposed to an undesirable level of sleep disturbance. This must be qualified though by noting of course that this research upon which the sleep disturbance levels are based does not take into account the effect of a curfew such as exists at Wellington.

8.18 Where windows are opened the evidence becomes quite cogent. No one living inside the ANB in 15 years time (between 1892 and 2891 people) with their windows open would not be exposed to undesirable levels of airport related noise.

8.19 It is therefore concluded that the extent of the effect of aircraft noise on the future population likely to be residing inside the ANB could be significant.

Third Enquiry

Need and appropriateness

8.20 This enquiry provides the final rigour to determining if the Study results present sufficient merit warranting advancement to Stage 2. The Terms of Reference state Stage 2 consideration can occur '…following stage 1 if having regard to "need and appropriateness" it is decided to proceed.'

8.21 This raises the following questions.

8.22 Is there a need to advance to Stage 2?

8.23 The Study results indicate that noise sensitive uses inside the ANB could significantly intensify within the planning period, and that significant numbers of people could be exposed to the adverse effects of aircraft noise. It is clear that further investigation is required if these consequences are to be avoided. Not entering into further investigation could strongly aggravate the possibility that large numbers of people will be exposed to undesirable levels of aircraft noise. This has the secondary effect of increasing the chances that the Airport would become the focus for further restriction. As such, there is a demonstrable need to advance to Stage 2.

8.24 Secondly, is it appropriate to undertake further investigation?

8.25 It could be while further investigation is needed it may not be appropriate to carry out that investigation. Further analysis through Stage 2 potentially exposes the District Plan to change and the Airport, Airlines or other parties to considerable cost for an insulation programme.

8.26 It is considered in the circumstances that it is appropriate to undertake additional work, in full recognition of that exposure. The potential adverse effects demonstrated by the Stage 1 analysis demand it. Ignoring those results and ceasing the Study now could leave issues to intensify and go unresolved, intensifying the risk of adverse effects on the local community, the airport and indirectly the entire region.

8.27 Therefore it is appropriate to proceed to Stage 2.

9. Conclusion

9.1 This report has inquired into whether there is merit in proceeding to Stage 2 of the LUMINS Study.

9.2 It established the background to the current provisions of the District Plan and the Study. It then summarised the results for the separate steps into which Stage 1 of the Study was broken into. This allowed the results to undergo scrutiny by each of the three 'tests'.

9.3 At this point we are now able to ascertain 'merit'.

9.4 The following was concluded for each of the tests:

1. Residential and other noise sensitive development could significantly intensify within the ANB under existing District Plan provisions.

2. The extent of the effect of aircraft noise on the future population likely to be residing inside the ANB could be significant

3. There is a need to carry out further investigation on the issues highlighted, and this investigation is appropriate.

9.5 Consequently there is merit in progressing to Stage 2 of the LUMINS Study.

10. Recommendation

10.1 It is recommended to the Wellington Air Noise Management Committee that Stage 2 be progressed to.

5.2 LUMINS Stage 2 2009

LUMINS

Land Use Management and Insulation for Airport Noise Study

STAGE 2

SEPTEMBER 2009

Prepared for Air Noise Management Committee by Boffa Miskell Ltd

LUMINS
STAGE 2

21 September 2009
prepared for the Air Noise Committee by

Boffa Miskell

CONTENTS

INTRODUCTION

This report presents the findings of Stage 2 of the Land Use Management and Insulation For Airport Noise Study (LUMINS). The overall purpose of LUMINS is to determine the future management of land uses *and* noise insulation for the properties within the area described by the Wellington International Airport Air Noise Boundary (ANB).

Stage 1 of LUMINS (refer Land Use Management and Insulation for Airport Noise Study (LUMINS) 2006) considered:

- The extent to which residential and other noise sensitive activities are likely and able to intensify within the ANB;
- Whether people's health would be affected by airport generated noise and if so what the extent of that effect was; and
- Whether, based on the findings of Stage 1, LUMINS should proceed with Stage 2.

In its conclusion, Stage 1 identified that there *was* a need to proceed to Stage 2 of LUMINS because:

- Residential and other noise sensitive development could significantly intensify within the ANB under the existing District Plan provisions.
- The extent of the effect of aircraft noise on the future population likely to be residing inside the ANB could be significant.

LUMINS STAGE 2 SCOPE & OUTCOMES

The scope of LUMINS Stage 2 is to address the matters identified in Stage 1. The aspects of Stage 2 relating to insulation have been completed. A summary of the findings of this is included on the next page. The Stage 2 Land Use Study is accordingly focussed on the following outcomes which are to:

- Examine the land uses within the ANB that are incompatible with the prevailing and forecast noise environment
- Determine the effectiveness of existing planning instruments in promoting compatible land uses and minimising incompatible land uses
- Determine the changes required to planning instruments to promote more compatible land uses within the ANB.

PHASES

To address the scope and produce the outcomes sought the work has been conducted in three phases. It is noted that this work has also been conducted in parallel with the Wellington Airport Master Plan process. These three phases are described below:

PHASE 1 | BACKGROUND

Backgrounds previous LUMINS work, considers the broad strategic city planning context, and identifies the landuses and characteristics of the area which affect compatibility with the noise environment.

PHASE 2 | LAND USE OPTIONS

Considers the land use options that may be possible within the area and the types of criteria that need to be considered in determining compatibility of future development.

PHASE 3 | EVALUATION AND ACTIONS

Evaluates the land options for the area and identifies the elements required within a strategy for land use management under the relevant planning instruments.

The outcomes of these three Phases are represented by the three parts of this report.

PART 1 | BACKGROUND

COMMUNITY SURVEY

A survey of households within the ANB was carried out by Colmar Brunton in January 2008. The following conclusions were drawn from this research which generated 181 responses.

Overall, the respondents were satisfied with living in the area. Many respondents have lived in their homes for years and few have complained about noise originating from the airport.

However, the survey findings indicated that airport noise does have some negative impact on living conditions. Significant numbers of the respondents said that airport noise interferes with their conversations and their TV. Those living in the high L_{dn} zone (the noisiest part) are most likely to be affected. Furthermore, respondents rated airport noise as the community feature most needing improvement, as well as the feature that has the most negative impact on their satisfaction with living in the area.

These findings may seem in contradiction to high levels of satisfaction and low numbers of formal noise complaints. It is possible that the many positive features of the location, such as convenience to shops and amenities offsets concerns about airport noise to some extent.

However, given the location of the homes, it is also possible that some respondents have come to accept airport noise as 'normal', and that some daily interruption is inevitable. There is evidence to suggest that respondents have adapted to airport noise over time. Results illustrate that those who own their home and who have lived in the ANB for a longer period are less likely to say that airport noise has a substantial negative impact on their overall satisfaction. Furthermore, those who have lived in their home for less than three years are more likely than average to say that airport noise wakes them up, or makes them keep their windows shut when they would prefer to have them open.

Finally, it appears that few households have had alterations to reduce the impact of noise from the airport. Ceiling insulation is the most common kind of alteration, and just over one third of those alterations were done at least partly to reduce airport noise. Those who have lived in their home for a longer time are more likely to report having added ceiling insulation. Those in the high L_{dn} zones are more likely to be unsure whether alterations have been made to their home. This is consistent with results indicating that they have lived in their homes for a shorter periods of time and that they are less likely to own their homes.

Satisfaction with living in the area

- The survey findings indicated that the vast majority of respondents within the ANB (92%) were either quite satisfied or very satisfied with living in their local area. Some of the main reasons for being satisfied included convenience to shops (38%) and amenities (26%), and a friendly local community (21%).

- The key reason for moving into the area was affordable housing (27%). Over half of the respondents (60%) have lived in their homes for 7 years or more, indicating that for many respondents the area is an attractive place to live.

- Around one quarter of respondents said that it is at least quite likely that they will move in the next two years. The main reasons for wanting to move were airport noise (15% of those intending to move), needing more room or a bigger home (14% of those intending to move), and buying a home (13% of those intending to move).

Airport noise in relation to other community issues

- Respondents were asked to indicate how much negative impact a variety of issues have on their satisfaction with living in their area. They could answer on a scale from 0 (no negative impact) to 10 (large negative impact). The majority of respondents (86%) indicated that airport noise has at least some negative impact on their satisfaction (ie, they gave a score above 0). Of the ten issues mentioned in the survey, respondents felt that airport noise, traffic congestion, crime, and vandalism have the most negative impact on their satisfaction. Respondents in the high L_{dn} zone were more likely than those in the medium and low zones to give airport noise a score of 3 or above (77%, compared to 62% and 58% in the med and low zones, respectively).

- To get a sense of the importance of reducing airport noise relative to other areas for improvement, respondents were asked to allocate hypothetical Council funds to improve services or facilities in their area. On average, respondents allocated the most money to reducing noise from the airport. This was over and above other facilities such as roads and footpaths, reducing traffic congestion, and children's playgrounds.

Impact of airport noise

- Seventy percent of respondents said that airport noise interferes with their conversations, and half (50%) said that it interferes with their TV. Respondents in higher L_{dn} zones were more likely than those in the low L_{dn} zone to say that airport noise interferes with their TV, that it wakes them up, and that it makes them keep their windows shut when they prefer them to be open.

- Overall, respondents felt that airport noise annoys them more when they are outdoors than when they are indoors. Just over half of respondents who say airport noise has at least some negative impact (53%) said that airport noise disturbs them more outdoors.

- Respondents said that the most annoying type of noise is aircraft taking off. Half of all respondents who said that airport noise has at least some negative impact (50%) said that aircraft taking off is at least moderately annoying, compared to one third (33%) who said that aircraft landing is at least moderately annoying. Around one quarter of respondents who felt that airport noise has at least some negative impact on their satisfaction said that engine testing (23%) and aircraft taxiing (25%) is at least moderately annoying.

- The time when airport noise annoyed respondents the most is weekdays from 6pm to 10pm (33% who said that airport noise has at least some negative impact on their satisfaction said that noise is at least moderately annoying during this time). The least annoying time is weekdays from 9am to 6pm, when many respondents are not home.

Complaints about airport noise

- Few respondents (7%) reported ever having made a complaint about airport noise. Only eight respondents that were interviewed had made a complaint in the last 12 months. Twelve percent (12%) of respondents intended to make a complaint but had not done so. This proportion was higher in the high and med L_{dn} zones than in the low L_{dn} zone (14% and 15% in the high and med zones, respectively, compared to just 8% in the low Ldn zone).

Homes in the ANB

- According to respondents, 44% of homes have had their ceilings insulated since construction (just over one third of these for sound proofing purposes). Twenty three percent of homes have had their walls insulated since construction (just over one third of these for sound proofing), 21% have had seals placed around doors and windows (two thirds of these for sound proofing), and 9% have had double-glazed the windows installed (three quarters of these for sound proofing).

LUMINS STAGE 2 INSULATION REPORTS

Three reports were carried out to look at costs of insulation to residential and educational buildings within the ANB. These are:

- *Indicative Order of Cost Report for Noise Study (LUMINS)* by Rider Levett Bucknall dated 31 July 2007
- *Estimate of Cost Report for Airport Noise Study LUMINS Stage 2 Acoustic Assessment New Houses* by Rider Levett Bucknall dated 19 December 2007
- *Lumins Stage 2 Educational Facilities Acoustic Insulation Assessment* by Malcolm Hunt Associates dated August 2008

The following results were obtained from these studies:

1. The cost of insulating existing houses inside the Air Noise Boundary (Item 2(l)).

Work was first carried out by Rider Levett Bucknall (RLB and formerly Rider Hunt), which was then peer reviewed by Beca. Their estimates are tabled below. It is noted the Beca estimate accounts for only a ventilation system to houses newer than 1997. The RLB estimate does not allow for this ventilation cost. The Beca estimate has calculated different model houses based on size, number of storeys and scope of work. The RLB estimate only allowed for one house type as their model. The size of this house was larger than the average house in the area and did not account for houses of more than 1 storey.

The Beca estimate recognises the potential for variation from the standard model house and has determined a cost for the houses which differ from this. The Beca estimate includes a risk register which values items which have the potential to impact on costs.

Estimator	Internal noise environment	Cost	Adjusted cost1
Rider Hunt	L_{dn} 45 dB	$17 million	$23 million
	L_{dn} 40 dB	$43 million	$54.7 million
Becas	L_{dn} 45 dB	$22 million	$28.1 million
	L_{dn} 40 dB	$33.5 million	$45.2 million

(Reported Footnotes)

1 The 'adjusted cost' column takes into account the cost of acquiring the balance of houses within the L_{dn} 75 dB sound exposure contour that Wellington International Airport Limited (WIAL) does not already own. The costs of insulating houses within this contour relative to the value of the house are considered so high that it is assumed more cost effective to acquire and demolish [it is also known that the adverse health effects at this level can be high]. For internal noise environments of L_{dn} 45 dB the cost of insulating houses within the L_{dn} 75 dB sound exposure contour has been subtracted from the total costs of insulation, and the cost of acquisition of the balance of houses not owned by WIAL within this contour added. For internal noise environments of L_{dn} 40 dB the costs of insulation of dwellings within the L_{dn} 75 dB sound exposure contour were so prohibitive that they were left unassessed by Rider Hunt and Becas. That allows the costs of acquisition of the balance of properties not owned to simply be added to the costs of insulation of dwellings in the remaining contours.

It is conservatively assumed 26 properties will need to be acquired, @ $450,000 = $11.7 million.

2. The extra cost of insulating **new** houses (Item 2(II)).

Internal noise environment	Noise Band1	Insulation Category	Extra cost
L_{dn} 45 dB	1 (L_{dn} 65- 67 dB)	No Action	Nil
L_{dn} 45 dB	2 (L_{dn} 68- 69 dB)	A	$8000
L_{dn} 45 dB	3 (L_{dn} 70- 74 dB)	B	$13,000
L_{dn} 40 dB	1 (L_{dn} 65- 67 dB)	B	$13,000
L_{dn} 40 dB	2 (L_{dn} 68- 69 dB)	B	$13,000
L_{dn} 40 dB	3 (L_{dn} 70- 74 dB)	C	$23,000

(Reported Footnotes)
1 L_{dn} 75+ dB not assessed, since it assumed no houses will be permitted to be constructed within this band.
Note also that this cost does not include mechanical ventilation and is the cost of insulation only.

3. The cost of insulating existing educational facilities [to L_{dn} 40 dB internal noise environment]

Facility	Sub components	Cost
Miramar South School	Main Classrooms	$17,000
	Old Block	$16,000
	Hall	$113,000
	Prefabs	$38,000
A'Oga Amata Preschool (On Miramar S. School site)		$55,000
Early Years Childcare Centre (Salek Street)		$81,000
Total		$320,000

4. Impact of insulation against property values

The comments of Richard Chung, Wareham Cameron are repeated below:

"In respect of insulation costs, we note that these have been divided into various tranches by Rider Levett Bucknall. The A, B, and C categories reflect costs per house in the range of $13,000 to $28,000. The nature of this work (insulation of ceilings, window and door sealing, installation of an airflow system) are predominantly 'non visual' and we do not believe such costs would be captured in higher process/values....the LUMINS stage 1 report noted "there appears to be only a weak correlation between housing value and proximity to the airport", suggesting the market does not really distinguish between housing in the ANB vis a vis outside the ANB. We suspect the same would generally apply in comparing two houses that were the same, bar one had works A, B or C ie the spend would not be additive per se in terms of market pricing, notwithstanding the improved utility of the dwelling. If the work extended to cat. D...($124, 000 which extends to new external linings to exterior walls, wall and ceiling insulation and replacing windows or glass), then we suspect there would be a positive impact on value, but nowhere near the costs of the work."

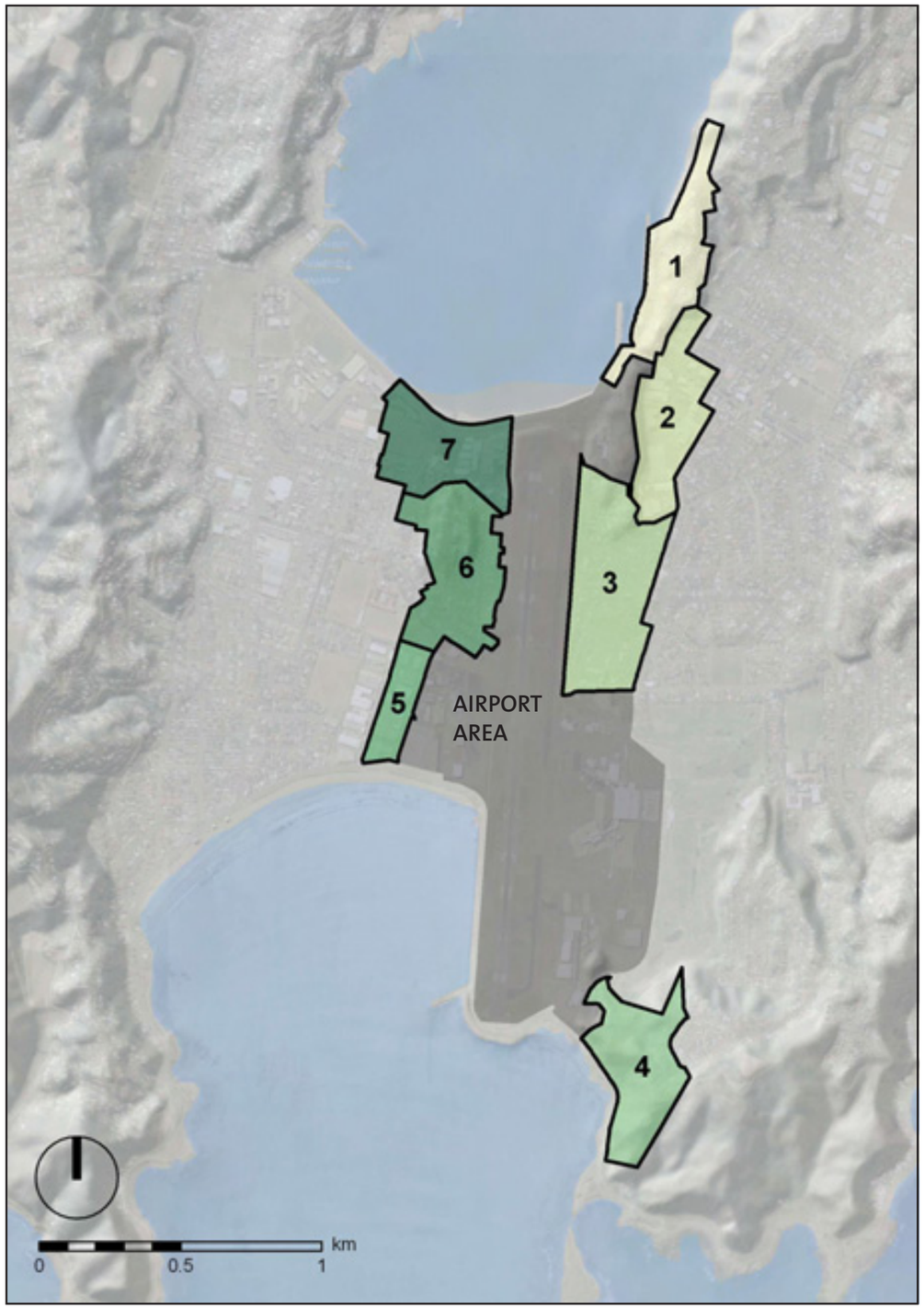


DIAGRAM 1: PLAN OF AIR NOISE BOUNDARY SHOWING PRECINCT AREAS

CURRENT AND FUTURE LAND USE

The area within the Air Noise Boundary (ANB) is large (232 hectares of which the airport is some 110 hectares). Within the ANB there is some variation in characteristics from one place to another. These characteristics are described in the following pages with a view to understanding the place-based issues that affect current compatibility with the noise environment and the potential for accommodating future land use changes. To assist this characterisation the ANB area has been considered in 'precincts' and these are described in Diagram 1 and the text below.

PRECINCT 1

In Maupuia on the east side of Evans Bay, north of Miramar Avenue and northwest of Maupuia Road. Land use is a mix of industrial/commercial and residential.

PRECINCT 2

In Miramar on the northeast side of the airport. Cobham Drive, Calabar Road and Maupuia Road define the western boundary of the precinct. Stone Street and Southhampton Street define the eastern boundary (this is also the eastern limits of the ANB). The southern boundary of the precinct is defined by the edge of the industrial area on Wexford Road. Land use is industrial/commercial.

PRECINCT 3

In Miramar on the eastern side of the airport. Hobart Street defines the eastern boundary (this is also the eastern limits of the ANB). Broadway Street defines the southern boundary. The northern boundary of the precinct is defined by the edge of the industrial area on Wexford Road. Land use is mainly residential, with educational and a small area of industrial.

PRECINCT 4

In Strathmore Park/ Moa Point on the southeastern side of the airport. The northern boundary is defined by the Miramar Golf Course. The southern and western boundaries of the precinct are defined by the edge of Rangitatau Reserve and Lyall Bay. Land use is a mix of residential, open space and utility services.

PRECINCT 5

In Rongotai on the southwestern side of the airport. Part of Rongotai College defines the northern boundary of the precinct. The Lyall Bay coastline borders the southern boundary. The western boundary is defined by Kingsford Smith Street. Land use is industrial/commercial.

PRECINCT 6

In Rongotai on the west side of the airport, south of Rongotai Road and north of the Suburban Centre Area on Kingsford Smith Street. Land use is residential and a small area of industrial.

PRECINCT 7

In Rongotai/Kilbirnie on the northwest side of the airport, north of Rongotai Road. The northern boundary is defined by Evans Bay and the western boundary by the western limits of the ANB. Land use is industrial and a small area of residential.

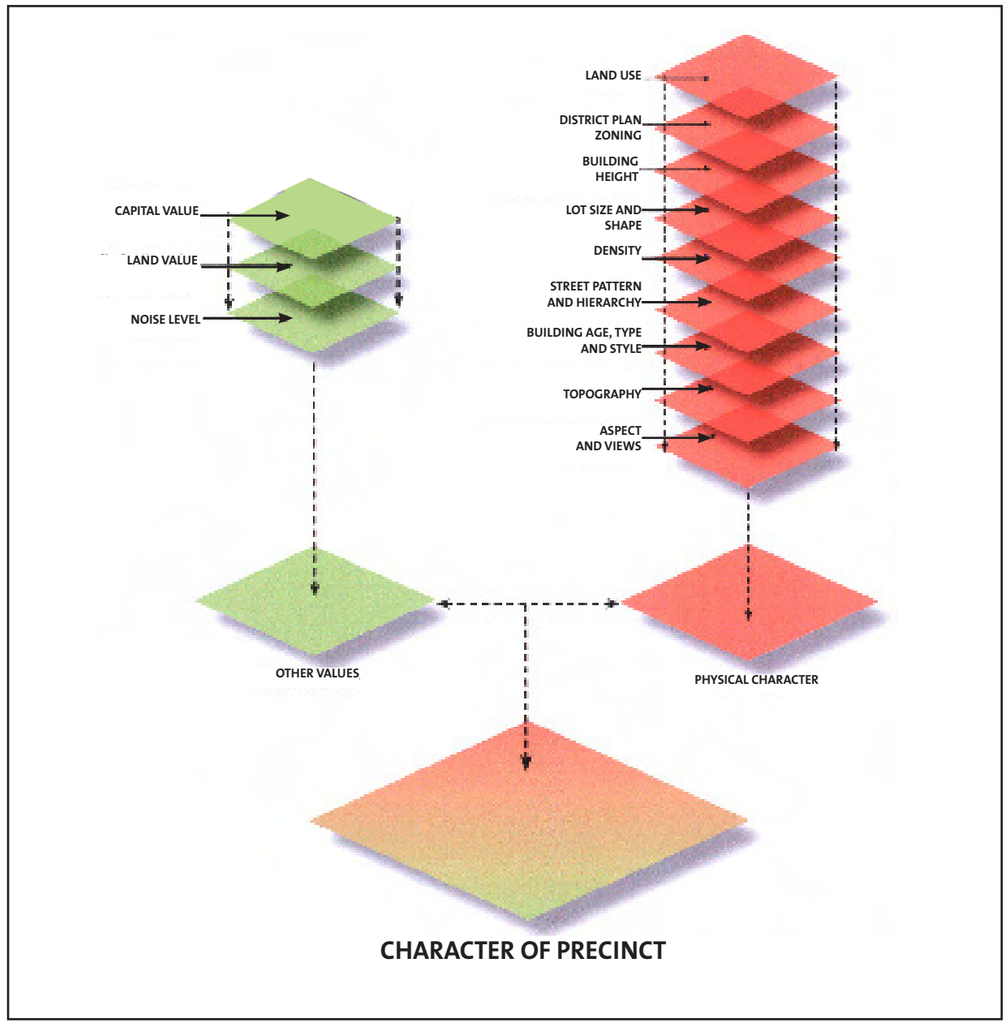


DIAGRAM 2: PROCESS OF DEFINING CHARACTER

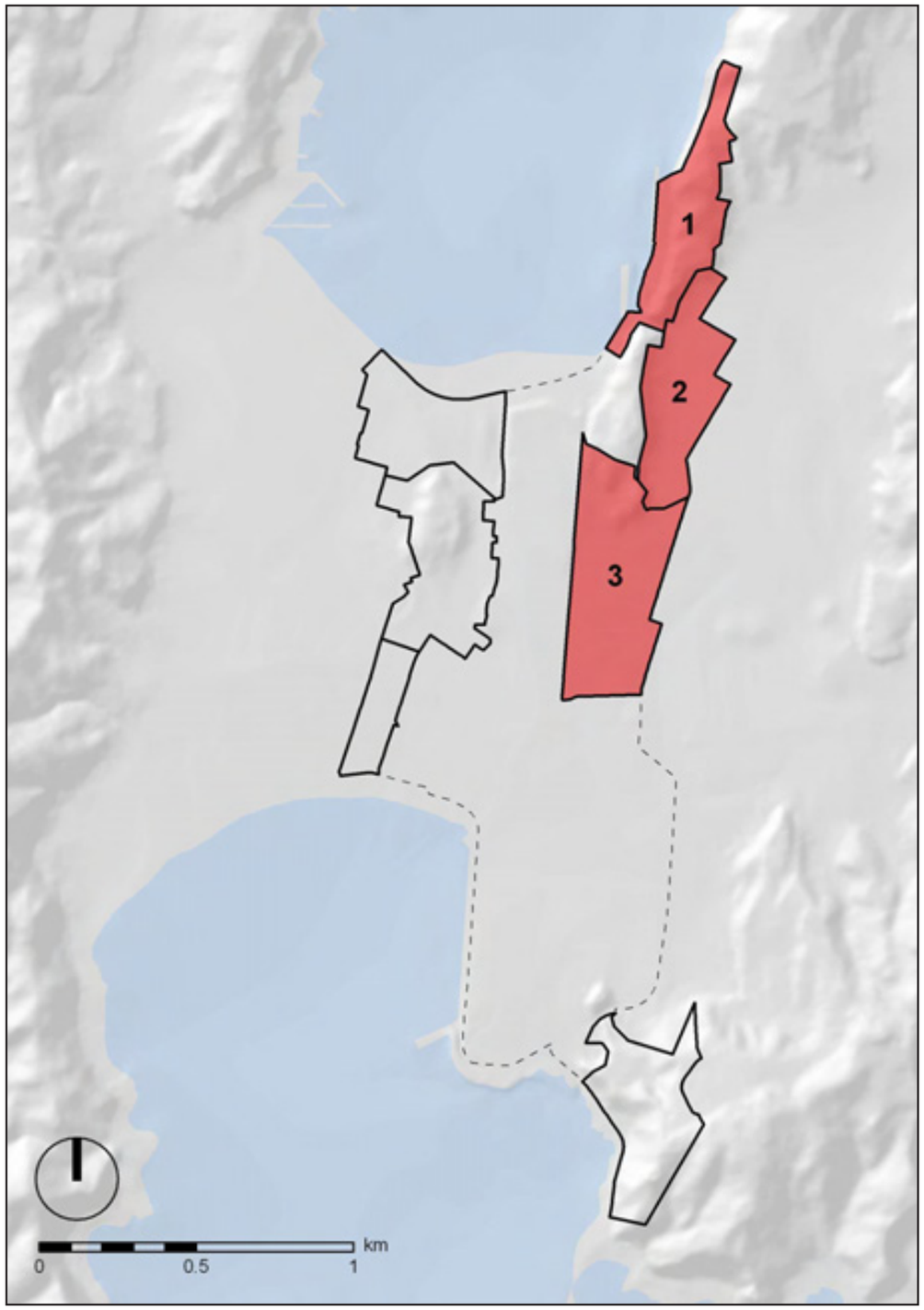
CHARACTER ANALYSIS OF PRECINCTS

The range of characteristics considered includes:

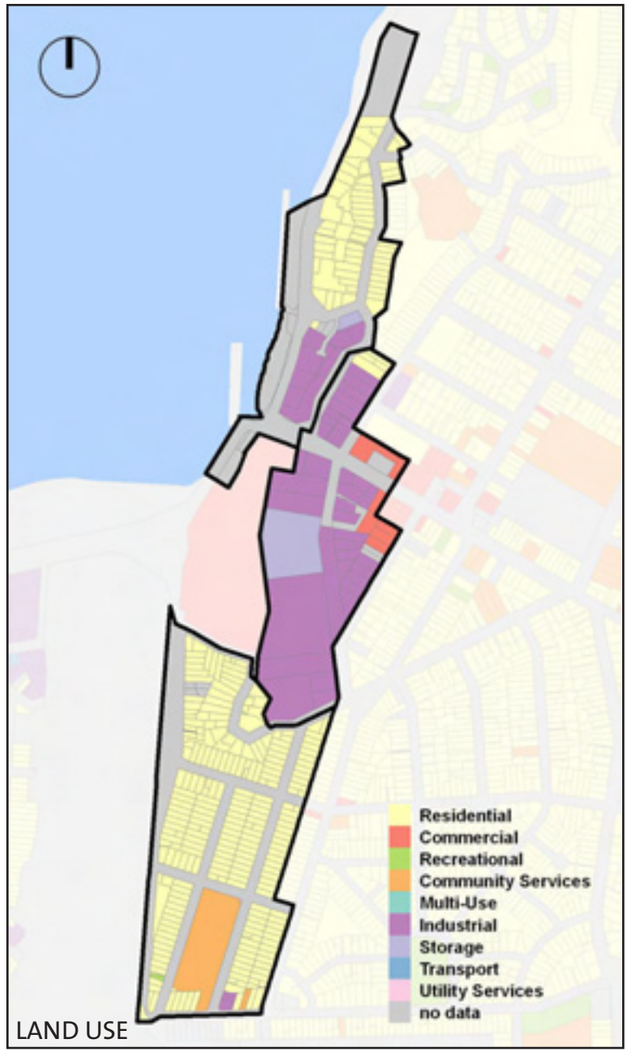
- type of land use
- Wellington City District Plan 'zoning'
- building height
- lot size and shape
- density
- street pattern and hierarchy
- building age, type and style
- topography
- aspect and views
- capital values
- land values
- noise levels.

The combination of different characteristics (refer to Diagram 2) influences the type of land use that may or may not be possible and/or appropriate within the ANB in the future.

