



**WORKING  
WEEK 2025**



**Locate25**  
THE NATIONAL GEOSPATIAL CONFERENCE



Collaboration, Innovation and Resilience:  
Championing a Digital Generation



**Geospatial**  
Council of Australia

Brisbane, Australia 6-10 April

**Jacobs**

Presented at the FIG Working Week 2025,  
6-10 April 2025 in Brisbane, Australia

# Arts Queensland Cultural Centre

*Using 3D scanning to safeguard our national treasures.*

*Jim Avens - Jacobs*

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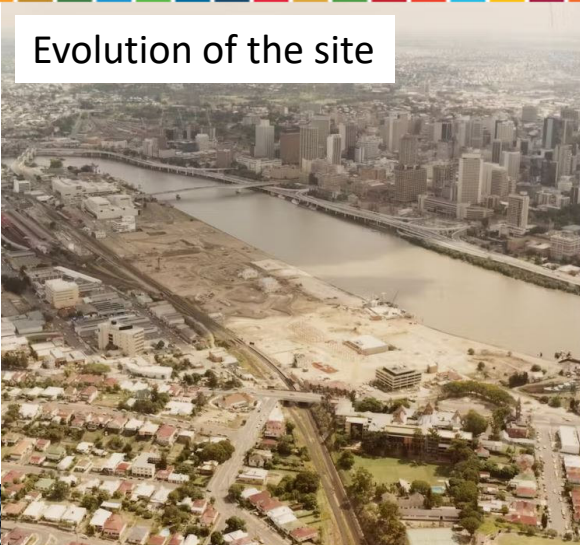
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Evolution of the site



Word Expo 1988



Robin Gibson



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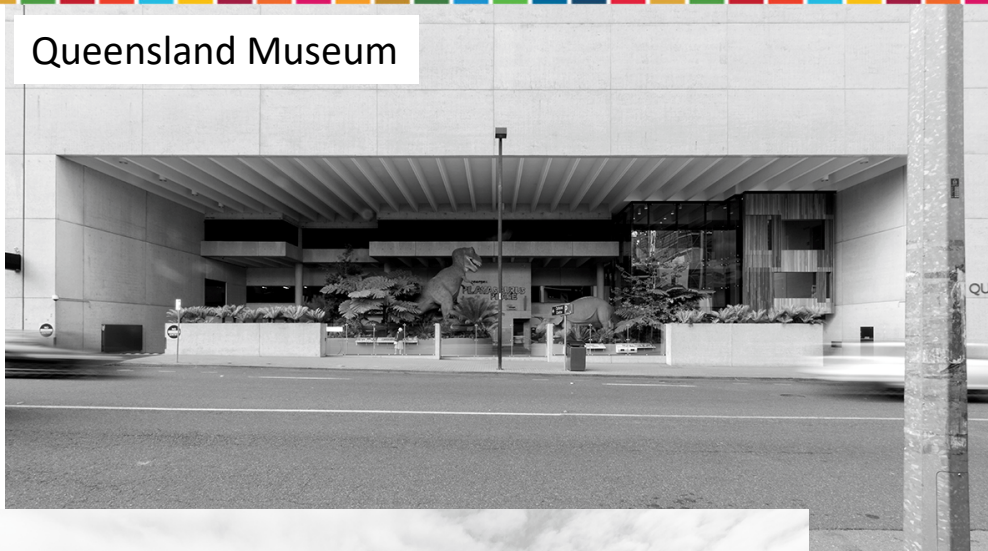
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Queensland Museum



Queensland Art Gallery



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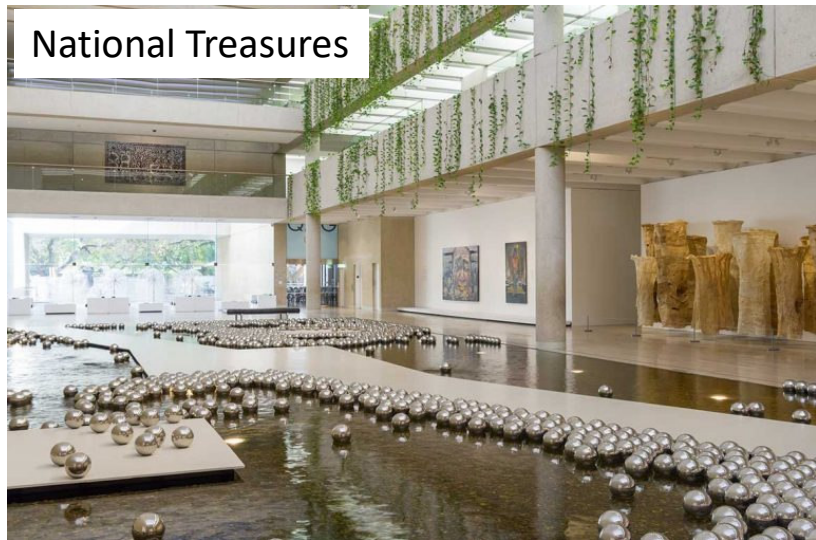
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## National Treasures



