Annexure 10

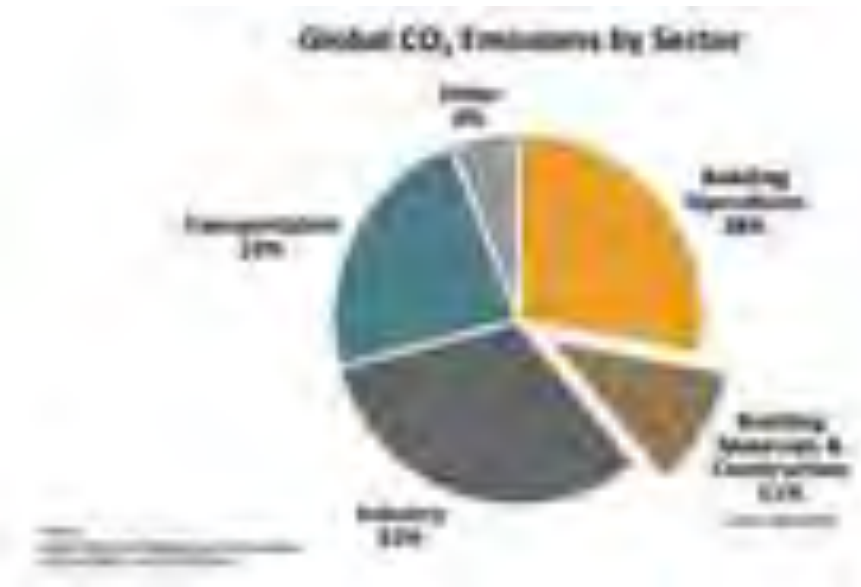
SPILL AIR & THERMAL COMFORT REQUIREMENTS

Market Hall Chadstone Fresh Food Story Board

Prepared By: ADP Consulting

Date: 15/11/2022

Carbon is a problem



Concept of Natural Ventilation and Spill Air

- Use of spill outdoor air from tenancies via shopfront (Blue) to the surrounding Market Hall (Yellow)
  - Regulatory Outside Air Requirement is getting spilled from tenancy to the mall
  - No impacts on outgoing as Outdoor Air is a regulatory requirement to be provided in any tenancy – irrespective of Heating/Cooling requirement. Instead of the outdoor air being released via the AC systems, it is released via the Market Hall
- Operable louvres allow the building to have natural ventilation throughout, while promoting a greater association with the outside weather conditions.
- Louvre Operation:
  - Open: when external temperatures are between 17 and 28°C - 34% of occupied hours
  - Closed: Use of spill air

Shopfront Permeability

- Tenancy shopfront design and as-built must meet the minimum permeability (opening) requirement of **0.0035m2 of open area per 1m2 of NLA**. This permeability requirement **must be permanent** and able to be achieved both during and outside of trading hours (example. when the shopfront is closed). The required open area (via the use of louvres, perforation or linear slots) must be located beneath the smoke buffer zone outlined in the fire engineering report, (this is the line below the smoke level zone).

- Internal Temperature within tenancy remain unchanged as per conventional tenancy – 21.5deg.C +/- 1.5deg.C

Shopfronts Principles

Simple Design
Slot in Shopfront at high level (Section)

Integrated Shopfront Design
within Door

Market Hall – Thermal Comfort

Human Comfort Influences

Human Comfort Evaluation

Market Hall Response

Climate control through multiple sensors for comfort

Operable louvres above fresh food kiosks area are operated in response to internal sensors (temperature, CO2 levels) and external weather station (outdoor temperature, wind, humidity, rain) to ensure internal conditions are maintained during extreme outdoor conditions

Market Hall – Thermal Comfort

Outcomes of the Design:

Through a combination of improved building fabric (e.g. insulation and glazing), architectural design, provision of natural ventilation and spill air from surrounding tenancies, the current results indicate that **adaptive thermal comfort has an acceptability limit of more than 80%, achieved across 95% of the floor area for 98% of the hours of operation**.

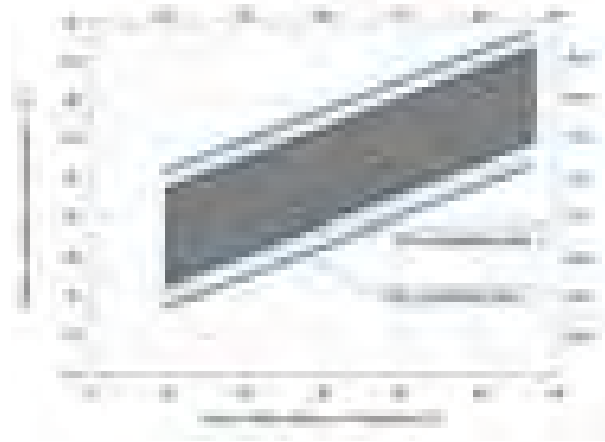
The results equates to a **Predicted Mean Vote (PMV) between -1 & 1**. This is inline with the minimum requirement stated in ASHRAE 55 and mandated by the NCC under JV2 & JV3.