The characteristics of the separate precincts are described in the following pages.



PRECINCT 1, 2 & 3



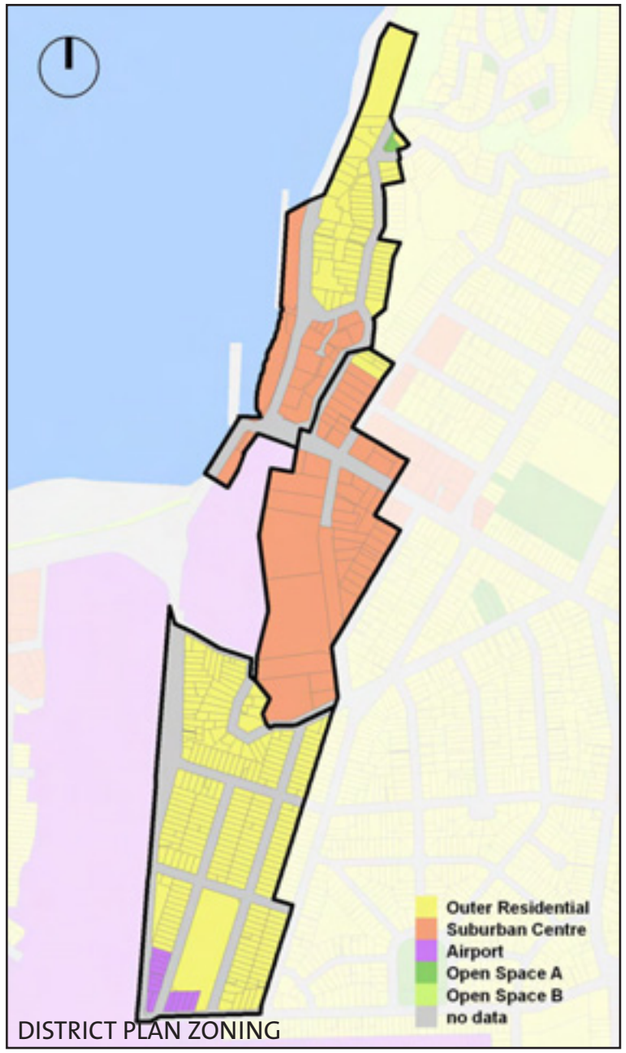
Land Use

Precinct 1 comprises an area of residential land use to the north and an industrial area to the south.

Precinct 2 comprises an area of commercial and industrial land uses including some large land holdings and a small amount of residential land use.

Precinct 3 comprises mostly residential land use (small detached residences) and a community service land use, Miramar South School.

There are some areas where residences and industrial land uses face each other across the street (eg. Southampton and Tauhinu Streets) presenting interface and compatibility issues.



District Plan Zoning

Precinct 1 is predominantly zoned as Outer Residential and Suburban Centre.

Precinct 2 is zoned Suburban Centre and Outer Residential.

Precinct 3 is zoned Outer Residential and Airport.

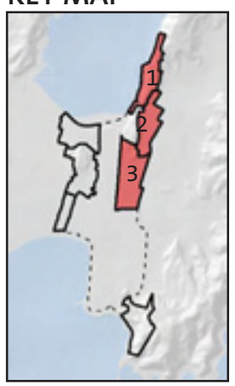
The mix of residential and industrial in Precincts 1 & 2 causes some interface issues.

Precinct 2 has commercial land use on Miramar Avenue.

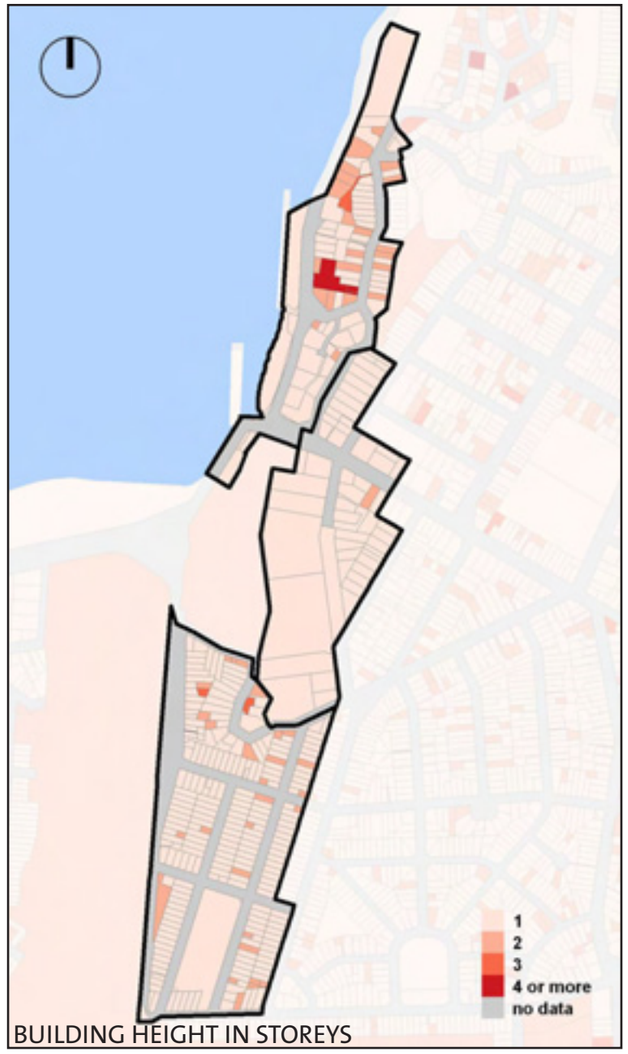
Miramar South School is located in Precinct 3.

Industrial area in Precinct 2.

KEY MAP

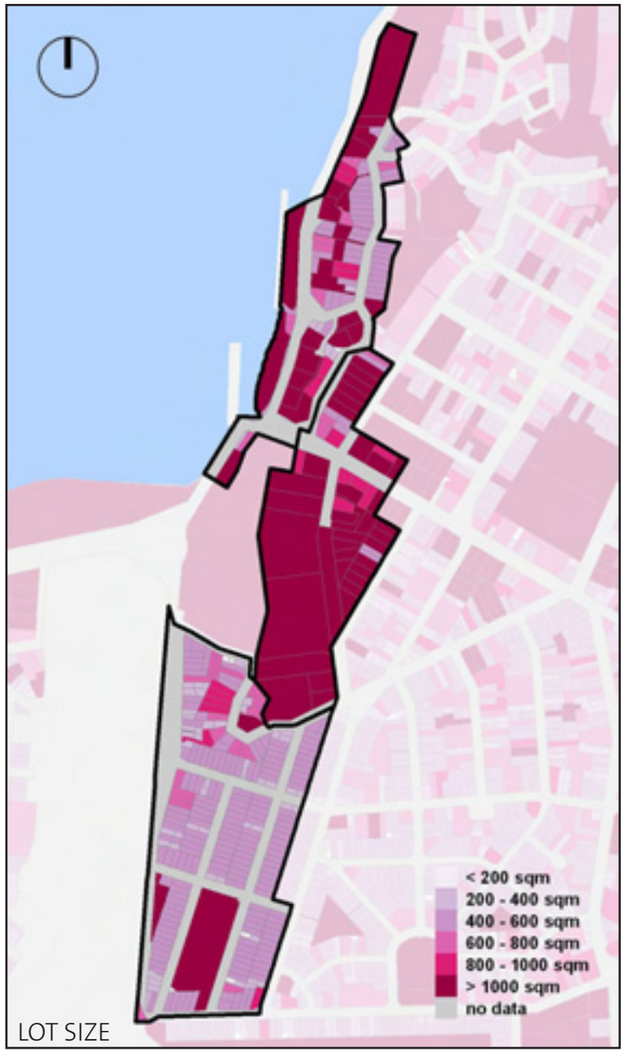


PRECINCT 1, 2 & 3



Building Height

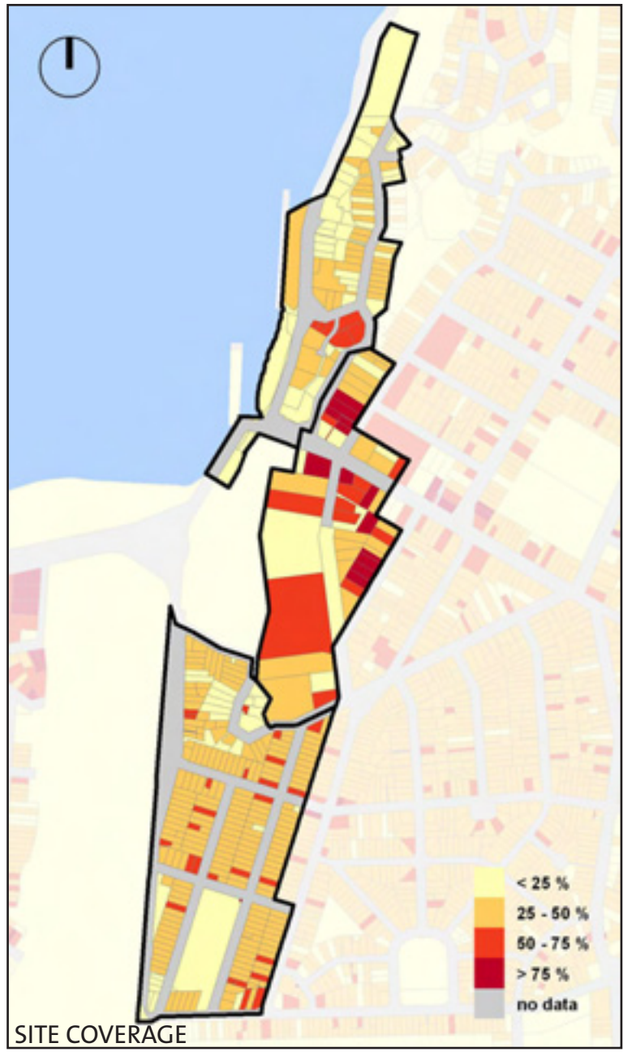
Most buildings are one storey in height. There are a small number of buildings that are two or more storeys in height, including some recent multi-unit developments in Maupuia (Precinct 1). The industrial and commercial buildings in Precinct 2, while mainly one storey, are a greater height than the residences (larger floor to ceiling heights) and of larger scale generally.



Lot Size and Shape

Most residential lots are rectangular in shape. The standard lot size is 12m wide x 40m deep with an east/west orientation. Most lots are 400-600 sqm. The sloping sites in Precinct 1 and 3 are less regular in shape.

Industrial/commercial lots in Precinct 1 and 2 are mostly large (>1000 sqm) and irregular in shape. The industrial lots in Precinct 2 are large and rectangular in shape.

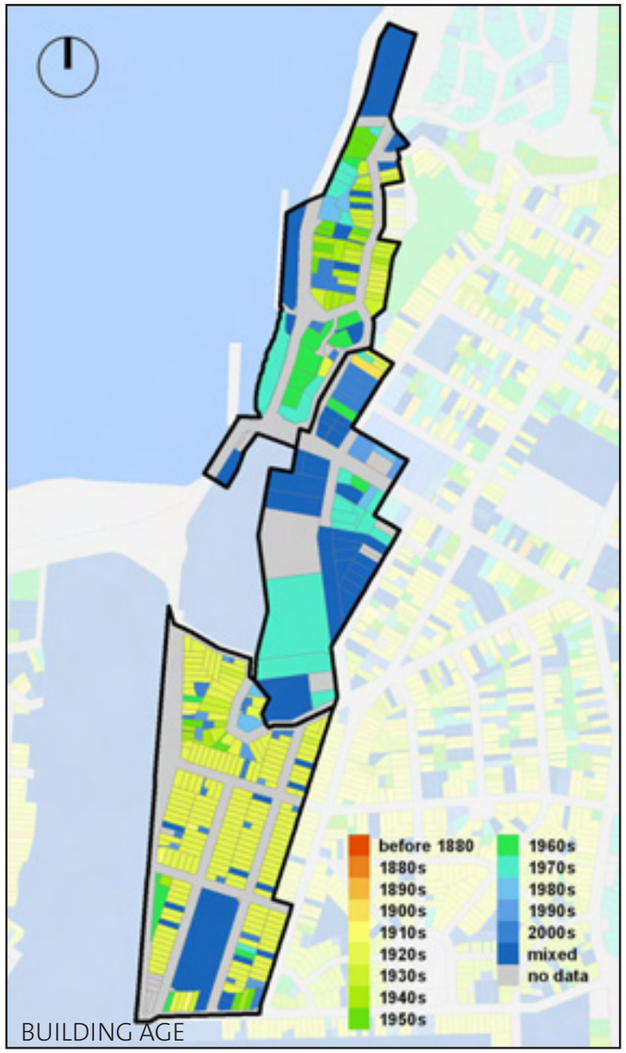


Density

Site coverage varies from less than 25% to greater than 75% with most residential lots in the range of 25-50%. Most industrial/commercial lots have greater than 50% site coverage. This is relatively high site coverage compared to Wellington as a whole. Site coverage is generally higher in the flat areas of the precincts.

Buildings are predominantly aligned to the street. Residences are located in the front half of the lot with 6-8m the average setback from the front boundary. Industrial buildings in the Precincts generally have no or minimal setback.

STREET PATTERN AND BUILDING FOOTPRINTS



BUILDING AGE

Street Pattern and Hierarchy

The street pattern responds to the topography with a grid street pattern in the flat areas of Precinct 2 and 3 and curved streets in Precinct 1. The main streets run in a north-south direction. A pedestrian underpass (under the airport) connects Coutts Street with Miro Street in Miramar. While some streets have a strictly residential character, others such as Maupuia, Tauninu and Stone Street have a mixed industrial/residential character, causing some compatibility issues. The airport forms a strong edge restraining movement to the west of the precincts.

Blocks are long (more than 400m) which is not good for ease of movement within a residential area (a block length of 90-120m is desirable as it provides increased directional choice).

Building Age, Type and Style

Buildings range in age from the 1900s to recent (post 2000s) buildings. The majority of houses were built in the 1920s (prior to the airport) in the bungalow style. The consistency of residence age and style and lack of modification to structures provides a consistent built form character to residential streets. The industrial buildings in Precinct 1 and 2 are all post 1960s and mixed in ages.

While building condition varies form poor to good, most residences have been maintained and have a good overall condition.

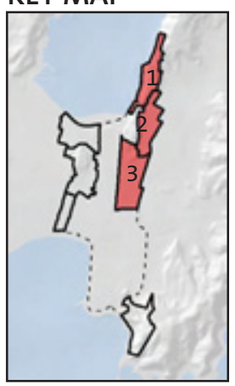
The majority of houses were built in the 1920s in the bungalow style.

A slip road off Calabar Drive provides access to residential properties.

Street trees are common in the streets in Precinct 3 and improve the street appearance.

The pedestrian underpass connecting Coutts Street, Rongotai to Miro Street, Miramar.

KEY MAP

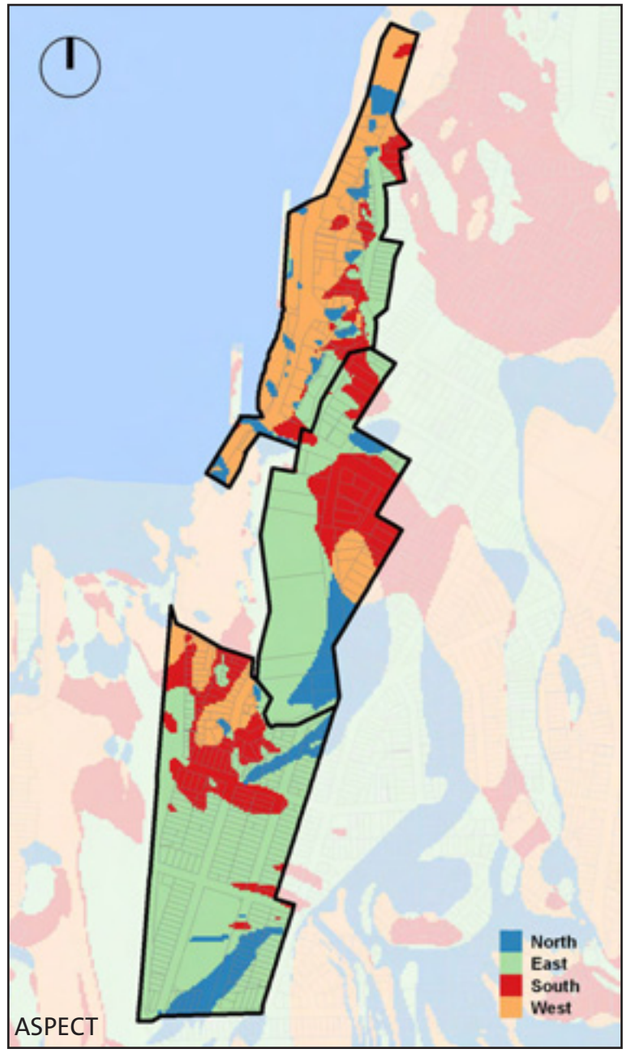


Topography

Precinct 1 has a steep slope facing Evans Bay with development at the top and bottom of the escarpment.

The Wexford hill west of Precinct 2 creates a natural visual barrier between Miramar and the Airport, screening the airport from this area of the city. The hill also creates a green backdrop, contrasting with the sparsely vegetated streets on the flat areas surrounding it.

The development pattern in the area north of Caledonia Street in Precinct 3 responds to the sloping topography. The berm alongside Wexford Street provides some separation from the airport/Calabar Drive and residences, but looks of low visual amenity.



Aspect and Views

The hill in Maupuia provides different aspects and views for buildings located in Precinct 1. Houses located on the slope facing Evans Bay have a western aspect.

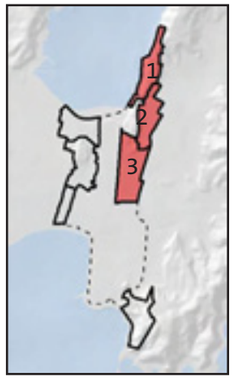
New apartments in Maupuia optimise the views over Evans Bay.

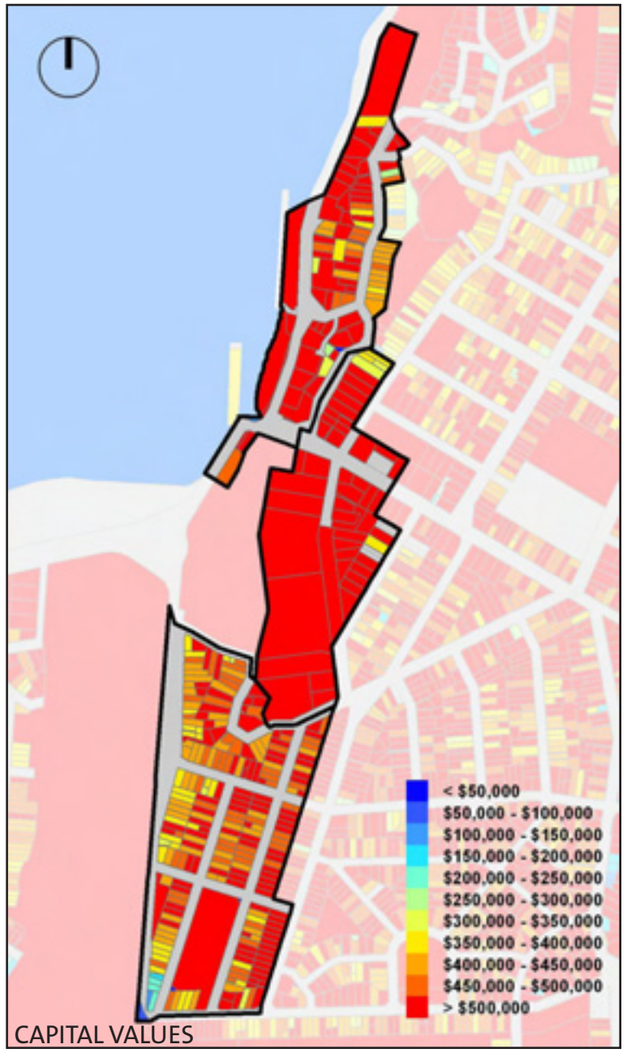
The topography of Precinct 1 makes buildings highly visible across Evans Bay.

The hill in Maupuia offers the amenity of views.

A berm alongside Wexford Street screens the airport and Calabar Drive from residences.

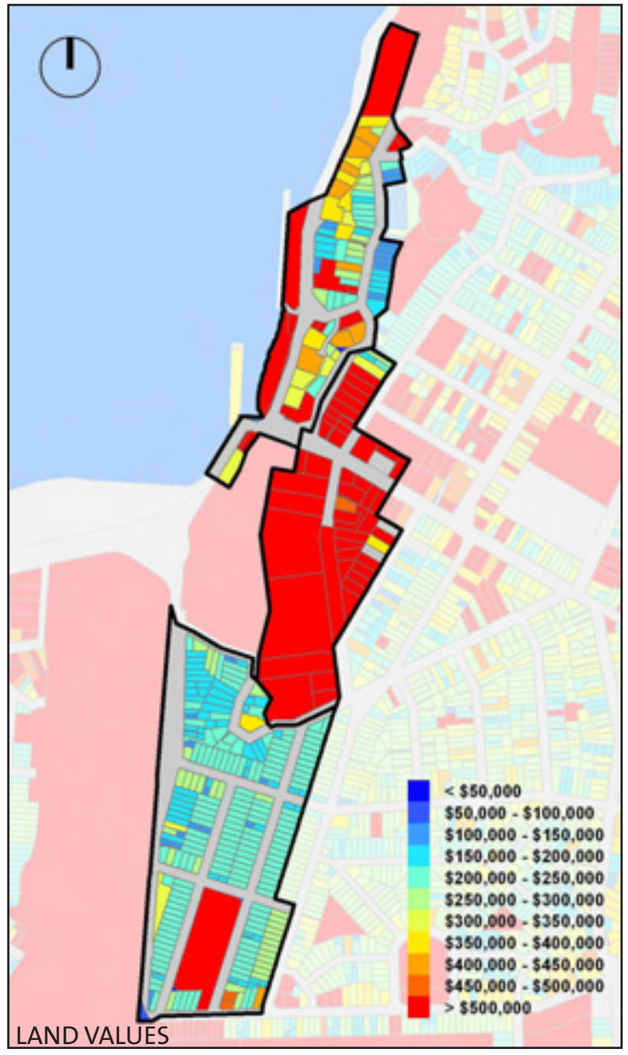
KEY MAP





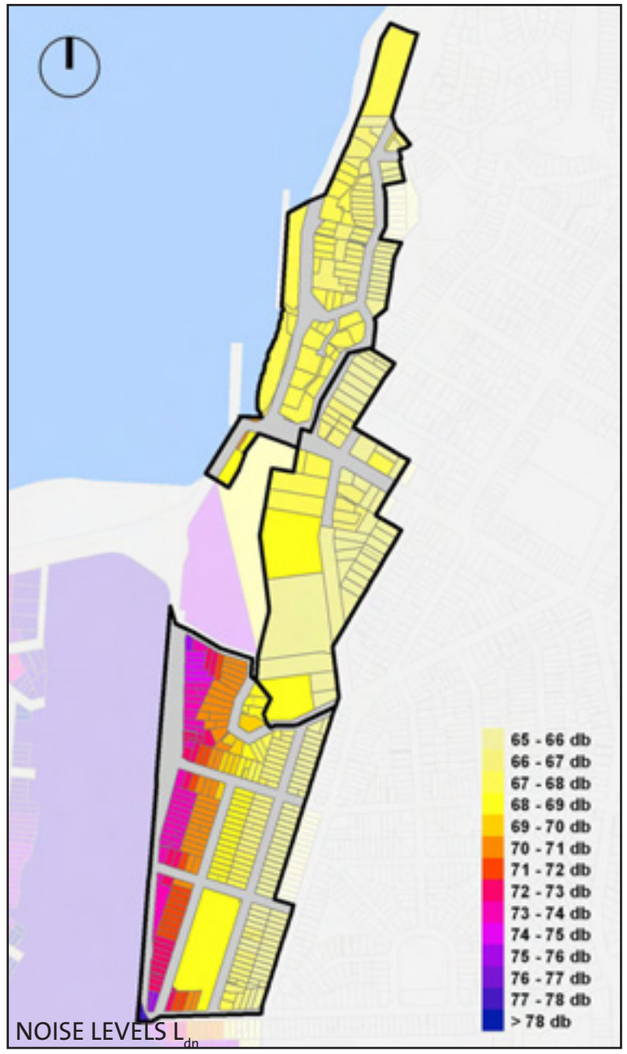
Capital Values

Capital values in Precinct 1,2 and 3 are mostly in the range of $400,000 to $500,000 or more. Capital values are slightly lower in the area closer to the airport which correlates with where noise levels are higher (western side of Precinct 3).



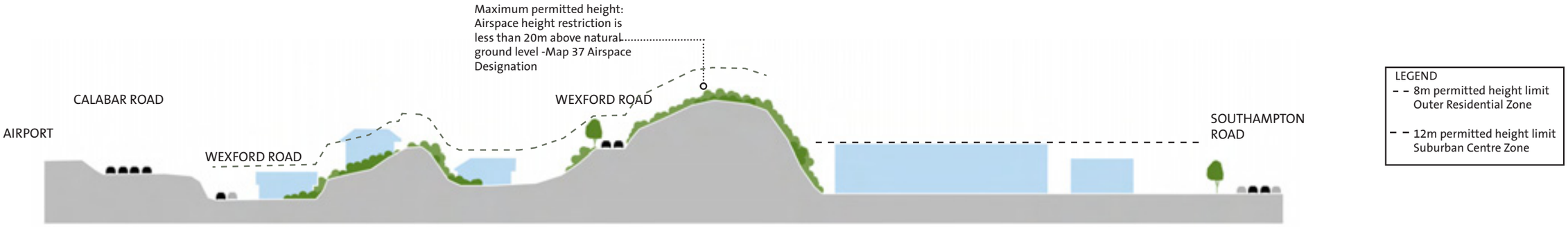
Land Values

Land values in Precinct 1 and 3 are mostly in the range of $100,000 to $300,000. Land values in Precinct 2 are mostly over $500,000. Land values are relatively evenly spread across the Precinct regardless of proximity to airport, noise level, aspect or views. The area to the west of Precinct 3 (close to the airport) has slightly lower values, as does the area to the east of Precinct 1 (perhaps due to the aspect).

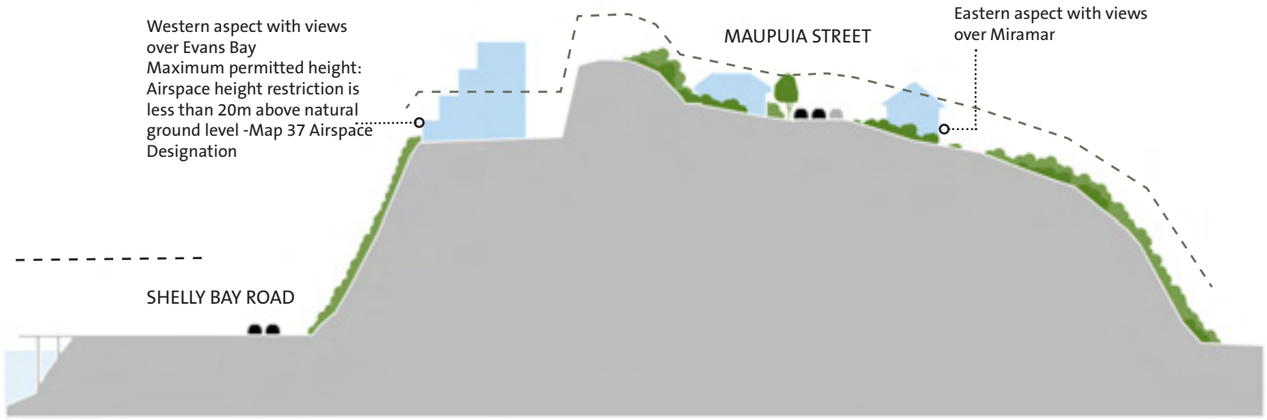


Noise Levels

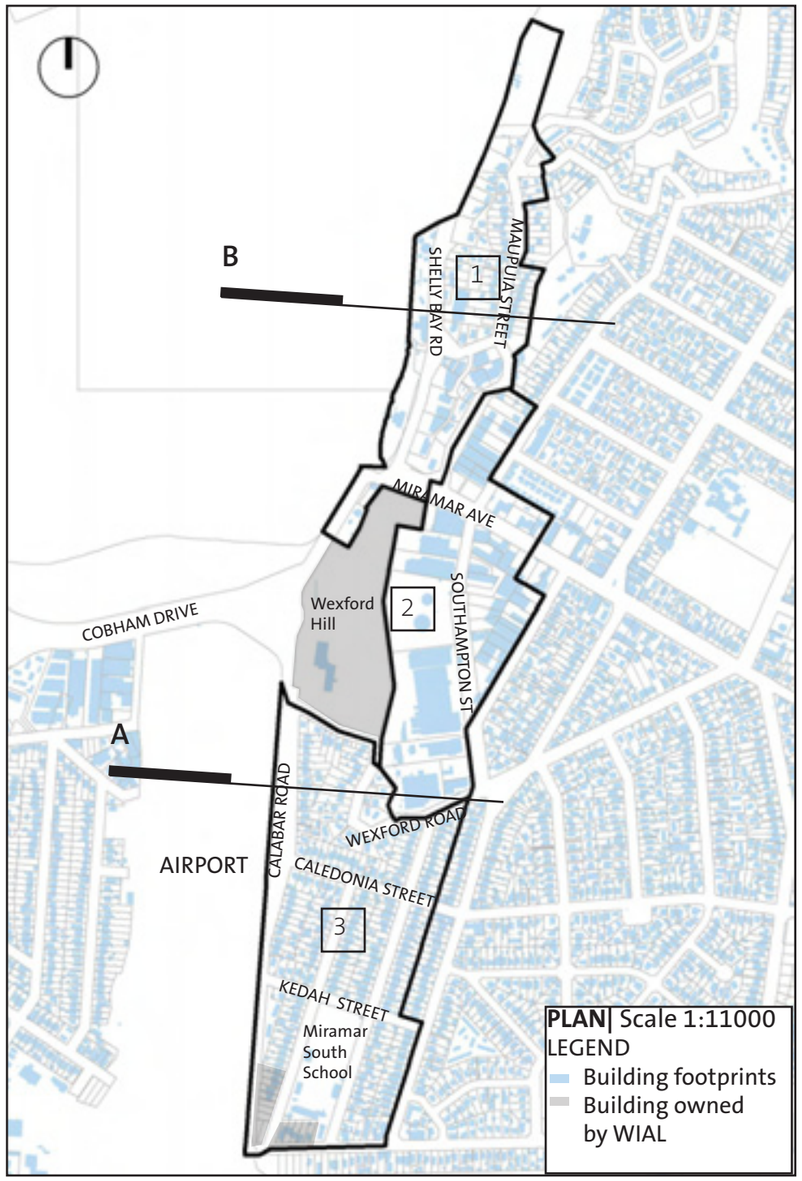
Noise levels range from L_{dn} 65-78 dB. The highest noise levels are received on Calabar Drive. Noise levels are lowest on the eastern side of the precincts.



