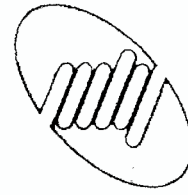


13-06-2017

## **APPENDIX 9**

### **VENTILATION ASSESSMENT**



## Consultant Advice

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<b>From:</b> Peter Affleck	<b>Date:</b> 9 Jun. 17	<b>File No:</b> w10104\001\00121\ca170608w0010	<b>Pages:</b> 5
<b>Project:</b> Lyall Bay Apartments			<b>No:</b> CA001[1.0]
<b>Attention</b>	<b>Company</b>	<b>Email</b>	
<b>To:</b> Mike Stonyer	Reve Architecture Ltd	mike@revearchitecture.co.nz	

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### Lyall Bay Apartments, 57-59 Kingsford Smith Street, Lyall Bay – Ventilation Requirements

The purpose of this Consultant Advice CA001 is to demonstrate a method of compliance with the Resource Consent requirements for the proposed Apartments in the referenced WCC building zones, these being:

- **Business 1 Zone – Ventilation Requirements - 34.6.2.10.2**  
Where habitable rooms with openable windows are proposed, a positive supplementary source of fresh air ducted from outside is required at the time of fit-out. The supplementary source of air is to achieve a minimum of 7.5 litres per second per person.
- **Noise Insulation and Ventilation - Airnoise Boundary - 34.6.2.12.2**  
Any new habitable room within the Airnoise boundary depicted on Map 35 that is proposed to have openable windows must be provided with at the time of fit-out a positive supplementary source of fresh air ducted from outside. The supplementary source of air is to achieve a minimum of 7.5 litres per second per person.

In addition to addressing the necessary building zone requirements, we also demonstrate a method of complying with NZ Building Code Acceptable Solution G4 Ventilation, to a concept level (expected to be suitable for Resource Consent application) for the Apartments.

Please find on the following pages, written description of the requirements, and a proposed method of compliance notated against typical apartments as shown on the Architectural drawings.

There is no allowance for ventilation of spaces containing gas-fuel appliances within this document.

This document solely addresses the ventilation of the Apartment Habitable Rooms.

#### NORMAN DISNEY & YOUNG

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## Project Requirements

### Resource Consent and WCC Building Zone

- The Resource Consent requirements include the need for outdoor air ventilation to habitable spaces, to a rate of 7.5 litres per second per person.
- Habitable Spaces include areas in the Apartments such as Living, Dining, Kitchen, and Bedrooms, but specifically excludes areas such as “bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby”.
- The number of occupants is undefined in the Resource Consent requirements. The referenced standards provide guidance for assessing the number of occupants.
- However, as we note below, the minimum outdoor air ventilation requirements are exceeded by the exhaust air requirements and the requirement to maintain a positive pressure within the occupied space.
- The outdoor air volume requirements are thereby met and exceeded by the need to comply with the Building Code G4/AS1 exhaust air volumes.

### New Zealand Building Code Acceptable Solution G4

- G4/AS1 section 1.5 applies to the proposed Apartments, due to the required mechanical supply ventilation.
- Due to the Apartment layout, and the required supply ventilation, mechanical exhaust ventilation is required to be installed to serve bathrooms/en-suites, and the kitchen.

### Additional Notes

- We note the requirement for mechanical supply ventilation (as per Resource Consent) thereby negates the use of Trickle ventilators mounted in the facade/glazing units (G4/AS1 1.3.9)
- Of particular note, if a Type 5 Fire Alarm system is installed, mechanical exhaust ventilation shall be installed to serve the kitchen (G4/AS1 1.1.3).

### Unit 8 Example

Refer to appended schematic overlay for Unit 8, as an example of the proposed mechanical ventilation solution.

- The Bathroom and En-Suite share a combined exhaust system, operating at 50 l/s.
- The two Bedrooms will be served by a system providing outdoor air at a rate of 55 l/s (a rate that exceeds the requirement of 7.5 l/s per person (2 occupants per bedroom maximum), due to the need to positively pressurise the space when the bathroom/en-suite exhaust system is operating).
- The Kitchen has a dedicated exhaust system, operating at 50 l/s.
- The Living and Dining areas will be served by a system providing outdoor air at a rate of 55 l/s (a rate that exceeds the requirement of 7.5 l/s per person (allowing for a maximum of 7 occupants), due to the need to positively pressurise the space when the kitchen exhaust system is operating).



## General

### Natural Ventilation:

- There is no allowance for natural ventilation, as it is a requirement within the noise boundary to not rely upon operable windows to provide ventilation.
- There is no allowance for trickle vents to be installed into the apartment facade / glazing, and these are not to be installed due to the use of mechanical supply ventilation.

### Mechanical Services:

- Mechanical ventilation systems for:
  - The bathrooms and toilets in each apartment. Each apartment will have dedicated exhaust system/s.
  - Individual exhaust systems provided per apartment kitchen to exhaust air to outside.
  - Outdoor supply air is to be supplied to the apartments so all "living areas" within the apartments are ventilated. This air is required to be filtered and tempered (heated to match the interior temperature, expected to be 20°C).
  - Option; use heat exchange ventilation units to recover heat from exhaust air, to temper (partly heat) incoming outdoor air. Reduced heating of the incoming outdoor air will be required. Non-permeable plastic heat exchange materials are required, to ensure no cross contamination of the airstreams.

