



Collaboration, Innovation and Resilience: Championing a Digital Generation

Brisbane, Australia 6-10 April

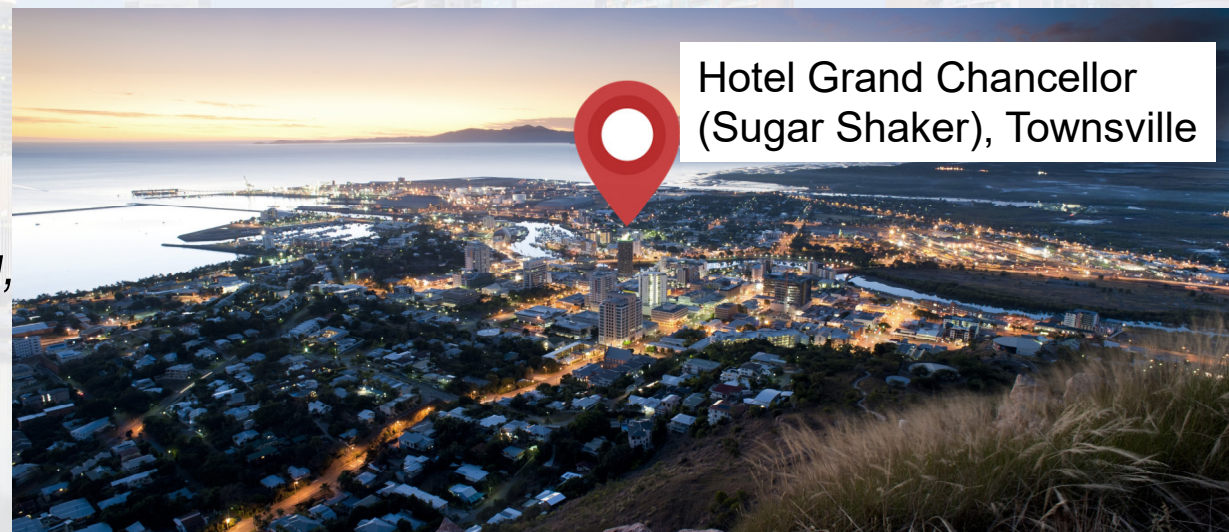
Integration of LiDAR to Enhance the Digital Representation of Cadastral Parcels in Queensland

Tahlia Seeto, Garry Thomson and Jessica Watson

Senior Spatial Information Officers Authors

*Queensland Government Department of
Natural Resources and Mines, Manufacturing,
and Regional and Rural Development*

FIG2025, Commission 7



Hotel Grand Chancellor
(Sugar Shaker), Townsville



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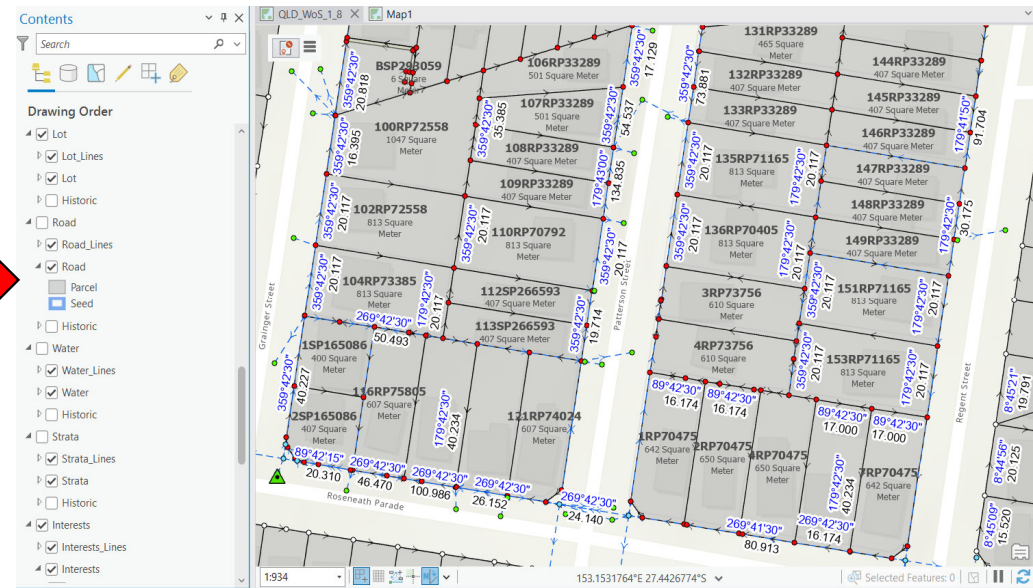
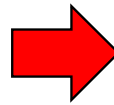
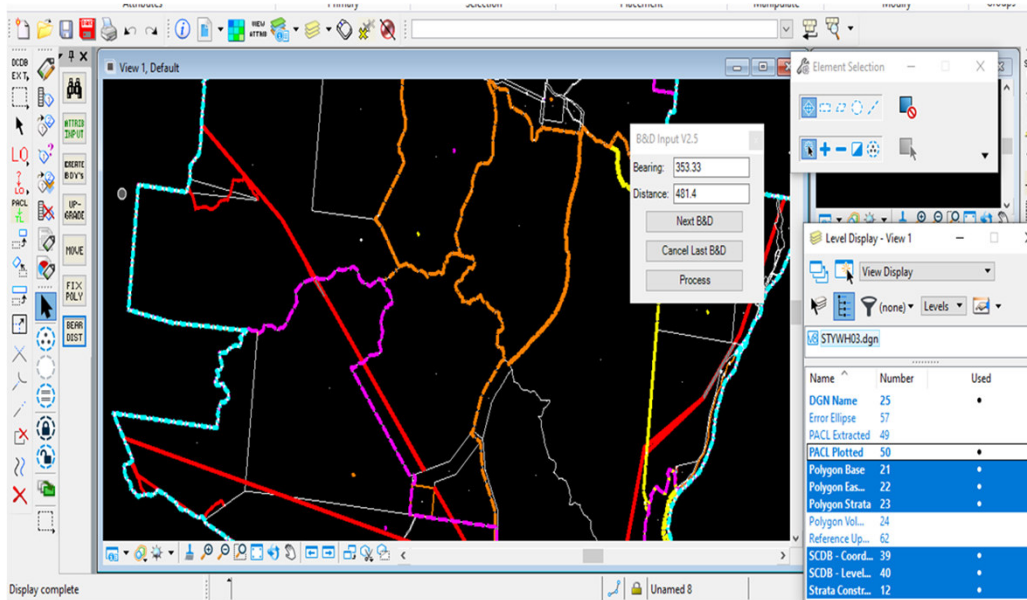


