



One Shelley Street Performance Study

A Collaboration between
Brookfield Multiplex and Macquarie Group

Agenda

- Fast Facts
 - Building Statistics
 - Design Brief
 - 'Green Initiatives'
- The Team and Timeline
- Achieving High Performance
- Measuring Performance – from the building and from the people
- Independent Indoor Environment Quality - UNSW
- Independent Building Use Study – UTS
- Sustainable Return on Investment
- Close
- Questions



Building Overview – Fast Facts

Statistics

- **NLA:** 33,500 m²
- **GFA:** Over 75,000m² GFA (35,000 above ground & 40,000 below)
- **Grade:** PCA A Grade Office Space +
- **Green Star:** 6 Green Star Design Rating
- **Floorplates:** Open Floor space with minimal internal columns
- **Occupancy Ratio:** 1 person per 10m² – utilisation of 20% greater than a standard office.
- During the design development Brookfield Multiplex and Macquarie Group agreed to jointly upgrade the building to target a 6 Star Green Star Design rating.
- Currently collating As Built documentation in order to lodge for a 6 Star Green Star Office As Built V2 Rating.



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+ Building Overview – Fast Facts

Design Brief

- A building designed from the inside out
- A building for people with large floor plates, good natural light, flexible to change over time, healthy, productive and enjoyable
- To deliver a highly specified A Grade commercial building to set a new industry standard for such buildings in Australia
- Combine iconic architecture with ESD initiatives at the forefront of building design and technology
- Large floorplates to maximise efficiency and flexibility of workspace and reduce churn costs
- Design to re-use the existing basement structure to minimise waste and therefore cost



Building Overview – Fast Facts

‘Green’ Initiatives:

- A passive chilled beam HVAC system
- 100% increase to outside air over Australian Standards and a single pass air system
- Harbour heat rejection system
- Dali light controls
- Glazing and fritted glass facade for sun shading and cooling
- Low flow water fixtures
- Dual pipework fitted for grey and black water recycling
- A high performance facade with central atrium, to promote natural light and mitigate solar load
- VOC minimisation
- PVC minimisation



+ Building Overview



+ Building Overview

“Traditional offices suffer from an undue deference to tradition, or to the past and lull people into a false sense of complacency. If you want to challenge your staff to do great things, then your office should embody that challenge. There is no need to be polite in designing work space.”

Clive Wilkinson
Clive Wilkinson Architects



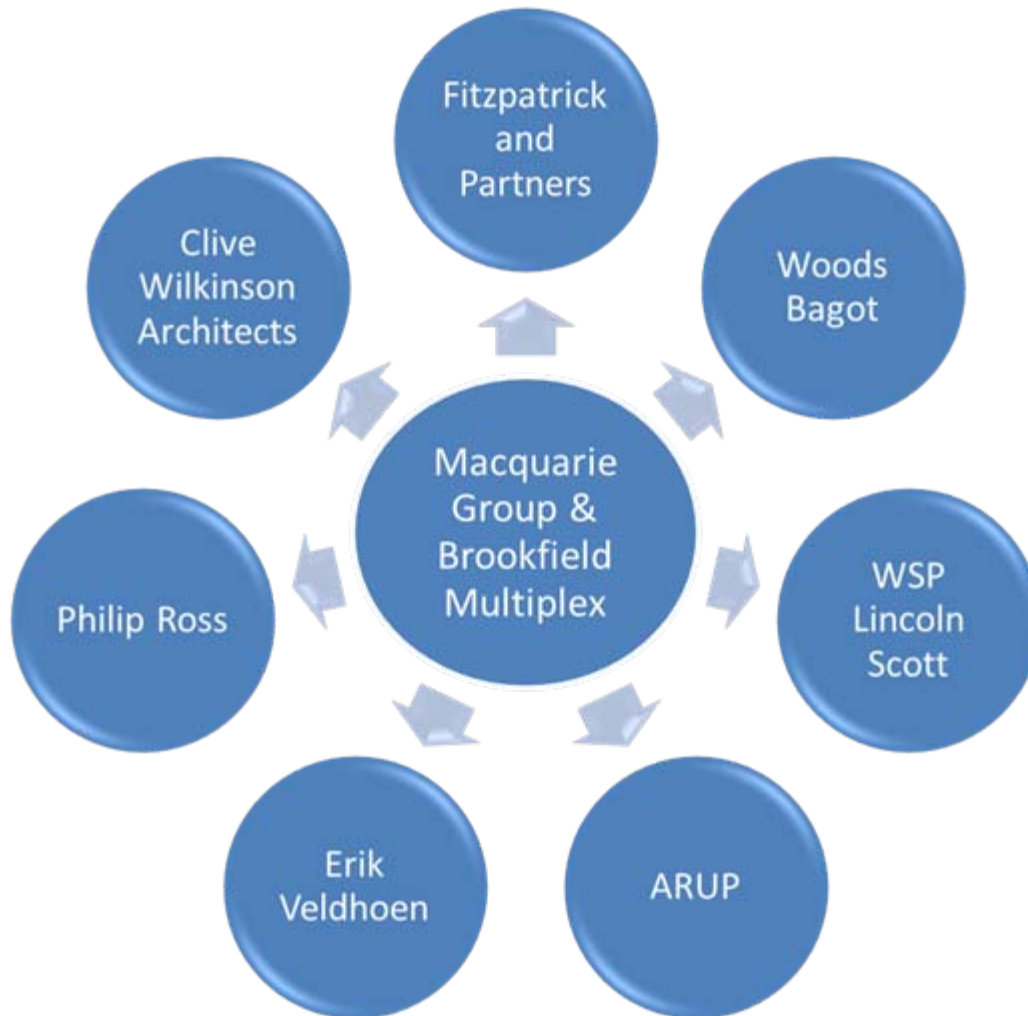
+ Building Overview

“This building offered a promise more than anything else on the market such as large connected floor plates, great natural light, the opportunity to impact on the design at an early stage.”