SECTION A| Scale 1:1000



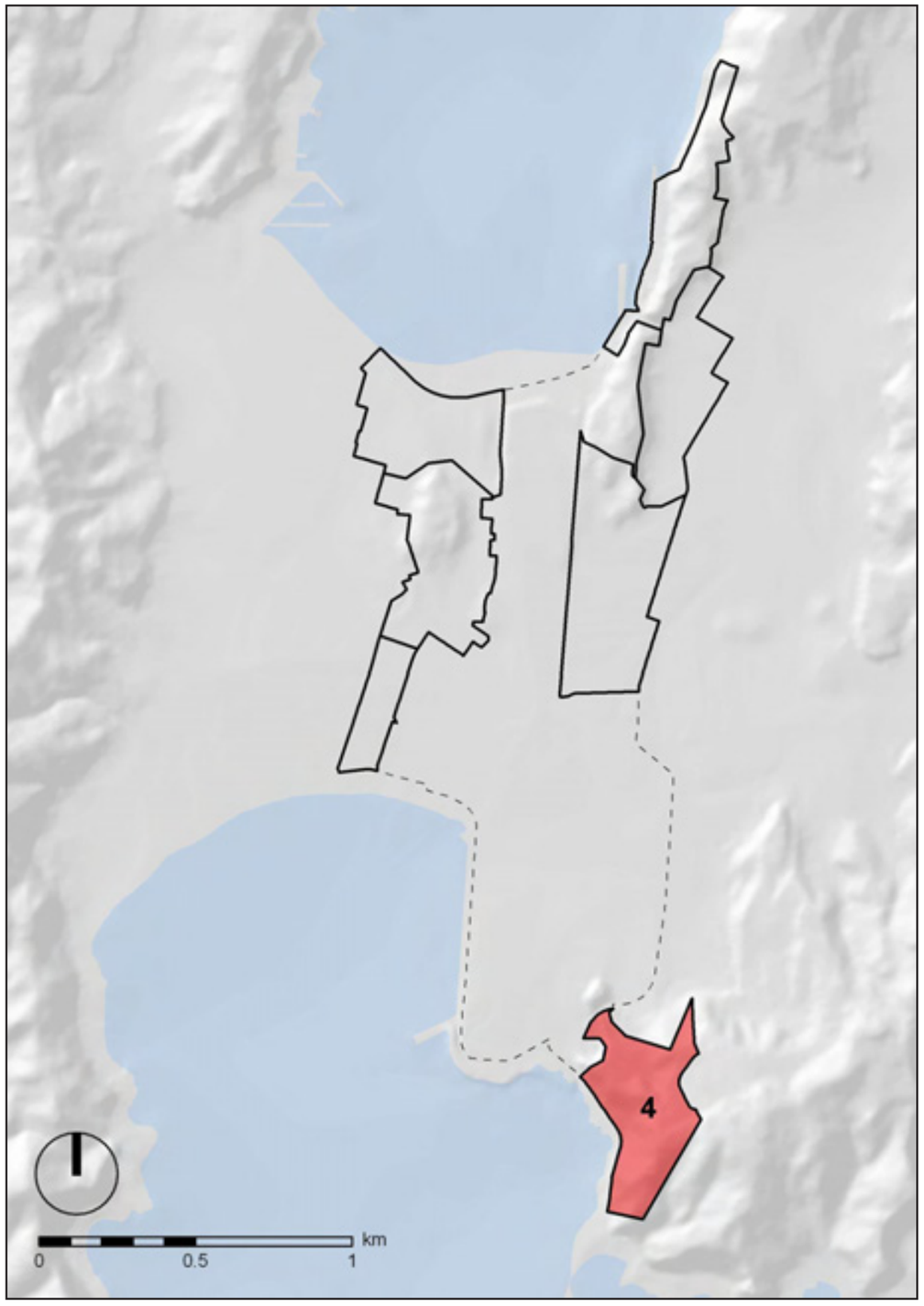
SECTION B| Scale 1:1000



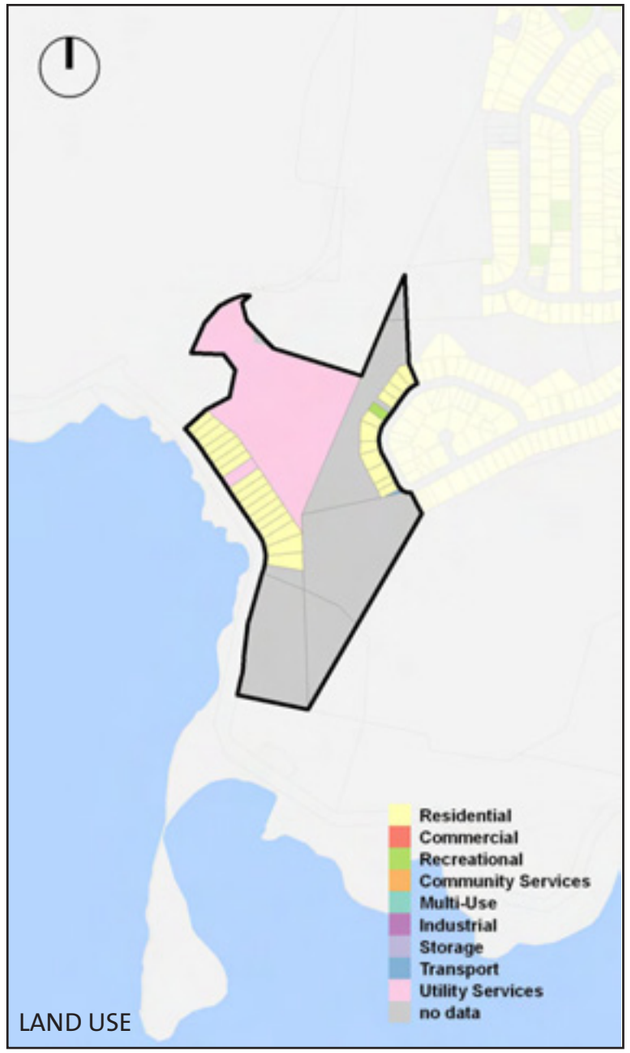
PRECINCT 1, 2, & 3 SUMMARY

Precinct 1,2 and 3 are located on the east side of the airport.

- Land use is a mix of residential, industrial and some commercial (suburban centre zone) in Precincts 1 and 2 and mostly residential in Precinct 3 (outer residential zone).
- Most residential lots are rectangular in shape and 400-600 sqm and relatively intensively used especially in Precinct 3.
- Residential properties closest to Calabar Road are impacted by high noises levels and the adjacency of the busy road - the Miramar South School is also a noise sensitive activity within Precinct 3
- Industrial/commercial lots in Precinct 1 and 2 are mostly large (>1000 sqm) and irregular in shape. The industrial lots in Precinct 2 are large and rectangular in shape -the larger lots suggest some flexibility as to future uses
- Site coverage varies from less than 25% to greater than 75% with tenancies to less coverage of the industrial and steeper sites.
- The street pattern responds to the topography with a grid street pattern in the flat areas of Precinct 2 and 3 and curved streets in Precinct 1.
- Buildings range in age from the 1900s to recent (post 2000s) buildings. The majority of houses were built in the 1920s (prior to the airport) in the bungalow style and are unlikely to be well insulated
- The industrial buildings in Precinct 1 and 2 are all post 1960s and mixed in ages - there are some signs of redevelopment including residential apartments.
- Precinct 1 has a steep slope facing Evans Bay with a good aspect to the west and views - there is development at the top and bottom of the escarpment.
- The hill in Precinct 2 creates a natural visual barrier between Miramar and the airport.
- Capital values in Precinct 1,2 and 3 are mostly in the range of $400,000 to $500,000 or more.
- Land values in Precinct 1 and 3 are mostly in the range of $100,000 to $300,000. Land values in Precinct 2 are mostly over $500,000.
- Noise levels range from L_{dn} 65-78 dB. The highest noise levels are received on Calabar Drive. Noise levels are lowest on the eastern side of the precincts.



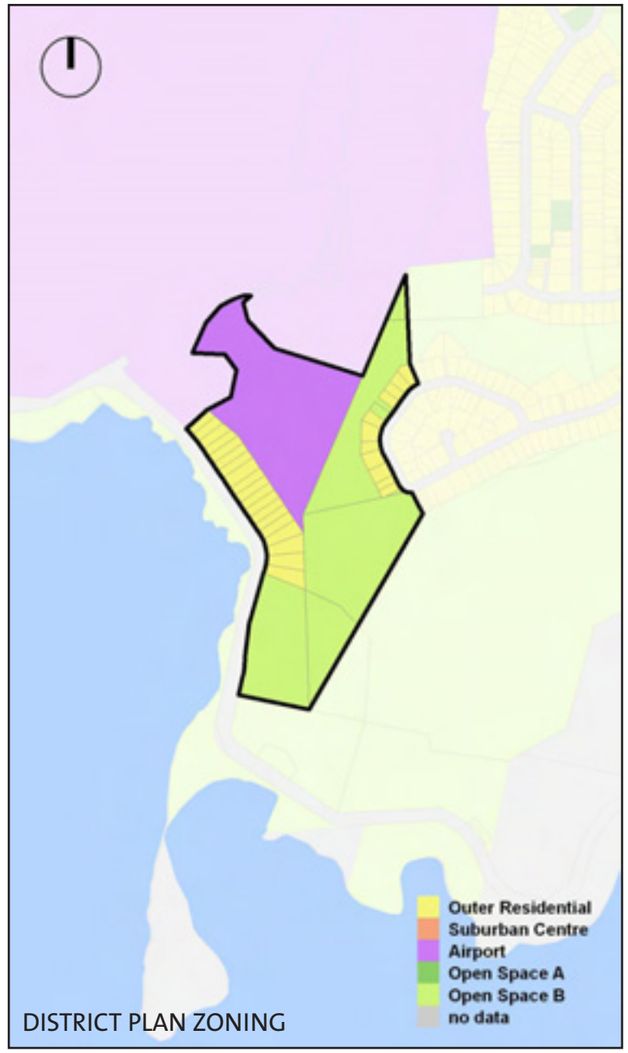
PRECINCT 4



Land Use

The largest land use in Precinct 4 is open space in the form of steep escarpments with sparse significant vegetation, dominated by rank grass and weed species and one group of pine trees. Moa Point comprises predominantly small scale detached residences along the coastal road. Kekeranga Street in Strathmore Park is predominantly state house style houses and a mix of one and two storey attached multi-units. Within the ANB many of the houses are privately owned.

The other major land use is the wastewater treatment plant, accessed via Stewart Duff Drive. The open space and topography assist to visually separate the treatment plant from residential areas.



District Plan Zoning

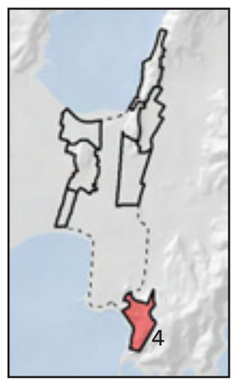
Precinct 4 is zoned under the operative Wellington City Council District Plan as Outer Residential, Airport and Open Space B.

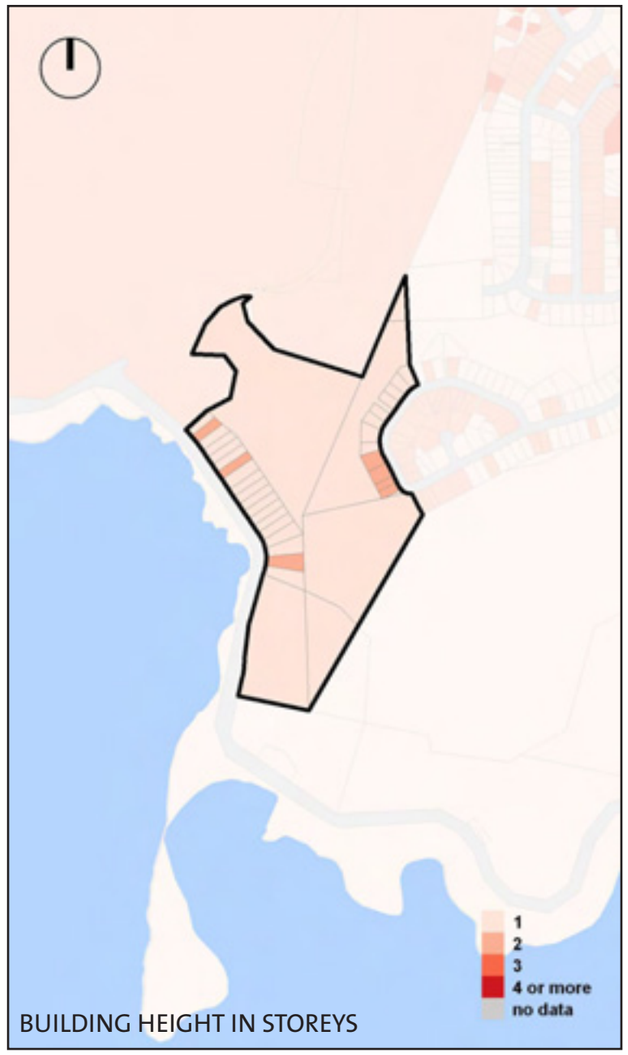
The main land use in Moa Point is residential.

The waste water treatment plant limits the surrounding development options.

The large area of undeveloped open space accentuates the wild, remote character of Moa Point.

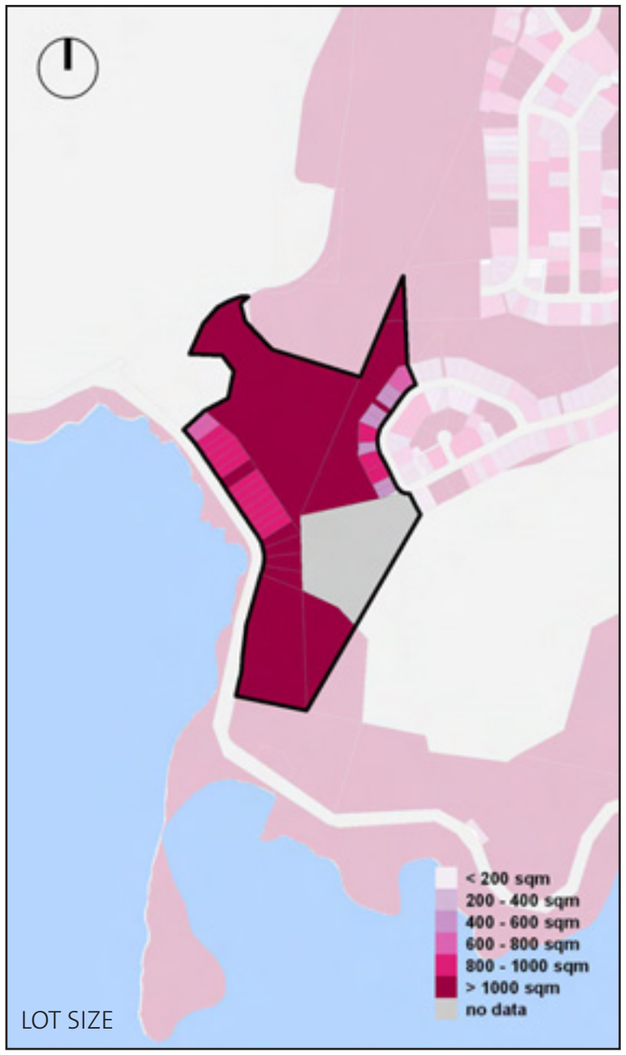
KEY MAP





Building Height

Most buildings are one storey in height. There are no buildings of more than two storeys in the precinct although the scale of some buildings such as the wastewater plant is significantly larger than the residential buildings in the area.

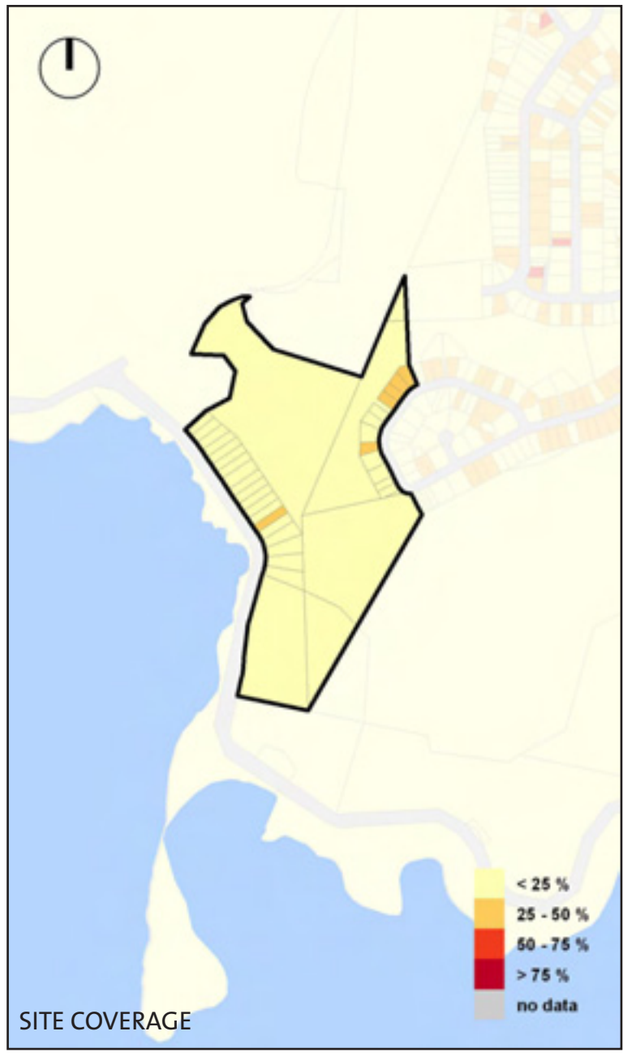


Lot Size and Shape

Most residential lots are rectangular in shape. Where Kekeranga Street curves, lots are less regular in shape.

The standard lot size is 14m wide x 60m deep in Moa Point and 15m wide x 34m deep in Strathmore Park. Most residential lots are 400-1000 sqm in area.

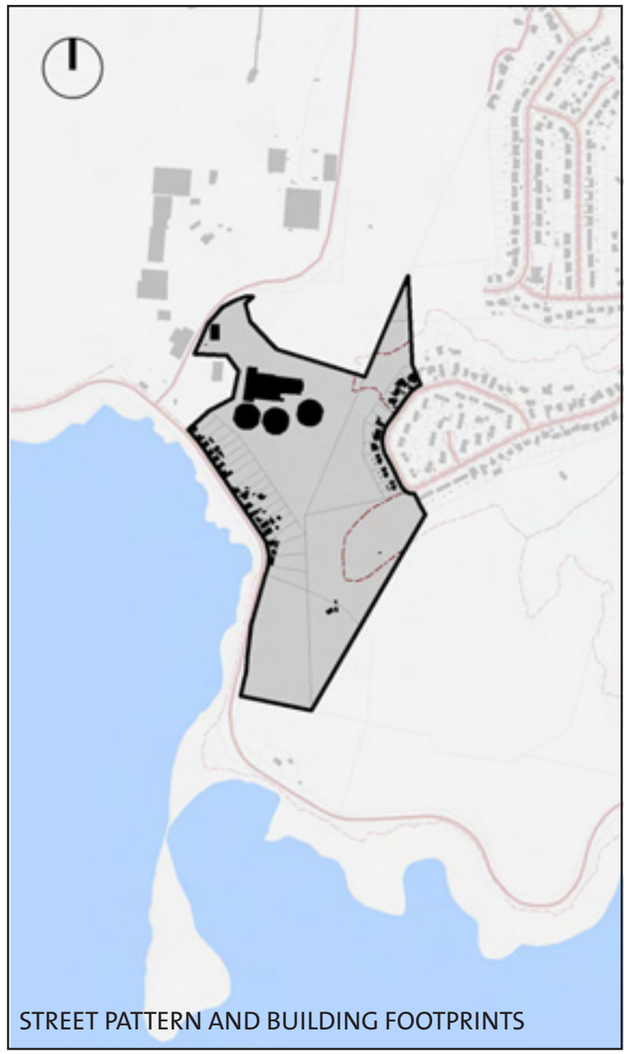
The wastewater treatment plant and open space reserve are irregular in shape and greater than 1000 sqm in area.



Density

Site coverage is predominantly less than 25%. This is relatively low site coverage compared to Wellington as a whole and gives the precinct an undeveloped character.

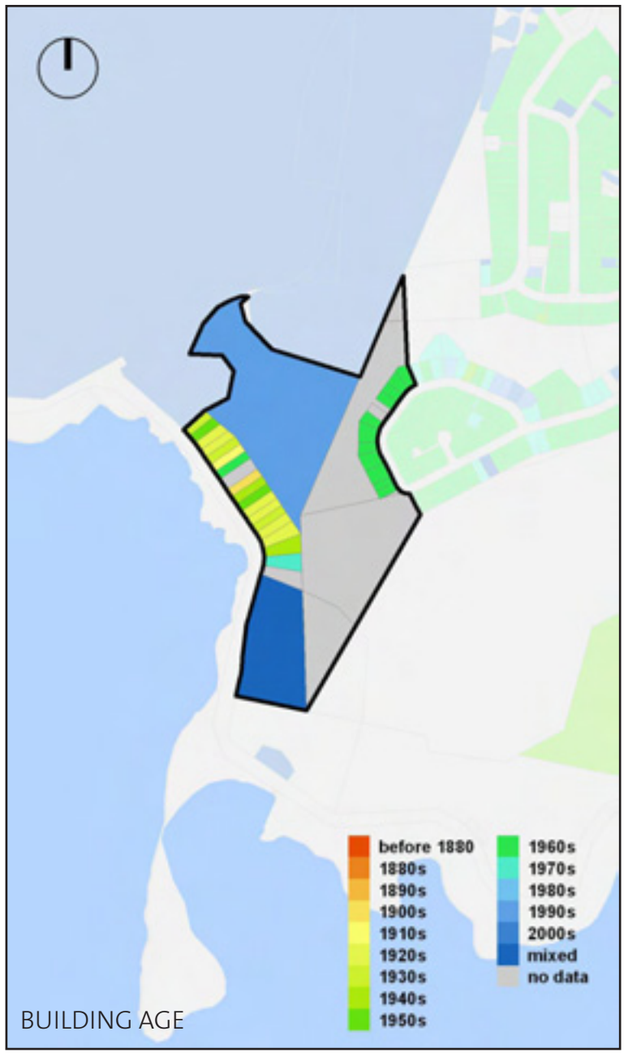
Buildings are predominantly aligned to the street and located in the front half of the lot with minimal (less than 5m) setback in Moa Point and 6-8m setback from the front boundary in Strathmore Park.



Street Pattern and Hierarchy

Moa Point Road follows the line of the coastal edge. Kekeranga Street has a distinct curved pattern. Stewart Duff Drive provides a rear entrance to the airport. It has an industrial/commercial character and lacks legibility or definition as an entrance/gateway to the airport.

The airport forms a strong edge to the west and north of Moa Point and the reserve forms a strong edge to the south and east, creating a sense of isolation.



Building Age, Type and Style

Housing age is mixed at Moa Point with houses built from the 1920s onwards. There is more consistency to the houses on Kekerenga Street which were built in the 1960s in the recognisable state housing styles of the time.

While building condition varies from poor to good, most residences have been maintained and have a good overall condition.

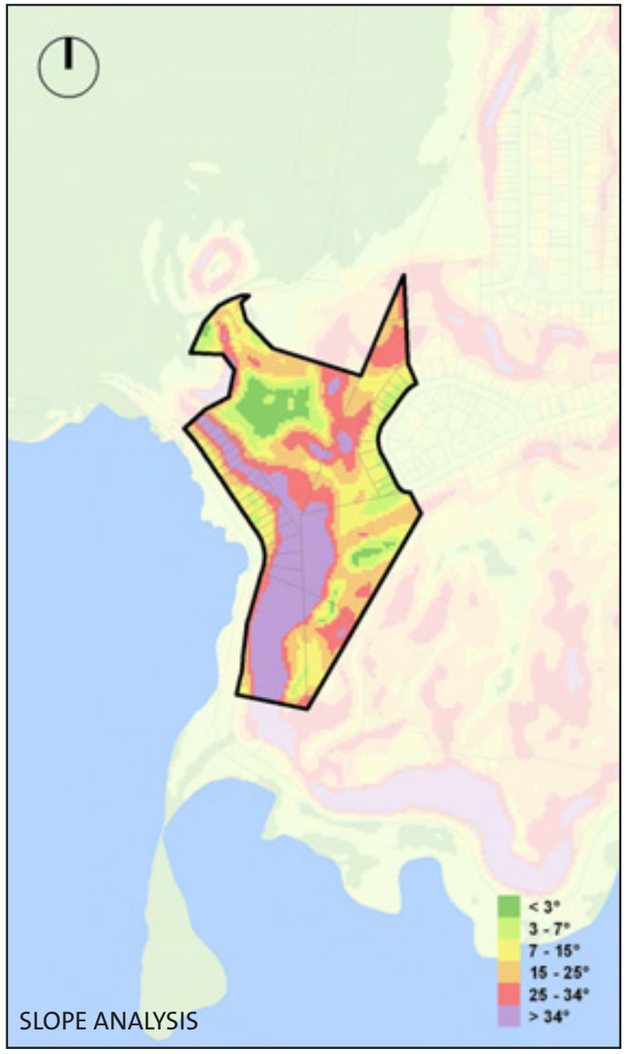
Most buildings are in original condition with little modification evident.

Moa Point Road has a quiet, wild character.

Some of the houses in Kekerenga Street have an identifiable state house style.

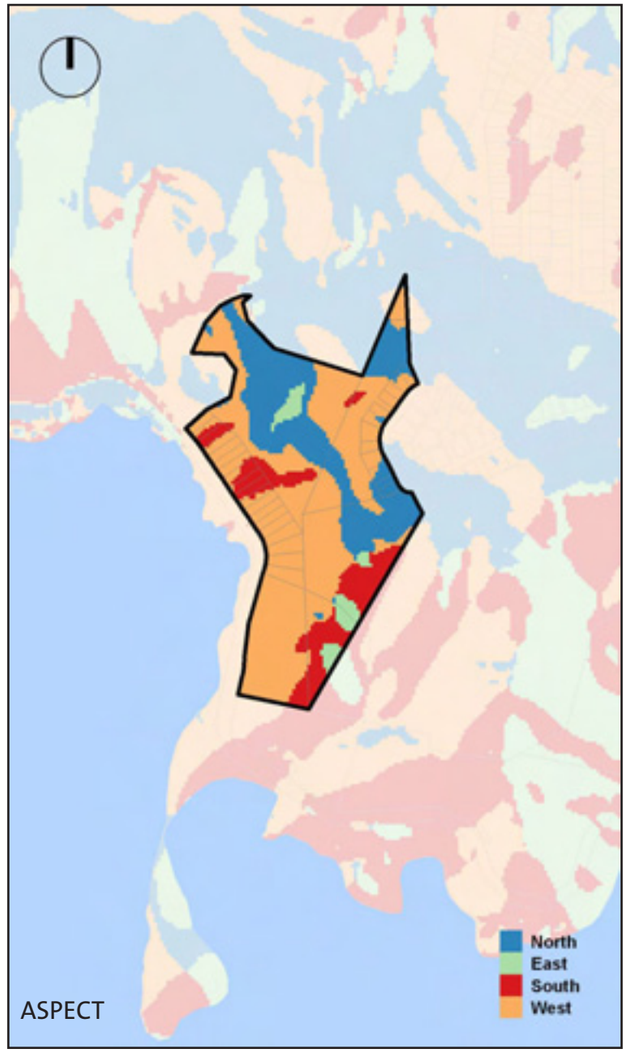
The southern end of Stewart Duff Drive provides the rear access to the airport and has an industrial character.

KEY MAP



Topography

The topography of Precinct 4 has influenced the patterns of development with housing restricted to the ridge top (Strathmore Park) and coastal platform (Moa Point) with the steep coastal escarpment and hills remaining undeveloped. The undeveloped slopes provide a strong green character to the area in contrast with the larger scale of the airport and wastewater plant. The topography also limits the access to Kekerenga Street reducing one aspect of its residential amenity.



Aspect and Views

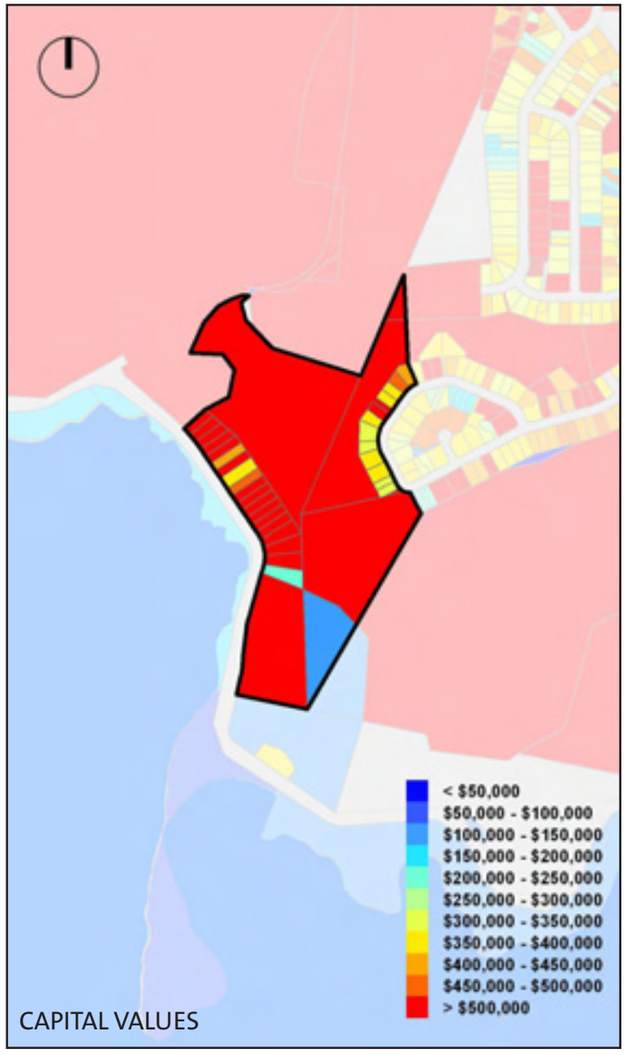
The views and western aspect from Kekeranga Street, Strathmore Park provides visual amenity for residents. Residences on Moa Point Road also have a western aspect and coastal views.

The escarpment behind houses in Moa Point limits development.

The views and western aspect from Kekeranga Street provide amenity for residents.