Cadastral Modernisation Program

AIM: transition our spatial cadastre data and operations from the current legacy database platforms to Esri ArcGIS Enterprise



History of the Cadastre



Current system: MicroStation

- No ability to keep line attributes
- Only 2D digital representation possible

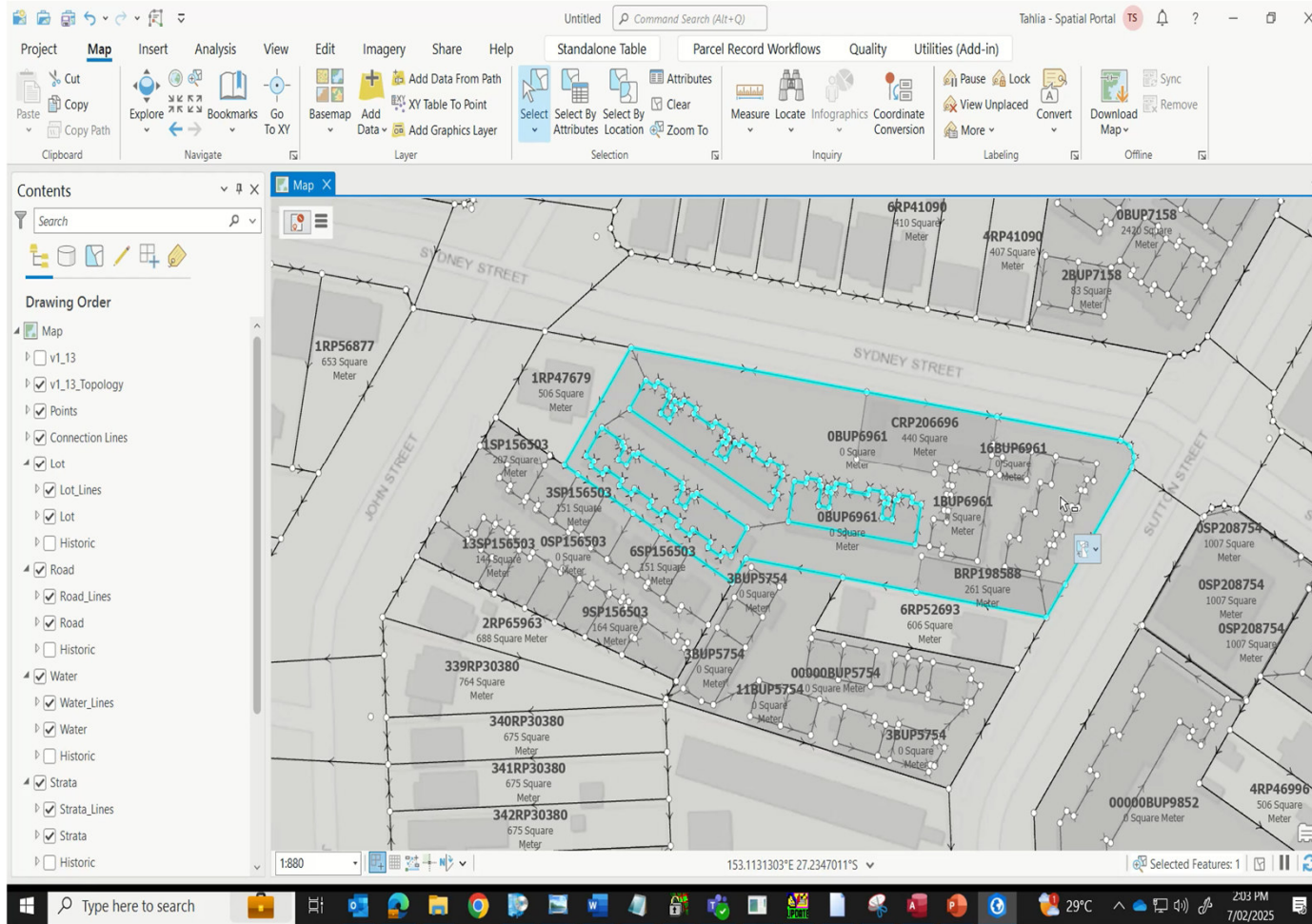
Future system: Esri Parcel Fabric

- Ability to keep attributes for lines, polygons and points
- 3D representation

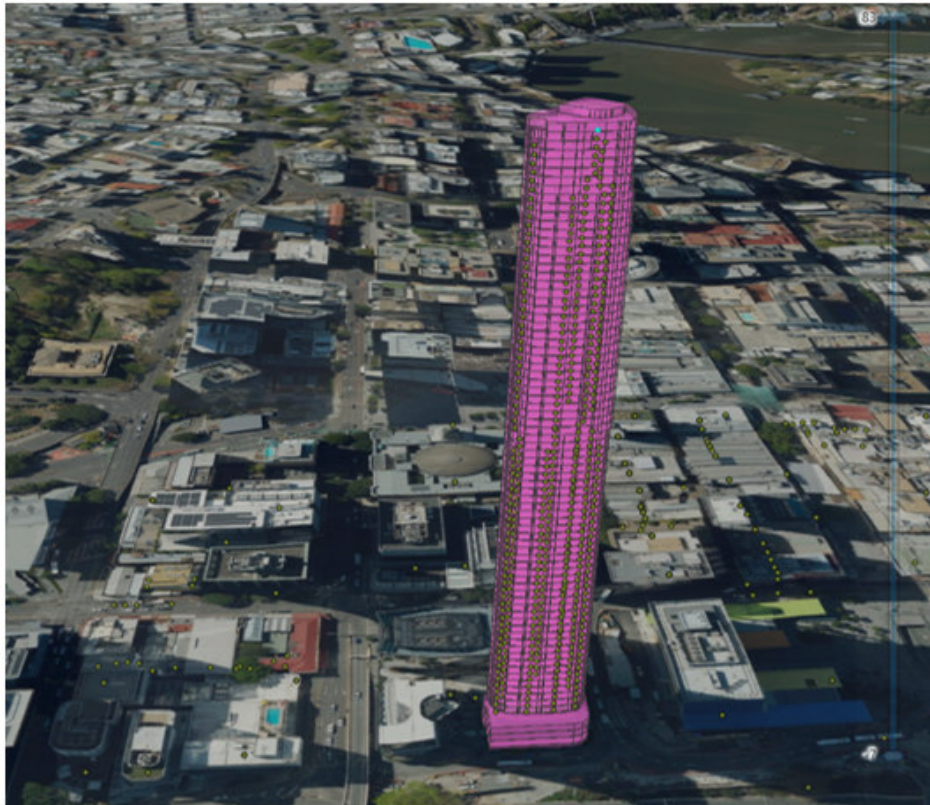


**Queensland
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What is strata?



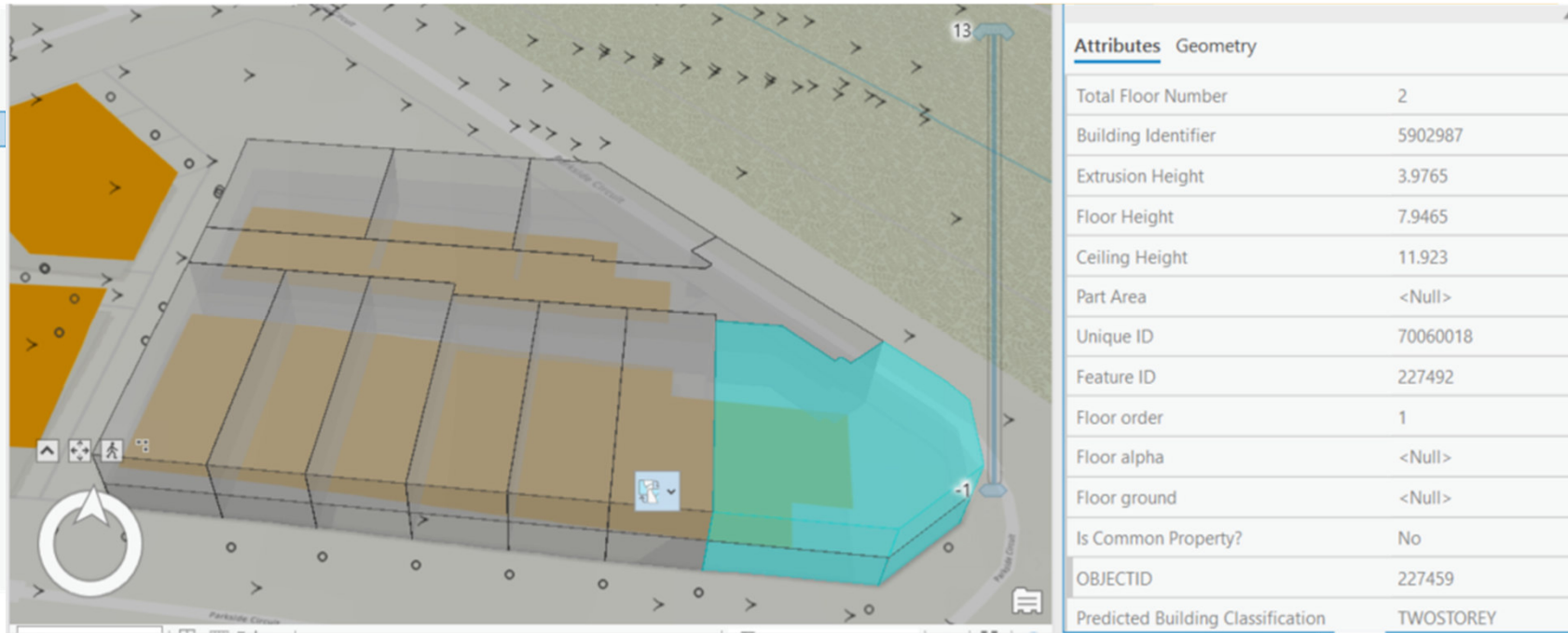
New Super Detailed Strata Capabilities



Lot	8003
Plan	SP293017
Lot/plan	8003SP293017
Unit type	U
Unit number	8003
Unit suffix	<Null>
Floor type	<Null>
Floor number	80
Floor suffix	<Null>
Property name	The One
Street number	8
Street name	Adelaide
Street type	Street
Street suffix	<Null>
Street name/type	Adelaide Street
Locality	Brisbane City
Local authority	Brisbane City
State	QLD
Address	UB003/8 Adelaide Street Brisbane
Address status	P
Address standard	UK
Lot/plan status	C
Address primary ID	3151361
Geocode type	PC
Latitude	-27.47038
Longitude	153.022059
Elevation	244.72



LiDAR - QRA



- Building outlines created from captured LiDAR on behalf of Queensland Reconstruction Authority (QRA) and used for natural disaster events
- LiDAR data integrated into Parcel Fabric Strata layer produces floor level 3D visualisations with minimal capture
- With additional capture of each parcel within the base lot, individual units within an apartment complex, individual townhouses etc can be visualised in 3D