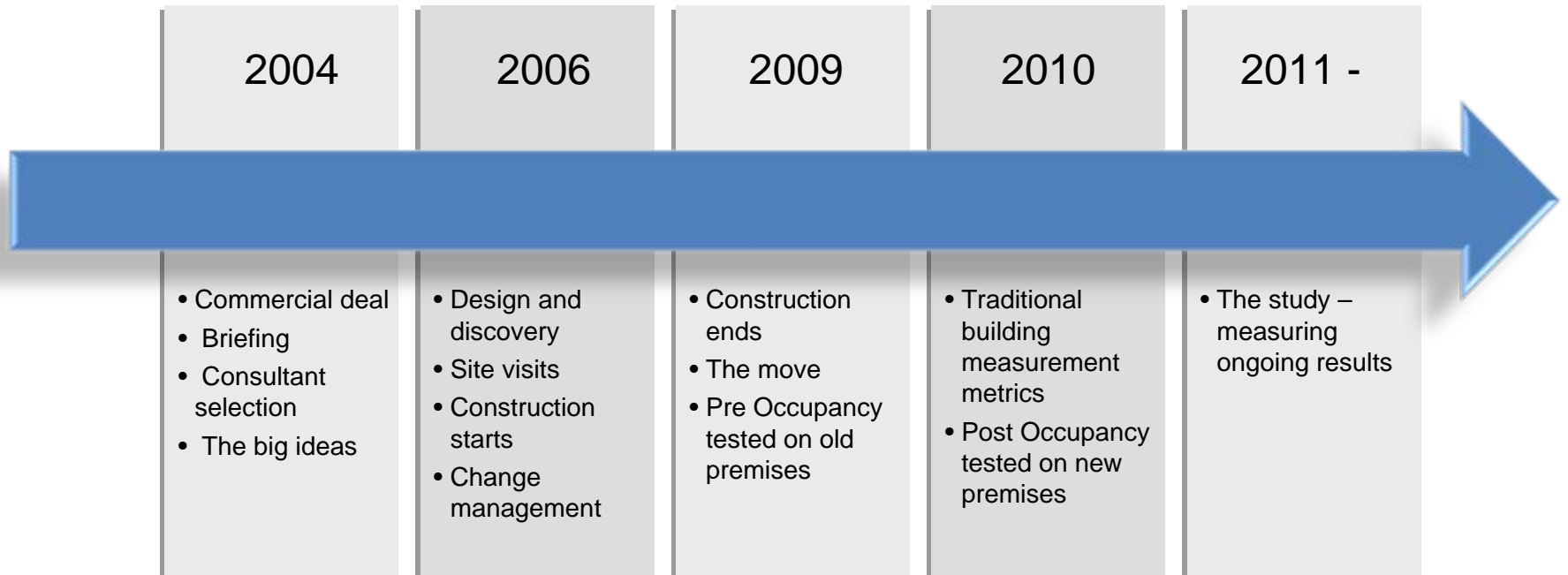
Will Walker
Executive Director of
Macquarie Group



Team Overview – A journey of collaboration



The Journey – Timeline



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Measuring Success – Traditional Measures

1. Significant environmental benefits:

- Water savings of 50% + against typical A Grade buildings
- Energy savings of 55% against typical A Grade buildings
- Paper savings of 36% against typical A Grade buildings
- 6 Star Green Star rated

2. Flexible working – ABW has increased space utilisation, enabled physical changes to happen instantaneously.

3. International attention – 3m + website hits, more than 20 industry awards, key publications including Frame and InDesign

4. An ongoing study by UTS and UNSW to measure the success of the investment in the building.

Why do a Study?

“to better understand the relationships between green building, indoor environmental quality, occupant perception and satisfaction with the workplace.”



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Brookfield
MULTIPLEX
Built to outperform.



Measuring Success – High Performance Measurements

Two Elements:

1. Physical data detection to measure IEQ – Indoor Environment Quality
2. Questionnaire and interviews – Building Use Studies

Who was involved?