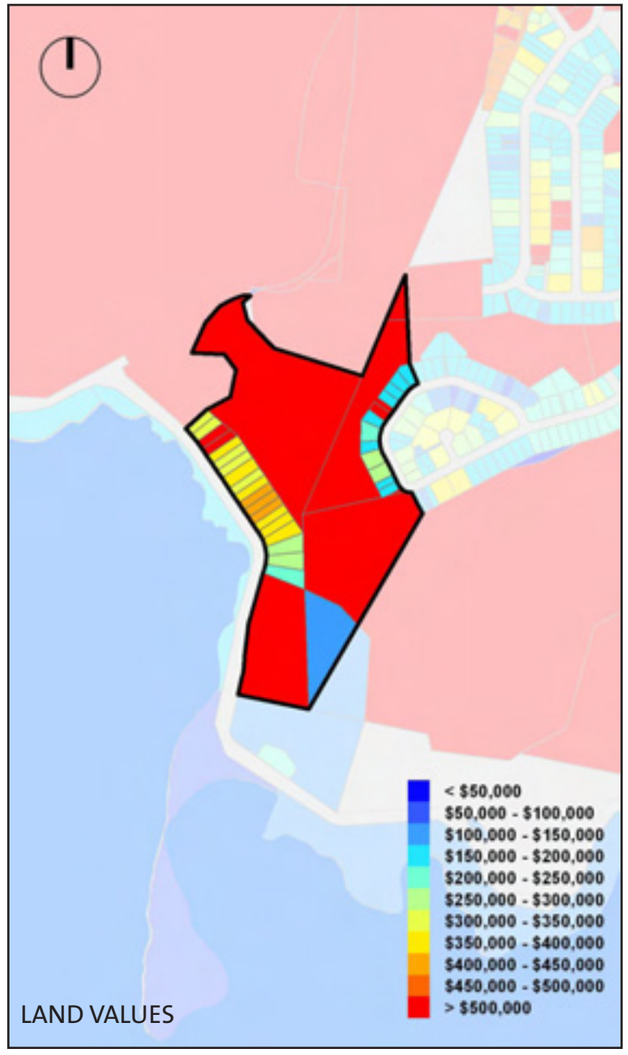
The reserve at the end of Kekerenga Street gives it an open natural feel.

KEY MAP



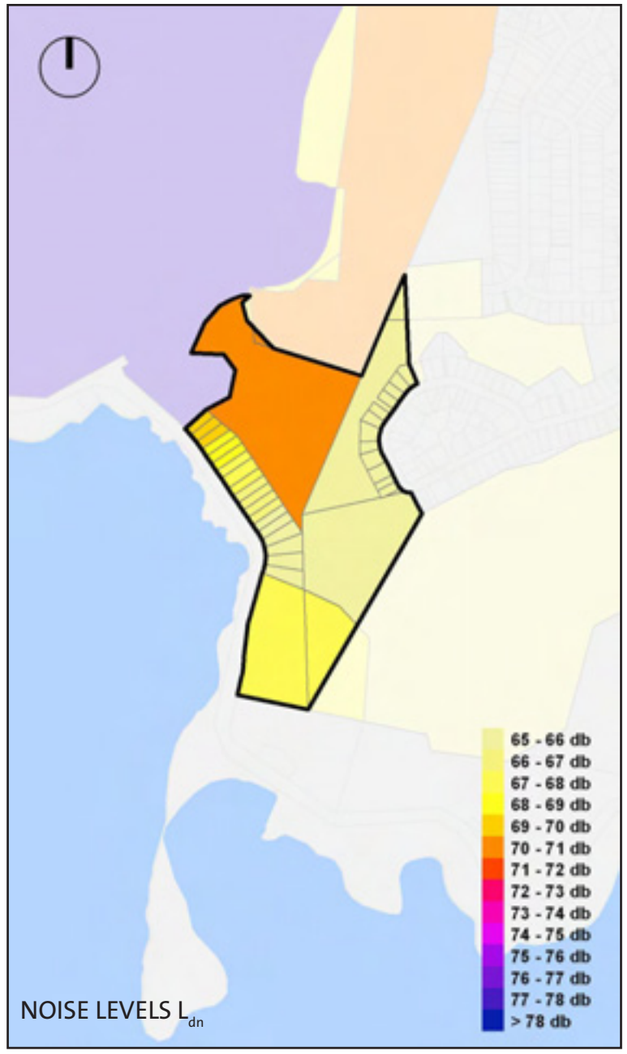
Capital Values

Capital values in Precinct 4 are mostly in the range of $300,000 to greater than $500,000. Capital values appear unrelated to noise levels.



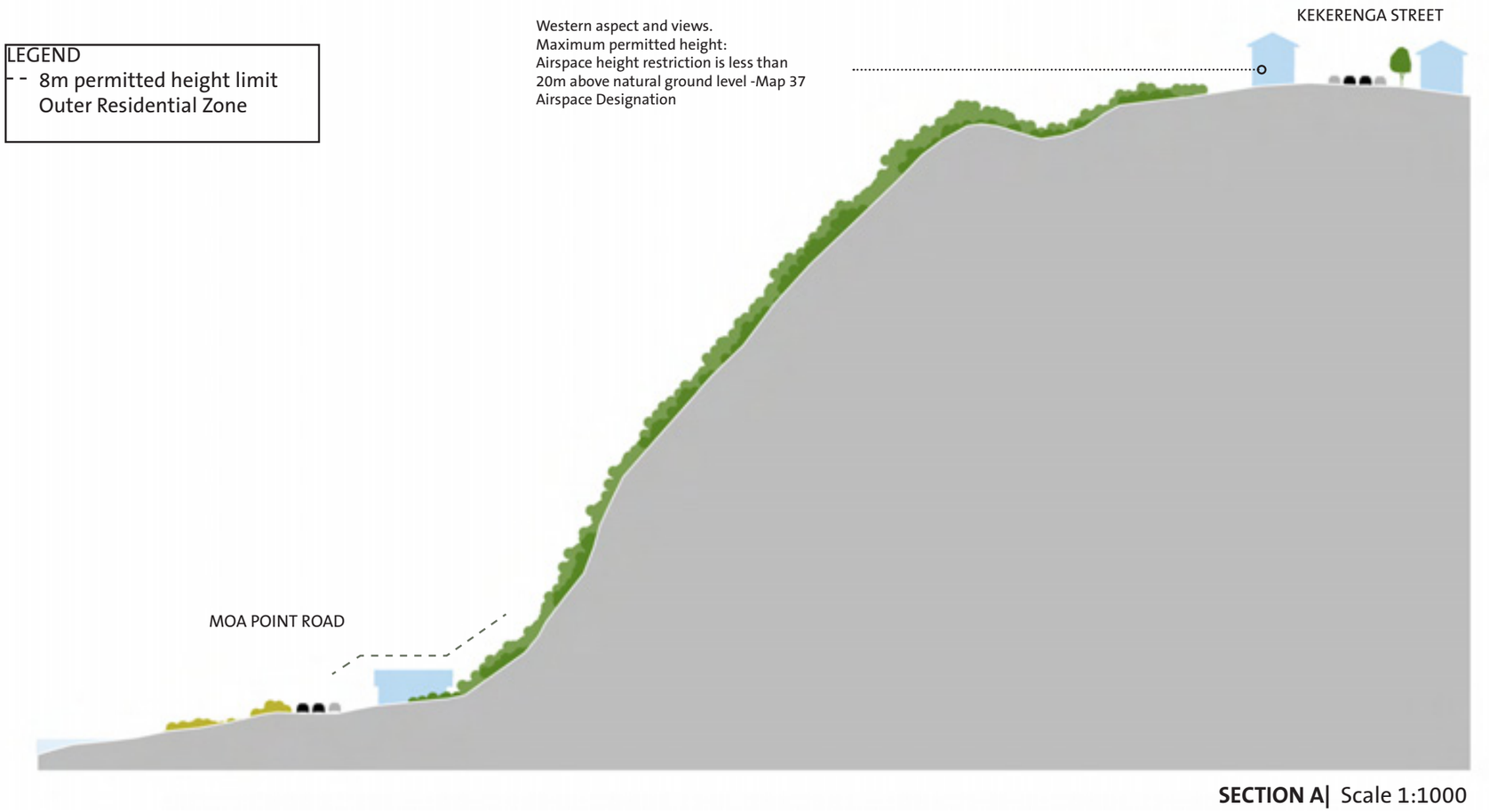
Land Values

Land values in Precinct 4 are mostly in the range of $150,000 to over $500,000. The land values are lowest in Strathmore Park, probably due to the buildings being state housing.

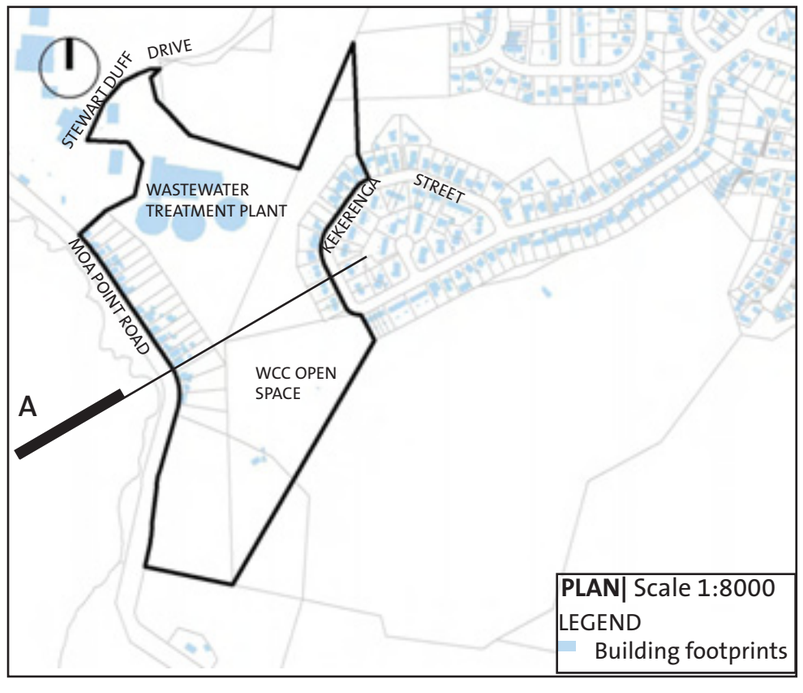


Noise Levels

Noise levels range from L_{dn} 65-71 dB. The highest noise levels are received at the wastewater treatment plant. Noise levels are lower at the southern side of Moa Point and Strathmore Park.



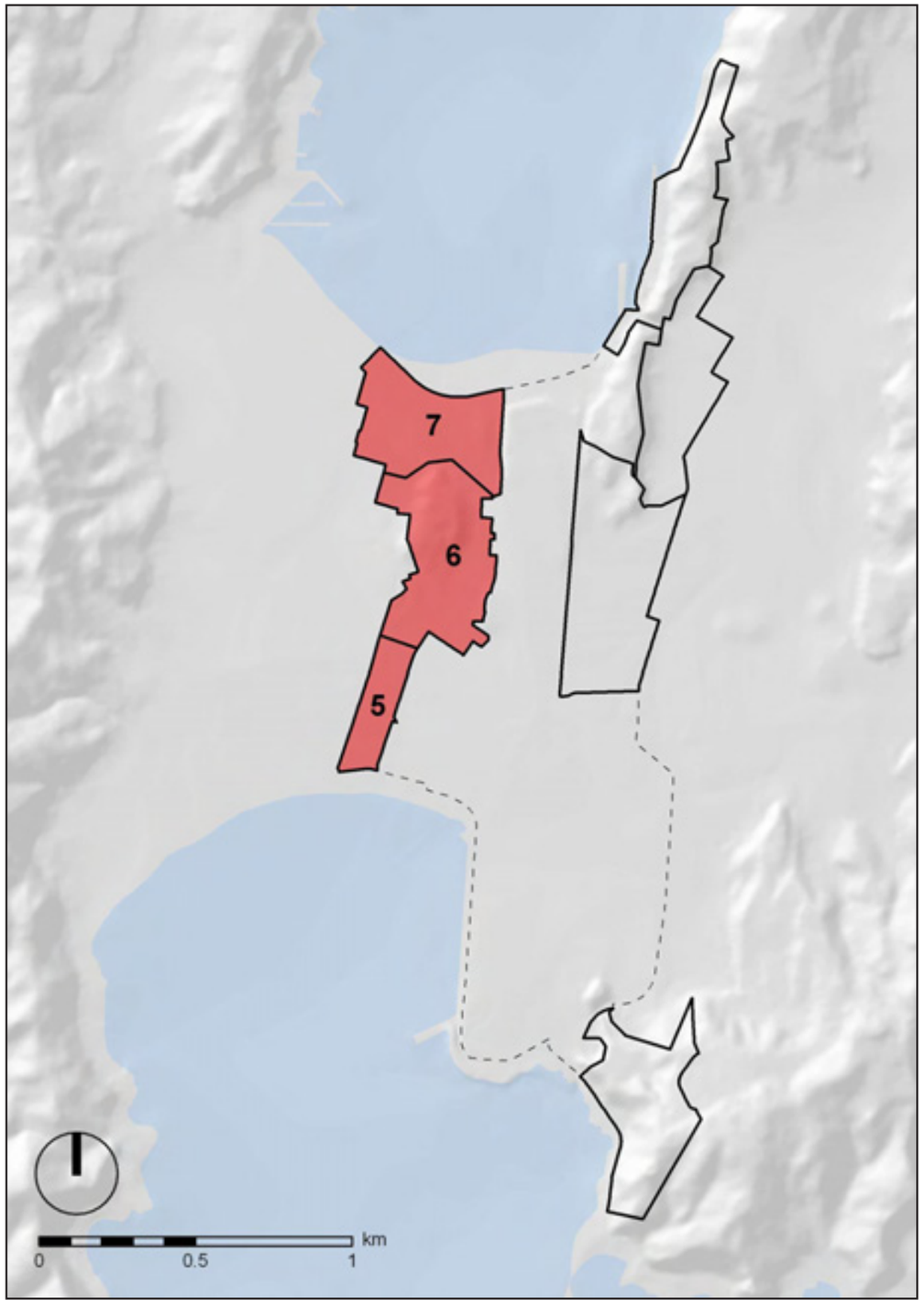
SECTION A| Scale 1:1000



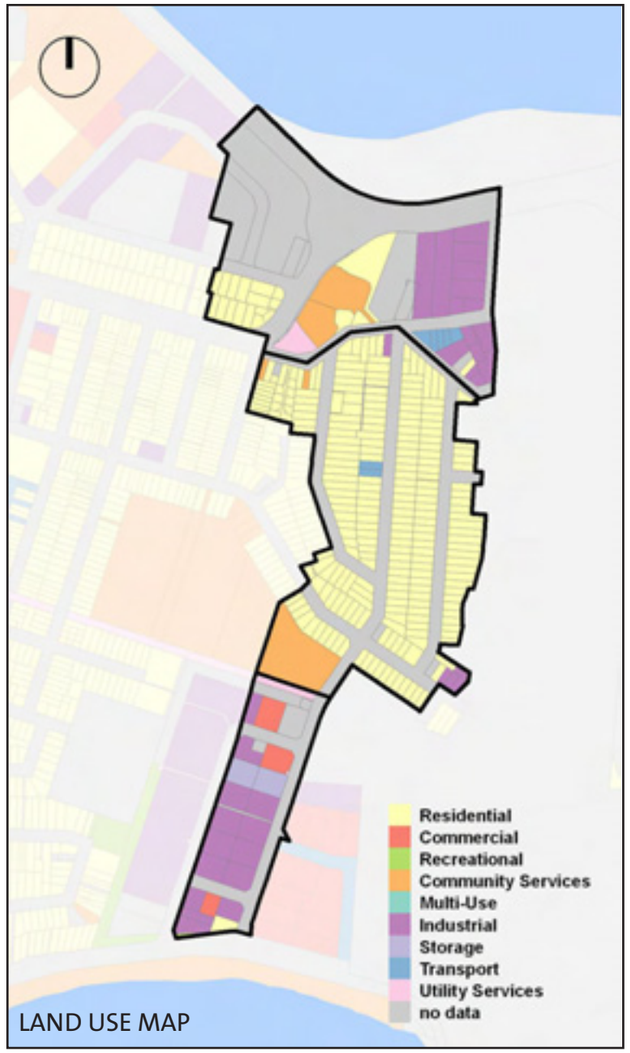
PRECINCT 4 SUMMARY

Precinct 4 is located on the south west side of the airport.

- Land use is industrial, residential and open space and zoned under the operative Wellington City Council District Plan as Outer Residential, Airport and Open Space B. .
- Most residential lots are rectangular in shape and 400-1000 sqm in area, although many larger sites have steep topography which limits future development and site coverage is relatively low (less than 25%)
- The wastewater treatment plant and open space reserve are not particularly noise senstive, although there are effects on open space amenity
- Housing age is mixed at Moa Point with houses built from the 1920s onwards -there are some limited signs of upgrading, but generally the houses are unlikely to be well insulated.
- There is more consistency to the houses on Kekerenga Street which were built in the 1960s in the state house styles.
- The topography of Precinct 4 has influenced the patterns of development with housing restricted to the ridge top (Strathmore Park) and coastal platform (Moa Point) with the steep coastal escarpment and hills remaining undeveloped.
- Capital values in Precinct 4 are mostly in the range of $300,000 to greater than $500,000.
- Land values in Precinct 4 are mostly in the range of $150,000 to over $500,000.
- Noise levels range from L_{dn} 65-71 dB.



PRECINCT 5, 6 & 7

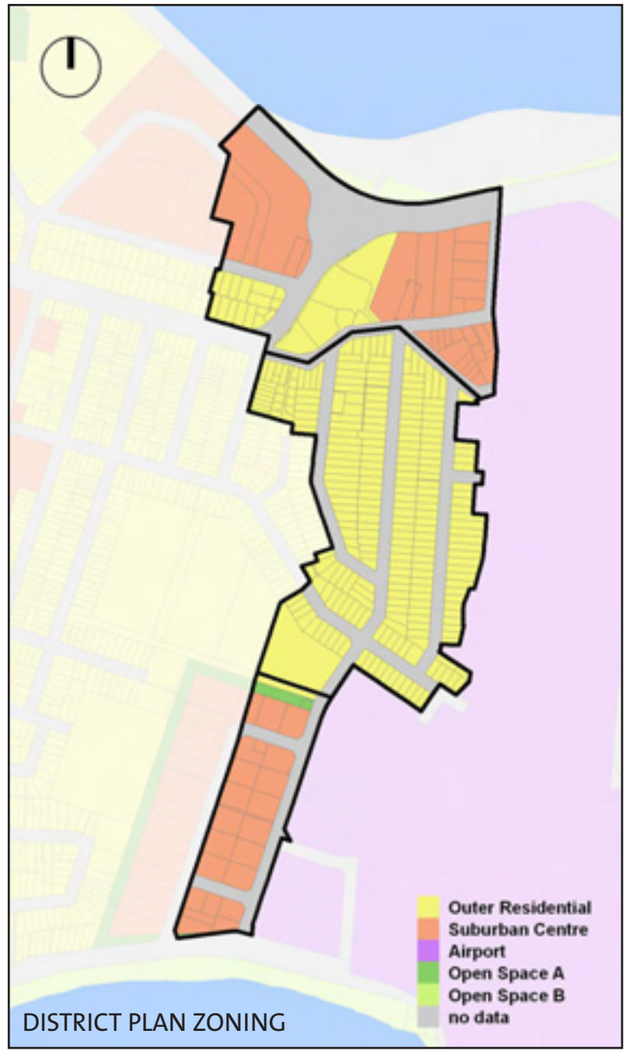


Land Use

Precinct 5 and 7 have industrial/ big box retail uses with a small amount of residential. A fire station is located in the southwest corner of Precinct 7.

Precinct 6 comprises predominantly small scale detached residences and some multi-units. The air traffic control tower is listed as a transport land use and is located on Tirangi Road within the precinct. There is a small amount of industrial use on Coutts Street. There are also some community services land uses in the Precinct. A small part of Rongotai College (generally open space) is in the south west corner of the Precinct.

There are some areas where residences and industrial land uses face each other across the street (eg. Rongotai Road) presenting interface and compatibility issues.



District Plan Zoning

Precinct 5 is zoned Suburban Centre and Outer Residential.

Precinct 6 is zoned Outer Residential and Airport.

Precinct 7 is zoned Suburban Centre and Open Space A.

The adjacent zoning to the west is Outer Residential and east is Airport.

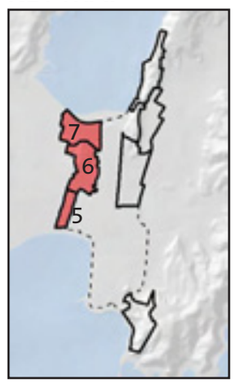
The main land use in Precinct 6 is residential.

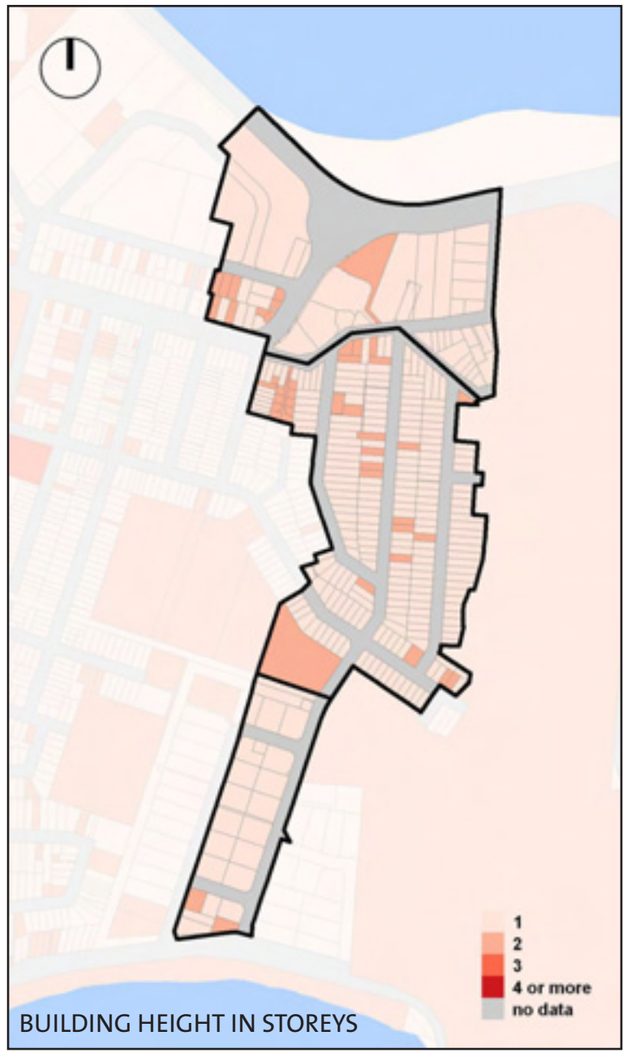
The fire station tower is a landmark land use in Precinct 7.

Part of Rongotai College is located in the southwest corner of Precinct 6.

The industrial land uses in Precinct 7 fit into the pocket between Evans Bay and the hill.

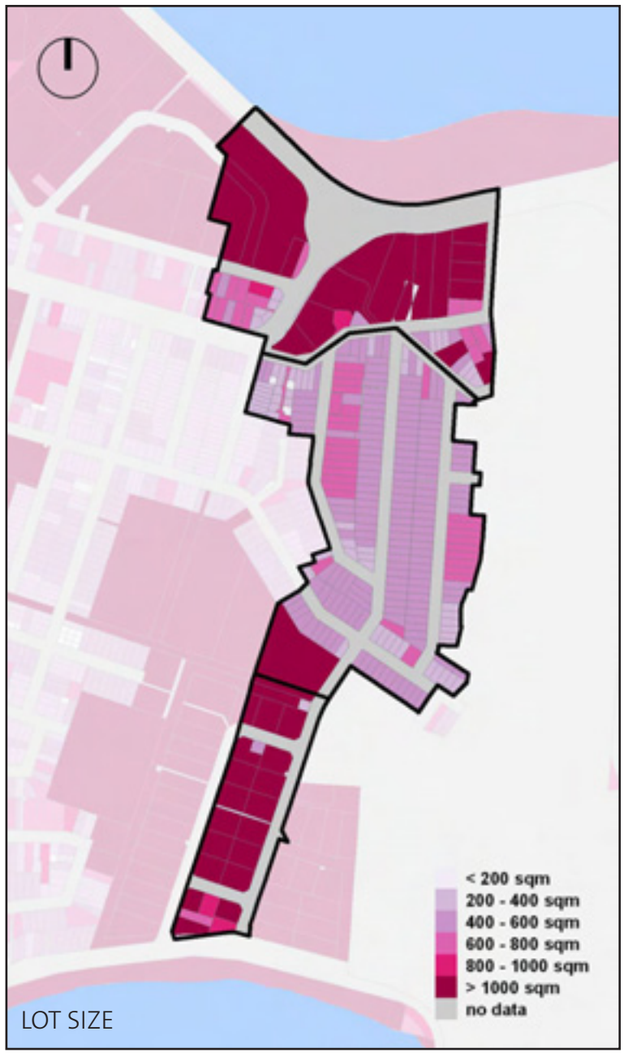
KEY MAP





Building Height

Most buildings are one storey in height. There are no buildings of more than two storeys in the precinct (except the air traffic control and fire station towers). The industrial and commercial buildings in Precinct 5 and 7, while mainly one storey, are a greater height than the residences (larger floor to ceiling heights).

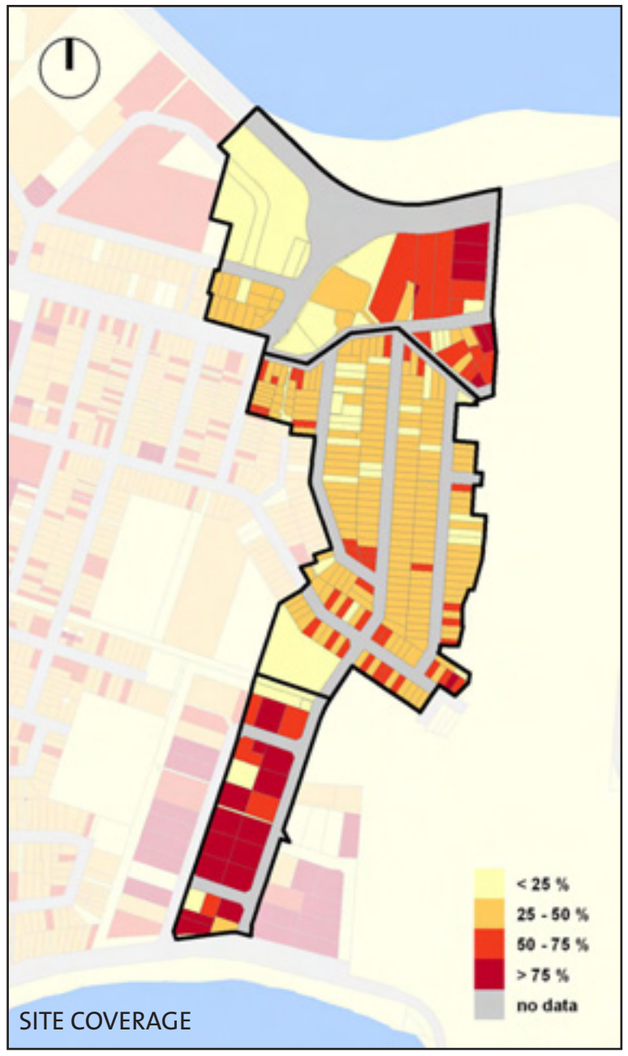


Lot Size and Shape

Most residential lots are rectangular in shape. The standard lot size is 12m wide x 36m deep with an east/west orientation. Most lots are 400-600 sqm in area. Where Lonsdale Crescent curves to fit the contours, lots are less regular in shape.

Industrial/commercial lots in Precinct 5 are large (>1000 sqm) and irregular in shape.

Industrial/commercial lots in Precinct 7 are large (>1000 sqm) and square in shape.

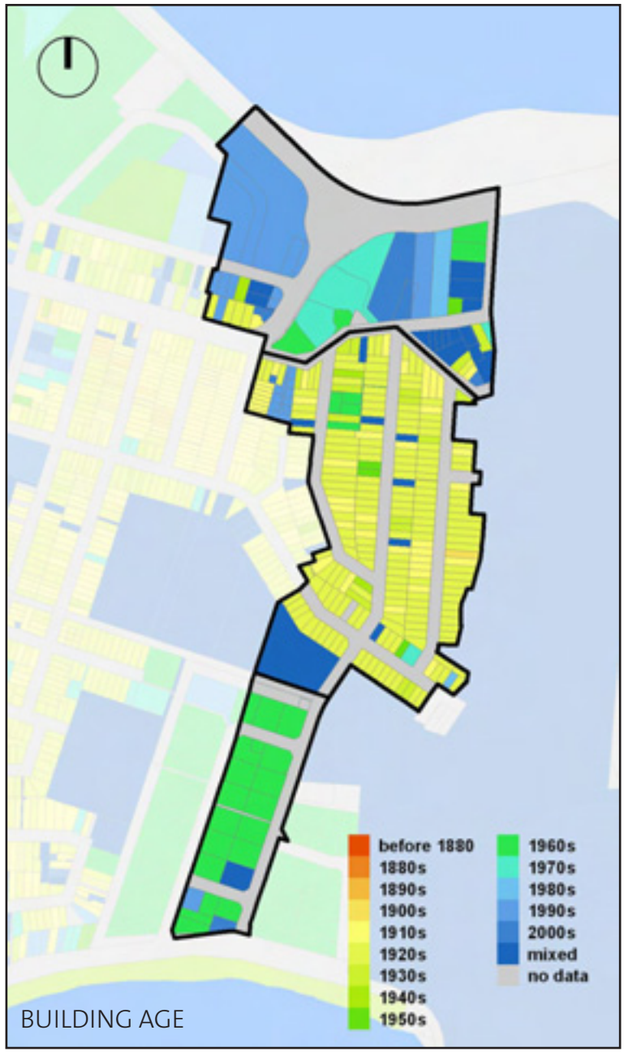


Density

Site coverage varies from less than 25% to greater than 75% with most residential lots in the range of 25-50%. Most industrial/commercial lots have greater than 50% site coverage. This is relatively high site coverage compared to Wellington as a whole. Site coverage is generally higher in the flat areas of the precincts.

Buildings are predominantly aligned to the street. Residences are located in the front half of the lot with 6-8m the average setback from the front boundary. Industrial buildings in the Precincts generally have no, or minimal, setback.

STREET PATTERN AND BUILDING FOOTPRINTS



BUILDING AGE

Street Pattern and Hierarchy

There is a grid street pattern in the precincts. The main streets, Tirangi Road and Bridge Street run in a north-south direction. Tirangi Road is discontinuous, connected only by a pedestrian way at its northern end, where the slope is steep. A pedestrian underpass (under the airport) connects Coutts Street with Miro Street in Miramar. Most streets are 20m wide, a width that facilitates vehicle movement, but is overly wide for a residential area. The airport forms a strong edge that prevents movement to the east of these Precincts.

Blocks are long (more than 400m) which is not good for ease of movement within a residential area (a block length of 90-120m is desirable as it provides increased directional choice).

Building Age, Type and Style

Buildings range in age from the 1900s to recent (post 2000s) buildings. The majority of houses were built in the 1920s (prior to the airport) in the bungalow style. The consistency of residence age and style and lack of modification to structures provides a consistent built form character to the residential streets. There is slightly more diversity of building age and style west of Tirangi Road. Most of the multi-unit housing was built post 1930. The industrial buildings in Precinct 5 are all post 1960s and mixed in ages, while those in Precinct 7 are mostly from the 1960s.