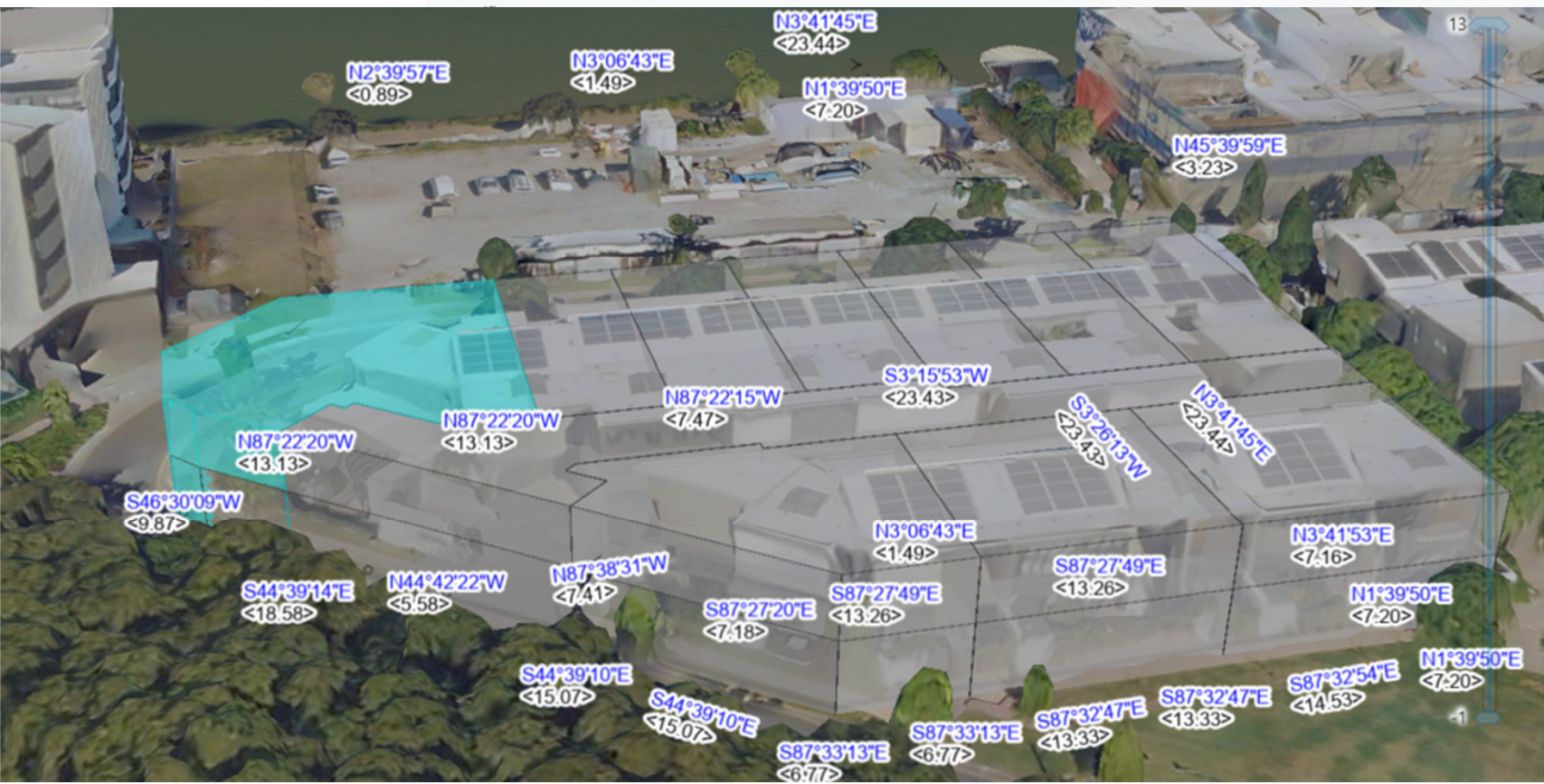
Calculations - scripting

$$\text{Total Number of Floors} = \frac{\text{Maximum Building Elevation} - \text{Predicted Habitable Floor Elevation}}{3}$$

$$\text{Extrusion Height} = \frac{(\text{Maximum Building Elevation} - \text{Predicted Habitable Floor Elevation})}{\text{Total Number of Floors}}$$

$$\text{Floor Height} = \text{Predicted Habitable Floor Elevation} + (\text{Extrusion Height} * \text{Floor Order})$$

$$\text{Ceiling Height} = \text{Floor Height} + \text{Extrusion Height}$$