- Macquarie
- Brookfield Multiplex
- UNSW
- UTS
- Key Stakeholders

Process Followed:

- Pre IEQ Test
- Pre Occupant Evaluation
- Post IEQ Test
- Post Occupant Evaluation
- Focus Groups
- Key Stakeholder Interviews

Timeline:

- Pre test – 2009
- Post test – 2010
- Future test – 2012

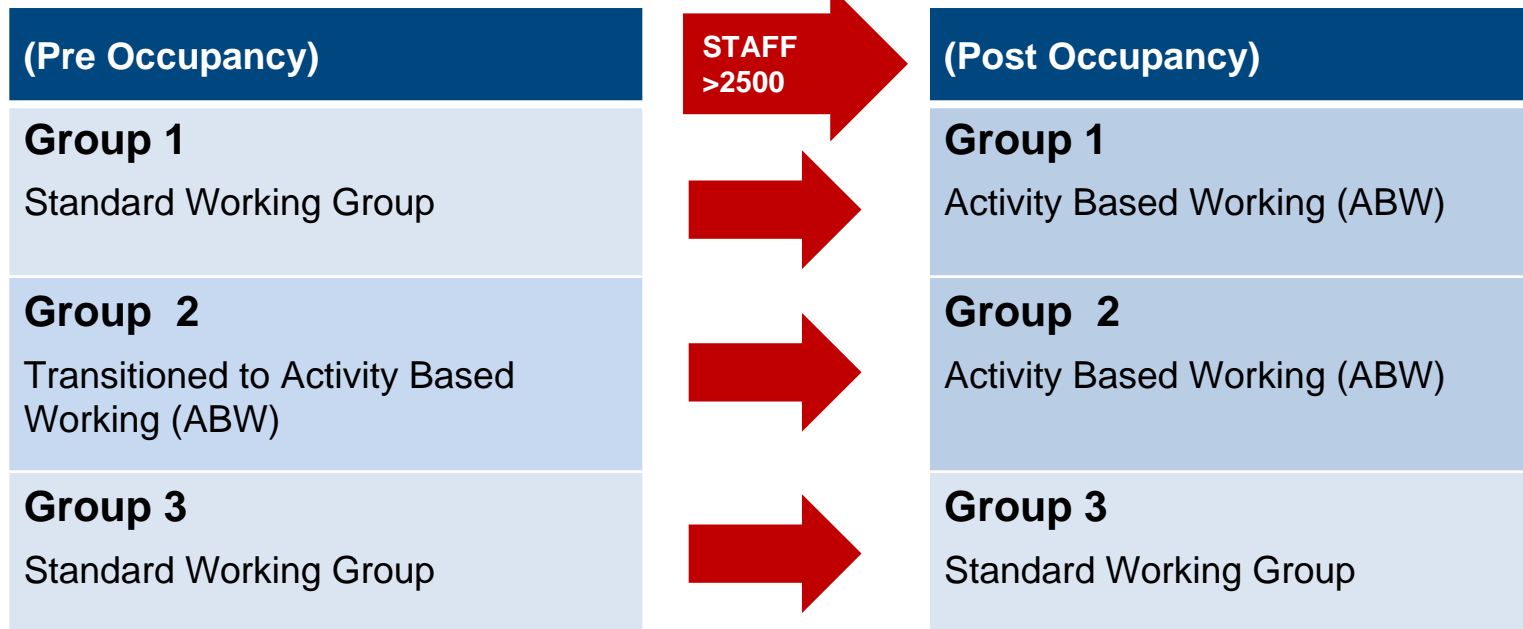


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Measuring Success – The Study Cohorts

- Comparison of old (pre) and new (post)
 - Preoccupancy reviews at current premises
 - Post Occupancy reviews in new premises – after 12 months
- Three key comparison groups
 - Identified to explore physical, social and virtual impacts



Indoor Environment Quality Detail – “IEQ”