While building condition varies form poor to good, most residences have been maintained and have a good overall condition.

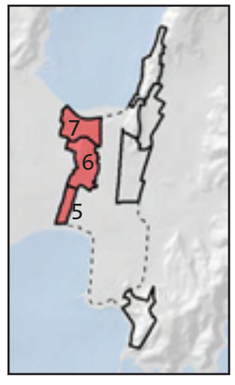
The majority of houses were built in the 1920s in the bungalow style.

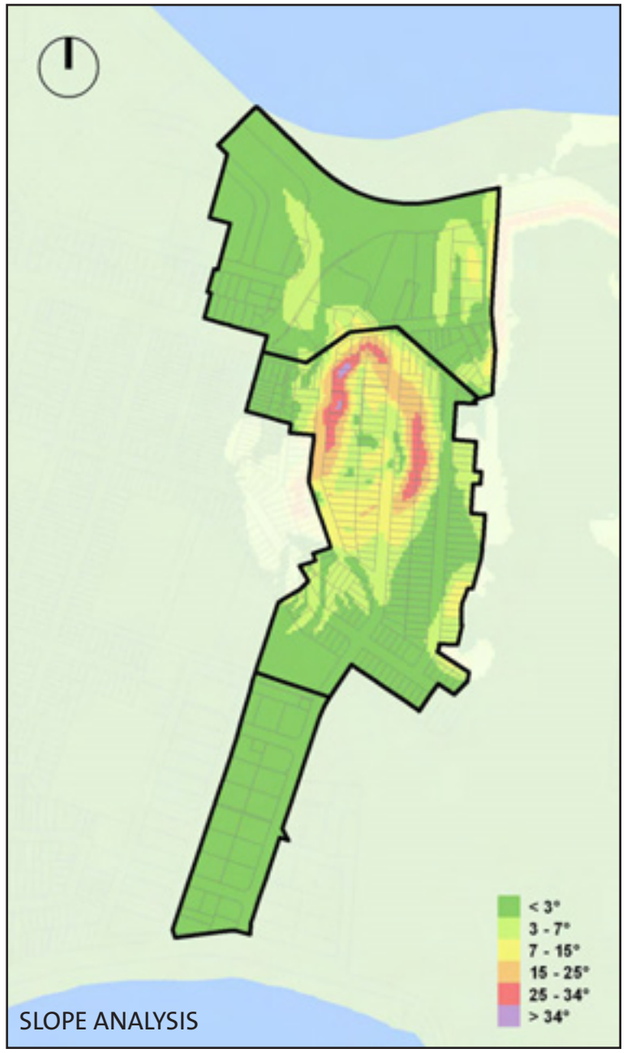
The wide streets and predominantly one storey buildings creates a low ratio scale of building edge to street width.

The pedestrian connection on Tirangi Road.

The pedestrian underpass connecting Coutts Street to Miramar.

KEY MAP





Topography

The hill in Precinct 6 creates a natural visual barrier between Kilbirnie and the Airport, screening the airport from this residential area of the city. The access issues due to the slope of the hill combined with the Obsticle Limitation Surface (OLS) requirements limit the potential land uses for these hill areas.

The hill also creates a green backdrop, contrasting with the sparsely vegetated streets on the flat areas surrounding it. The grid street and development pattern does not relate to the contours of the hill, with houses aligned to the street and accessed via steps or ramps.

Where land is flat (most of Precincts 5 and 7 and part of Precinct 6) this makes it suitable for a wider range of land uses.

Aspect and Views

The hill provides different aspects and views for houses located on the slopes. Houses located on Lonsdale Street have a western aspect and views over Kilbirnie. Tirangi Road provides views over the airport and an eastern aspect. Houses located in the northern section of Tirangi Road have a northern aspect and views over Evans Bay.

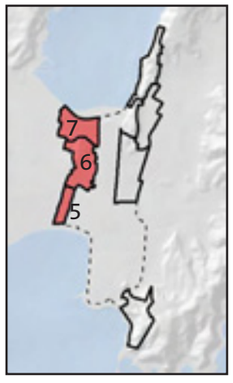
The airport control tower utilises the existing slope for visibility.

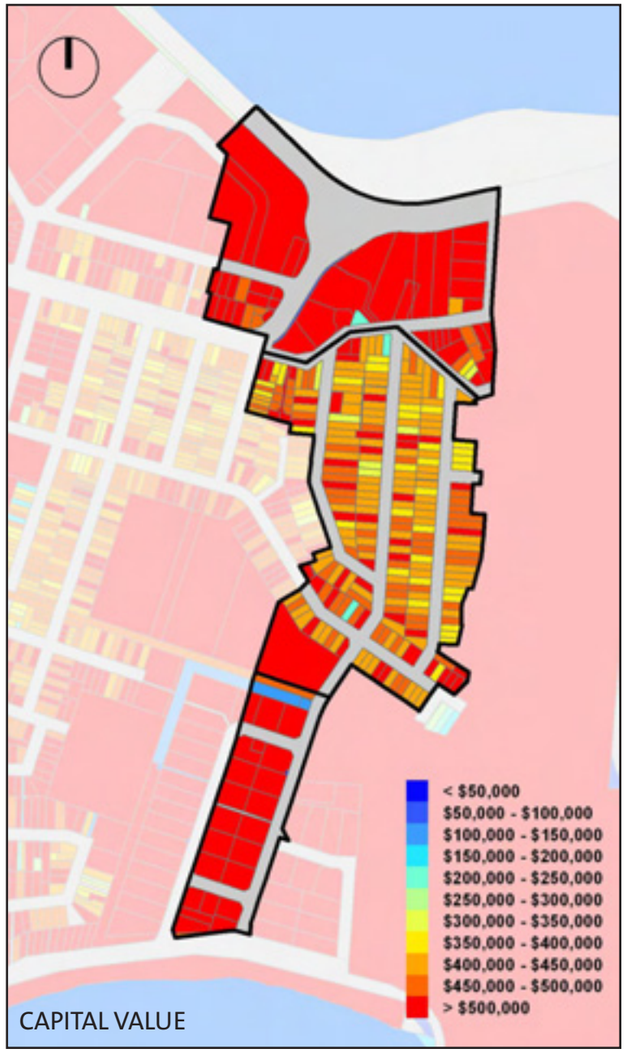
Houses on the east side of Tirangi Road have a view of the airport.

The hill viewed from Rongotai Road blocks the view of the airport.

Access issues limit the type of development opportunities on the slope.

KEY MAP

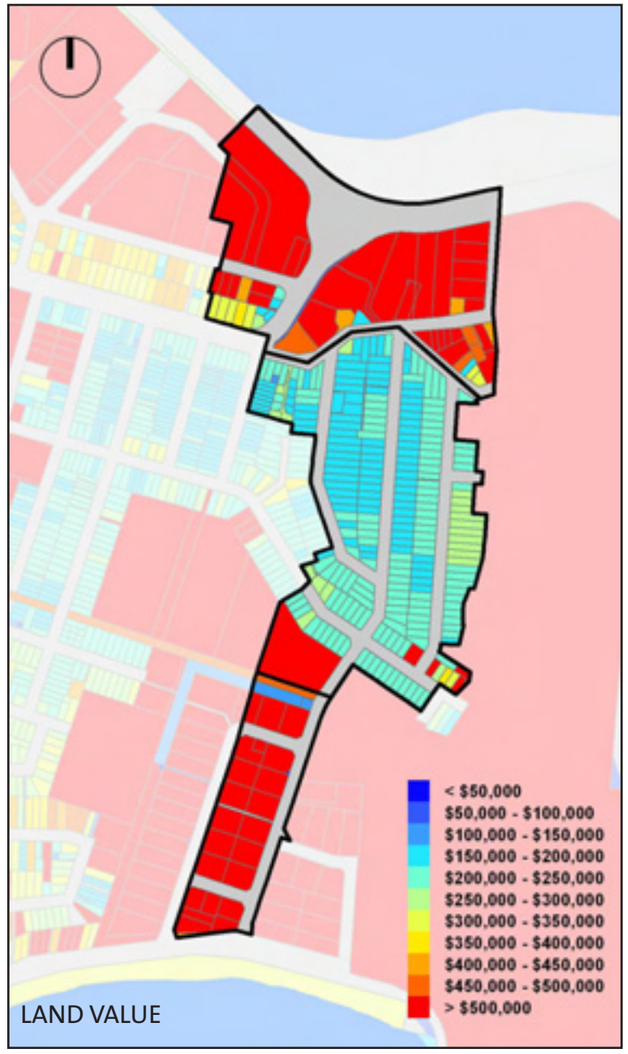




Capital Values

Capital values in Precinct 5 and 7 are mostly over $500,000.

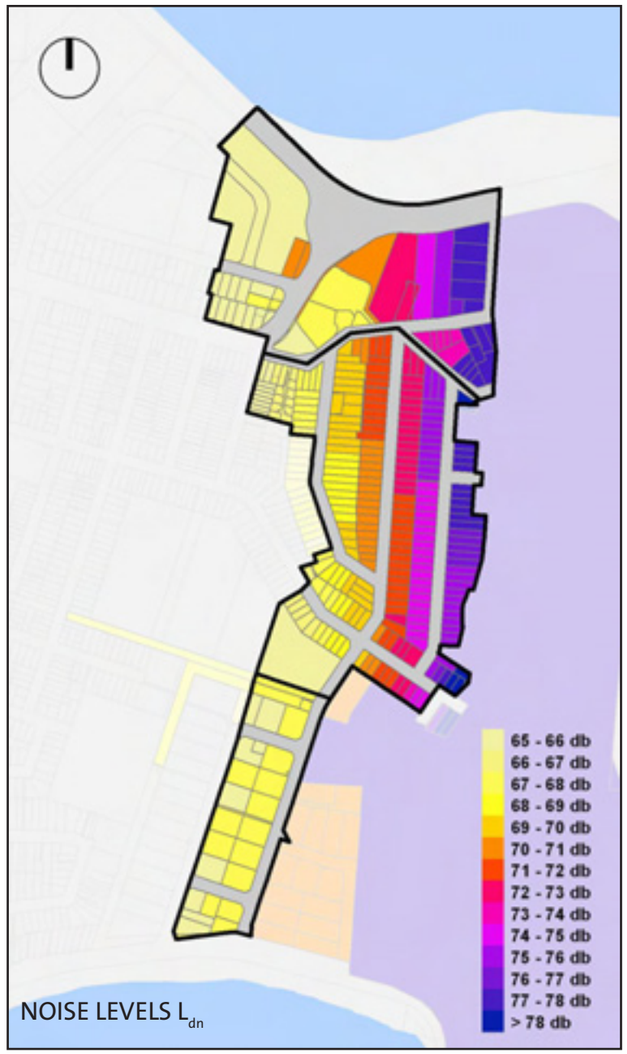
Capital values in Precinct 6 are mostly in the range of $350,000 to 500,000. Capital values are relatively evenly spread across the Precinct regardless of proximity to airport, noise level, aspect or views.



Land Values

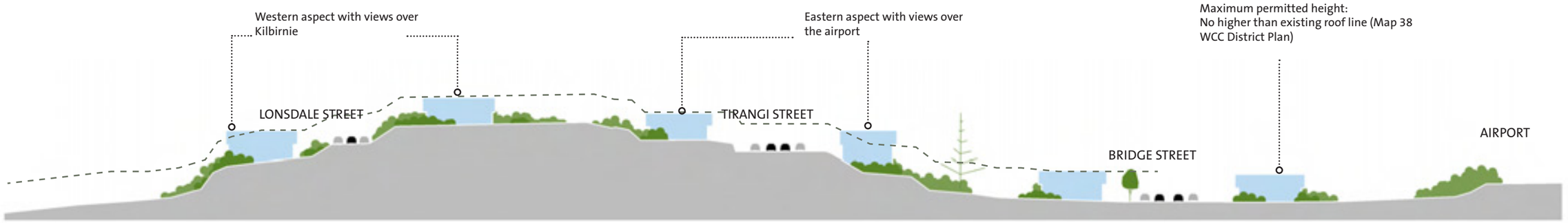
Land values in Precinct 5 and 7 are mostly over $500,000.

Land values in Precinct 6 are mostly in the range of $150,000 to 300,000. Land values are relatively evenly spread across the Precinct regardless of proximity to airport, noise level, aspect or views. The areas located on the flat land appear to be slightly high in value. The size of the land parcel is the biggest determinant of value.

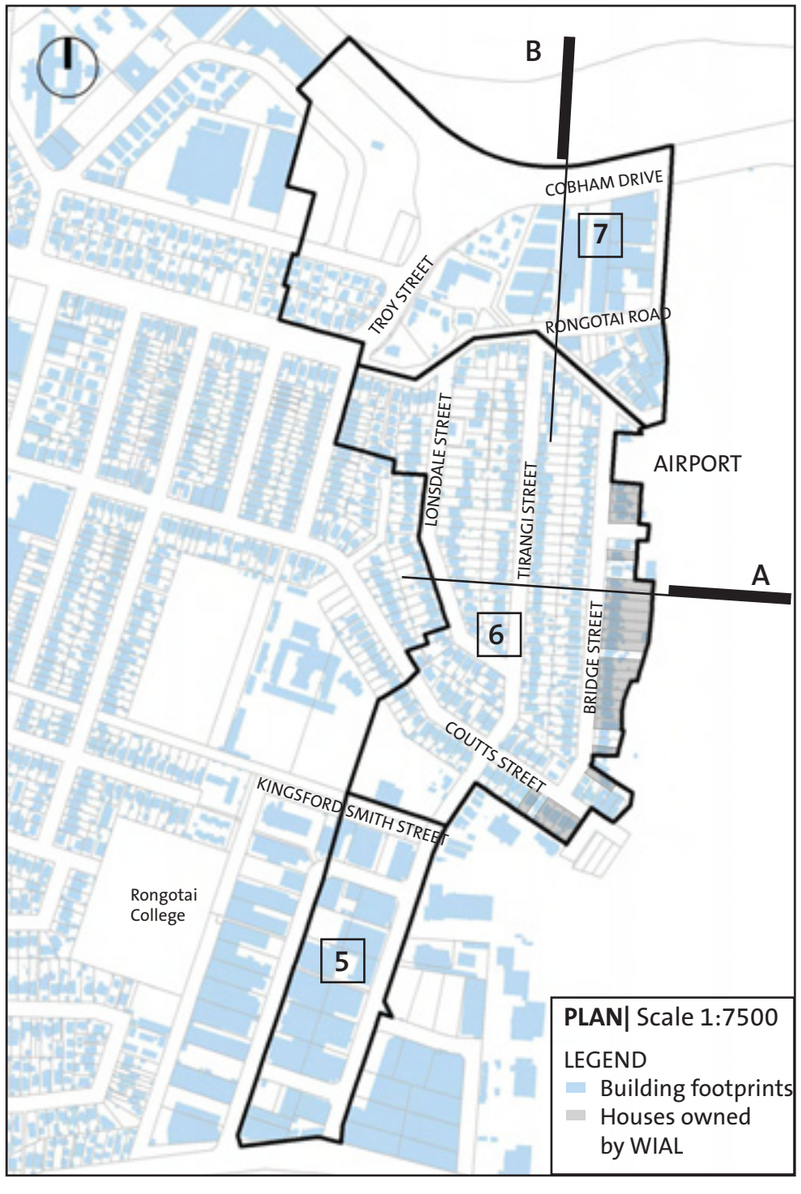


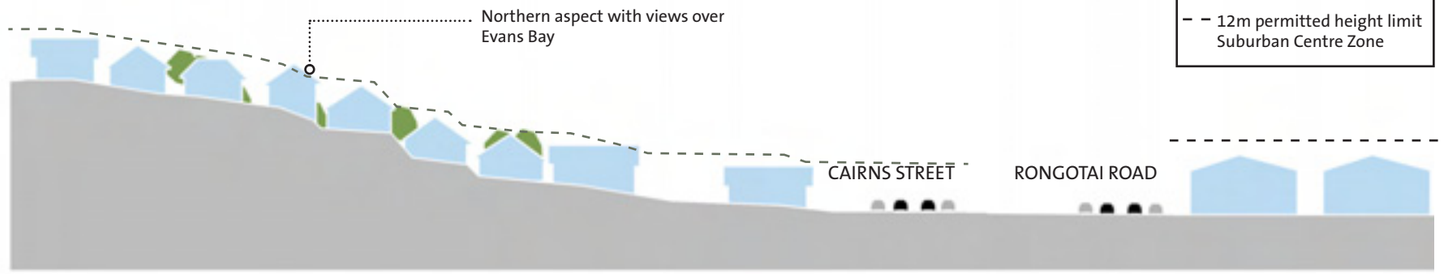
Noise Levels

Noise levels range from L_{dn} 65-78 dB. The highest noise levels are received on Bridge Street and the end of Coutts Street. Noise levels are lower on the western side of the hill (Lonsdale Street).



SECTION A| Scale 1:1000





SECTION B| Scale 1:1000

PRECINCT 5, 6, & 7 SUMMARY OF EXISTING CHARACTER RELEVANT TO FUTURE USE

Precinct 5, 6 and 7 are located on the west side of the airport.

- Land use is industrial and some commercial (suburban centre zone) in Precincts 5 and 7 and mostly residential in Precinct 6 (outer residential zone). There is also a pre-school located in Precinct 6.
- Many of the residential properties in Bridge Street are owned by Wellington International Airport Limited (WIAL) and will likely be removed and the land used for airport operations in the medium future as this is one of the most affected noise locations - they also correspond with the draft Airport Master Plan proposed changes.
- Site coverage varies from less than 25% to greater than 75% with most residential lots in the range of 25-50% which does not suggest a significant potential for infill given the 35% allowance for permitted activities.
- The majority of houses were built in the 1920s (prior to the airport) in the bungalow style which makes them less well insulated than contemporary buildings.
- Most residences have been maintained and have a good overall condition.
- The hill in Precinct 6 creates a natural visual barrier between Kilbirnie and the Airport which reduces the noise effects in that direction.
- The access issues due to the slope of the hill combined with the OLS requirements limit the potential land uses for these hill areas.
- The hill provides different aspects and views for houses located on the slopes.
- Capital values in Precinct 5 and 7 are mostly over $500,000.
- Capital values in Precinct 6 are mostly in the range of $350,000 to 500,000.
- Land values in Precinct 5 and 7 are mostly over $500,000.
- Land values in Precinct 6 are mostly in the range of $150,000 to 300,000.
- The size of the land parcel is the biggest determinant of value.
- Noise levels range from L_{dn} 65-78 dB. The highest noise levels are received on Bridge Street and the end of Coutts Street.

DISTRICT PLAN (and Changes)

NOISE MANAGEMENT APPROACH

The Wellington City District Plan is the main Wellington City Council (WCC) policy document in terms of directing and controlling the land uses in the city. It is a statutory document prepared under the Resource Management Act 1991 (RMA).

The airport has its own zone - Airport Area zone - which applies generally to the airport's operational 'footprint'. Within the Airport Area there are limits to operation including curfew on the hours of operation to avoid 12 midnight/1am to 6am period. The noise 'zone of influence' is represented by the Air Noise Boundary (ANB) which acts as an overlay to the various other zones contiguous with the airport (Residential, Suburban Centre and Open Space as described on District Plan Map 35). The District Plan seeks a balance between accommodating development within the ANB, while mitigating the effects of airport noise through an insulation standard. These standards differ for zones over which the ANB is overlayed.

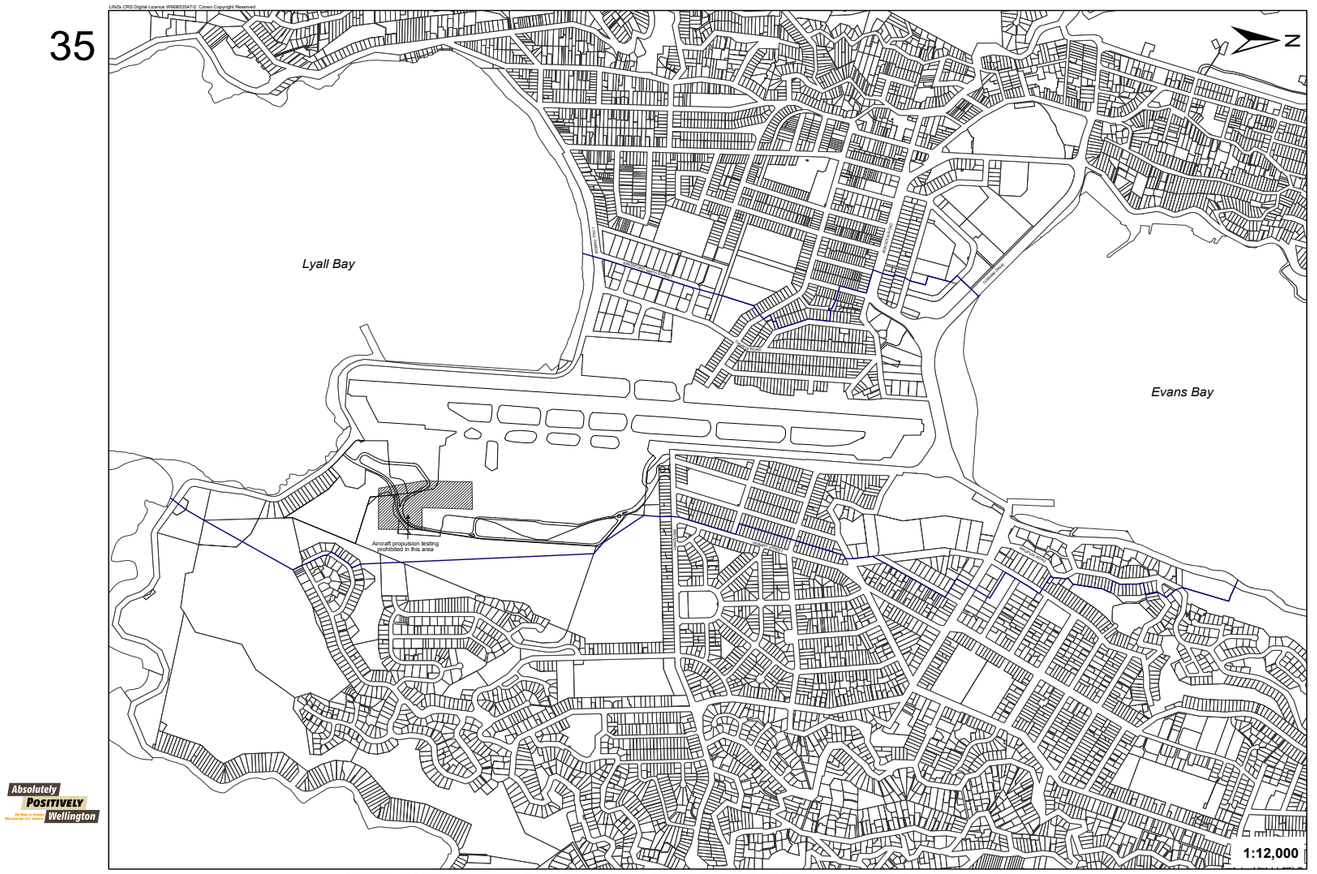
For the residential areas within the ANB, the District Plan specifically manages residential development (including multi-unit where there is three or more dwellings created) as a discretionary activity for which a resource consent is required. The specific assessment criteria Council uses to determine whether a resource consent should be granted for each case are set out in the District Plan. The criteria require noise effects on an increased number of residents to be assessed along with the potential for reverse sensitivity constraints on the airport's operations.

The current Residential Area provisions for the ANB do not address other potentially noise sensitive activities (such as tourism accommodation or rest homes for example). Nor does the Plan limit alterations or additions to existing dwellings; or single dwelling infill within the ANB.

The Suburban Centre Area zone provides for a wide range of activities to provide for commercial and industrial development. There has been recent work by Council to review the approach to managing Suburban Centres. The proposal currently is to nominate which of these zones should be managed for a mix of residential with employment, and which should be retained more exclusively for employment related activities. The Suburban Centres review is at the draft stage currently.

There would be new noise management provisions within Suburban Centres as a result of the review that allow higher noise generation in employment areas where residential use would be limited. The policy also seeks that any new residential properties (as noise sensitive activities) that were developed would be insulated to limit the effects of the increased noise environment on them.

Insulation standards currently used in the Central Area and Port Noise Affected Area ($D_{nT,w} + C_{tr} > 30/35$ dB) are proposed to be carried over to apply to all new residential development in Suburban Centres (except within the ANB) as a result of the review.



WELLINGTON INTERNATIONAL AIRPORT AIR NOISE BOUNDARY (Ldn 65)
Refer to Rule 11.1.1.1

OPERATIVE: 27/07/2000
REPRINTED: 02/11/2005

This $D_{nT,w}$ approach is effectively a building wall design specification for effective insulation against noise, as different than the current approach within the ANB of calculating the desired level of sound insulation to achieve the specified internal noise criterion. The aim is the same - seeking an internal noise level of no more than L_{dn} 40 dB - but the approach is a specification for the construction required to achieve it - this provides some certainty within the new building design process.

A key question for this study (LUMINS) is whether this approach should be similarly carried over to apply to new residential development in the ANB. This would give a consistency in approach with the other known noise sensitive areas of the city. It is understood that this approach is being used successfully for the Dunedin Port Noise Affected Area.

INFILL HOUSING POLICY (2007)

In May 2007 Wellington City Council introduced Plan Change 56 to enable it to better manage infill (backyard type) housing. This plan change is relevant to LUMINS as it put in place tighter controls on residential development to better protect the character and amenity of existing residential areas. In effect the plan change aims to limit changes in density to most residential areas of the city and target it to locations around nominated centres. There was strong community endorsement for this change.

URBAN DEVELOPMENT STRATEGY (2006)

This WCC strategy defines a long term direction (30-50 years) for urban development in Wellington. It proposes to direct growth to where the benefits are greatest, where adverse effects are minimised and improve the quality of development.

The growth scenario for long term planning purposes is 50,000 more people in the city by 2055. One of the key features of the strategy is a proposed 'Growth Spine' from Ngauranga to Wellington Airport defined as 'transit orientated intensification of employment and housing along a spine of growth'.

The two key implications for the airport area from this strategy are:

1. **Improved transport connections to the airport.**
   The location of the airport as the end point of a growth spine which is supported by a core public transport link and some road improvements implies the likelihood of enhanced accessibility from within the city to the airport and its surroundings. The transport implications are discussed in greater depth in the Ngauranga to Wellington Airport Draft Corridor Plan below.

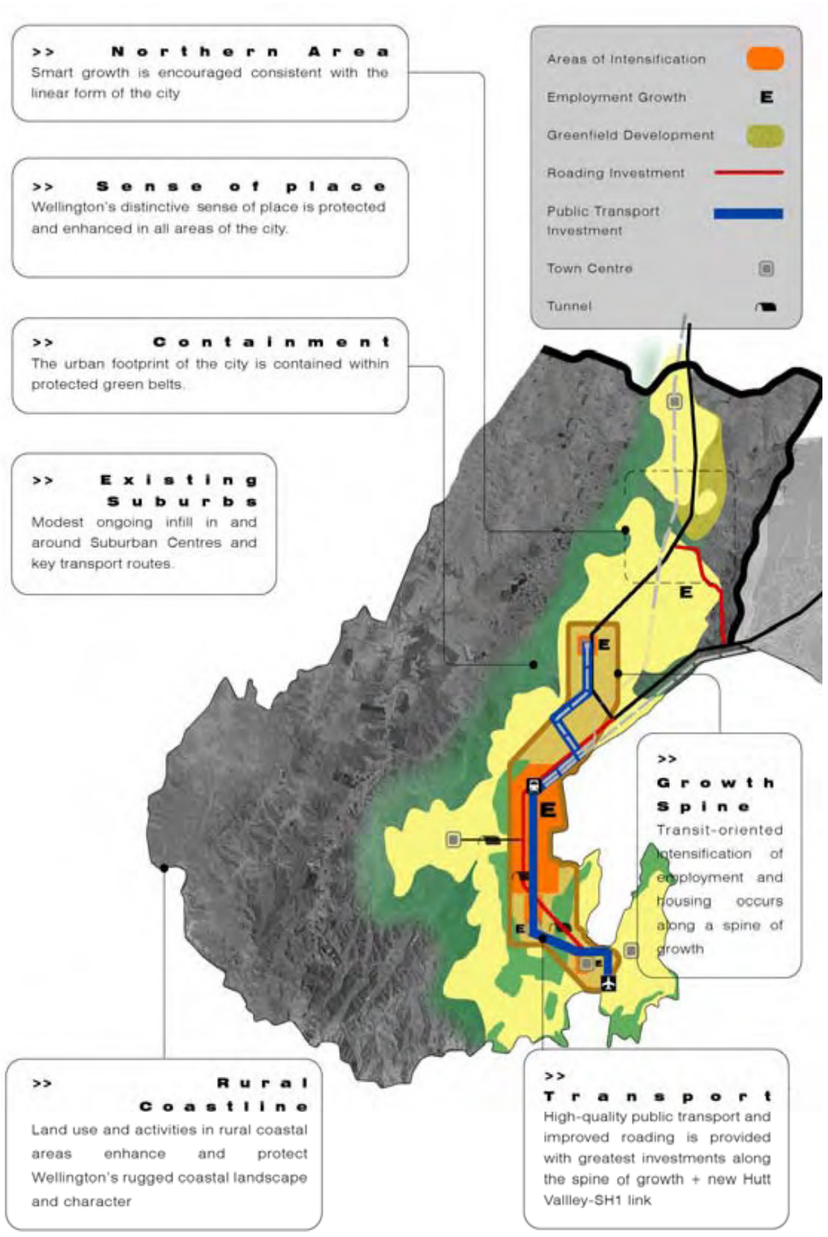
2. **Future growth along the spine.**
   Both residential and employment growth is proposed to be directed along the growth spine providing opportunities to intensify current land uses around the airport area.

NGAURANGA TO WELLINGTON AIRPORT CORRIDOR PLAN (2008)

This plan is connected directly to the Wellington Regional Land Transport Strategy (RLTS 2007-2016) which guides the long term development of the region's transport system. The plan outlines the current and ongoing activities and initiatives within the corridor then sets out proposed improvements and actions. The area of Kilbirnie is highlighted as a growth node in the plan.

3. Long-term direction for Urban Development

Our 50-year growth concept



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SUBURBAN CENTRES POLICY (2008)

This is a framework to assist the development and management of Wellington City's centres. It will be supported and implemented through more detailed policies (including the District Plan and centre plans). It introduces a hierarchy of centres to provide guidance on their role and function and to assist in assessing the appropriateness of proposed developments.

The Suburban Centres in the Air Noise Boundary are defined under the categories of:

Town Centres
Miramar (not within Air Noise Boundary area, but adjacent)
Work Area
Rongotai East, Rongotai South
Live/Work Areas
Miramar South, Ropa Lane Miramar

Town Centres are recognised as retail/community hubs servicing one of more suburb. Objectives include to strengthen the multi-functional nature of centres, including their role as community foci, public transport hubs, places to live and work and centres for entertainment, recreation and local services. The review of infill housing has identified areas around centres as offering the greatest benefits from residential intensification due to good transport accessibility, suitable physical characteristics and lower sensitivity to changes in character.