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Find Address, Lot Plan or Suburb

Flood levels 1974



**Brisbane City Council**  
Flood Information

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Flood levels 2011



 **Brisbane City Council**  
Flood Information

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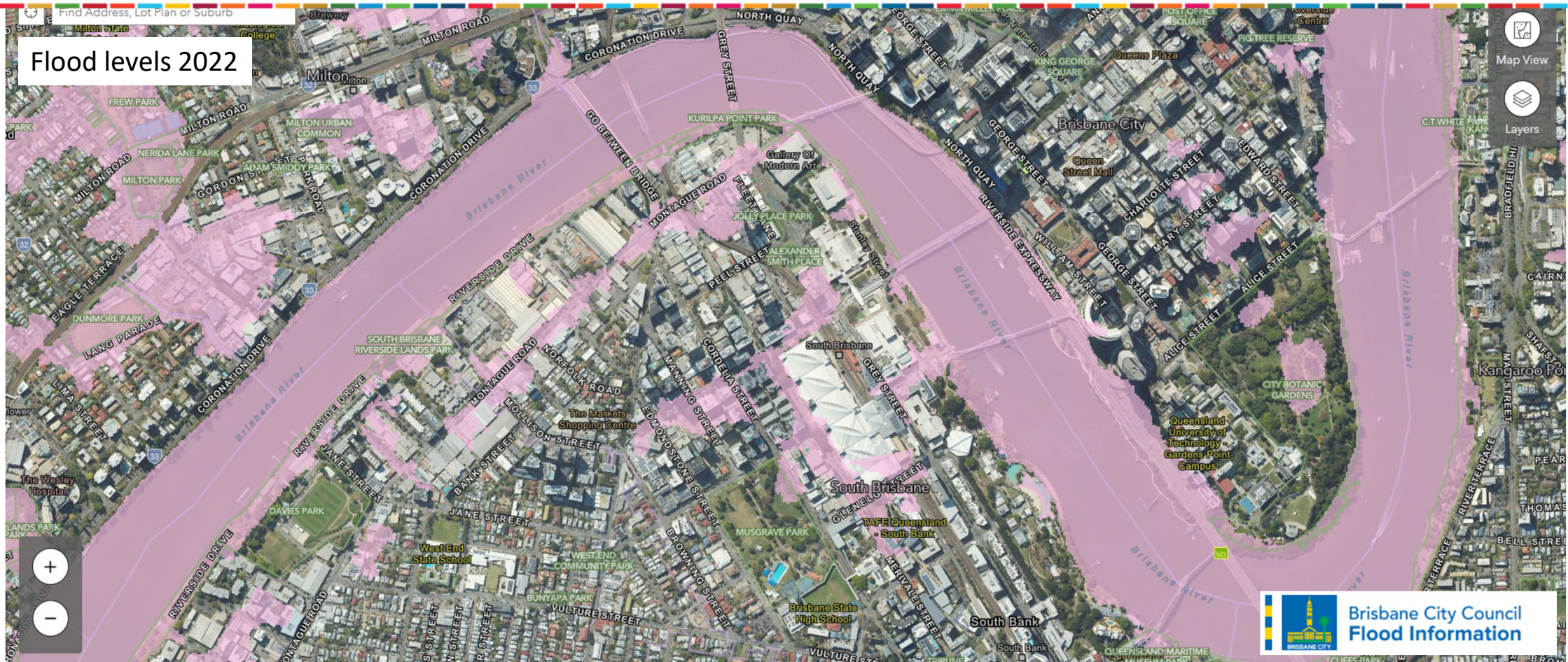
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Flood levels 2022



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## The Reason WHY - Flooding