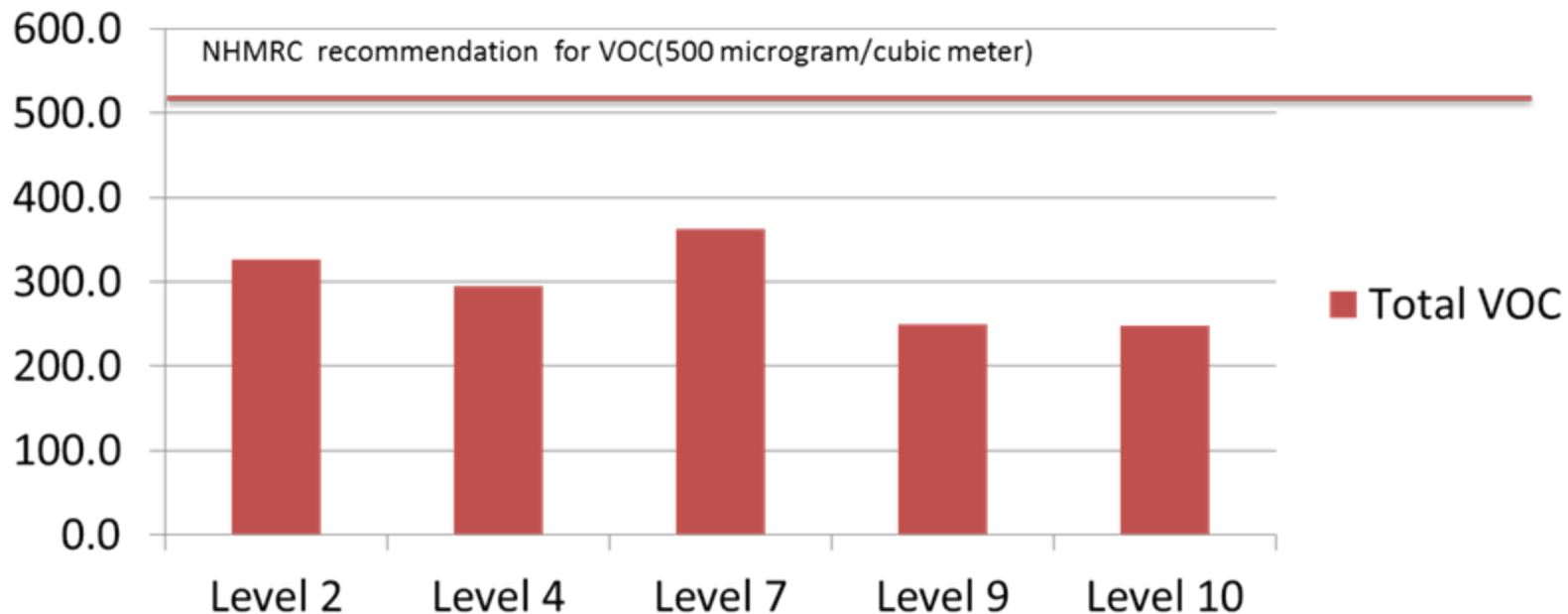
Summary of Parameters

- Temperature, noise and illumination
- Humidity
- VOC
- Formaldehyde
- CO Spatial
- CO2
- Particulate
- Air movement



Building use studies *(continued)*

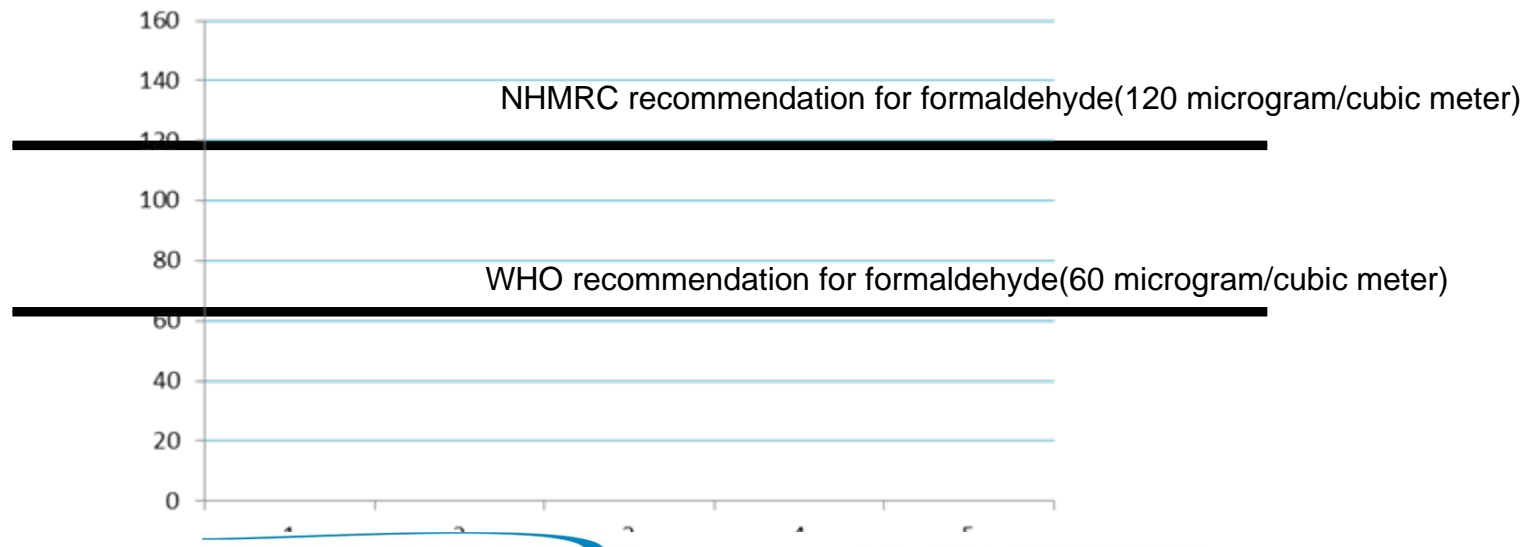
Average concentration of VOC at Shelley Street and in comparison the standard guideline



Building use studies *(continued)*

Formaldehyde

*Note: Formaldehyde was not detected in any sample at One Shelley Street
– Guidelines shown in the graph*



Building Use Studies – Detail

The **comfort index** is derived from 7 key comfort variables

- Temperature in summer and winter
- Air in summer and winter
- Noise
- Lighting
- Overall comfort

The **satisfaction index** is derived from 4 key satisfaction variables

Summary Index = Mean of Comfort and Satisfaction Indices

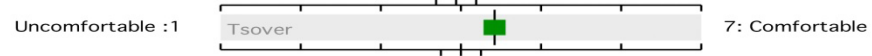


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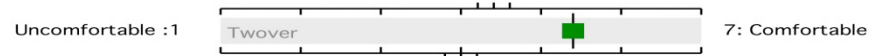


