

# Occupant Satisfaction Metrics for Soft Landings Projects

Determining the carrying capacity of non-domestic buildings from occupant comfort perceptions, using long-term time-series studies

**Roderic Bunn**  
EngD Researcher, Virtual Environments, Imaging and Visualisation



## Why is research needed?

Developers and owners of office buildings are demanding higher performance in terms of environmental sustainability, and in the health, comfort, and productivity of the occupants.

Little is known about the inter-relationships of the wide range of environmental, seasonal and functional factors that determine building occupants' ongoing perceptions of their wellbeing. This research project set out to determine the relationship between the built environment and the factors that influence longitudinal perceptions of wellbeing, and to identify where thresholds of tolerance and acceptability may lie. The ecological construct of **carrying capacity** is adopted: The maximum population of a given species that can survive in a given environment.

**The question is whether occupant perceptions of comfort, health and productivity can be a reliable sustainability measure to define the carrying capacity of office buildings**

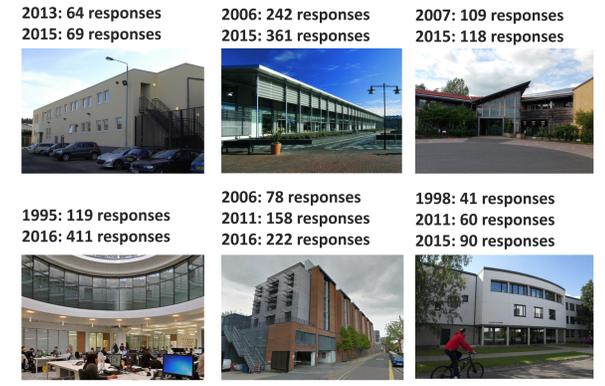
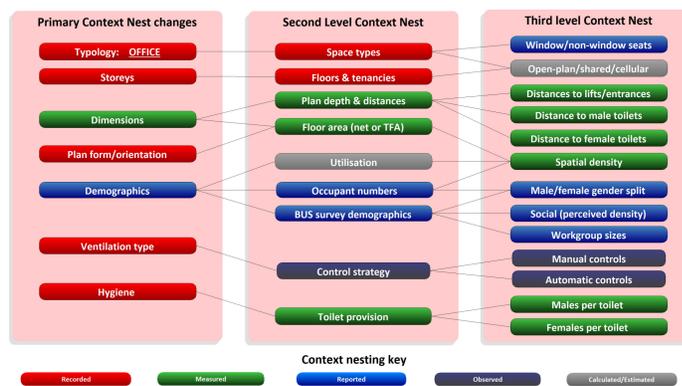
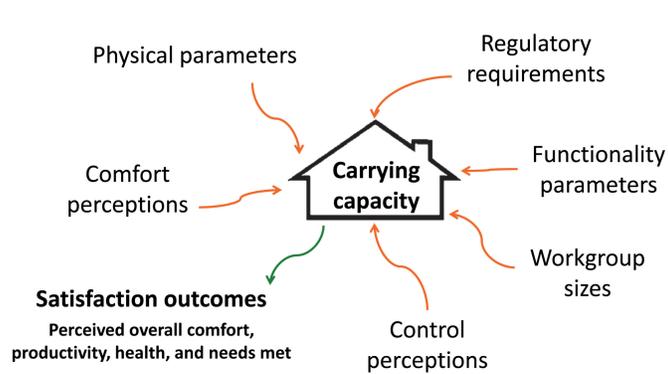
## What is Soft Landings?

Soft Landings is a 3-year period of professional aftercare for new buildings, preceded by a greater focus on operation outcomes at design, including energy efficiency and occupant satisfaction. Occupant surveys are used to check that the client's performance ambitions have been achieved.

## The approach to research: A grounded theory approach using occupant perceptions in real-world office buildings

Six non-domestic office buildings were studied over periods ranging between two and 21 years, using the same research methodology (the Building Use Studies occupant satisfaction survey), applied in exactly the same way. Changes in comfort perceptions were tracked for 29 built environment factors and mapped using a **theory of context**: nested contexts of occupied spaces and their built environment characteristics

### Conceptual model → Context nests → Case study dataset (2142 total respondents)



Note: All survey response rates lay variously between 68% and 98%.