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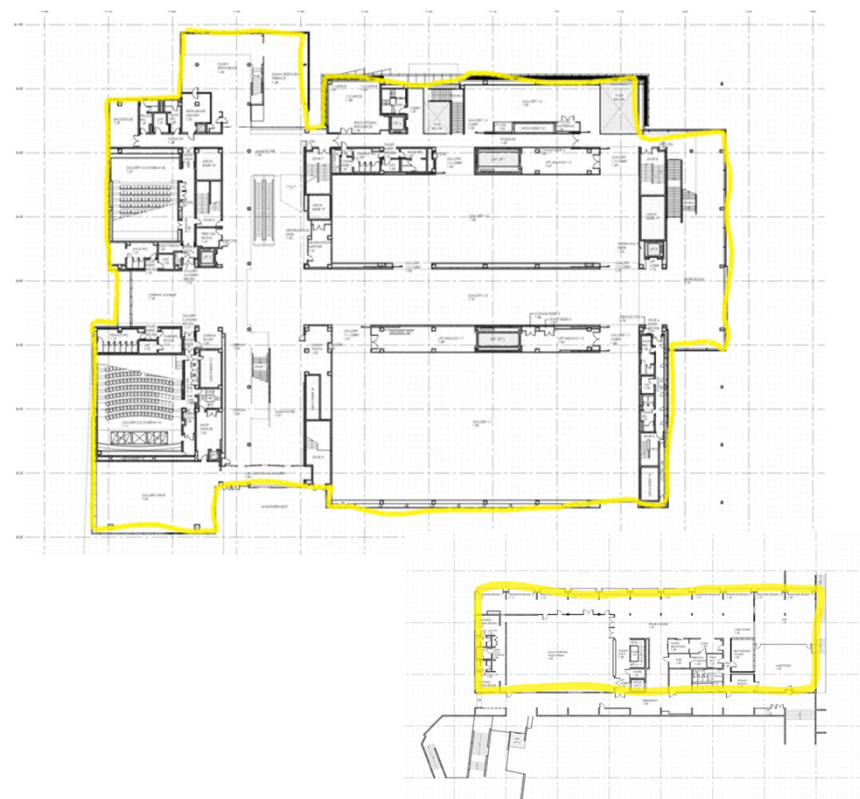
## The Challenge:

### To develop a digital mechanism to address key issues

- Flood Mitigation & Flood Resilience
- Asset Management
- Planning for Future Infrastructure Investment

### Constraints

- ❖ Less than half the buildings on site had Revit data
- ❖ None of the civil utilities were available digitally
- ❖ Most records were old scanned pdf drawings



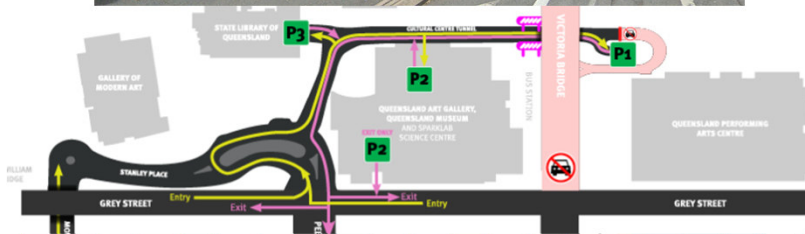
Filling the gaps by traditional methods was not feasible, so

Where did we start?



## Why Terrestrial Scan?

- Multi Levelled
- Extremely Complex
- Interconnectivity between buildings
- Vertical tolerance
- Design Level cloud







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## Data Capture Methods

- Leica RTC360 Terrestrial Scanner
- Leica P50 Terrestrial Scanner
- GeoCue TrueView Lidar and M350 Air Frame
- Leica MS60 Total Station



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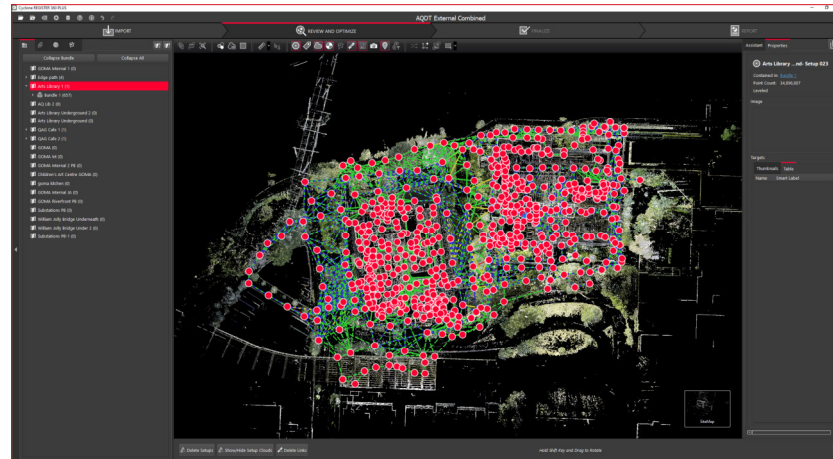
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## 3D Laser Scanning

