3D Property Ownership Map Base for Smart Urban Land Administration
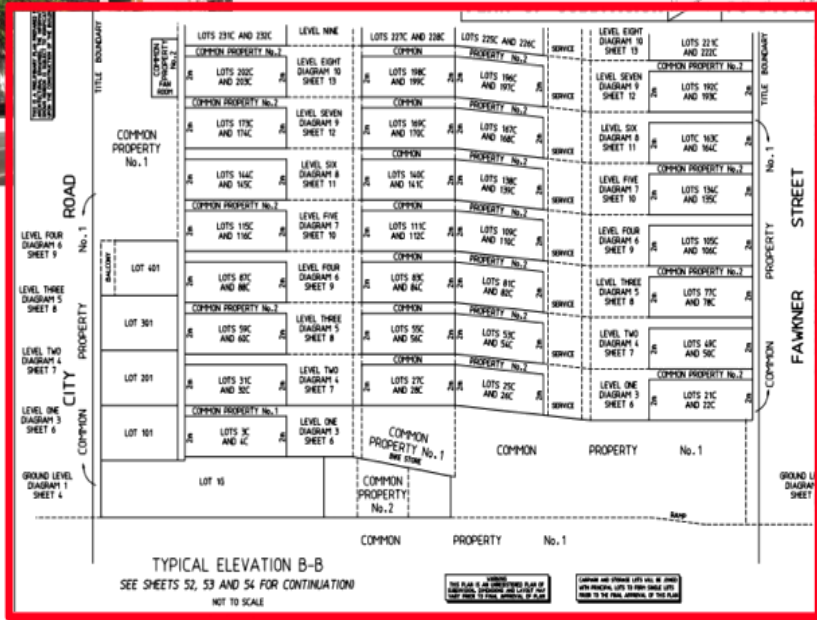
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CSDILA
THE CENTRE FOR SPATIAL
DATA INFRASTRUCTURES
& LAND ADMINISTRATION

Current Urban LA Practice

Flame Towers in Azerbaijan

Communal interest
(Among all owners and residents)

Private interest
(Office Block)
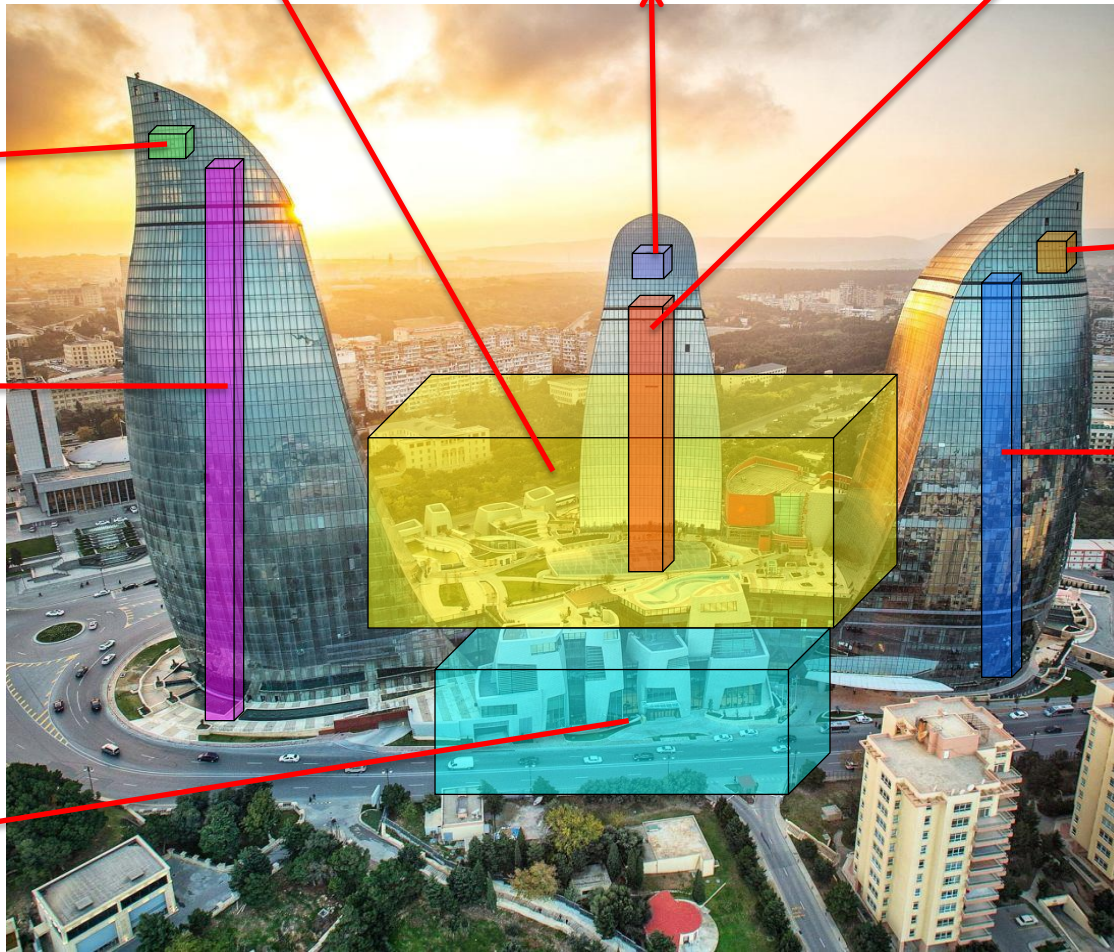
Communal interest
(Office Owners)