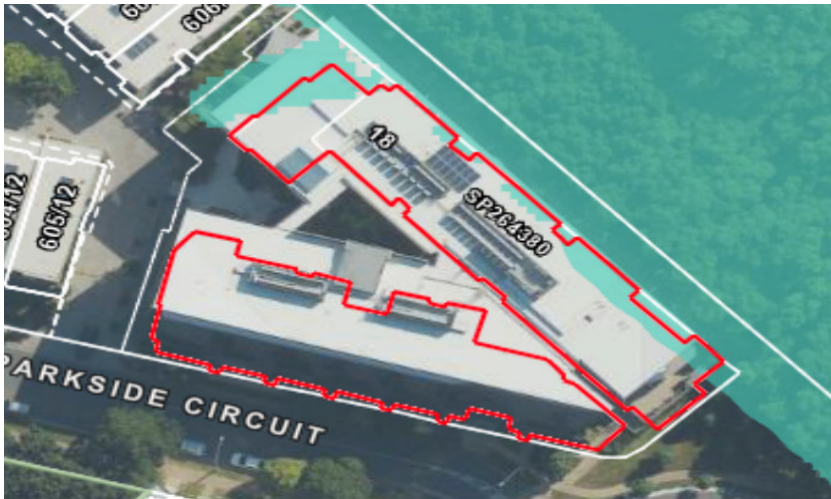


Change the selection.

Strata : Strata (1)
10SP253285

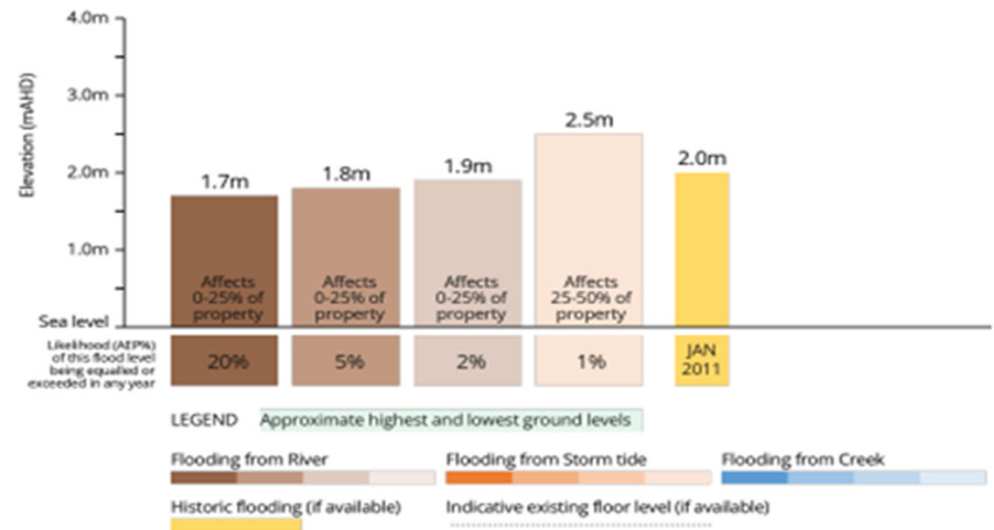
Attributes	Geometry
Total Floor Number	2
Building Identifier	5902987
Extrusion Height	3.9765
Floor Height	7.9465
Ceiling Height	11.923
Part Area	<Null>
Unique ID	70060018
Feature ID	227492
Floor order	1
Floor alpha	<Null>
Floor ground	<Null>
Is Common Property?	No
OBJECTID	227459
Predicted Building Classification	TWOSTOREY
Minimum Building Elevation (m)	5.628