Live/work areas and work areas have more of a single-activity focus (industrial or large-format retail) and are not considered to be centres with the same roles and functions of centres. The policy looks at managing the impact of "out of centre" location of large format retail and the effects on centres and industrial land availability. Live/work areas are recognised as having a mixed use role and function including residential activities, while work areas have no future anticipated residential activities.

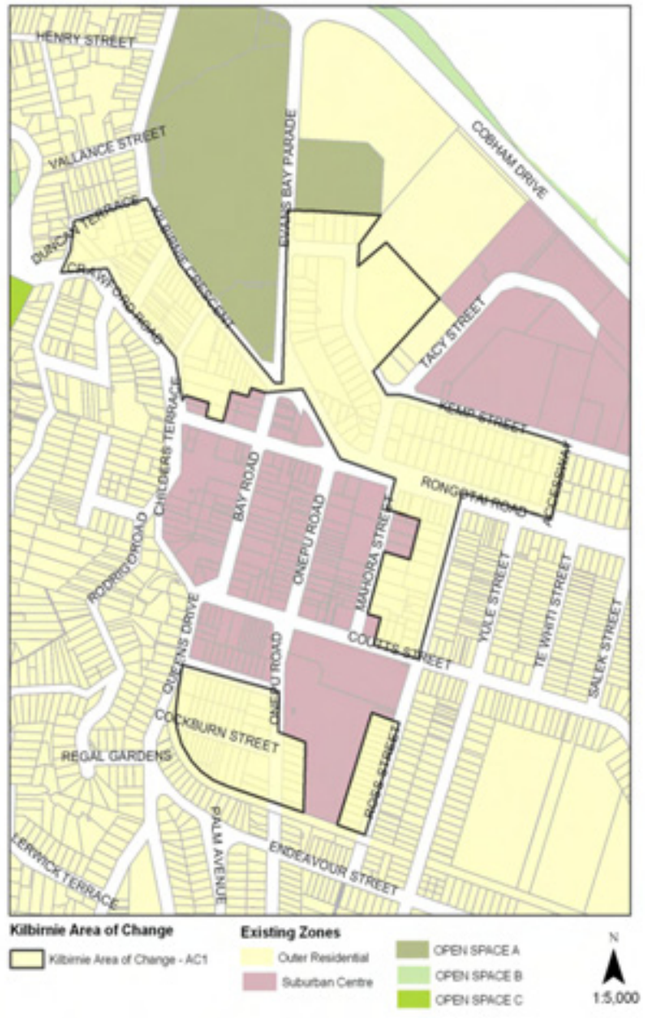
The Kilbirnie Sub-Regional Centre is described as having several parts that are located within a wider catchment including the Airport and Rongotai West. Building and improving connections between these parts is listed as a key aim of this policy.

HOW AND WHERE WILL WELLINGTON GROW? DISCUSSION PAPER (2008)

As part of the implementation of the Urban Development Strategy, Council initiated a major review of infill housing opportunities. This discussion document forms part of this review. The main initiative outlined in this discussion document is a targeted approach to infill housing - encouraging growth in and around key centres with good infrastructure and public transport, while restricting growth in areas of 'special' character (refer to Infill Housing Policy above).

The paper lists 'areas of change' (growth areas) and 'areas of character protection'. Kilbirnie, Miramar and Lyall Bay Parade are listed as areas of change in the paper. These are areas where comprehensive redevelopment of housing would be encouraged and facilitated, resulting in moderate to significant increases in residential density and changes to the character of the areas.

It is noted that following public feedback on this strategy, Council has changed its plan to concentrate only on three centres in the near future: Kilbirnie, Johnsonville and Adelaide Road. Kilbirnie is most proximate to the airport area, but is not immediately affected by the ANB overlay.



KILBIRNIE AREA OF CHANGE

PART 1 KEY ISSUES SUMMARY

NOISE INSULATION FINDINGS

In general, noise has an effect on the residents of the area within the ANB and influences their quality of life and the decisions they make. There are cost/value implications for insulation and existing District Plan issues in respect of managing development within the ANB. Particular points in these respects are:

- The main reason people want to move out of the ANB, if they are considering moving, is airport noise.
- The majority of residents indicate that airport noise has at least some negative impact on their satisfaction with living in the area.
- 70% of residents say that airport noise interferes with their conversations. Residents in higher L_{dn} zones are more likely than those in low L_{dn} zones to say that airport noise interferes with daily life such as sleeping and watching TV.
- Residents feel that airport noise affects them more outdoors than indoors.
- Airport noise is most annoying weekdays 6pm-10pm.
- Less than half of the houses have had some form of insulation since construction which means that there are many people experiencing unmitigated noise levels.
- Newly arrived residents are more likely to complain about airport noise than those who have lived in the area for some time.

- The cost of insulating existing houses is significant, under both the L_{dn} 40 and 45 scenarios.
- The extra cost of insulating new houses is not significant in terms of overall construction costs, except for the most noise exposed housing under the most stringent noise insulation scenario.
- There is evidence that the delivery of education at Miramar South School could be improved through the insulation of certain school buildings. The cost of insulating existing educational facilities within the ANB is significant.
- The insulation of existing housing against airport noise is unlikely to positively impact on house value.

- Current noise levels are L_{dn} 3-4 dB quieter than what is permitted under the District Plan.
- Relatively few complaints are received about noise.
- Under existing District Plan provisions residential intensification is encouraged, subject only to less than ideal noise insulation.
- Under existing District Plan provisions the extent of the effect of aircraft noise on the likely future population is likely to be significant.
- Further to the Environment Court decision (known as the Corrigan case), some residential conversion of existing industrial areas (Suburban Centres) within the ANB is possible, depending on the area's visual amenity and relative position within the ANB.
- Under the existing District Plan provisions non-residential noise sensitive activities are permitted inside the ANB and do not have to be insulated (eg childcare centres or tourist accommodation).
- Under the existing District Plan provisions, additions and alterations to existing residential dwellings are permitted without acoustic insulation.

CHARACTER FINDINGS

In general, the character of the ANB area varies widely as each of the precincts has different combinations of the character elements assessed. This variation suggests that a one size fits all approach to land use will not be appropriate and that there will be different responses possible in different locations. Particular points in these respects are:

- Building height is constrained by the OLS and Airways designations on the west side of the Airport and also Wexford Hill.
- There is a problematic road hierarchy in the Kilbernie/Rongotai/Lyall Bay area as any large vehicles or large quantities of traffic seeking to move between State Highway 1/Cobham Drive and Lyall Bay/Rongotai must traverse the residential streets of Kilbirnie.
- Road access around the Wexford Hill/Rongotai Ridge area is also constrained by topography.
- The affects of noise levels are the greatest in the areas to the east and west of the airport runway and this will be important to consider for change from current residential use and/or forms of residential development.
- Steep topography in parts of the ANB, particularly around Tirangi Road and in Maupuia, is influential to the type of development that will be possible there - it will generally be unsuitable for commercial or industrial uses.
- The aspect (views/sun) afforded by the topography in some places presents opportunities for alternative land uses.
- The majority of housing within the ANB dates from the 1920's and 1930's and although there has been some renewal and infill, there are opportunities for change to reflect changing lifestyle and demographic needs.
- The current lot size of individual residential sites will constrain more comprehensive forms of redevelopment.
- Under utilisation of the visual amenity and proximity of the south coast for the areas which are around Moa Point, but particularly on the west side of the ANB's coastal interface.
- The larger lot sizes on the ANB west side in the current commercialising area present more flexible options for redevelopment.

STRATEGIC CONTEXT FINDINGS

WCC has initiated strategic planning for the future growth and change in the city and there are some contextual points of note from this work:

- WCC's Urban Development Strategy anticipated significant intensification along the 'Growth Spine' which terminates within the ANB area.
- Significant transport infrastructure improvements to the City to Eastern Suburbs route are likely to emerge from the Ngauranga - Airport Corridor Plan and this suggests that the airport's function as a node should be considered in respect of mutually beneficial landuses. The wider context of the State Highway from the airport to north of Levin as a road corridor of 'national significance' is also noted.
- WCC's Centres Policy anticipates residential development alongside commercial development in suburban centre zoned land in Miramar South and Maupuia.
- Following public input, WCC have determined that further residential intensification will occur in only 3 areas (in addition to the CBD), including Kilbirnie. The precise extent of the Kilbirnie sub regional centre area is as yet unconfirmed.

PART 2 | LANDUSE OPTIONS

PART 2: LAND USE OPTIONS AND EVALUATION CRITERIA

The purpose of Part 2 is to: (a) identify and define the various types of land uses and activities that can be considered for the different precincts within the ANB; and (b) identify and define criteria that can be used to evaluate the land use options as to their appropriateness to meet the LUMINS purpose.

LAND USE OPTIONS IDENTIFICATION APPROACH

The approach to identifying land uses and activities that can be considered within the ANB has been, in conjunction with the application of local knowledge and understanding of urban dynamics in the Wellington area, to consider:

- **Current uses in the area**

  As described in Part 1 there is a general mix of residential, light industrial commercial and airport type activities within the ANB. The residential activities are known noise sensitive uses and special care will be required in how these are considered by the evaluation criteria. However, whatever choices are made about future land uses will need to provide for residential given that this is a predominant existing land use that will not change its predominance significantly in the foreseeable future.

- **Variations in the existing uses**

As described in Part 1 and the summaries to the precincts, there are some locations where there are opportunities to utilise certain attributes (for example good aspect in combination with lesser noise levels) to enable some location specific changes in the scale or density of some uses - including residential. These could only ever occur through a resource consent process that enabled the necessary assessment to be undertaken and for consent to be declined as appropriate. There is a concept for consideration in this respect which is that by encouraging residential *re*development (ie replacing existing older houses with new ones) then a better insulation performance from those new buildings could be achieved. This could be considered somewhat out of step with the current planning provisions (refer to Part 1 Urban Development Strategy) which aim for increased density around nominated areas of change.

An aspect of this concept that could be considered is whether increasing the density of residential development would both give additional uptake of change (ie there would be some market motivation to gain value from increased number of units) as well as insulation performance.

In respect of increased insulation performance there are possibilities to redevelop the site (or possibly for larger scale redevelopment) a collection of sites with outdoor and more noise sensitive internal activities such as bedrooms that are better positioned and away from the noise source, and where the material may be more substantial (ie concrete) and so better insulating than a smaller scale wooden structure replacement.

Industrial land in the subject area is also able to accommodate variations in type and scale. The historical uses in these areas have been heavily influenced by whole of sector changes which have been pronounced in the Wellington region as the New Zealand economy has moved away from a domestic manufacturing base. The areas in Rongotai and Miramar that are within the ANB, as well as contiguous with it, have changed markedly in terms of the type of activities that are accommodated there - their future is less easy to prospect.

One aspect of the changes to these areas that can be anticipated is an expectation for a greater mix of activities and use for what are typically considered commercial type activities (this is evidenced by proposals for the Rongotai Area for a large format retail complex). With this there is an expectation of higher amenity and in some places the change to more residential living mixed within. As noted above, some care with residential activities will be required within this environment. There are linkages in this element to Council policy on Suburban Centres which are described further below.

The airport itself as the biggest single activity within the ANB is also going to continue to have a fundamental role in the area. The changes that may be required within the aviation industry - such as towards safety, different sized aircraft and frequency of flights, together with the ancillary activities in terms of services, amenities and local transport can be influential to the airport's needs over the medium to longer term. WIAL have developed a Master Plan (draft as at September 2009) which sets out the airport's intentions and needs to 2030. This master plan is described further below.

- **Strategic influences**

  The strategic influences are explained more fully in Part 1 of this report, but primarily relate to the Wellington City Council's (WCC) District Plan and urban development policy, as well as WIAL's strategic planning, embodied in the Master Plan.

  With regard to WCC's planning the principal aspect of its policy direction of interest to LUMINS and the land uses option is the Suburban Centre's policy changes. There are residential aspects also of note in regard to where infill and intensification should occur. Areas of intensification are all out of the ANB area and are only relevant to the extent that the policy is not encouraging of intensification within the ANB.

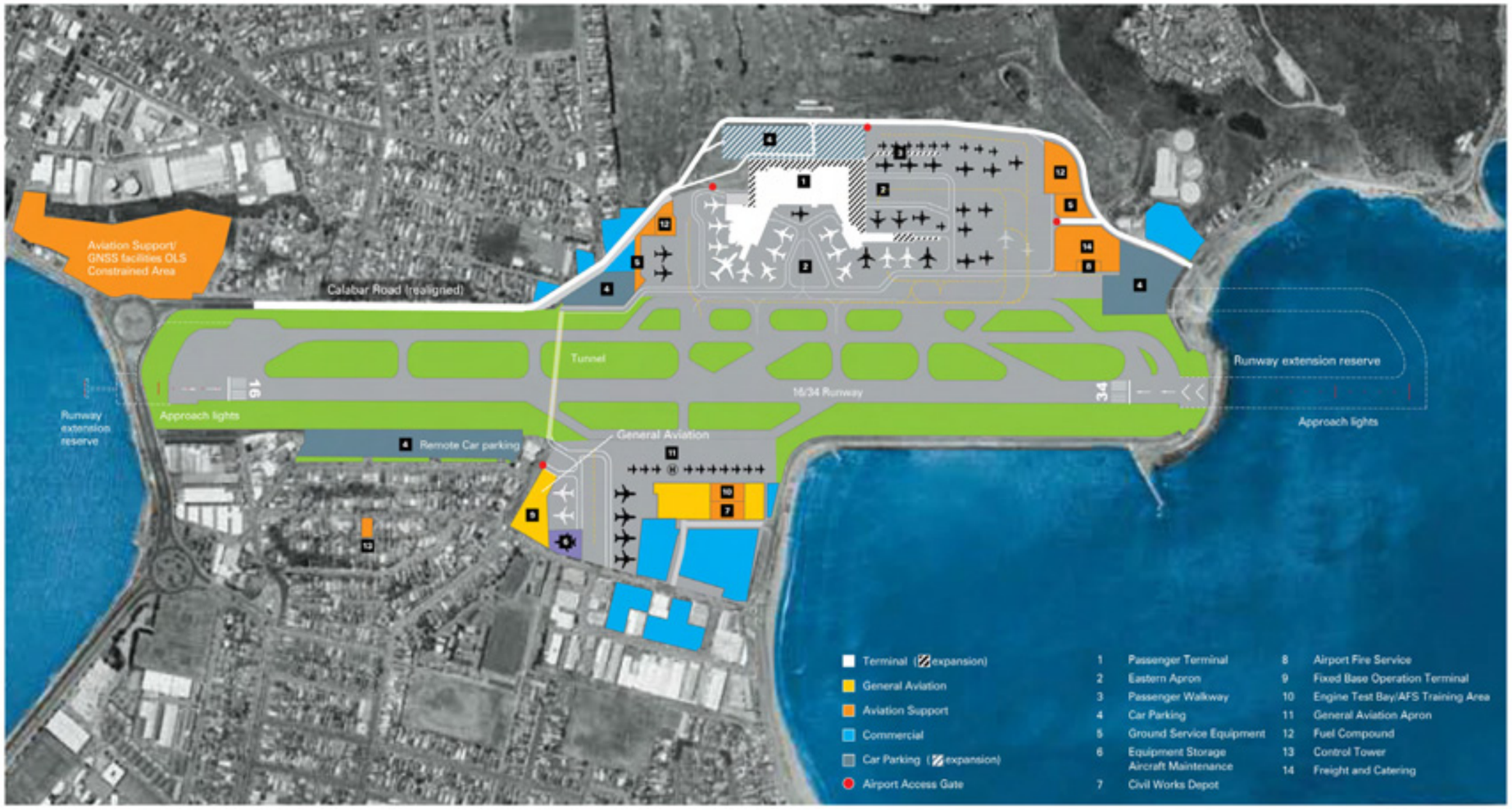
  Within the land areas zoned Suburban Centre the policy is to nominate some of these as living/working areas, or more exclusively for work. Within the subject ANB there are a mix of both and the option for more residential in the live/work centres (only in Mapiuia) will need consideration.

  With regard to the WIAL draft Master Plan (see below) the potential for extending the footprint of the airport is clear. To the east this potentially means changes to the alignment of Calabar Road, removal of some residential properties and some commercial areas, to the west again involves some removal of residential properties, car parking and commercial activities.

  The various land uses that may be possible, considering the above factors, are described below.

2030 Airport Layout

Figure 10-5



A RESIDENTIAL LAND USE OPTIONS

The range of residential land uses that may be possible in the ANB are considered below.

Some of these already occur within the ANB (for example, the suburban house) and others have potential suitability. As discussed earlier, the suitability will need to be carefully assessed to ensure that the risk of additional noise effects being generated are addressed by any change to the land use type.

Typical existing residential street in the area.

A1 SUBURBAN HOUSE

Detached house on single lots
500m^2 typical lot size in ANB
two to four bedrooms and garage.
1-2 storey

A2 MEDIUM DENSITY TOWN HOUSE

Townhouse with attached party walls - sometimes body corporate or separate titles
300 - 500m^2 typical lot size or in split larger lot
two to four bedrooms and garage.
2-3 storey

A3 HIGH DENSITY APARTMENTS

Apartment typology with some shared walls and floors.
body corporate and separate strata titles
100 - 300m^2 typical size
requires larger lot - over 1000m
one to three bedrooms and separate or bulk garaging.
3-5 storey

A4 ELDERLY HOUSING

Detached, townhouse or apartment typology with some shared walls and floors - ownership or rental.
Requires larger lot > 5000m2 to create
One bedroom, sometimes garage
50 - 100m^2 typical size
1-4 storey

A5 VISITOR ACCOMMODATION

Apartment typology with shared walls and floors giving vertical attachment between units.
Requires larger lot >5000m2 to create
One bedroom, sometimes bulk garaging
50 - 100m^2 typical unit size
1-4 storey, Typically on main road routes

B COMMERCIAL/INDUSTRIAL LAND USE OPTIONS

The range of commercial and industrial land uses that may be possible in the ANB are considered below. All of these either currently occur in the ANB or may be possible in the future due to market demand.

They all have generally internalised functions and tend to be places of work that are not where people live or sleep and are in that sense less noise sensitive. However, the smaller scale retail and to some extent any quality office/industrial type space will be attracted by amenity in the form of quality external space (such as for outside seating) as well as view or outlook.

As noted earlier there is some WCC policy tendency towards mixed uses for retail type activities that encourage residential at higher densities in conjunction with commercial uses (ie ground floor retail and residential above which is a consideration, but in relation to potential noise issues must be carefully considered.

To some extent airport related activities of a commercial and industrial nature could be included in this group, but a separate type is identified below for airport related activities.

Typical scale of commercial and industrial activity and structures in the area

B1 SMALL RETAIL

Small retail of less than 500m2. Could be isolated dairy or store or part of a group of shops. A variation on this type is also the smaller scale fast food outlet. Need for some parking/potentially 'drive through' . Potential for external amenity spaces associated for outside seating if food related

B2 LARGE FORMAT RETAIL

Large format retail of 500m2 or greater size. Large surface car parking area requirements. Vehicle orientated and typically little external amenity public space

B3 OFFICE

Office building - range of floor area sizes, and storeys. Car parking needs, often external. Can benefit from outlook and relationship to amenities for staff, including transport. Typically in locations with other office/commercial activities

B4 SERVICE STATION

Car park type area for vehicle movements, canopy over fuel pumps, ancillary shop, ancillary mechanics. Signage dominant.
Provides local shop role. Little external amenity in terms of public space quality

B5 INDUSTRIAL BUILDING

Industrial activities, warehousing or storage buildings. Tend to larger footprint sizes. Flatter sites for larger footprints, heavy transport needs. On site parking/external open yard space needs. Noise and amenity typically less of a concern.

C AIRPORT LAND USE OPTIONS

The airport is a major landuse in the subject area and it has a combination of types of activities that occur in association with the function. These include:

- large open hard surfaced areas for runway and apron
- large buildings to accommodate passenger and freight terminal functions
- associated commercial activities which can be ancillary to the airport such as for supply to aircraft, goods distribution or mechanical servicing
- large open areas or structures to accommodate car parking and access roads

as well as associated visual amenity spaces

Typically the airport and associated functions require flat areas of land and they tend to be contiguous with one another. The airport is relatively 'fixed' in the sense of the LUMINS study in that it cannot changes the position of its footprint - it can only expand and retract from its current position.

For the purposes of LUMINS the options are distinguished as either building type development or open space for parking/open space amenity - it is assumed that the runway itself and terminal buildings will not relocate or change from the current location.

C1 AIRPORT SERVICE/COMMERCIAL

Storage and ancillary office and industrial facilities. Typically have larger scale and have little general public accessibility

C2 AIRPORT OPEN SPACES/ PARKING

Open areas for parking and amenity landscape - visual amenity for large parking areas and managing stormwater in ecologically sustainable way. Parking structures also possibility

D PUBLIC LAND USE OPTIONS

The range of public and community related land uses that may be possible in the ANB are considered below. Some of these already occur in the ANB (for example, Rongotai College and streets and reserves) and others new uses may be possible in the future due to changes in demographics or market demand. There may also be changes to streets and associated amenity reserves spaces that can occur.

Typical street road reserve space and school

D1 EDUCATION FACILITY

Childcare, Primary or Secondary School or tertiary facility including classrooms, hall and outdoor areas
Surface parking generally
Requires larger lot > 2 ha to create
1-2 storey
Typically near bus service

D2 RECREATIONAL OR CIVIC BUILDING

Council building, sports clubrooms, swimming pools, libraries.
Surface parking generally
Requires larger lot > 1ha to create
1-2 storey
Typically near bus service and main road routes and town/local centres

D3 HEALTH CENTRE/ HOSPITAL

A health centre operates in daytime hours. A hospital/ hospice will have patients staying overnight.
Surface parking generally
Requires larger lot > 2 ha to create
1-2 storey
Typically near bus service and main road routes

D4 OPEN SPACE RESERVE

DESCRIPTION
Reserves including road reserves and street spaces

D5 UTILITIES

DESCRIPTION
Public utility type structures and uses
Reserves including road reserves and street spaces

OPTIONS EVALUATION CRITERIA

LANDUSE OPTIONS EVALUATION CRITERIA APPROACH

In order to be able to evaluate the land use options a set of evaluation criteria has been developed. Those evaluation criteria are derived from the consideration of the following :

The Lumins Study Purpose

The study brief establishes a terms of reference which provides the objectives of the work , this being the focus on the land use management methods (in conjunction with insulation) that can be used to address the noise related conflicts between existing land uses (essentially residential and airport). Despite noise management being the focus, there has been some consideration given to the urban planning opportunities that may be consequent to the change in land uses that can occur in the future, especially where that relates to some of the strategic changes being proposed such as through the Airport Master Plan, and the WCC Suburban Centres review.

Guidance of ANMC

There has been a series of meeting of the Airnoise Management Committee in the process of undertaking this study. That group has provided guidance on the draft criteria which were revised as appropriate in response. The ANMC guidance has enabled the representative interests to be recognised and provided for in the criteria so that these interests can be provided for the decisions made about the appropriateness of any proposed changes in land uses.

Best Practice

The criteria being used to 'test' the options for land uses within the ANB need to reflect best practice technique for this type of study. In this case that means the criteria need to be:

- clear so that all the people with an interest in this study understand what they pertain to
- measurable as far as possible so some comparative analysis of relative fit of different options against that criteria can be made
- comprehensive so that the outcomes are robust and the objectives in respect of noise management are tested against all the right considerations for them to stand scrutiny

The criteria that will be used to test the land uses options described earlier in this report are set out and described below.

1. NOISE MITIGATION MEASURES

Benchmarks for Noise Mitigation

There are several different types of noise benchmarks to consider in evaluating the land use options for the subject area. Although different, all of the benchmarks have the common goal of seeking an acceptable internal noise environment for people living in the particular subject area.

The New Zealand Standard [NZS6805:1992] while providing a base definition for noise sensitive activities (a definition which notably has not been followed in the Wellington City District Plan) does not prescribe an ideal internal noise level. Instead, this Standard looks more closely at where noise sensitive activities are appropriate in proximal relation to airports. In particular, it prescribes projected L_{dn} contours be overlayed the subject airport, then uses these contours to prescribe what activities are appropriate, given their relative location to the airport.

The outermost contour prescribed is based on the future L_{dn} 55 dB contour and within which the Standard recommends some degree of noise mitigation is applied to manage the effects on noise sensitive activities. As the sound exposure contours increase (ie moving towards the subject airport) the Standard recommends higher standards of mitigation to a cut off at the L_{dn} 65 dB noise contour line. Past that contour (ie between the contour and the airport) the Standard recommends that noise sensitive activities are prohibited.

This Standard could not be applied fully to the Wellington scenario due to the airport being constructed within an existing built up area. This area included residential land uses immediately adjacent to what became (and are still) operational airport areas. Instead, only the L_{dn} 65 dB contour was established in the WCC District Plan (known as the ANB) and rather than prohibiting noise sensitive activities inside this contour, the associated District Plan land use rules attempt to manage the existing noise sensitive activities contained within the ANB.

Specifically, these rules attempt to ensure that ***new*** noise sensitive activities meet certain noise mitigation standards. While these standards will be described in more detail below, it is important to be aware that neither existing noise sensitive activities nor extensions to existing noise sensitive activities were subject to these rules.

NZS6805 aside, other New Zealand Standards identify and describe acceptable internal noise levels. NZS6807:1994 (also known as the Helicopter Noise Standard) notes that noise sensitive activities should deliver an internal environment of L_{dn} 40 dB. The Helicopter Noise Standard does not set a limit for existing noise sensitive activities.

NZS6809:1999 (also known as the Port Noise Standard) contemplates scenarios where noise sensitive activities are already present within a noisy environment and notes that an internal noise environment of L_{dn} 45 dB would be the upper limit of acceptability. Given that existing dwellings, particularly older buildings, are difficult to retrofit for noise mitigation, the L_{dn} 45 dB standard outlined in the Port Noise Standard is seen as a practicable approach to managing noise within existing urbanised environments.

Although L_{dn} 45 dB is not specified in the airport noise standard (as noted above), there is a general acceptance of L_{dn} 45 dB being the upper end of acceptable internal noise level, which is evidenced by its use both internationally and in other New Zealand standards (as also noted above).

This noise level (L_{dn} 45 dB) is considered to be an appropriate benchmark to adopt as the baseline measure for noise sensitivity inside the ANB. While attaining this acceptable internal noise environment of L_{dn} 45 dB inside existing dwellings is, in all but the noisiest of locations, generally achievable, insulating beyond this standard (say to L_{dn} 40 dB or less) in an existing building is a significantly more complex task. While an internal noise environment of L_{dn} 40 dB would be an 'ideal world' goal, the relative benefits of the additional noise reduction to less than L_{dn} 45 dB are difficult to justify when the scope of work and costs are considered.

Experience from other airports has also noted the issues faced with retrofitting existing houses for noise mitigation. This is known to be apparent at Auckland International Airport, where in an operative noise insulation scheme running for the last 5 years, the L_{dn} 45 dB has been used as the benchmark for improving dwelling's noise mitigation performance. In this instance, the L_{dn} 45 dB was used as the best practical option, although it is noted that home owners had the option (at their cost) of insulating beyond this level if they chose to.

The constraints of insulating to deliver an internal noise level of L_{dn} 45 dB for ***existing*** older dwellings are described above. However, for a ***new*** dwelling if specified appropriately, even the normal modern materials and building techniques can deliver an internal noise environment of L_{dn} 45 dB with ease. With relatively little additional cost further reductions in noise levels can be achieved to less than L_{dn} 45 dB.

Given the relative ease with which new dwellings can be built to achieve internal noise levels of less than L_{dn} 45 dB this is an opportunity that should be taken. This is consistent with the Helicopter Noise Standard, which notes an internal noise environment of L_{dn} 40 dB is ideal for new dwellings.

With regards to new construction, and in addition to the New Zealand Standard benchmark, there are two other broad benchmarks which could be adopted:

WCC District Plan

The Wellington City District Plan has two sets of requirements for noise management outside of the Airport Area and these are broadly reflective of either a standard residential environment, or an environment where there are known issues or potential issues with noise between different types of land uses, typically with residential being one of those. The former of these benchmarks is recognised not to be applicable in this situation - the ANB is recognition in its own right of the noise conflicts between the airport and other, predominantly residential, land uses.

In respect of the District Plan's recognition of noise conflicts there are now two types of District Plan benchmark:

- the existing ANB requirements which are described in Part 1 (rule 5.1.3.8 - any new residential dwelling inside the ANB must achieve an internal level of L_{dn} 45 dB inside any habitable room with doors and windows closed); and

- the existing requirements for Port Noise Areas and the Central Area which require the habitable rooms of buildings to be insulated to manage the effects of external sound through insulation design to the measure of $D_{nT,w} + C_{tr} > 30$dB (some noisier areas require the external facade performance at 35dB). A schedule describes the materials that would be needed to be used in building construction to achieve this measure.

In addition to these construction standards, the WCC District Plan outlines further noise mitigation measures in the form of a curfew on activities inside the Airport Area Zone. In particular, land use rules specific to this zone set limits on operation including a midnight (for domestic/1am for international flights) to 6am curfew to avoid the period when people's sleep could be most disrupted by aircraft noise. The zone also has a 'rolling average' over 90 day requirement such that the airport's operation should not result in an excess of L_{dn} 65 dB outside the ANB.

Wellington Case Law

A real Wellington example where the opportunity to deliver noise insulation to a higher standard than the District Plan (or even the various NZ Standards) is seen in the decision by the Environment Court know as the "Corrigan" case. This particular application sought resource consent for four new residential units in Ropa Lane, Maupuia, which is within the Suburban Centres Zone. This consent was granted subject to noise insulation and mechanical ventilation being used to achieve indoor noise levels of L_{dn} 40 dB, with further insulation for bedrooms designed to achieve an L_{max} of 55 dB. Step 1(b) of the Stage 1 LUMINS report contains a more detailed discussion of this case and the potential precedent it sets.

Summary of Noise Mitigation Benchmarks

To summarise the noise mitigation benchmarks, given the noise mitigation practicalities facing retrofitting existing homes relative to new construction, it is appropriate to address 'new' and 'existing' dwellings separately. The New Zealand Standards describe an appropriate internal noise environment for an existing noise sensitive activity as being L_{dn} 40 or 45 dB. The application of mitigation measures that will achieve L_{dn} 45 dB for existing dwellings will give residents a significant improvement in their internal living environment. For the most part this will not involve substantial and costly rework of the building. As new construction can more easily achieve a higher internal noise standard than retrofitting existing buildings, a standard goal for new noise sensitive activities should be L_{dn} 40 dB.

2. NOISE SENSITIVITY RISK

The noise sensitivity of each of the land use options varies and accordingly the risk of the people associated with those land uses being affected by noise will be a function of:

- the type of activity it is - the noise sensitive activities are recognised in the District Plan definitions section as being residential, hotels/motels and like type temporary accommodation, and early childhood centres
- the variations in the type of activity and the construction of the buildings associated with it - for example an increase in resident numbers through new residential multi-unit development may generate increased risk of noise issues due to more people being affected, whereas redevelopment of new, but smaller units of good construction which keeps resident population to existing levels may reduce the risk through improving the noise insulating properties of the dwelling.
- the relative noise levels that exist in that location currently, or that could potentially occur in the future based on allowances the airport has for its operation as expressed in the noise contours.