Private Interest
(Residential Unit)

Private Interest
(Hotel room)

Communal Interest
(Residential owners)

Communal Interest
(Hotel Residents)

Public Interest
(Shopping Mall)

Who is responsible for what?

Source: www.showalterroofing.com/roof-leaks

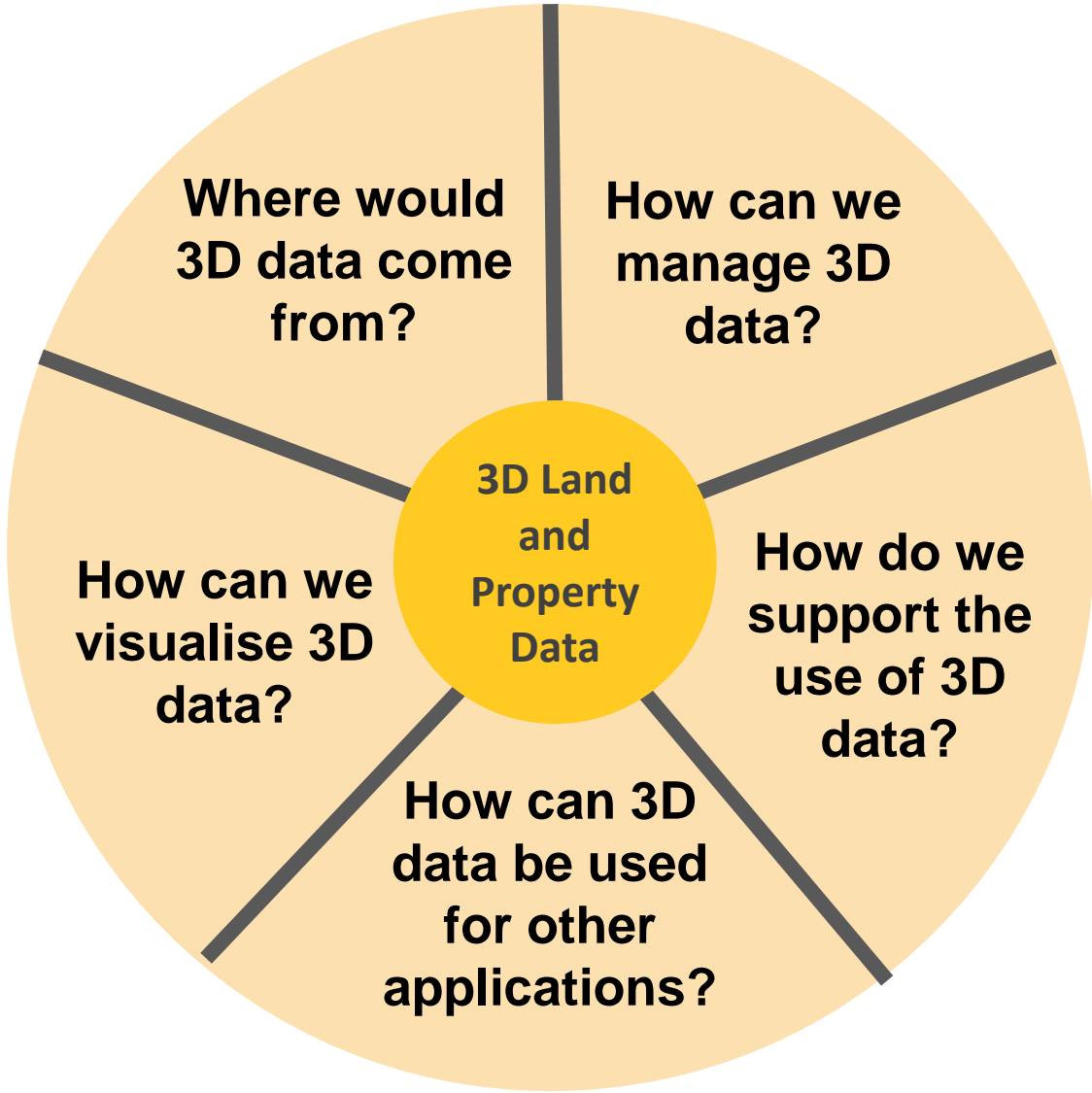Source: www.embraceselflove.com/blog/category/fear