Brisbane City Council case study

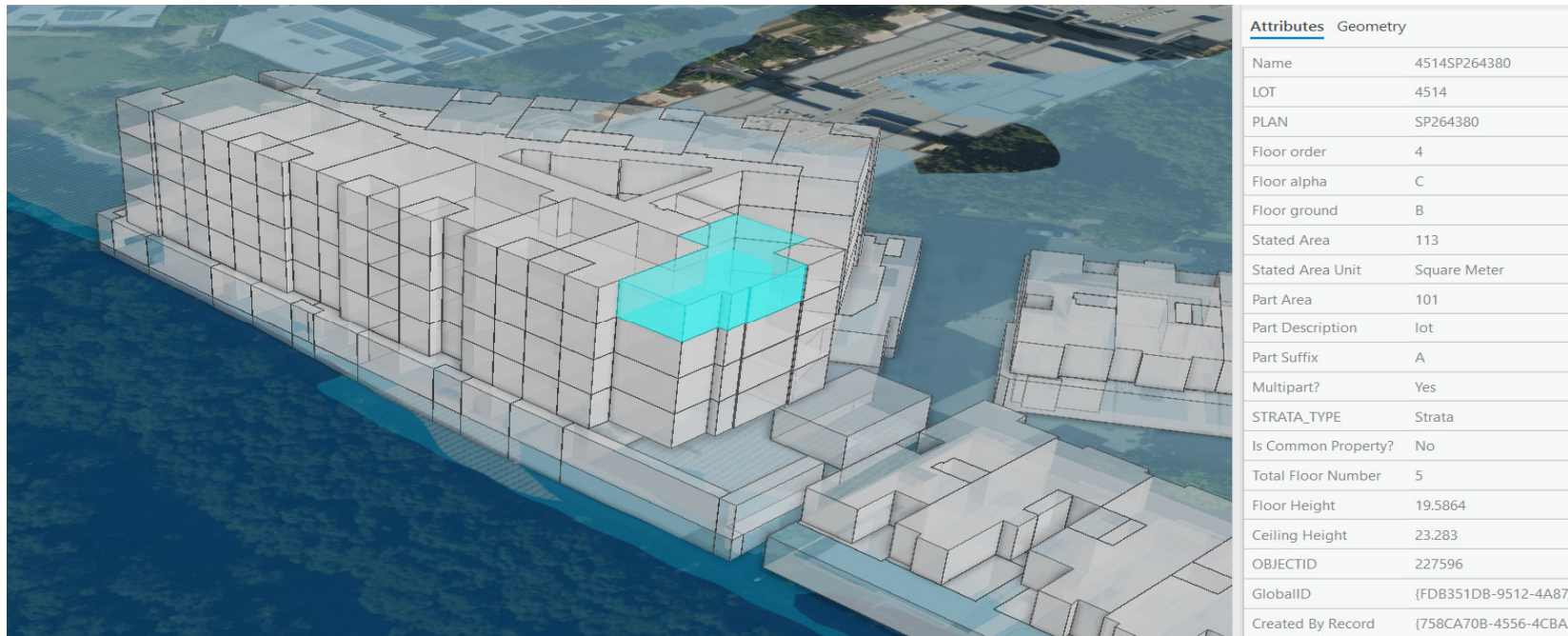


- Brisbane City Council FloodWise Report.
- Currently single multipart 2D object over both buildings.
- Inability to separate individual parcels or even buildings.

- 1% AEP for river, creek or storm flood extent.
- All units are rated same, irrespective of their position within the complex.