Unpacking of Results – Group 1 Summary

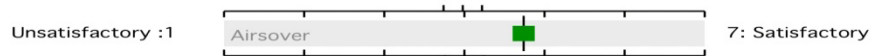
Temperature in summer overall



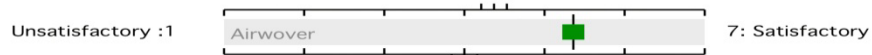
Temperature in winter overall



Air in summer overall



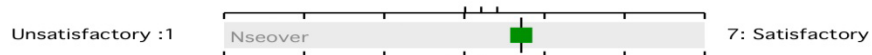
Air in winter overall



Lighting overall



Noise overall



Comfort overall



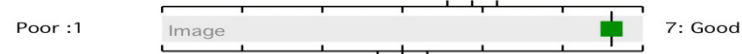
Design



Needs

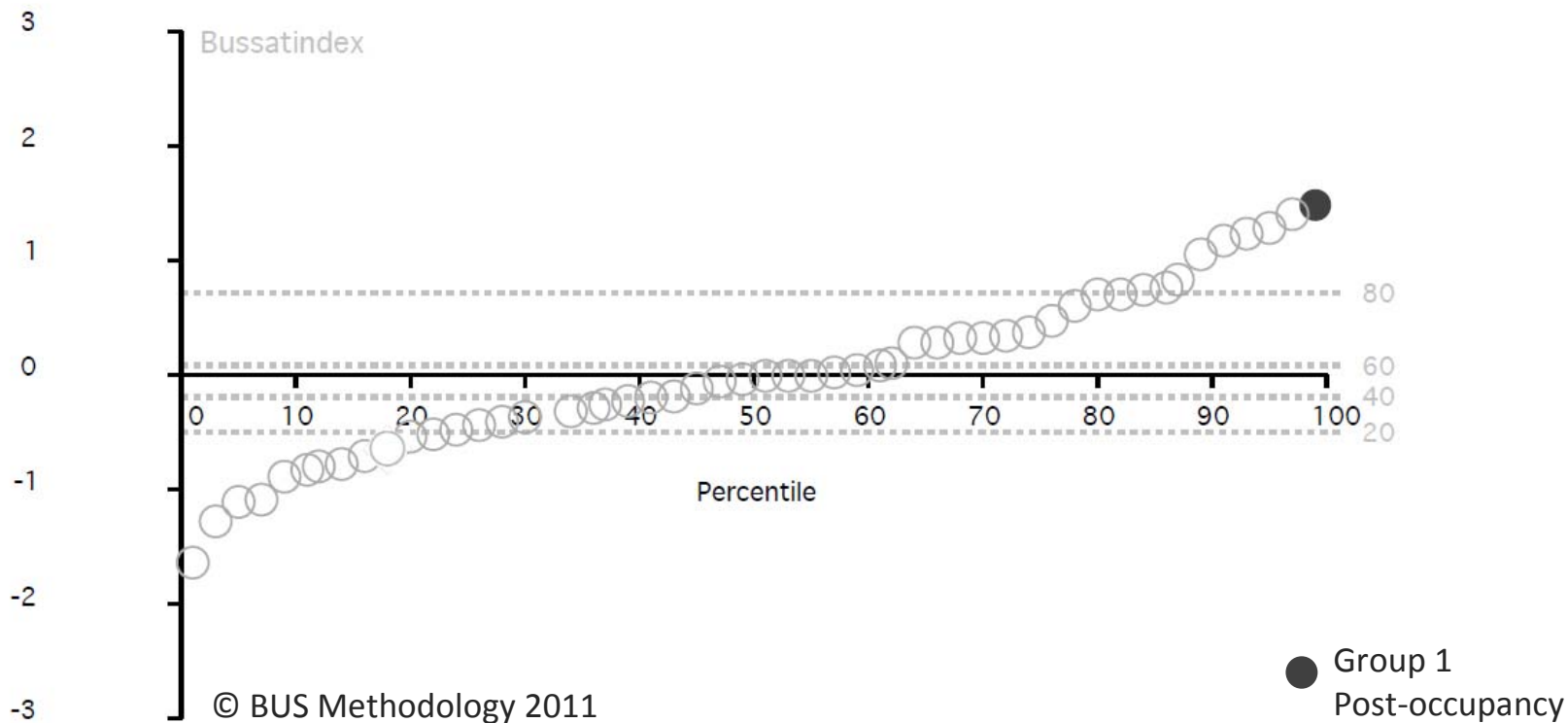


Image to Visitors



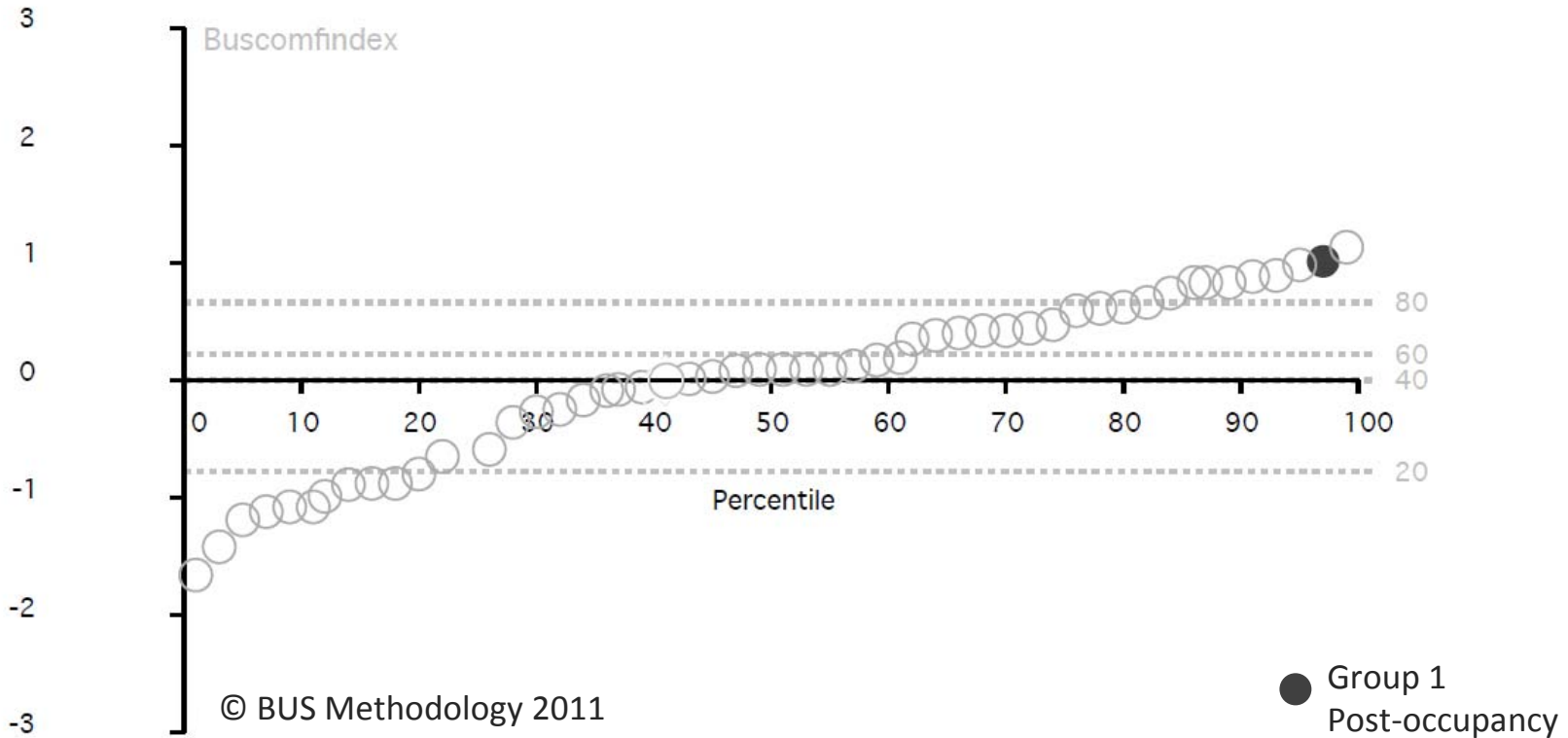
© BUS Methodology 2011

Satisfaction Index for Group 1



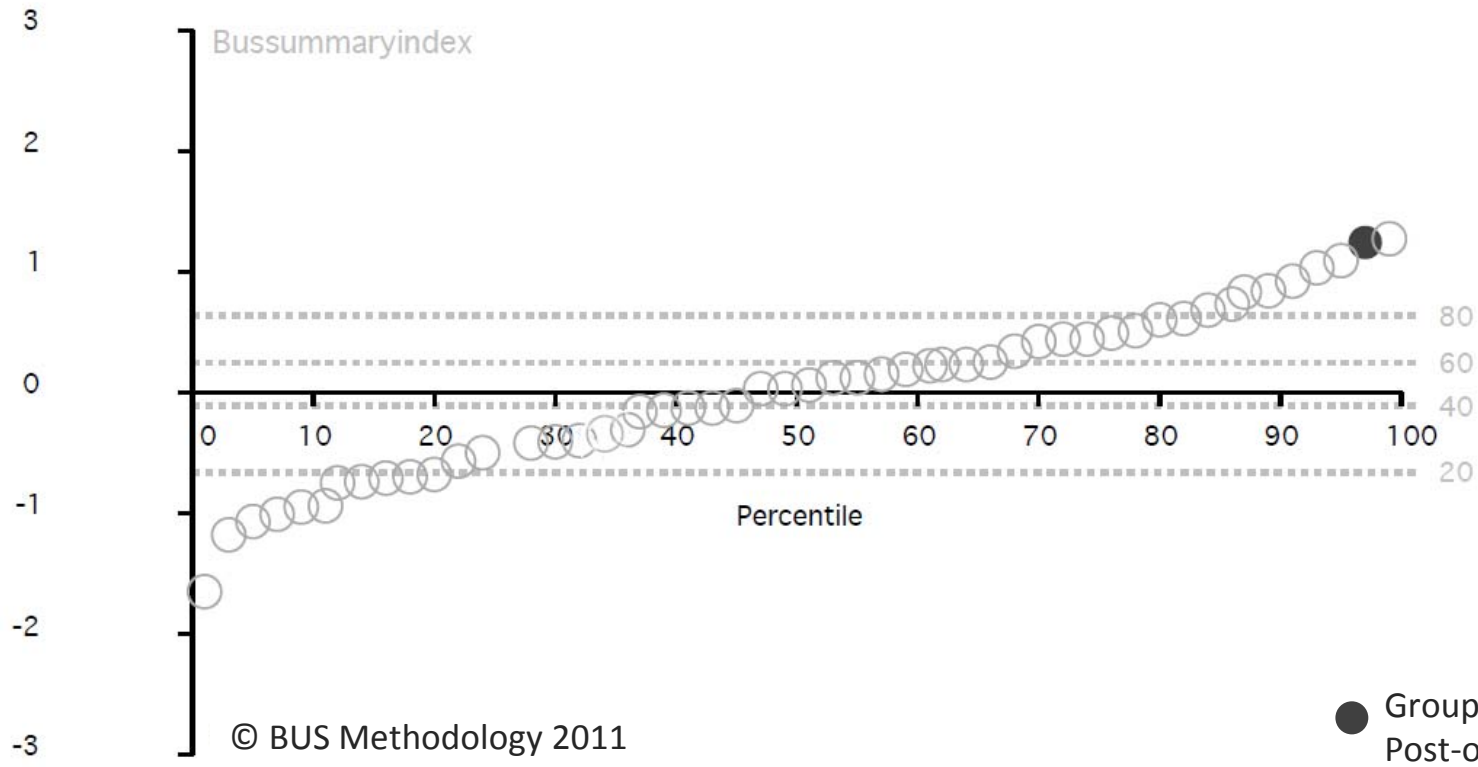
Source: Evaluation of occupants' experience at Macquarie Bank Tenancies on behalf of Brookfield Multiplex and Macquarie. A study by Leena Thomas, UTS, 2009-2011