### Exhausts systems

Each apartment will have ducted, fan driven, exhaust system/s.

Exhaust air will be discharged to outside via a soffit or facade louvre.

Bathroom/En-suite fans will be turned on/off by the light switch(s) in each bathroom/enclosure and have a run-on timer to ensure removal of odours post occupancy.

Kitchen Exhaust fans shall be turned on/off by occupants during cooking.

Associated outdoor air system shall operate at the same time as the exhaust system, via electrical interlocks.

### Outdoor supply air systems

Each apartment will have ducted, fan driven, filtered and tempered supply air system/s.

There outdoor air system will require electric air heaters to temper the incoming air supply (required to raise the incoming temperature from a minimum of 4 degrees to 20 degrees).

Automatic operation of the outdoor air systems shall occur when an associated exhaust air system is operating.

Manual operation of the outdoor air systems shall be possible by the occupants turning a switch on/off.

Instructional labels shall be fitted to explain the operation, including a note of the need for system operation when windows or doors are closed.

Outdoor air systems may operate alone, on the basis of positive air pressure exiting the space via the non-operating exhaust air systems' duct pathways.

As an option, NDY recommend the use of heat recovery air handling units, with non-permeable plastic heat exchange plates, to reduce the pre-heating requirements for the incoming air supply.

### Transfer of Air between spaces

Doors between served by supply air and exhaust air shall be undercut by 20mm to allow the transfer of air between spaces, so that both systems may operate effectively.












## Design Criteria

Item	Design Criteria
Toilet Exhaust	<ul style="list-style-type: none"> <li>• Mechanical ventilation to AS 1668.2-2002               <ul style="list-style-type: none"> <li>▪ Minimum of 25 l/s per room intermittent</li> </ul> </li> <li>• Individual system/s per apartment ducted to facade or soffit.</li> <li>• These may be combined with Bathroom exhausts.</li> </ul>
Bathroom or En-suite Exhaust	<ul style="list-style-type: none"> <li>• Mechanical ventilation to AS 1668.2-2002               <ul style="list-style-type: none"> <li>▪ Minimum of 25 l/s per room intermittent</li> </ul> </li> <li>• Individual system/s per apartment ducted to facade or soffit.</li> <li>• These may be combined with Toilet exhausts.</li> </ul>
Kitchen Exhaust	<ul style="list-style-type: none"> <li>• Buildings containing Type 5 Fire Alarm system must have mechanical extract installed in kitchens (NZBC G4/AS1 1.1.3)</li> <li>• AS 1668.2 does not include Exhaust rates for Residential Kitchens</li> <li>• NDY recommend Mechanical ventilation to NZS 4303               <ul style="list-style-type: none"> <li>▪ Minimum of 50 l/s intermittent</li> </ul> </li> <li>• Individual system/s per apartment ducted to facade or soffit.</li> <li>• These cannot be combined with Bathroom or Toilet exhausts.</li> </ul>
Outdoor Air Supply	<ul style="list-style-type: none"> <li>• As per G4/AS1 1.5.5, the building shall be positively pressurised, that is, the outdoor airflow shall exceed the exhaust airflow.</li> <li>• Mechanical ventilation to NZS 4303 table 2.3, filtered outdoor air as follows:               <ul style="list-style-type: none"> <li>▪ 0.35 air changes per hour for living spaces, but not less than 7.5 l/s per person.</li> </ul> <p>NDY have undertaken a test calculation of Unit 8, with a living space volume of circa 190m<sup>3</sup> as a maximum, leads to 18 l/s airflow. The Occupancy will exceed the apartment minimum air change rate.</p> <li>▪ As per NZS 4303, Occupancy is based upon 2 people for the first bedroom, with 1 person per bedroom there after (unless a greater occupancy is otherwise advised).</li> </li></ul> <p>NDY note that the rates for exhaust ventilation requirements, and the need to positively pressurise the space, causes the necessary supply air volume to exceed the minimum occupant requirements.</p>
Applicable Standards	<p>Key standards governing Mechanical Services design include:</p> <ul style="list-style-type: none"> <li>• New Zealand Building Code Acceptable Solution G4</li> <li>• AS/NZS 1668.2-2002</li> <li>• NZS 4303-1990</li> </ul>



Unit 8 example schematic

### VENTILATION LEGEND

-  EXHAUST AIR DUCTING
-  EXHAUST AIR FAN
-  EXHAUST AIR GRILLE
-  EXHAUST AIR OUTLET LOUVRE
-  OUTDOOR AIR INLET LOUVRE
-  OUTDOOR AIR VENTILATION UNIT WITH FILTER, FAN, AIR HEATER
-  SUPPLY AIR DIFFUSER
-  SUPPLY AIR DUCTING
-  UNDERCUT DOOR TO ALLOW AIR TRANSFER