3. INSULATION COSTS

The cost of insulating existing noise sensitive activities within the ANB has been described in Part 1 of this report. As that part describes, the higher the existing noise level context and the better the objective internal noise level sought, the higher the costs to insulate.

This is also affected by the age and condition of the building in question with older buildings being more difficult to achieve effective internal noise insulation for. In brief the cost to insulate the existing residential properties to an internal noise level of L_{dn} 45 dB within the ANB is between $23 million and $28 million depending on the parameters used to cost this work.

The degree to which the insulation is effective over time will also vary - with an older building the insulation will be dependant on maintaining the insulation levels - if exterior wall cladding deteriorates for example, this will affect the insulation of the dwelling as a whole.

As a criteria the test will be the degree to which for existing noise sensitive activities it is more cost effective to insulate the existing associated building or to change that land use due to the very high cost and its potential long term effectiveness.

4. ACHIEVABILITY

The degree to which the various land use option can be reasonably expected to be achievable into the future requires consideration. There has had to be some determination of what land uses are conceivable for the subject area (the approach to identifying these is set out in earlier in this report) as a starting point so all of these are considered at least theoretically possible. However, all of the land uses identified as possible will be more or less achievable dependant on factors such as:

- land and capital values which will reflect the opportunities for change on each site
- market demand for the land use activity in the area in question - this will vary over time
- the ease with which the proposed activity can be consented bearing in mind the District Plan provisions that apply (currently)

5. TIME FRAMES SUCH AS STAGING AND SEQUENCING

Consideration needs to be given as to how to stage land use changes to achieve the best noise management outcome in the ANB. The areas where the noise levels generated from the airport are highest could be the initial focus of changes to land uses. There are potentially considerations that relate to staging that are outcomes from the Airport Master Plan also.

The timing for any land use changes or other methods for achieving the best noise management outcomes will also be coordinated with changes that are made to the District Plan.

6. ENVIRONMENTAL EFFECTS and OPPORTUNITIES

The environmental effects relate to the potential for the proposed land use options to generate potential adverse effects in their own right. The changes from currently noise sensitive activities such as residential into other land uses like businesses, large format retail, airport activities or associated car parking can generate changes in the existing environment that have effects in their own right.

Types of adverse effects from some of the options may be in relation to:

- additional or different traffic movements (such as trucks or cars)
- loss of visual amenity from larger scale buildings or car parking and/or on prominent landforms
- changes in neighbourhood or community function from loss of residential activities
- reverse sensitivity (such as from residential activities in a Suburban Centre work area)

In addition to potentially adverse environmental effects there could be opportunities to improve the existing environment (in addition to noise benefits) through new land uses that have positive environmental effects. These positive effects may come from:

- improved visual amenity by the design of the additional airport land use extensions on the Calabar Road frontage
- improved vitality within live/work centres through the introduction of residential activities where these are compatible with business
- improved residential living diversity in the area through the introduction by a resource consent process of new smaller units in less noise sensitive locations with high visual amenity/aspect
- improved accessibility options for the future through redevelopment of new transport routes (such as Bridge Street and Calabar Road) that are realised by changes in the existing residential use context.

7. DEGREE OF FIT WITH STRATEGIES

The relevant strategies associated with the subject ANB area are canvassed earlier in Part 1 of this report. These are principally the Wellington City Council strategies for the development of Suburban Centres as well as the WIAL strategy which is embodied in the (currently draft as at July 2009) Master Plan. Although peripheral other strategies of Council around intensification and transport are noted.

PART 3 | LANDUSE OPTION EVALUATION

PART 3: INTRODUCTION

Part 3 of this LUMINS report presents an evaluation of the various land use options relative to the criteria, both of which were described in Part 2. Ultimately a proposed set of land uses is recommended for the land within the ANB and an outline for implementation is provided.

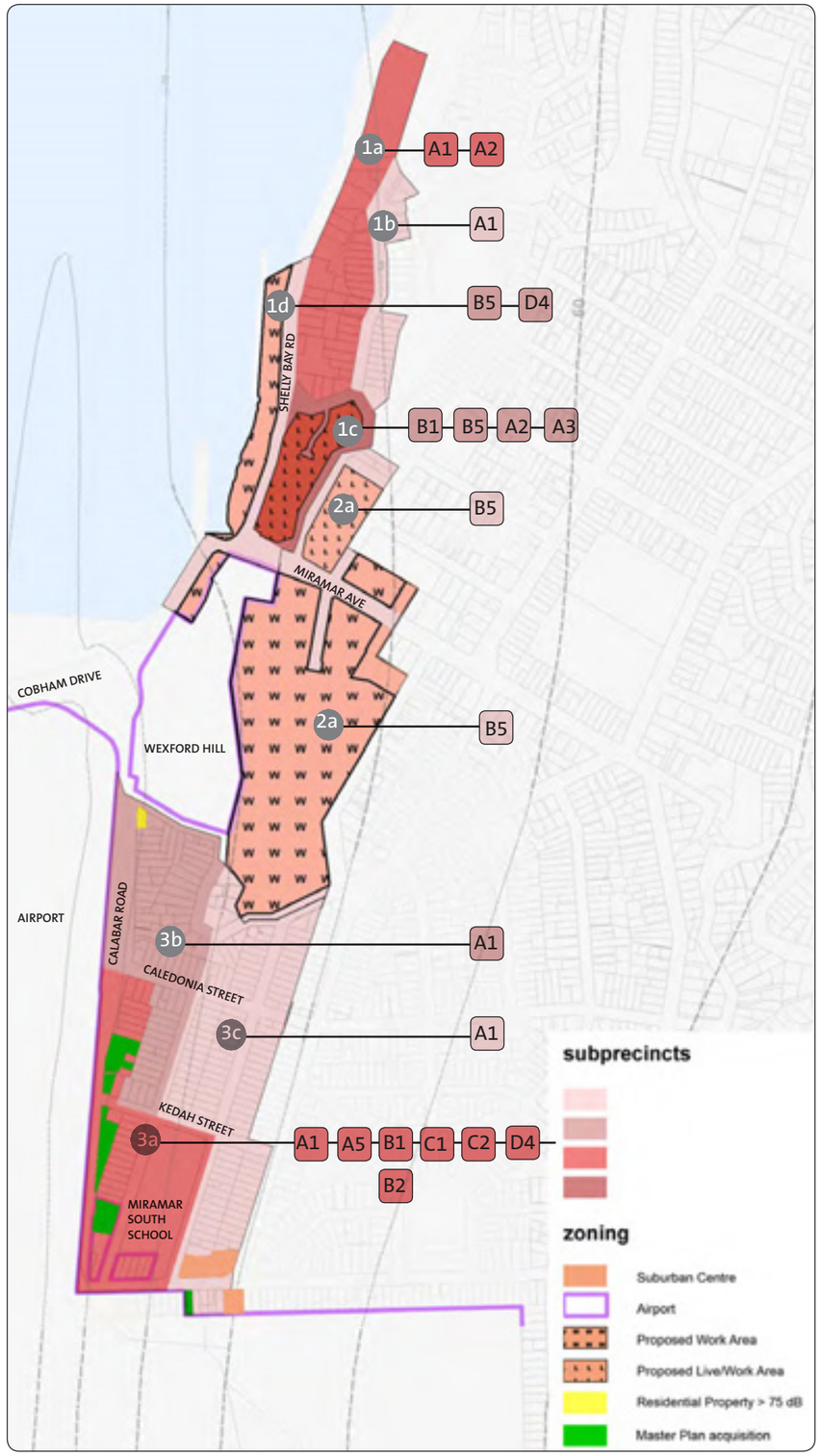
The evaluation uses the structure provided by the precincts identified in Part 1 to articulate the land use options considered. This enables the different conditions between each of the precincts to be recognised and provided for in determining the most appropriate land use options.

For each precinct a plan of the area with a reference to the land use types is used to convey either the proposed changes or proposed status quo..

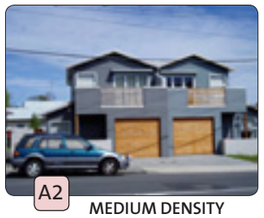
It is important to note that:

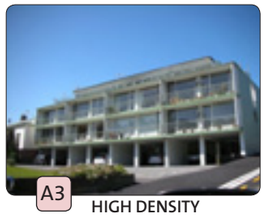
- Any proposals set out in this report for changes to land uses cannot take effect without a willing landowner - existing landowners can continue their current activities as long as they wish to. In time the proposals for changes are expected to be given effect to through the Wellington City District Plan and the outline for those proposals is noted in the implementation below. At that time there are statutory processes that are required to be followed before the land use zoning can be changed. Any landowners affected by these changes will be notified and can support or oppose such changes. The statutory processes set out under the Resource Management Act (1991) and administered by Wellington City Council will ultimately determine whether the land use zoning and associated rules will be changed. Even at that time existing uses are able to be continued until such time as owners want to change.

- Any proposals which involve the retention of existing land uses should be encouraged to insulate to prevent adverse effects from air noise. Incentives may be given to provide encouragement towards better insulation. The level of this incentive will vary depending on the location of the residential activity relative to the airport. Those closer to the airport are generally experiencing higher noise levels and thus are requiring greater costs for noise insulation which will need to be reflected in the level of incentive provided.

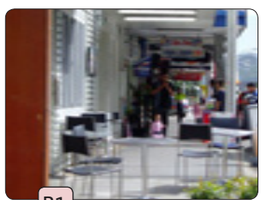



A1 SUBURBAN HOUSE

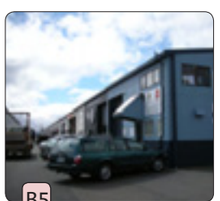

A2 MEDIUM DENSITY TOWN HOUSE

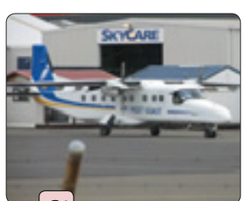

A3 HIGH DENSITY APARTMENTS


A5 HOTEL, MOTEL OR TEMPORARY VISITOR ACCOMMODATION


B1 SMALL RETAIL

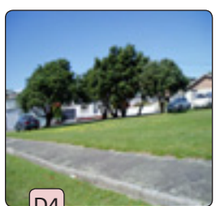

B2 LARGE FORMAT RETAIL


B5 INDUSTRIAL BUILDING



C1 AIRPORT


C2 PARKING


D4 OPEN SPACE RESERVE

PRECINCTS 1,2,3

Precinct 1,2 and 3 are located on the east side of the airport. Precinct 1 has been considered in four parts as each suggests different propensities for redevelopment involving either new types of land uses or retention of the existing land uses. Reference is made to Part 1 (which describes the existing environment) and Part 2 which describes the range of potential land uses and evaluation criteria .

Precinct 1a

The current land uses in Precinct 1a are residential. The benefit of this location for redevelopment is that contexturally there are some existing taller height buildings, larger sites and older buildings which suggests this may be a good area for redevelopment at greater density. Some sites are relatively large enabling multi-unit development. The sites to the west side are also able to gain some aspect towards Evans Bay. However, the area is within the L_{dn} 65-70 dB sound exposure range.

In considering the options for Precinct 1a continuation of the low and mid range density residential uses appears most appropriate. The change to less noise sensitive activities is unlikely to be appropriate given the access constraints for the likes of larger vehicles or increased traffic movements. The major constraint to any larger scale commercial type activities is the topography which is relatively steep combined with the potential for reverse sensitivity issues.

There is the potential for Precinct 1a to accommodate through a resource consent process higher residential density given the opportunities provided by the good west aspect from most properties in conjunction with some larger sites. The land values would suggest that the quality of redevelopment would tend to be higher (and thus construction quality and insulation effective).

There is some evidence of higher density residential development in the adjacent Precinct 1c. The Environment Court case law appears to support the use of the higher amenity location for residential development in combination with good quality construction that enables internal insulation standards to be met. However, recent WCC strategies towards residential intensification are focused around centres so a deliberate change to higher density in Precinct 1a may be seen to be at odds here.

As noted in the recommendations and implementation section of this evaluation, any changes to higher residential density should be subject to specific noise controls and design via a resource consent process - this should be consistent with the Corrigan case (35 dB facade (which gives L_{dn} 40 dB internal rooms), and further insulation to give L_{max} 55 dB internal performance for bedrooms). Consideration should also be given to changes to the ridgeline landscape that may occur from increased residential density, especially for the larger scale apartments.

Consideration was given to other forms of accommodation, such as elderly housing or visitor accommodation. However, the area is relatively isolated from facilities that would support these activities and so these are considered less suitable.

The alternative to higher density residential development for Precinct 1a is to provide insulation options to the existing landowners to enable an improved internal noise performance from the existing building. This would retain the current density of use for residential purposes and enhance the amenity of the existing dwellings. Given the noise range environment here the costs of insulation of existing buildings may also be in the lower range.

The recommendation for land uses in Precinct 1a is Land Use Options A1, and A2 in combination with both improved noise insulation District Plan rules for noise sensitive activities, as well as encouraging insulation improvements for existing residential property owners.

Precinct 1b

In Precinct 1b the current land uses are residential. The precinct does not have the same amenity as Precinct 1a in that its aspect is east facing and lots are in the smaller size range - this difference is reflected in the land values in Precinct 1b. The combination of slope, lot size, existing uses and potential reverse sensitivity effect and access suggest that this area is not suitable for less noise sensitive activities such as commercial. The most appropriate options are considered to be retention of the residential land use at the existing lower density.

The recommendation for land uses in Precinct 1b is Land Use Option A1 in combination with both improved noise insulation District Plan rules for noise sensitive activities, as well as encouraging insulation improvements for existing property owners.

Precinct 1c

The current land uses in Precinct 1c are a mix of commercial/light industrial and higher density residential, including residential apartments the consent for which was established through the "Corrigan' decision of the Environment Court. That decision addressed the issue of noise sensitive activities being increased within the ANB and found that with the appropriate insulation standards in construction (required 35 dB facade construction (giving an internal L_{dn} 40 dB performance and internal L_{max} 55 dB for bedrooms) the amenity offered by the location supported the proposed residential development at higher density.

Precinct 1c is within the area zoned Suburban Centre and this is proposed to be a live/work area that would allow for residential buildings as Discretionary Activities. Because it is within the ANB residential uses are excepted from compliance with new noise standards ($D_{nT,w} + C_{tr}$ > 30 dB) for any habitable room within the building. The current noise provisions for properties within the ANB continue to apply here.

The options for land uses considered most appropriate in Precinct 1c include the current mix of higher density forms of residential where amenity is high and commercial/light industrial activities or some greater or lesser proportion of one or the other. Consideration has been given to other land use options including visitor accommodation, elderly housing and airport related activities. However, for the latter the location is too distant from the airport to be useful for its core purposes. For other forms of residential activities as with the other Precincts 1a and 1b, this location is away from the types of supporting activities and with steep streets for access which makes it less desirable for older people.

The recommendation for land uses in Precinct 1c is Land Use Options A2, A3 and B1, B5 in combination with both improved noise insulation District Plan rules for noise sensitive activities consistent with non-ANB live/work areas, as well as encouraging insulation improvements for existing residential property owners.

Precinct 1d

Precinct 1d sits on the east edge of Evans Bay and includes the Burnham Wharf area. The current land uses are typically light industrial in nature with much of that activity relating to the wharf (at least historically). There is public amenity provided for by the wharf itself and this is a popular place for fishing from.

The area is a Suburban centre and the proposed changes to this zone would make it a work area. As with Precinct 1c the proposed new suburban centre noise management provisions are excepted here as it is within the ANB and the current ANB provisions would apply.

The coastal location and easy flat access would suggest some higher amenity opportunities for the future redevelopment of this area. However, the land is constrained in width and the current uses are likely to be incompatible with any forms of residential activity (although this could change over time). The land sits within the L_{dn} 65 to 70 dB sound exposure contour and its working nature suggests that it will continue to provide for light industrial forms of land use into the future.

The recommendation for land uses in Precinct 1d is Land Use Option B5 although the current uses for open space suggest an element of D4. The proposed provisions for noise sensitive activities consistent with non-ANB live/work areas, and work areas are recommended to apply.

Precinct 2a

Precinct 2a is a relatively simple area to address in respect of the future land use options. It is currently and consistently throughout an area that provided for work related industrial and commercial type activities. Much of the land is flat (although the west side is a steep escarpment), has larger lots and provides an economic and functional role within the city with its current uses - the work area zoning proposed for the suburban centres review supports this value in a strategic sense.

It is not contiguous with the airport and has limited potential to provide for any airport extension, but is proximate so can provide satellite services and facilities as required. The introduction of residential or noise sensitive activities would have the potential to generate reverse sensitivity issues for the current businesses operating there. The area is in lesser range of noise affected land within the ANB.

The recommendation for land uses in Precinct 2a is Land Use Option B5. The proposed provisions for noise sensitive activities consistent with non-ANB live/work areas, and work areas are recommended to apply.

Precinct 3a

Precinct 3a is predominantly residential at present with airport zone at the south end which accommodates some commercial activities. The Miramar South School is also located here. This precinct is contiguous with the airport on its west side and Calabar Road, which provides the main access to the airport, is aligned on this edge. Typically the lots are of a smaller size. This precinct is affected by higher levels of noise including some properties that experience noise beyond L_{dn} 70 dB closest to Calabar Road and the airport runway.

The general amenity of the residential properties closest to Calabar Road is further impacted on by the busy road and the topography which puts them below the airport runway level and the road itself which is most extreme at the south end. Strategically this precinct is affected by the WIAL draft airport Master Plan which proposes over time to widen the runway towards the east, which consequently requires relocating Calabar Road slightly further east and the acquisition of some of the first line of residential properties at the south end particularly.

The opportunities this presents (not overlooking the effects on existing residents which are recognised) is to not only improve the airport's operation, but to improve the amenity of this main access to the airport through the treatment of the landscape around the realigned road.

In respect of future land uses in Precinct 3a the residential uses are considered to remain appropriate for those areas which are not in the noisiest locations. This is a large area of residential properties and it can be expected that over time gradual change will occur as people improve the buildings through alterations and additions. The conditions (aspect, larger lot size, values) that may encourage large scale multi-units redevelopment appear not to be present, although again this may change over time as many of the existing buildings are of an older age (1910-20).

The location of the area close to the airport and its flat topography suggests opportunities for the airport's needs to be met through some use extending into this Precinct (as reflected in the Master Plan). The commercial opportunity potential (either as part of the airport function or independently) also seems a reasonable fit with the current node of commercial activities in this location on the west end of Broadway. There is some evidence currently of changing residential land uses to service type commercial activities (eg rental cars) in this location. There is some question as to how to best manage this transition in land uses at this airport interface. Communication with existing private and other land owners will be important and some certainty as to the future and timing will need to be given consideration to.

Options from a land use planning point of view are to extend the current Airport zone , or to leave the current zoning in place and continue to manage the area as residential with the airport proposals in the background. It is considered that for the certainty of people in the area generally, the affected parties and for more effective decision making by Council land use planning that rezoning this area for Airport would be appropriate. There will need to be discussion with Council about this and the timing of the process in due course.

As noted above the proposed area for Airport activities is a significant one for the city in the sense of this being the "front door" to the city for many visitors. It is considered appropriate that consideration is given to the way in which any new use of this area, including proposed roading changes, will enable a high quality environment to result, such as through an appropriate set of urban design requirements.

The recommendation for land uses in Precinct 3a is Land Use Options A1, A5, B1, B2, C1, C2 and D4 in combination with both improved noise insulation District Plan rules for noise sensitive activities, as well as encouraging insulation improvements for existing residential property owners. It is further recommended that those residential properties which are within the > L_{dn} 75 dB sound exposure contour are acquired and decommissioned from residential use. The school and preschool are noise sensitive activities and given their location within the ANB should be insulated.

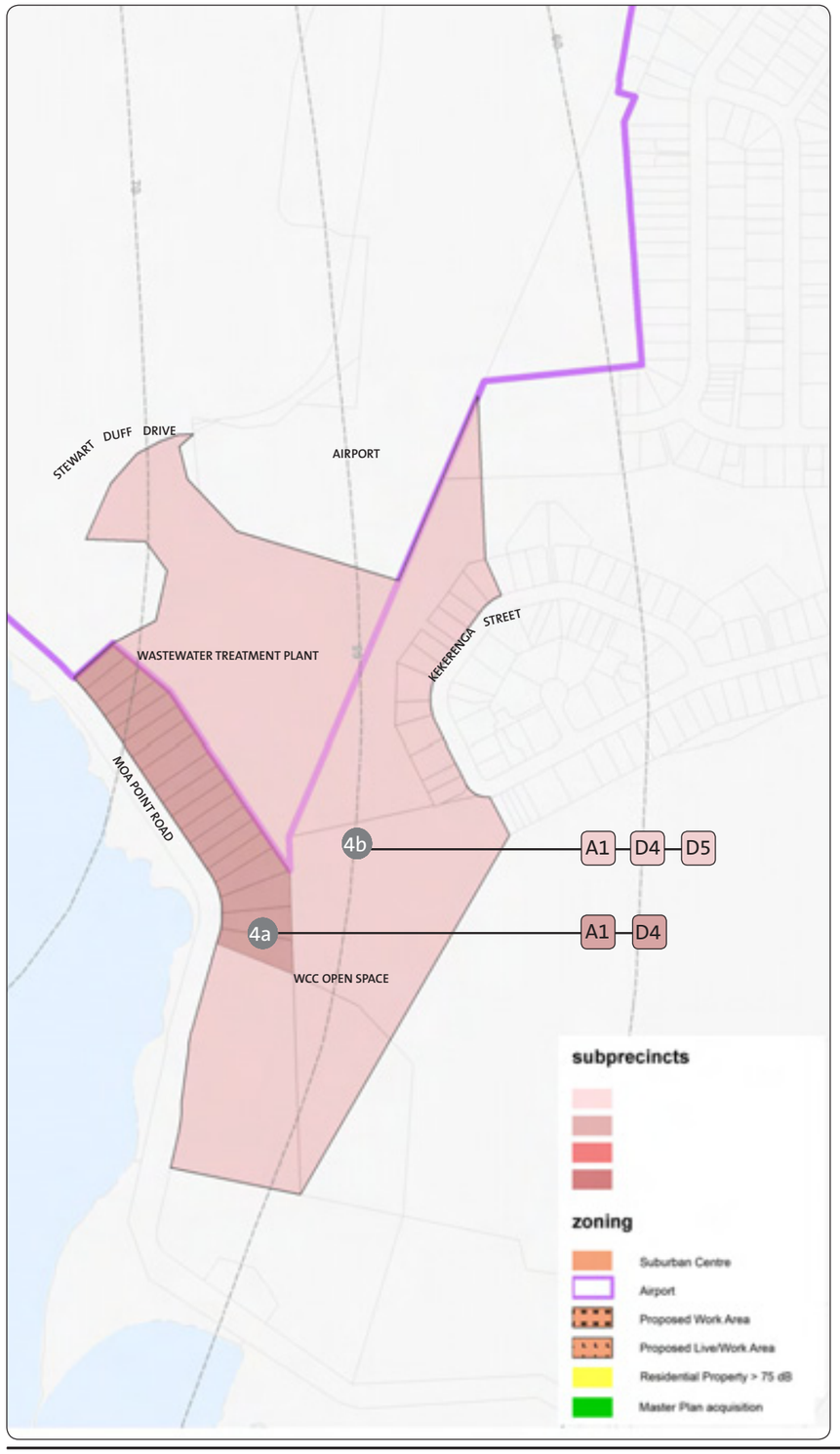
It is also recommended that the land required by the airport for the draft Master Plan is rezoned to Airport.

Precincts 3b and 3c

The current land uses in Precincts 3b and 3c are residential and the main distinction between the two are the topography which is higher in 3b with some residential properties enjoying a good west aspect; and the sound exposure levels that apply. There are some of the higher noise levels in the ANB in Precinct 3b including one property with greater than L_{dn} 75 dB, whereas generally they are in the L_{dn} 65-70 dB sound exposure range in Precinct 3c.

In common with Precinct 3a the residential conditions are similar and the expectation is that the current suburban housing density will remain into the foreseeable future for the most part. The current lot sizes, the comprehensive nature of the residential uses and the values in the area do not suggest any major redevelopment will occur for either alternative land uses or the residential high density alteratives. There remains a need to consider the appropriate ways to manage noise for the area given its proximity to the airport and for those properties (there is at least one in Precinct 3b) in the range > L_{dn} 75 dB decommissioning for residential purposes may need to be considered.

The recommendation for land uses in Precincts 3b and 3c is Land Use Option A1 in combination with both improved noise insulation District Plan rules for noise sensitive activities, as well as encouraging insulation improvements for existing property owners. It is further recommended that those residential properties which are within the > L_{dn} 75 dBA sound exposure contour are acquired and decommissioned for residential uses.



SUBURBAN HOUSE

OPEN SPACE

UTILITY

PRECINCT 4

Precinct 4 is located at the south end of the airport and has been considered as two parts. Reference is made to Part 1 (which describes the existing environment) and Part 2 which describes the range of potential land uses and evaluation criteria.

Precinct 4a

The current land uses in precinct 4a are residential. This is a discrete area of properties that sits at the base of the coastal escarpment and has good south coastal views and west aspect to sun. The open space values of the escarpment and the coastal strip are also a feature.

Because of the amenity the coastal location provides there can be some reasonable expectation of owners towards alterations and additions to these properties. There is some evidence of this currently which may well be a combination of the increased desirability coupled with the older age of the properties and their exposure to extreme weather conditions. Council is initiating protection for the coastal escarpment which is likely to limit the potential for development up this face which would otherwise provide potential for residential expansion in this precinct.

Sound exposure is in the L_{dn} 65-70 dB range, with those properties furthest to the west most affected. The draft Airport Master Plan shows a possible runway extension which would presumably alter the noise profile in this area bringing aircraft in closer proximity to this precinct.

The options for land uses in this location could include extensions to the contiguous utility (wastewater treatment plant), although there is no known need for such an extension. The land parcel sizes and the sloping nature of the site suggest the area has limited potential for commercial or industrial activities. This is location also has coastal landscape values which would suggest that large scale development would be challenged.

In general it is considered that the existing residential use is likely to be the most appropriate form of activity for the foreseeable future. It may be desirable to consider the implications for any runway extensions from the Master Plan for the noise environment of these properties.

The recommendation for land uses in Precinct 4a is Land Use Option A1, D4 in combination with both improved noise insulation District Plan rules for noise sensitive activities, as well as encouraging insulation improvements for existing residential property owners.

Precinct 4b

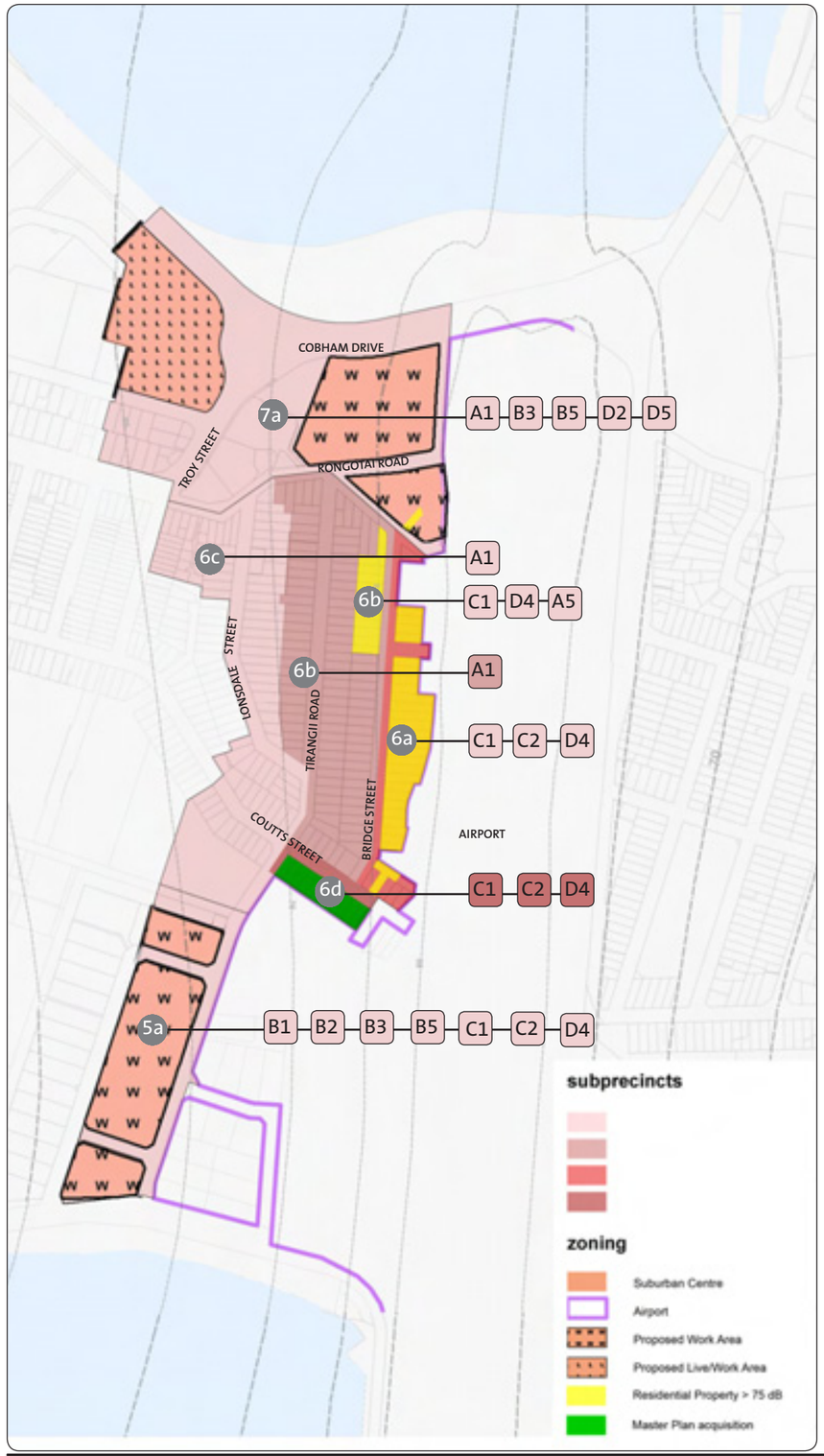
Precinct 4b is dominated by the wastewater treatment utility activity and the Wellington City Council owned open space. There is an enclave of residential activity on the hill top. These residential properties are of a 1960s era and tend to be within mid to low range of value.

They are within the L_{dn} 65-70 dB range within the noise contours. The location of these properties is dislocated from the airport and flat land of Miramar topographically as well as from an accessibility point of view.

There are few options from a land use point of view within this precinct aside from those that currently exist.

Although there would potentially be some benefit to the open space and landscape values of the escarpment from their acquisition by Council for open space, this is untenable and unwarranted.

The recommendation for land uses in Precinct 4b is Land Use Option A1, D4 and D5 in combination with both improved noise insulation District Plan rules for noise sensitive activities, as well as encouraging insulation improvements for existing residential property owners.