Thermal Comfort Methodology takes the following into consideration in its evaluation:

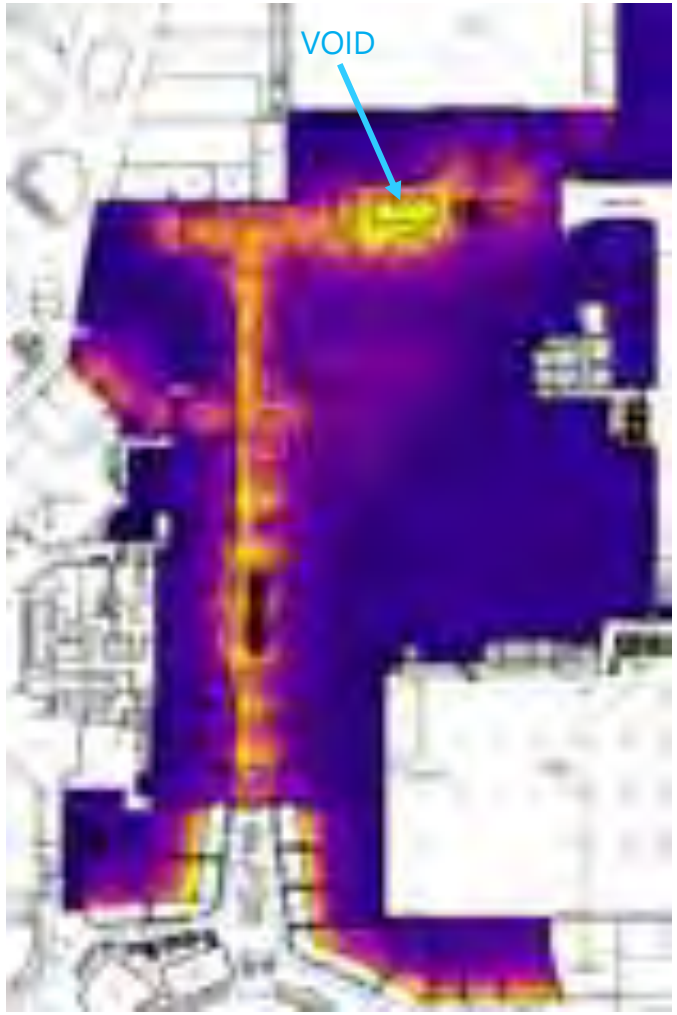
- Air Temperature – Internal & External
- Radiant Temperature (direct solar)
- Air-Speed / Air Movement
- Relative Humidity
- Activity type
- Clothing (people wearing different clothes depending on season

The notion of "internal Temperature" is not the sole contributor factor of thermal comfort in the space. Thermal comfort can be quantified by the PMV. The PMV is an index (between -3 "cold" and +3 "hot") which predicts the average climate assessment value of a large group of people. The PMV values between -1 "slightly cool" and +1 "slightly warm" are considered to provide adequate levels of comfort, with values closer to 0 being the ideal scenario.

Fresh Food Zone	80% acceptability	90% acceptability
Zone 1	100%	94%
Zone 2	99%	88%
Zone 3	98%	86%
Zone 4	98%	89%
Zone 5	99%	85%



Market Hall – Kiosks



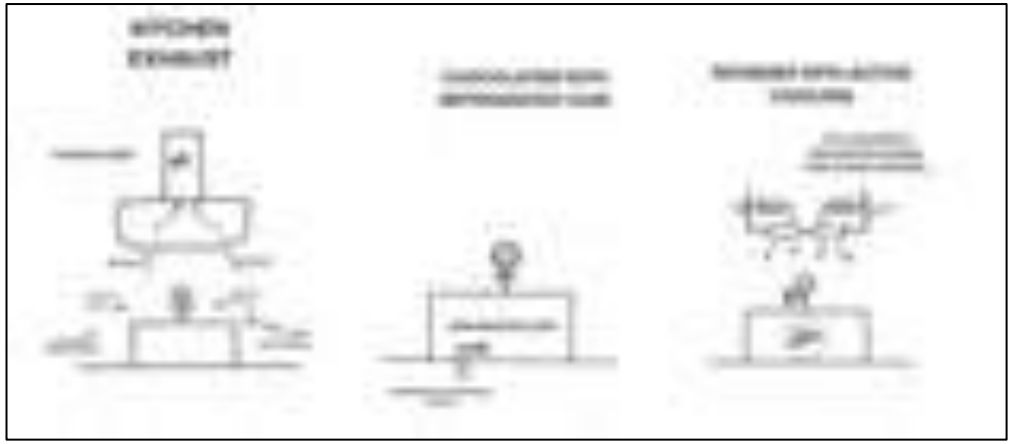
Kiosks have been positioned to ensure direct sunlight is limited via passive design of new roof – daylight is promoted via southern facing windows, that enable no direct sunlight

Yellow areas indicate direct sun from roof to the Market Hall.

Roof design and kiosks positioning have been made in such a way that direct sun is limited (bright yellow is in a void area to lower ground floor) therefore not impacting patrons and employees in the kiosks with discomfort of extreme direct sun

Kiosks have been designed to enable flexibility for the tenant, with the possibility of installing:

- Supplementary kitchen exhaust
- Refrigerated cases
- Active cooling



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