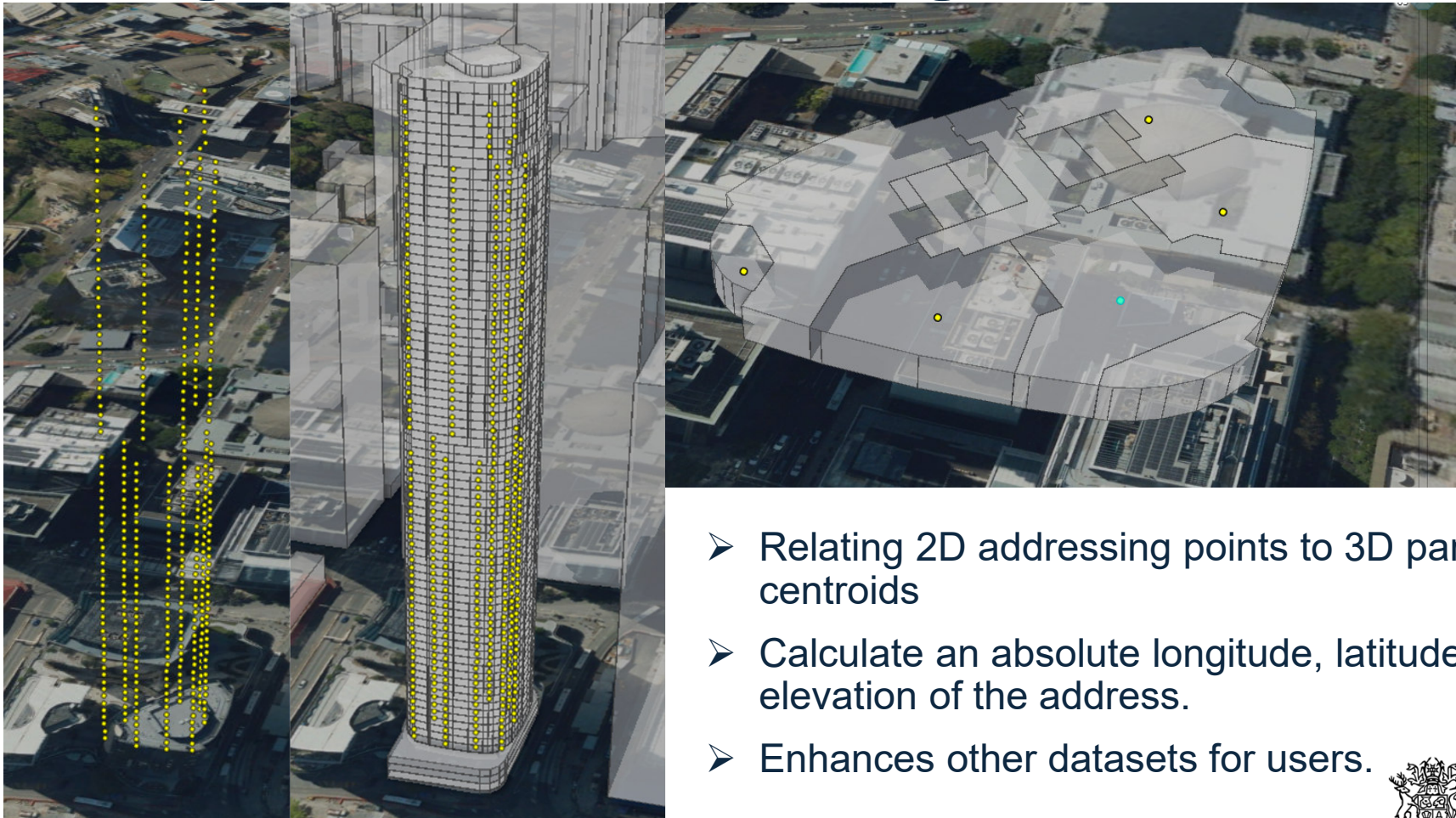


Digital representation of strata parcels



- Individual described spatial objects of part of a parcel – lot, balcony, garage etc.
- Defined absolute floor and ceiling elevation values for each parcel.
- Interaction with separate services, even third-party data.