A1 SUBURBAN HOUSE


A5 HOTEL, MOTEL OR TEMPORARY VISITOR ACCOMMODATION


B1 SMALL RETAIL


B2 LARGE FORMAT RETAIL


B3 OFFICE BUILDING


B5 INDUSTRIAL BUILDING


C1 AIRPORT


C2 PARKING


D2 RECREATIONAL OR CIVIC BUILDING


D4 OPEN SPACE RESERVES


D5 UTILITY

PRECINCTS 5,6,7

Precincts 5,6 and 7 are located on the west side of the airport. Reference is made to Part 1 (which describes the existing environment) and Part 2 which describes the range of potential land uses and evaluation criteria.

Precinct 5a

Precinct 5a is located at the south end of the airport and adjoins the Airport zone. The area has traditionally had industrial uses and the built environment is relatively large scale in terms of building footprints and the quality of the public amenity in respect of streets and public space is low. The amenity of the adjacent south Coast (Lyall Bay) is high. There are some constraints for traffic movements to this area from the State Highway network and arterial roads.

The flatness of the area, its relationship to the south coast, its large lot sizes and location relative to the airport suggest a range of potential future land uses. There is evidence of new large format retail activities in the land to the east and there are known proposals for increasing the retail development within this precinct by current landowners/lessees.

Sound exposure is in the L_{dn} 60 - 70 dB range. Strategically the area has been identified as a work area by Wellington City Council in its Suburban Centres review. This would allow for residential uses as Discretionary Activities. Because it is within the ANB residential uses are excepted from compliance with new noise standards ($D_{nT,w} + C_{tr} > 30$ dB) for any habitable room within the building. The current noise provisions for properties within the ANB continue to apply here. The WIAL draft Master Plan suggests some commercial development within the precinct in the future.

In considering the potential land uses for this precinct the potential for residential activities appears limited, although possibly visitor accommodation close to the coast, or higher residential density would be conceivable. The challenge for these forms of land use will be getting close enough to the coast to benefit from the amenity it provides to balance the 'robustness' of the old industrial legacy in the rest of the precinct. Although this could change over time, the move to large format retail is unlikely to be conducive to encouraging quality residential (including visitor accommodation) if the new retail follows the nature of that recently added to the area. Given the challenges to residential in this location from the work area zoning and the above factors, the most appropriate future use appears to be business - probably retail, office and the current industrial with possibly airport related activities also. Car parking associated with these activities is also likely. The work area zoning proposed for this precinct will attempt to manage the scale of retail activities and their effects, such as for transport and traffic movements, as well as urban design considerations.

These types of commercial activities will present low risks for noise conflicts. However, the potential for improved public amenity from these forms of uses will be less likely to be achieved than that of a mixed use approach.

The recommendation for land uses in Precinct 5a is Land Use Options B1, B2, B3, B5 and C1, C2 and D4. The proposed provisions for noise sensitive activities consistent with non-ANB live/work areas, and work areas are recommended to apply.

Precinct 6a

Precinct 6a sits immediately contiguous with the west side of the airport. The land uses here are residential with generally older houses, small sites and a relatively flat topography. These properties are all within the high range of sound exposure within the ANB being > L_{dn} 75 dB. Bridge Street itself is used as a transport route from the State Highway 1 and work areas of Precinct 7 through to Rongotai.

The WIAL draft Master Plan identifies these Precinct 6a properties for use as car parking - many of the properties are already in WIAL ownership.

The options for these properties in terms of land uses are particularly constrained by the high noise levels. There are also constraints given the height restrictions associated with the Control Tower and the Obstacle Limitation Surface (OLS). The high noise level effectively eliminate any continued use for residential activities. The adjacency to the airport provides a good opportunity for the airport to take over these residential properties for its own operations. Care will be needed with the way in which this Precinct is transitioned to ensure that the opposite residential properties on Bridge Street are not adversely affected by the change in use. Although the airport has signalled the land's use for car parking there are potential visual and increased traffic effects to be considered.

The potential for the land to accommodate office type activities or commercial activities could be considered appropriate, although this should be considered relative to the future of Precinct 6b as discussed below. In conjunction with the removal of a substantial number of residential uses from Bridge Street there is also opportunity to consider the development of this street as a redesigned higher volume transport route from the north to the south of Rongotai - this would require new connections to be made at the north end to Cobham Drive and for the south end link geometry to Tirangi Road to be determined. As discussed below there are implications for Precinct 6b from such a change.

The recommendation for land uses in Precinct 6a is Land Use Options C1, C2 and D4 with the potential in the future for "B" types. It is recommended that those residential properties which are within the > L_{dn} 75 dB sound exposure contour are acquired and decommissioned for residential uses.

It is also recommended that the land required by the airport for the draft Master Plan is rezoned to Airport.

Precincts 6b and 6c

The properties in Precincts 6b and 6c are similar in that they are typically on the east facing slopes of the ridge that separates the airport from Kilbirnie. A small number of properties in Precinct 6c are over the ridge facing west to Kilbirnie.

The properties are predominantly residential and the site sizes building types and values reflect this. The noise levels are highest in Precinct 6b where it adjoins Bridge Street and there is a group of properties at the north end which are in the > L_{dn} 75 dB sound exposure contour.

As noted in the evaluation of Precinct 6a the properties on Bridge Street have a lower level of amenity than the residential properties that are high in elevation or in a less shaded location.

The topography is a limiting factor for any larger scale commercial activities and these would also generate adverse effects for the residential amenity of the area. However, on the lower land on Bridge Street itself there is the potential to consider in the longer term the transition to commercial activities with visitor accommodation that would conceptually link the north and south work areas via an improved Bridge Street road design to connect at each end to the highway in the north and local road network in the south. This would address the higher noise levels that exist for the properties on both sides of Bridge Street.

For the residential properties higher up the slope, especially those over the ridge facing Kilbirnie there is a good aspect and potential over time for incremental property redevelopment for the existing residential purposes. However, on the higher properties there are relatively high sound exposure levels shown within the ANB.

There are no particular strategic influences from WIAL or Wellington City Council for the subject precincts.

The recommendation for land uses in Precincts 6b and 6c is Land Use Option A1 in combination with both improved noise insulation District Plan rules for noise sensitive activities, as well as encouraging insulation improvements for existing property owners. It is further recommended that those residential properties which are within the L_{dn} 75 dB sound exposure contour are decommissioned from residential uses.

Precinct 6d

Precinct 6d is a small area contiguous with the airport. The potential future uses are airport and or commercial related activities. The WIAL draft Master Plan shows these properties (about half of which are owned by WIAL) as transitioning to airport related uses. To facilitate this change, as with Precinct 6a and on the other side of the airport in Precinct 3a, the options are to recognise this by a change of zone to Airport. Alternatively the zone remains as residential and residential development will need to managed using noise standards (to limit future residential development). Whichever path is chosen the expectation is WIAL will eventually acquire these properties on a willing seller basis.

This management option is not considered as appropriate as an Airport zone type as the residential zoning will provide less effective guidance for the management of non -residential activities for location such as this. There are recognised potential effects for the existing residential landowners in this precinct from such a change of use and the effects on the other residential properties in the area will also need to be considered.

Provided the noise generating characteristics of any new activity in this precinct are not increased then the noise impacts for the wider residential area from the change of use should not increase. The effects in terms of the scale of building development and the associated movement of traffic will need to be considered in any rezoning proposal and the associated urban design requirements.

The recommendation for land uses in Precinct 6d is Land Use Options C1, C2 and D4 with the potential in the future for "B" types. It is recommended that those residential properties which are within the > L_{dn} 75 dB noise contour are acquired and decommissioned from residential uses.

It is also recommended that the land required by the airport for the Master Plan is rezoned to Airport.

Precinct 7a

Precinct 7a at the north end of the ANB and is predominantly a Suburban Centre and moving to live/work for the western area and work area on the eastern area side closest to the airport under the zone review. There is an area of residential and community services (fire station) within. The land is flat topographically and at its north side adjoins to Cobham Drive where there is an outlook to Evans Bay. The lot sizes are typically large except for the residential uses.

A large area in the west corner is playing field although it has a Suburban Centre zoning (moving to live/work area) and is earmarked for a new indoor sports stadium. This stadium will occupy all of the area within the ANB of this western most Suburban Centre effectively eliminating the noise sensitivity of this part of the Precinct.

Strategically the expectation from the zoning review is that the area closest the airport would retain its current uses as a light industry/commercial enclave. The area which is towards Kilbirnie may move to a mixed use of living and working type activities. Only part of this western most live/work area is within the ANB.

The high noise levels in the area of Precinct 7a close to the airport suggests that the current uses are appropriate and should continue. As noted above for the Precinct 6 there is the opportunity to connect this area to the south via a new Bridge Street link which may best connect through Precinct 7a to Cobham Drive, potentially via Tacy Street or the existing roundabout.

The western most part of Precinct 7a contains residential activities currently and these are expected to remain. However, the option of these properties transitioning to some other form of use of a commercial nature is possible as they may be affected by the proposed indoor stadium and the 'zone of influence' this generates. The current zone is residential for these residential properties and a change to a more commercially friendly zone would be expected to precede any major shift in land uses here.

The recommendation for land uses in Precinct 7a is Land Use Options A1 for the existing residential properties, B3 and B5 as well as recognition of the community facilities with type D2 (stadium) and D5 (fire station) in combination with both improved noise insulation District Plan rules for noise sensitive activities, as well as encouraging insulation improvements for existing property owners.

IMPLEMENTATION ACTIONS

The recommendations for land use changes and management from the evaluation form the primary direction for actions from LUMINS. To implement these directions for change there are a range of measures proposed. These are interlinked and will require detailed consideration and interaction with other parties - especially Wellington City Council. An outline of the implementation measures and strategy behind these is set out below.

Alignment with Strategies and Plan Changes

There are several concurrent Wellington City Council urban planning strategies and specific District Plan changes in train in parallel with LUMINS. The residential development and suburban centre District Plan changes are particularly relevant for consideration. Consideration should be given to:

- the retention and support for the proposed Suburban Centre policy for noise management in live/work areas where some residential development is considered appropriate (Precinct 1c)
- consideration as to the application of the proposed Suburban Centre review noise standard ($D_{nT,w} + C_{tr} > 30/35$ dB) as a more appropriate basis for all new noise sensitive activities within the ANB (see comment below)
- recognition in the Residential Area review (or a subsequent Plan Change process) of the need to manage noise standards for alterations and additions that add new habitable rooms
- recognition in the Residential Area review (or a subsequent Plan Change process) of the need to improve the definition of noise sensitive activities to better reflect the actual situation
- the specific design guidelines for the Residential Area review responding to the particular noise generating issues within the ANB and other noise sensitive locations (they mention noise sensitive internal areas, but perhaps could add external spaces too?)
- rezoning by Plan Changes for the current Residential Areas (Precinct 6a, 6d and part of 3a) to Airport to recognise the WIAL Master Plan.

District Plan Noise Standards - New Development

There are two different types of noise insulation standards that apply in the District Plan - that which applies within the Port Noise Affected Area and Central Area and is proposed for Suburban Centres as part of the review ($D_{nT,w} + C_{tr} > 30/35$ dB as noted above); and those which specify internal noise criteria for habitable rooms in the Residential Areas

There is an opportunity for new buildings and alteration and additions to be insulated to a higher standard and accordingly there is some sense in applying $D_{nT,w}$ standards across the Residential Area overlaid by the ANB (as well as the Suburban Centres) for any new noise sensitive activity (this includes by definition dwellings - see also note above) as this enables the construction to be appropriate to obtain an internal noise at L_{dn} 40 dB within a new dwelling, assuming the external noise is no greater than L_{dn} 75 dB. The aim remains to obtain the healthy internal noise standard, but the means to achieving this is clearer with the $D_{nT,w}$ approach in combination with the internal noise requirement. There may be a need to consider an additional L_{max} internal level for bedroom spaces to recognise that maximum noise above 55 dB may cause sleep disturbance (this was the approach adopted in the Corrigan case).

High Noise Locations

There are several locations where the sound exposure exceeds L_{dn} 75 dB. These are marked in yellow on the figures for each precinct (Precincts 4a, 6a, 3a). For these properties effective insulation to an internal level for existing residential buildings will be difficult to achieve. It is recommended that these properties are purchased in time and their residential use be terminated.

Insulation of Existing Noise Sensitive Activities

There remains the need to address the impact of sleep disturbance and amenity for residents of existing dwellings, and internal educational facilities inside the ANB. It is recognised that given the practicalities facing retrofitting existing homes, L_{dn} 45 dB is an acceptable internal standard. In general the recommendations for land use are that the existing Residential Areas would remain in use as such, except for the high noise locations as described above. The costs for insulating existing residential properties within the ANB to L_{dn} 45 dB have been estimated at between $23 and $28 million (not including acquisition of the very noisiest properties which is an additional $11.7 million).

Where properties within the ANB are in the less noisy locations there is better potential for insulation in a cost effective way. For those properties for which insulation is an option to mitigate airport generated noise effects it is recommended that a strategy for insulation be developed that:

- provides a scaled package for insulation which is reflective of the noise conditions that are projected for the future
- is strategically linked to the current Government energy efficiency insulation package
- considers some form of incentive to property owners undertaking additions and alteration of habitable rooms, or new dwellings to meet higher standards of acoustic insulation
- is administratively linked to Council Building Consent processes to enable records to be kept for LIM reports
- reflects in the timing of its implementation any District Plan change process
- is communicated overtly to all existing residential landowners as well as other noise sensitive activities as defined by the District Plan
- provides for insulation of educational facilities to an internal standard of L_{dn} 40 dB

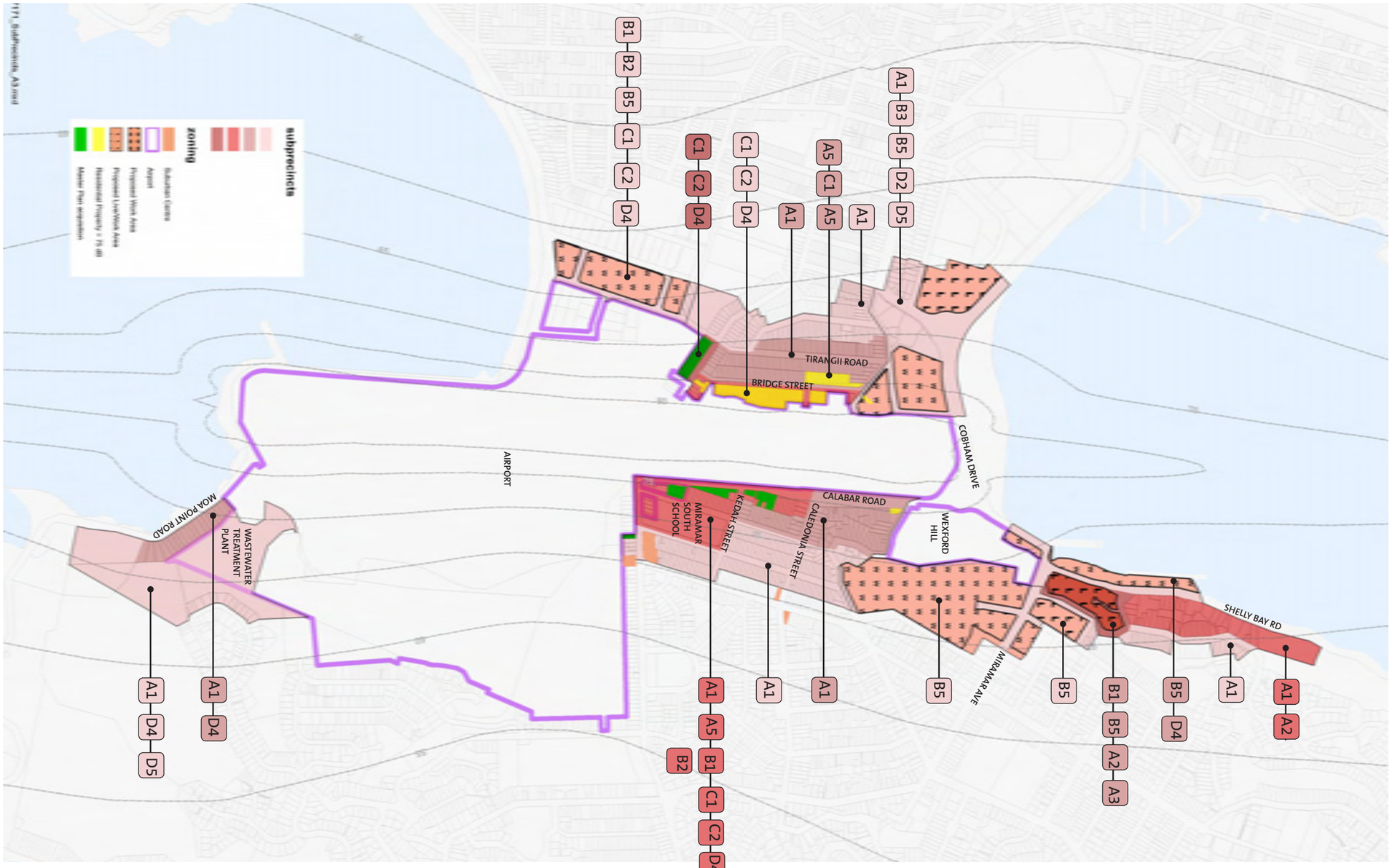
Airport Zone Changes

A key implementation method for the strategic direction for the airport as embodied in the Master Plan is the District Plan. It is recommended that for the areas shown for the airport extension that changes to the current Airport zone footprint are sought together with appropriate provisions to manage the effects of the Master Plan development proposed. The recommendation set out for the various precincts recognise that as part of such a rezoning some specific urban design qualities will need to be sought and these to can be provided for by way of an outline concept to accompany the zone changes together with some specific design guidance.

Multi-agency involvement and investment

There are two principal locations where there is an opportunity for change to the currently public infrastructure to benefit the city. These are the road connections either side of the airport. On the west side there is the potential to provide an improved north/south link between Cobham Drive and Rongotai by utilising Bridge Street. This would require property acquisition at the north end and Wellington City Council, New Zealand Transport Agency (Cobham Drive being State Highway) and WIAL involvement to advance with a collective approach.

On the east side the current issues of transport access to the airport can be improved through the redevelopment of the land in Precinct 3a in conjunction with redevelopment of the road carriageway for improved modal function (ie road, plus bus, cycle) and amenity. As the first and last experience of the city for many visitors to Wellington this road has poor visual amenity and can be significantly enhanced. As on the east side, this will require Wellington City Council, New Zealand Transport Agency (Cobham Drive being State Highway) and WIAL involvement to advance with a collective approach. This will need to be considered in conjunction with planning for the remainder of Precinct 3a and any extension in Airport zone as described above.



A1 SUBURBAN HOUSE

A2 MEDIUM DENSITY TOWN HOUSE

A3 HIGH DENSITY APARTMENTS

A5 HOTEL, MOTEL OR TEMPORARY VISITOR ACCOMMODATION

B1 SMALL RETAIL

B2 LARGE FORMAT RETAIL

B3 OFFICE BUILDING

B5 INDUSTRIAL BUILDING

C1 AIRPORT

C2 PARKING

D2 RECREATIONAL OR CIVIC BUILDING

D4 OPEN SPACE RESERVES

D5 UTILITY

COMPOSITE LAND USES OPTIONS PLAN

GLOSSARY OF NOISE TERMS

dB A measurement of sound level which has its frequency characteristics modified by a filter (an A-weighted filter so as to more closely approximate the frequency bias of the human ear).

L_{eq} The time averaged sound level (on a log/energy basis) over the measurement period (normally A-weighted).

L_{dn} The day-night sound level which is calculated from the 24 hour L_{eq} with a 10 dB penalty applied to the night-time (2200-0700 hours) Leq (normally A-weighted).

L_{max} The maximum sound level recorded during the measurement period (normally A-weighted).

$D_{nT,w} + C_{tr}$ The standardised level difference (outdoor to indoor) and is a measure of the airborne sound insulation provided by the external building envelope (including windows, walls, ceilings and floors where appropriate)

REFERENCES

LUMINS Stage 1 Summary Report

Colmar Brunton, (2008). "Wellington International Airport Sound Abatement Survey."

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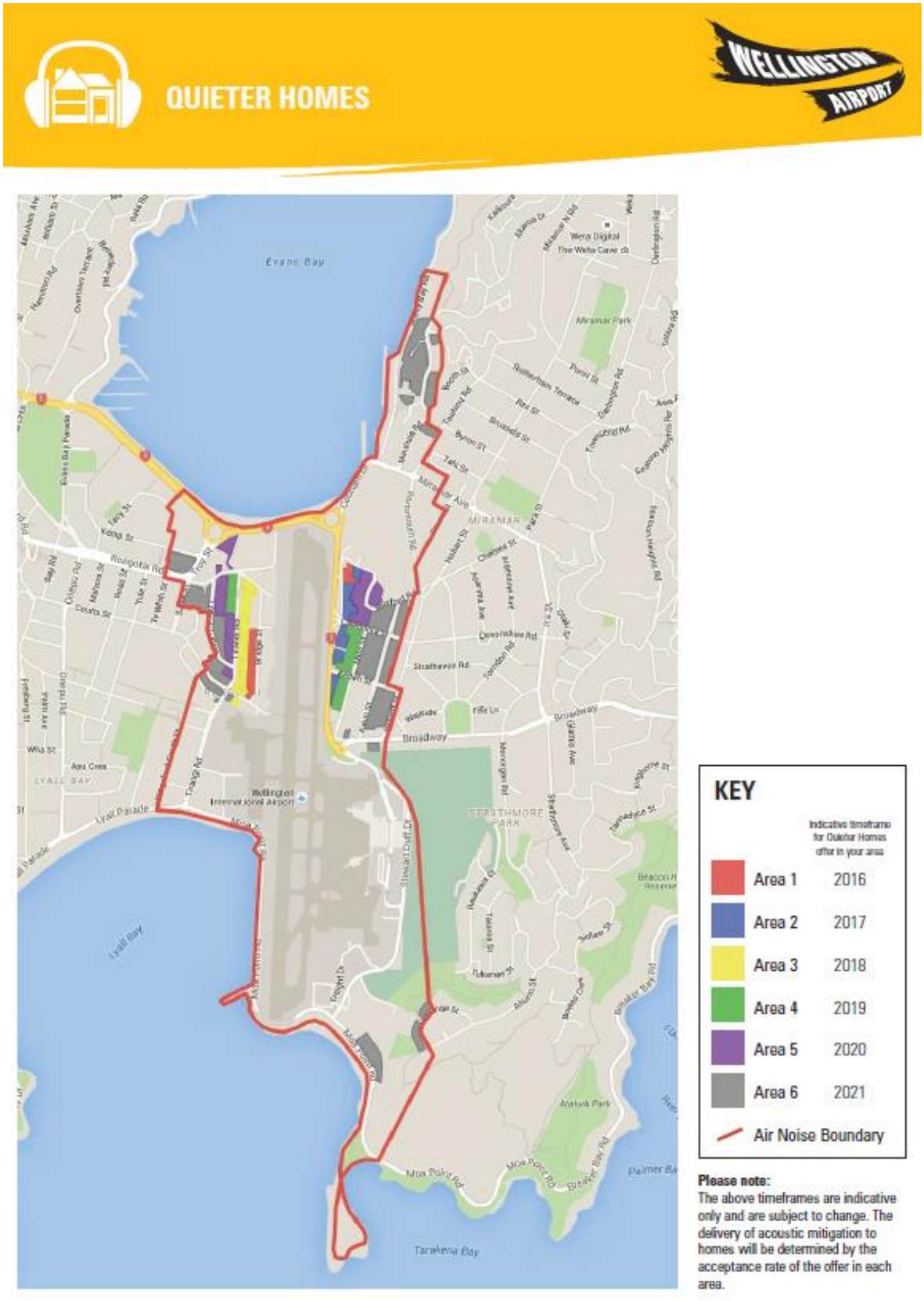
New Zealand Standard 6805:1992. Airport Noise Management and Land Use Planning

New Zealand Standard 6807:1994. Noise Management and Land Use Planning for Helicopter Landing Areas

New Zealand Standard 6809:1999. Acoustics - Port Noise Management and Land Use Planning

5.3 Quieter Homes Phased Roll Out (by area)



PART D

Review and Consultation Procedures

NOISE MANAGEMENT PLAN: MONITORING & REVIEW

The 1997 Environment Court Consent Order and the Wellington City Council District Plan require that the Noise Management Plan (NMP) includes procedures for it's ongoing monitoring and review. Accordingly these are set out below.

The Wellington Air Noise Management Committee (ANMC) is the body primarily responsible for the NMP. However the day to day upkeep of the NMP is delegated to the Airport Planner at WIAL.

The Airport Planner shall be responsible for ensuring the NMP is kept up to date with decisions of the ANMC, changes in legislation, standards etc. Accumulated changes shall be disseminated quarterly to all holders of the NMP, and recorded in the changes register, held in the Master Copy of the NMP.

Any changes to the District Plan that necessitate major changes to the Noise Management Plan may constitute grounds for a complete review and restructure.

A thorough review of the NMP including all changes made shall be carried out once every 5 years. This will determine the effectiveness of the NMP in meeting principally District Plan Objective 10.2.5 and Policy 10.2.5.4 (from which the NMP is derived), and also ensure that the cumulative effect of incremental changes does not result in a significant deviation from the NMP's core purpose.

The 5 yearly review shall be carried out by an independent body, under the direction of the ANMC.

2. Wellington ANMC Terms of Reference

Mission

As a partnership between airport, operators, and the local community, provide assistance and advice to WIAL in its preparation and implementation of a noise management plan for Wellington Airport that will assist the relevant parties in complying with the objectives and rules of the District Plan.

Principal Roles

Monitor the aviation industry's compliance with the rules as contained within the Wellington City District Plan, and other regulatory instruments.

Monitor WIALs compliance with the rules of the District Plan and the regulatory agencies' enforcement regime.

Provide an open and consultative forum for:

- Exchange of information between parties
- Discussion and recommendations on requests for exemptions/waivers

WIAL will consult the Committee on:

- Acceptable protocols for measuring and reporting noise impact, including complaints procedure
- Mechanisms for reducing or mitigating the adverse effects of airport noise
- Specifications, selection and location of noise monitoring equipment
- Best practice from overseas jurisdictions

In support of these roles -

WIAL will provide:

- Secretarial and support services
- Updated activity reports on aircraft movements, curfew etc
- Updated reports on system quality checks
- Technical reports on system development
- List of complaints and correspondence

WCC/WIAL:
Updated noise exposure reports from the noise monitoring system in a manner which is readily understood by outside observers

Aircraft operators will provide:
Updated activity reports on engine testing

Residents' representatives will provide:

- List of related correspondence and complaints which arise through their networks
- Communication of Committee decisions through their networks as required.

Airways Corporation New Zealand will provide:
Information and advice on the Air Traffic Services, and aircraft operations

All parties will provide:
Information gathered through networks on relevant best practice in overseas airports

A technical working group/subcommittee ~~is~~ may be established to work on and report to the main committee on technical issues.

Membership

- Residents' representatives [FOUR]
- BARNZ
- Local non-BARNZ operators
- ACNZ
- WIAL
- WCC
- Technical advisor
- NZ Defence

Residents' representatives

Length of term: Three years*

* Term to align with Local Government election cycle

Representation areas (refer Figure 1)

- Air Noise Boundary east – ONE Residents' representative
- Air Noise Boundary west – ONE Residents' representative
- Wider airport community (WCC Eastern Ward) – TWO Residents' representatives

Call for nominations for representative(s) from each of the above areas:

- Advertise for nominations
  - Public notice in Cook Strait News and Dominion Post
- Letter to all current Community Associations
- Nomination form and election procedure made available on WIAL website

Election procedure (where more than FOUR nominations are received):

- Postal vote to WCC Eastern Ward residents
- WCC Returning Officer appointed in accordance with WCC electoral policy

Representative attendance policy:

- The Representatives are required to attend scheduled meetings of the committee
- After three consecutive absences a Representative is considered to have resigned from the Committee, unless the Committee finds extenuating circumstances.
- Where there are fewer than THREE Representatives on the Committee, the next highest polling nominee will be appointed to the Committee.

Quorum

Representatives from:

- Residents
- WIAL
- BARNZ
- WCC

Method of conducting business

The Committee has an objective to reach consensus on issues, but dissenting views will be recorded.

Where issues fall within the jurisdiction of a particular organisation with the responsibility to make the final decision, it shall do so. For other matters where no particular organisation has the mandate to make the final decision the Chairperson shall determine whether consensus has been reached and any dissenting views shall be recorded.

Figure 1: ANMC Residents' Representation areas

Air Noise Boundary east

Air Noise Boundary west

Wider airport community (WCC Eastern Ward)

WELLINGTON AIR NOISE MANAGEMENT COMMITTEE

DISPUTES RESOLUTION

Wellington International Airport Limited (WIAL) is committed to a process whereby differences between the parties represented on the Air Noise Management Committee are resolved within the Committee through the provision of information, analysis, consultation and the development of a consensus.

WIAL recognises however that there may be occasions where a consensus does not emerge in an area where a decision is required. In the first instance the difference will be noted, but, if in the view of the Committee it is essential to resolve the difference the following applies:

1. WIAL accepts that it is the prerogative of the Chairperson of the Wellington Air Noise Management Committee (WANMC) to determine that a point of difference exists and that the Chair may endeavour to resolve the issue within the Committee acting as mediator.

2. To facilitate mediation WIAL will provide the Chair at its cost with whatever information and advice the Chair considers is reasonably necessary including if required a legal opinion on the issue or aspects of it, on the basis that the information and advice will be made available to the members of the WANMC.

3. If despite best efforts (including independent mediation if the Chairperson so chooses) a consensus cannot be reached within the WANMC, the appropriate body making the decision will consider any recommendation on the issue in dispute that the Chairperson may make and will formally advise the Chairperson within 10 working days of its decision in respect of any such recommendation and the reasons for its decision.

Appendices

1. The Language of International Civil Aviation (ICAO)
    - 1.1 Aircraft noise
    - 1.2 Environmental issues in civil aviation

2. ICAO International Standards and Recommended Practices: Environmental Protection: Aircraft Noise (Annex 16)

   http://cockpitdata.com/Software/ICAO%20Annex%2016%20Volume%201

3. Airports Council International (ACI) Policy Handbook

   http://www.aci.aero/Publications/Full-Publications-Listing/ACI-Policy-and-Recommended-Practices-Handbook-8th-edition-2016

4. Resource Management Act 1991

   http://www.legislation.govt.nz/act/public/1991/0069/latest/DLM230265.html
    - 4.1 s16 Duty to avoid unreasonable noise
    - 4.2 s31 Functions of territorial authorities under this Act
    - 4.3 s338 Offences against this Act
    - 4.4 s9 Restrictions on use of land

5. New Zealand Standards (only included in Master Copy)
    - 5.1 NZS6801:1991 Measurement of Sound
    - 5.2 NZS6805:1992 Airport Noise Management and Land Use Planning
    - 5.3 The Making of a Standard
    - 5.4 NZS6807:1994 Noise Management and Land Use for Helicopter Landing Areas