Comfort Index for Group 1



Source: Evaluation of occupants' experience at Macquarie Bank Tenancies on behalf of Brookfield Multiplex and Macquarie. A study by Leena Thomas, UTS, 2009-2011

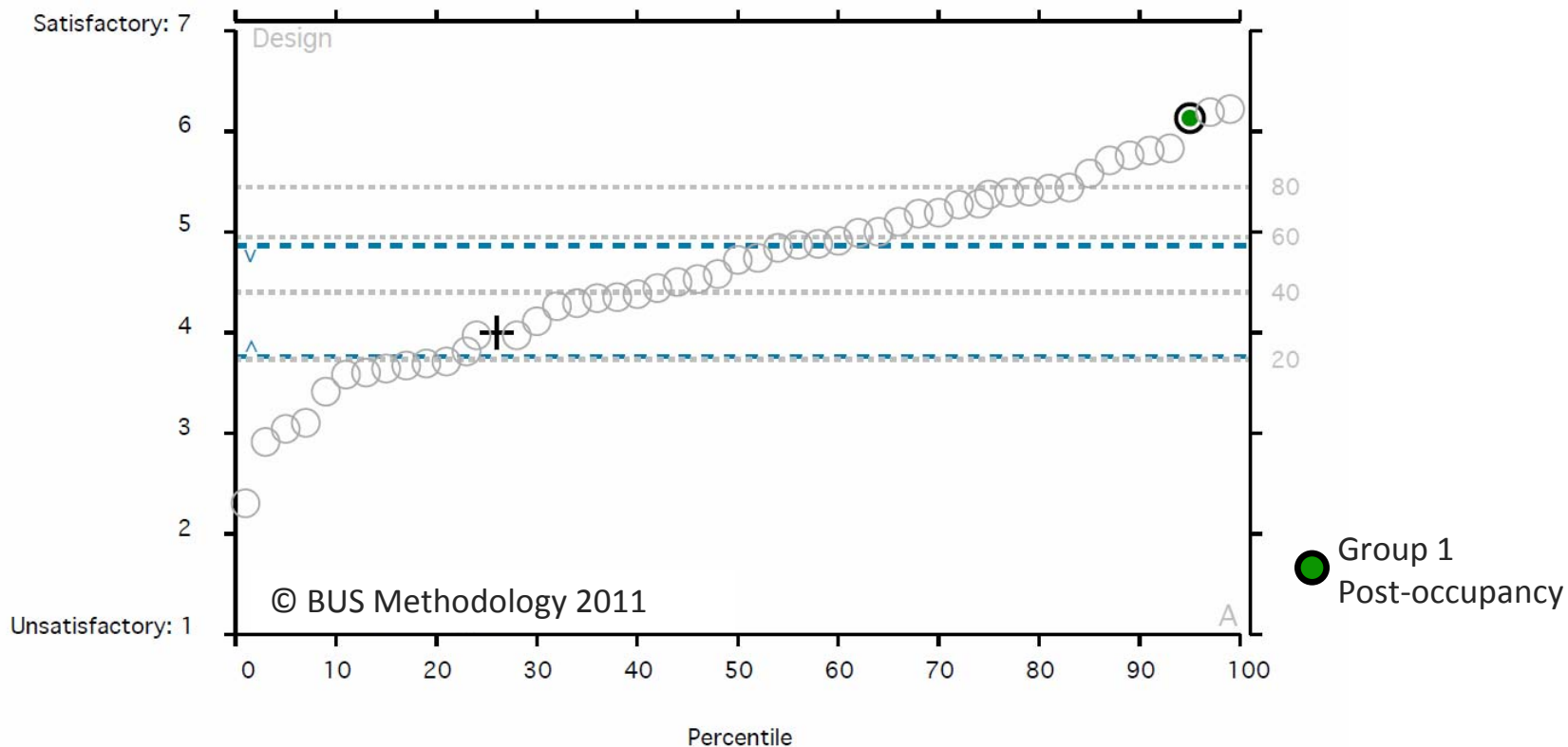
Summary Index for Group 1



Source: Evaluation of occupants' experience at Macquarie Bank Tenancies on behalf of Brookfield Multiplex and Macquarie. A study by Leena Thomas, UTS, 2009-2011