## In search of metrics

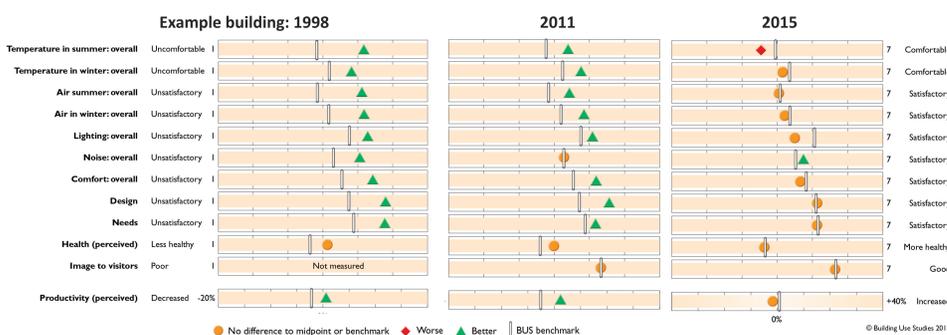
Occupant satisfaction and wellbeing is a growing area of research, evidenced by the advent of the US Well Standard<sup>1</sup> in the UK and claims that green design principles lead to improved health and productivity<sup>2</sup>.

However, the construction industry suffers from broken information feedback loops. Use of post-occupancy evaluation is not routine and project teams disband after completion, failing to follow-through to support building occupants and to learn what has worked and what needs fine-tuning<sup>3</sup>. The extended handover and aftercare activities required in Soft Landings offers the potential to deliver improvements in wellbeing from adjusting building systems and taking care to support and meet the needs of occupants<sup>4</sup>.

The time-series studies show how occupant satisfaction changes as internal contexts change. They have helped to identify indicators of discomfort that may be stressing a building's carrying capacity.

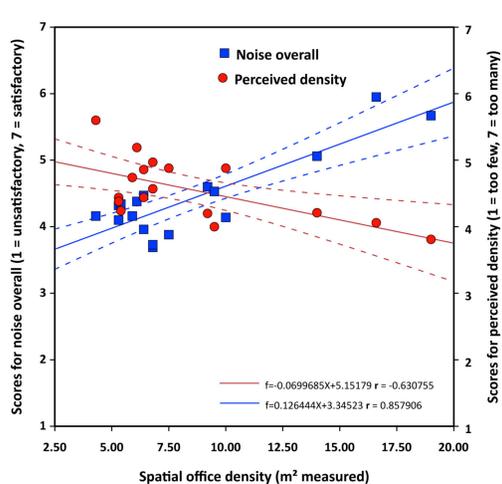
Based on findings from the research, the author believes that while occupant satisfaction metrics may be possible, they must be highly context-sensitive. The context-nesting approach tested successfully on the project may provide a common framework against which occupant survey data can be indexed.

## Initial findings: Each building possessed a distinctive occupant comfort 'signature'

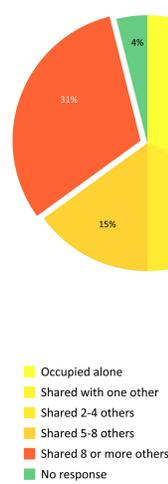


The pattern of occupant comfort perceptions was similar between BUS surveys, despite the passage of time. Comfort scores for 29 seasonal and functional comfort variables often declined between surveys, but maintained a pattern and distribution that suggest occupants' perceptions of a building may be largely determined early in its life, with the mean satisfaction scores changing either in relation to changes in the building's physical context, or in the way the building is operated.

## Specific finding: Occupant density had risen in all buildings. This may be a stress indicator



### In all case-study buildings, occupants perceived that the largest workgroups had increased in size over time



Statistical tests were carried out to determine differences between the longitudinal survey scores. While changes in perceptions were found to be context-specific, in all buildings spatial density had risen. Smaller workgroups had agglomerated with the largest workgroup type, and occupants complained of too many people and increased noise dissatisfaction. These changes, along with trends in office layout from cellular and shared to open-plan, often led to declines in perceived comfort and needs being met. Lower satisfaction was also often linked to fewer window seats and a loss of end-user control over the environmental conditions. Functionality problems, e.g. with toilets and meeting rooms, also led to a decline in satisfaction over time.

## References

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