



Project Name:	60 Miller Street, North Sydney, NSW
Date Completed:	August, 2004
Building Size:	15,600 m ²
Installed Sensible Capacity:	1,313 kW
Designed By:	Building Services Engineers
Installed By:	Key Services Ltd
System Used:	IDL10e Perimeter IDL20e Centre Zones
Number of Units:	1,591
<u>Design Criteria:</u>	
Room Temperature:	23°C / 45%RH
Chilled Water Temperature:	Not Applicable
Primary Air Temperature:	9.5°C
Maximum Available Air:	6,700 l/s per floor

Refurbishment,

sustainability

+ flexibility



60 Miller Street, a 12 story multi-tenancy North Sydney CBD office building with approximately 1,300m² nett lettable area per floor, required a significant increase in delivered sensible cooling capacity of +65% with necessary increases in air distribution rate to achieve a minimum 4.5 L/s/m² to suit modern occupancies.

The design target was not achievable with the existing duct infrastructure, risers and DX HVAC plant.

Solution must deliver best practice air quantities and increased cooling capacity using ductwork infrastructure no larger than the existing on-floor ductwork.

active chilled beam

Perimeter system

Inffuser cold air solution



active chilled beam

Perimeter system

Infuser cold air solution

The Challenges

- Existing air risers and on-floor ductwork could not be changed or expanded
- Insufficient on-floor air distribution in centre zones (2.3 L/s/m²)
- Required cooling capacity per typical floor increased from 54,000W to 90,250W (+65%)
- Air quantity limited to 6,703 litres/second maximum available air per floor
- 9,300 L/s air quantity required to solve cooling problem with existing 15°C supply air
- New supply air temperature of 9.5°C required to solve capacity problem with existing air quantity of 6,700 L/s
- Sufficient reduction in supply air temperature to solve capacity problems would result in air diffusion problems (Cold Air Dumping)
- HVAC system must be refurbished as a 'Live Building' with minimum tenancy disruption

The Solution

- Remove existing modulating air dampers and air diffusion 'Thermafusers'
- Remove & replace limited amount of flexible ductwork
- Retain & modify existing air ductwork for new air diffusion layout
- Install 1,591 High Induction 'IDL' Linear Inffuser™ units throughout the building
- Utilise Inffuser 'Induction' principle to increase on floor air distribution through localised entrainment of secondary air. 1.9 L/s of secondary air induced locally for every 1 L/s of primary air processed by the air handler
- Reduce supply air (Primary Air) temperature from 15°C to 9.5°C to achieve sensible cooling capacity target
- Modify existing air handler and fan to achieve 8.5°C off-coil condition and the required static pressure

The Benefits

- ✓ Refurbishment work was carried out on each floor in a "Live Building" scenario
- ✓ Delivered 67% increase in sensible cooling capacity for similar total air quantity to that previously installed
- ✓ Retained existing HVAC plant (modified for new primary air temperatures)
- ✓ Retained & re used existing on-floor ductwork & air risers
- ✓ Increased air distribution rates to higher than 4.5 l/s/m² to all areas of the building
- ✓ Smaller VAV boxes were installed for individual zone temperature control
- ✓ Delivered supply air temperatures of 14.5°C - 16°C from 9.5°C primary air
- ✓ New perimeter zone supply air quantity of 7,550 L/s delivered for only 4,698 L/s of primary air processed (Perimeter zone total supply air quantity increased by 108%)
- ✓ New centre zone supply air quantity of 3,848 L/s delivered for only 2,013 L/s of primary air processed (Centre zone total supply air quantity increased by 97%)