Unpacking of Results – Group 1 Design

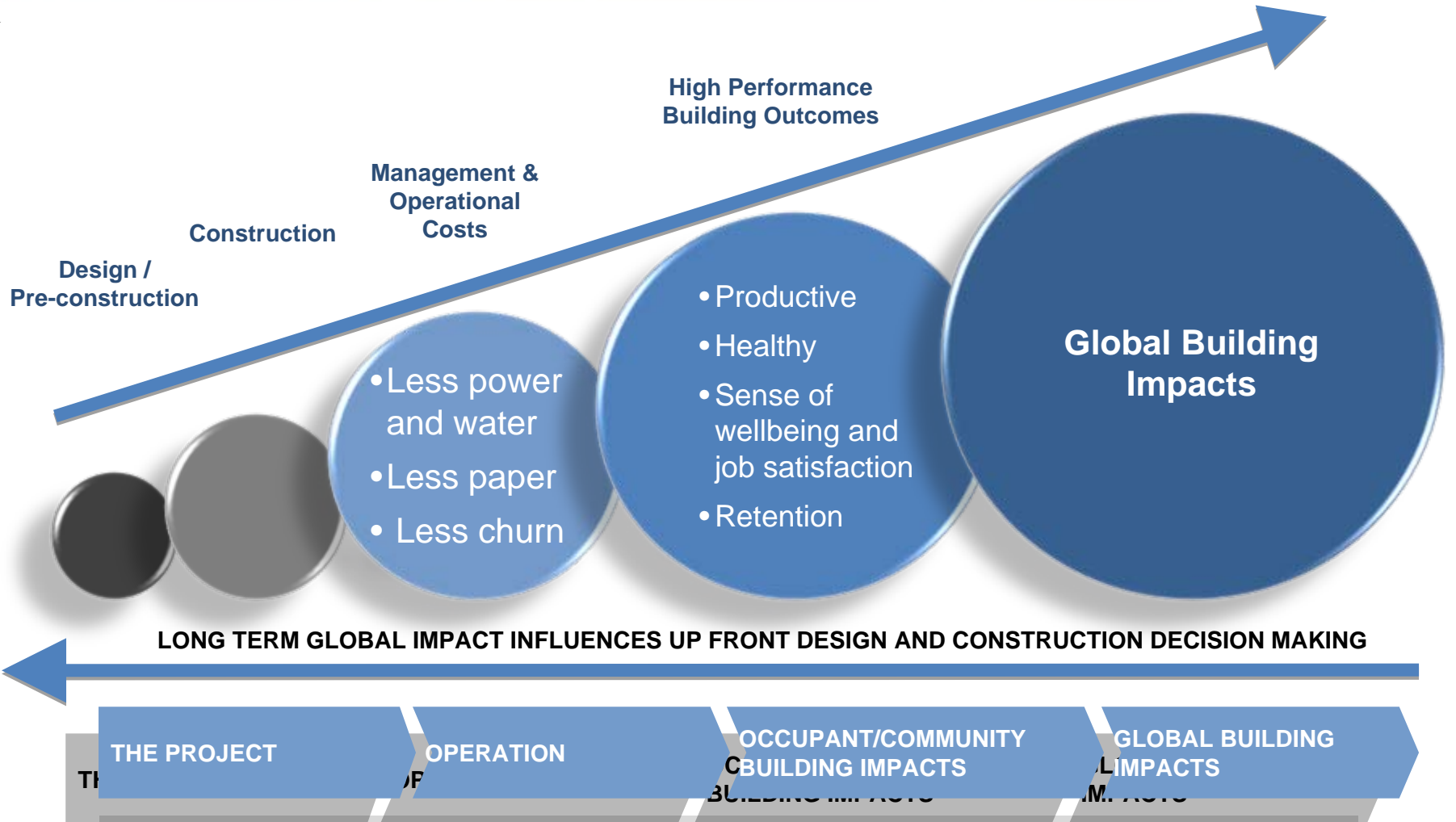
Design - Australian benchmark



Source: Evaluation of occupants' experience at Macquarie Bank Tenancies on behalf of Brookfield Multiplex and Macquarie. A study by Leena Thomas, UTS, 2009-2011

Sustainable Return on Investment Model

Brookfield
MULTIPLEX
Built to outperform.



Based on Evans, R, et al (1998) *The long term costs of owning and using buildings*, London: Royal Academy of Engineering

Conclusion

- A successful team collaboration resulting in an iconic, worlds first, flexible, innovative, high performance space that enabled people a better work experience.
- A building designed from the inside out.
- A building for people with large floor plates, good natural light, flexible to change over time, healthy, productive and enjoyable.
- Commitment to evidence based research to quantify high performance value across the triple bottom line.
- The most significant study undertaken in Australia and among the top internationally as a result of its long-term nature and scale of participants.
- A step to create better understanding of the relationship between high performance building, indoor environment quality, occupant perception and satisfaction with the workplace and worker productivity and health.



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