- 4000 Scans
- Highly accurate
- Information Rich
- 3D Point cloud
- 360 Panoramic imagery



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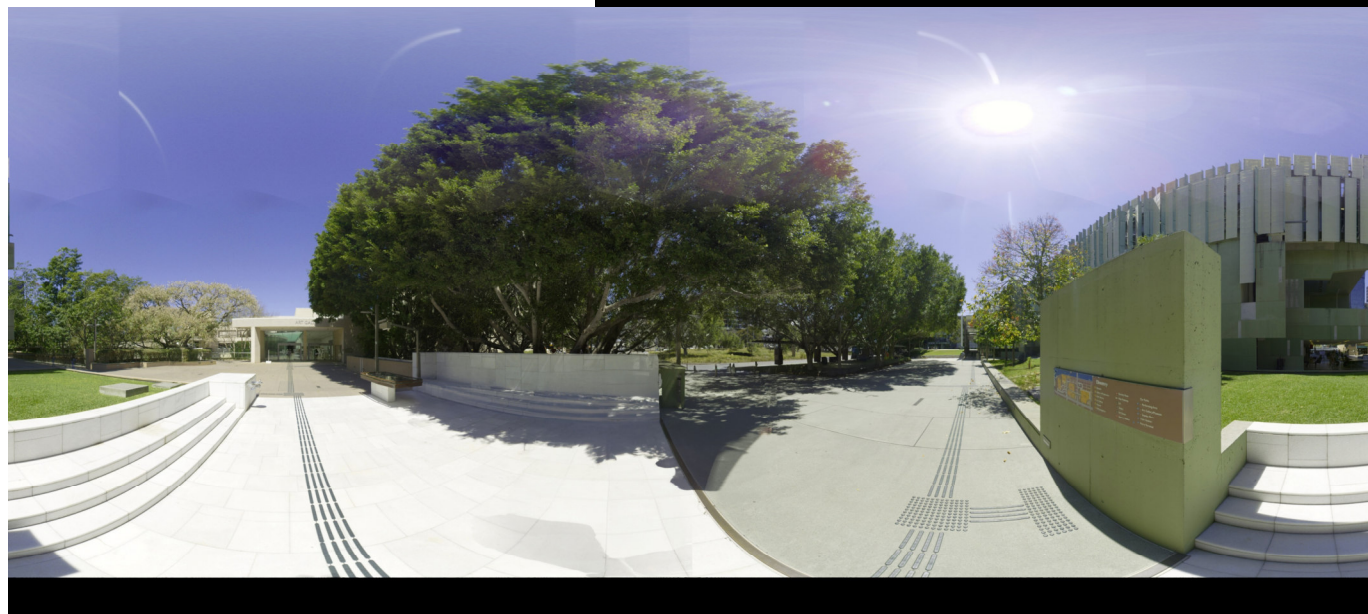


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## Terrestrial 360 Imagery

- High Resolution HDR Imagery
- Virtual Site visit
- Asset management
- Asset review
- Asset Conditioning







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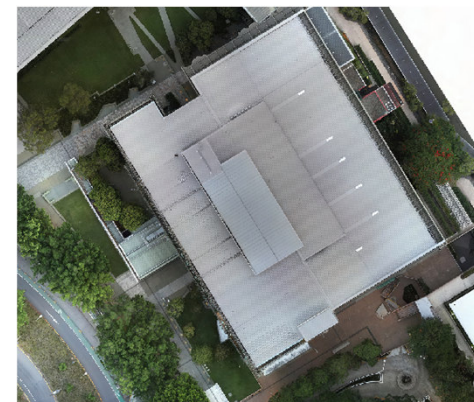
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## RPA Lidar and Imagery

- Large amount of planning
- Enable roofs to be captured
- Classified and joined to terrestrial
- Imagery
- Complete entire precinct