Do I have restrictions?

Source: www.air-conditioning-installation.com.au

Who owns what?

Extending the front door step

FIRE SAFETY DOOR - DO NOT OBSTRUCT

**Emergency Exit at
QV Building**

Land and Property
Information in 3D

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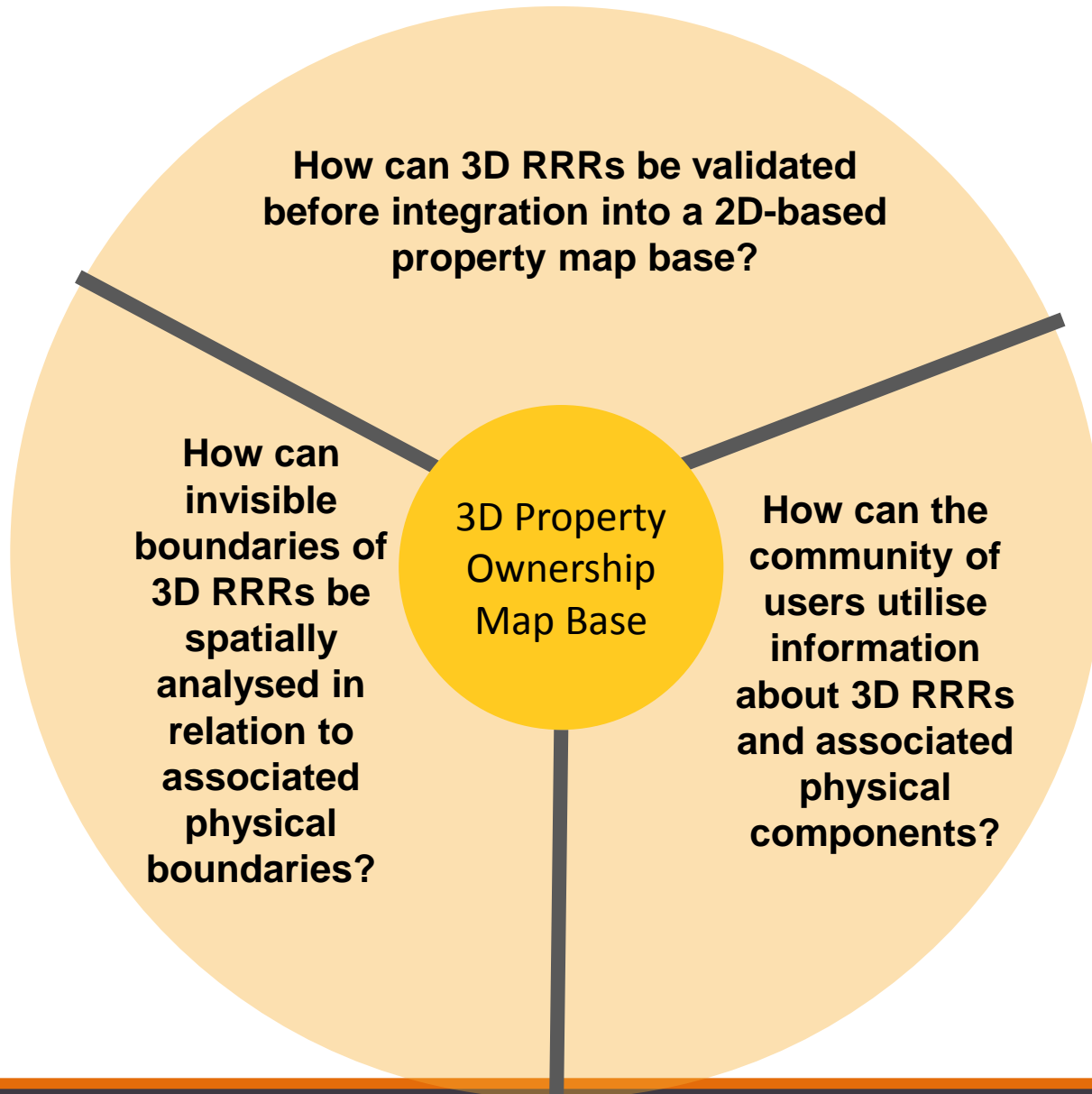MELBOURNE