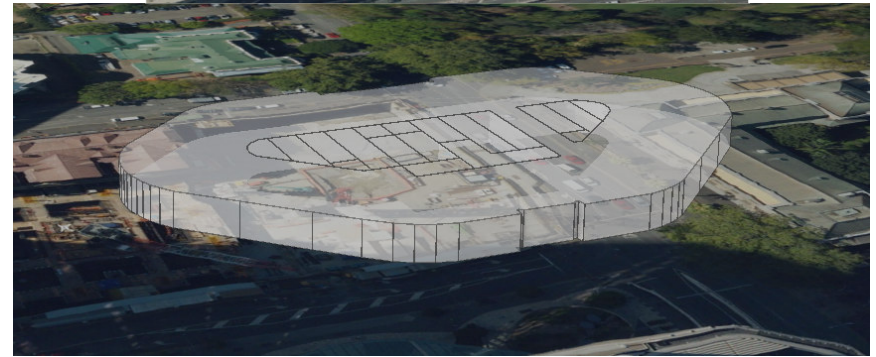
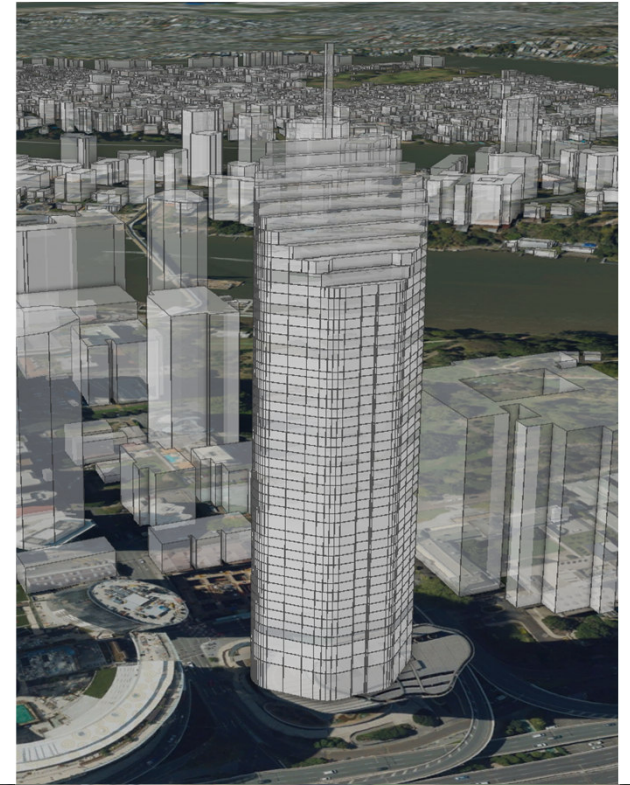
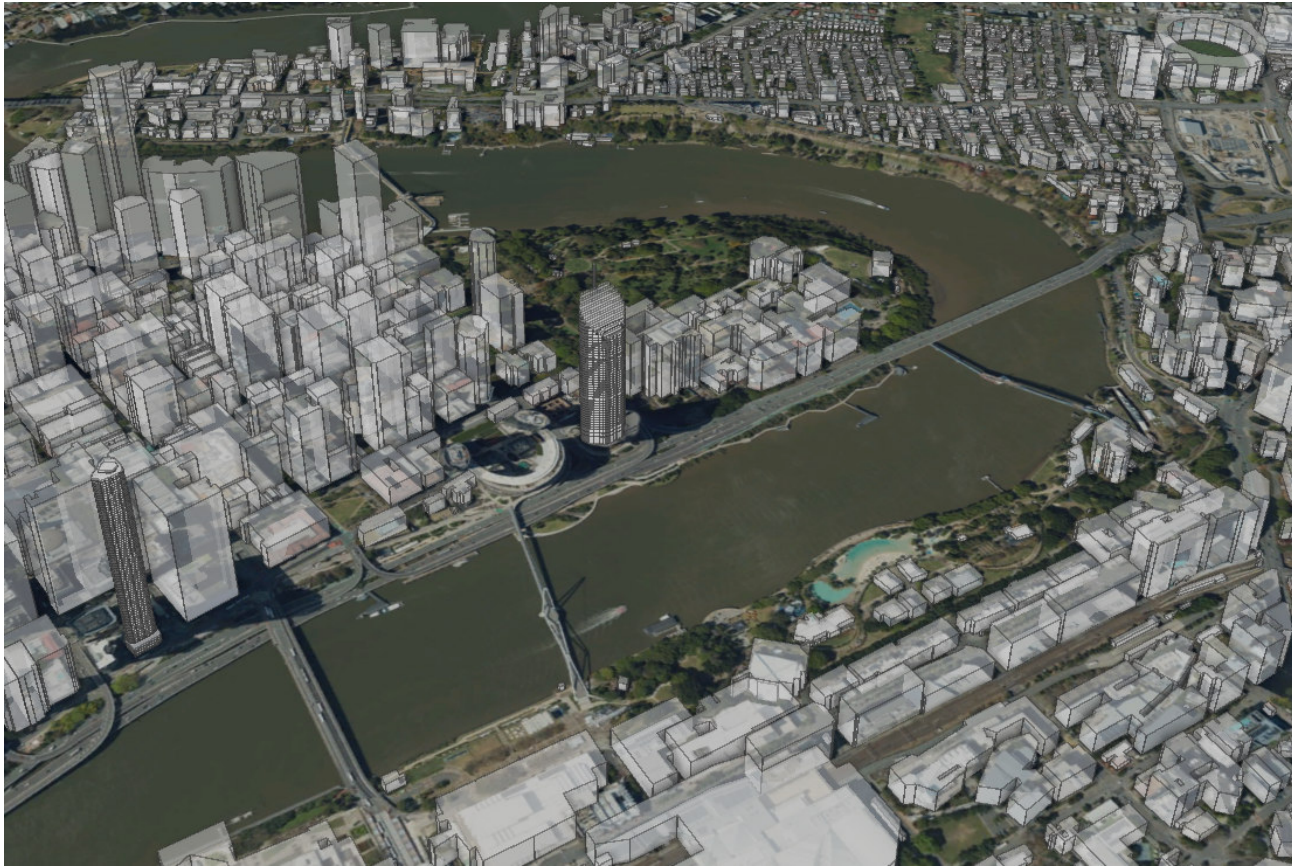
Taking this further – relating feature services



Property name	The One
Street number	8
Street name	Adelaide
Street type	Street
Street suffix	<Null>
Street name/type	Adelaide Street
Locality	Brisbane City
Local authority	Brisbane City
State	QLD
Address	U6303/8 Adelaide Street Brisb
Address status	P
Address standard	UK
Lot/plan status	C
Address primary ID	3151286
Geocode type	PC
Latitude	-27.470488
Longitude	153.021939
Elevation	192.717
floororder	63

- Relating 2D addressing points to 3D parcel centroids
- Calculate an absolute longitude, latitude and elevation of the address.
- Enhances other datasets for users.

Future goals and aspirations





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8 DECENT WORK AND
ECONOMIC GROWTH

1st relevant
SDG



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE

2nd relevant
SDG



3rd relevant
SDG

11 SUSTAINABLE CITIES
AND COMMUNITIES



**SUSTAINABLE
DEVELOPMENT GOALS**

International Federation of Surveyors supports the
Sustainable Development Goals

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Thank you!

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