Questions investigated, 2012-2016

Current challenges

- Victoria duplication related to cadastral map base is estimated to cost $1.8 million annually,

- More than 30 incidents around asset damage are estimated to occur every year in Victoria,

- An incidence of unintended contact with underground fibre cable in Sydney resulted in $1 million worth of damages and business disruption costs of around $30 million,

- Failure to support decision-making: the lack of 3D representation of properties has impacted on the rollout of the National Broadband Network for multi-storey properties.

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Questions to investigate, 2017-2019

How can 3D RRRs be validated before integration into a 2D-based property map base?

3D Property Ownership Map Base

How can invisible boundaries of 3D RRRs be spatially analysed in relation to associated physical boundaries?

How can the community of users utilise information about 3D RRRs and associated physical components?

Approach

This research aims to engineer a 3D property ownership map base by upgrading the current 2D map base to accommodate 3D ownership data derived from regulatory subdivision processes in an urban context.

Objectives:

1. Develop authentication guidelines for spatial integrity of 3D RRRs in properties and infrastructures.

2. Identify spatial relationships for analysis of 3D RRRs in relation to physical components of buildings and infrastructures.

3. Review impact of technical changes to recommend accompanying changes in organisational workflows and policy frameworks.
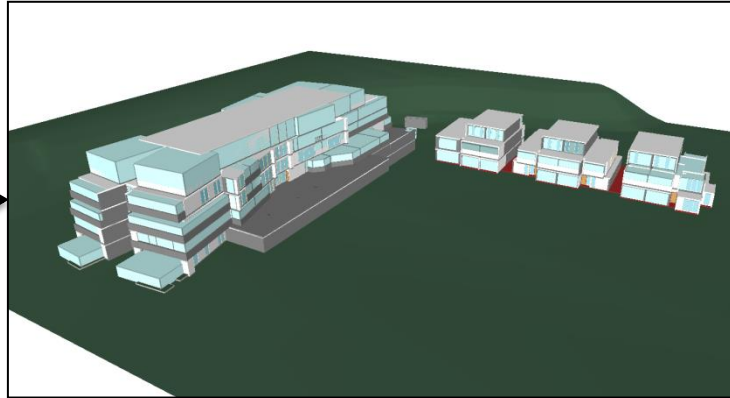
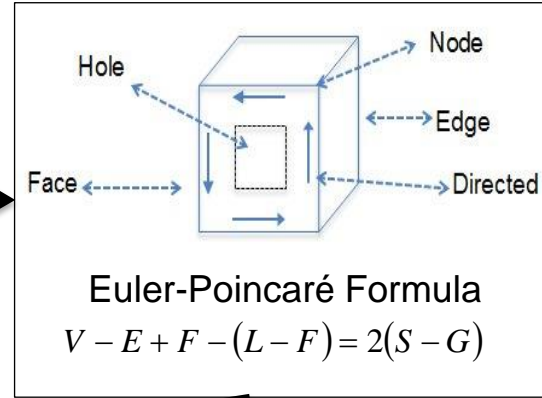# 3D Map Base for Smart Urban Land Administration
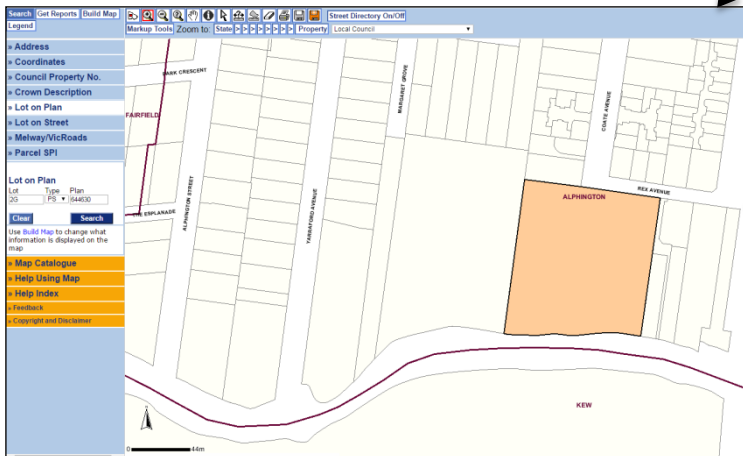
Subdivision Plan
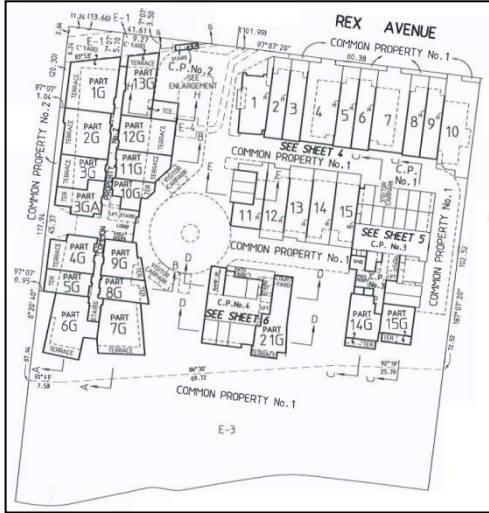
3D Digital Subdivision Model

Validate Model

Euler-Poincaré Formula

$$V - E + F - (L - F) = 2(S - G)$$

Integrate 3D Model into Map Base

3D Spatial Operations on Map Base

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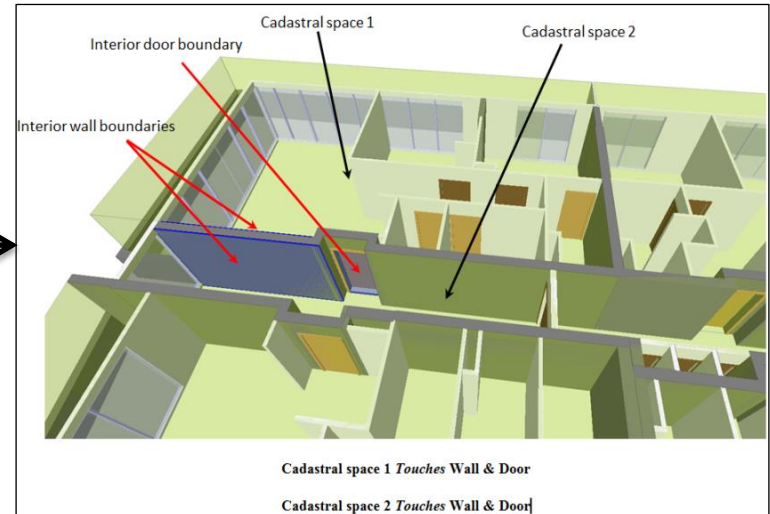
Research Team for 3D Map Base Project

- Chief Investigators
  - Prof Rajabifard
  - Dr Kalantari
  - Prof Williamson

- Industry Partners and Advisers
  - Land Use Victoria: Mr Briffa, Dr Olfat, Dr Shojaei
  - City of Melbourne : Mr Hassett
  - ICSM: Mr Tulloch

- Research Associates and PhD students
  - Mr Marwick (Senior Industry Adviser)
  - Mr Atazadeh
  - 3 PhD Students (TBA)

3D Map Base for Smart Urban Land Administration

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