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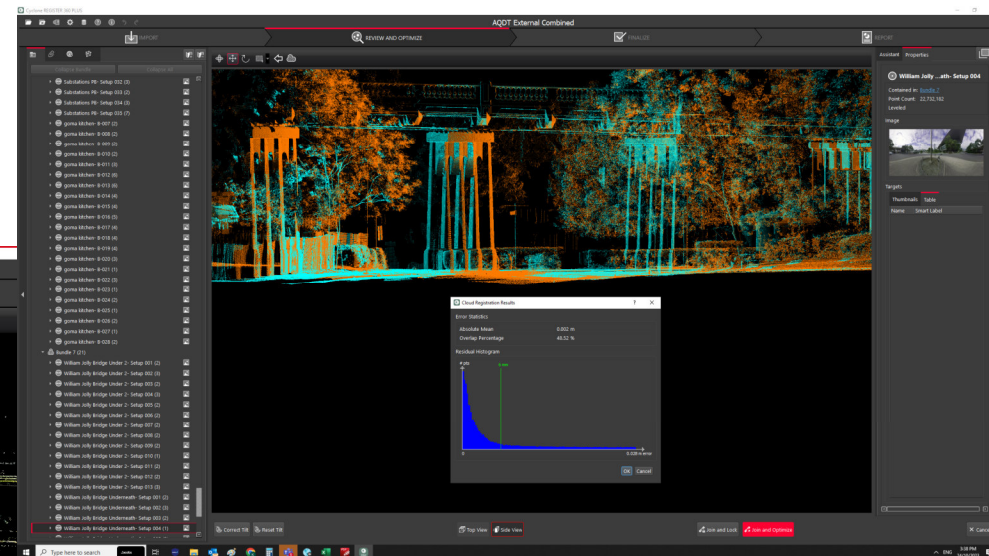
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# Registration

- Accuracy
- Data integrity
- Rigorous Adjustment
- Foundation Dataset



## Error Results for Bundle 1

Setup Count: 657  
Link Count: 1503  
  
Strength: 59 %  
Overlap: 46 %

Bundle Error  
0.004 m ✓

Overlap  
46 % ✓

Strength  
59 % ✓

Cloud-to-Cloud

Target Error

0.004 m ✓

--



## Point Cloud

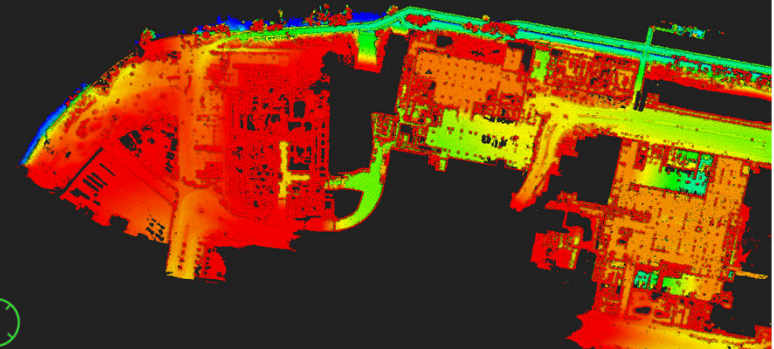
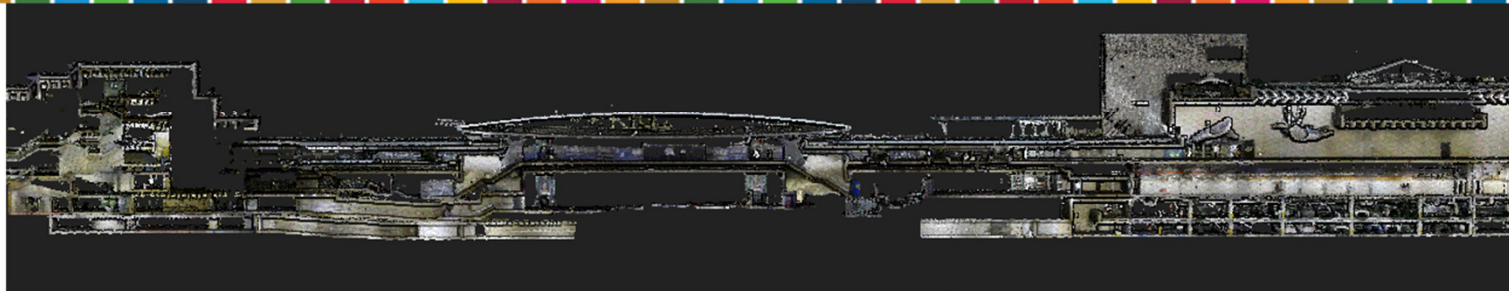
- Foundation dataset for creation of BIM models
- Asset identification from imagery
- Visualisation
- Pointerra





## Justification Terrestrial Scan

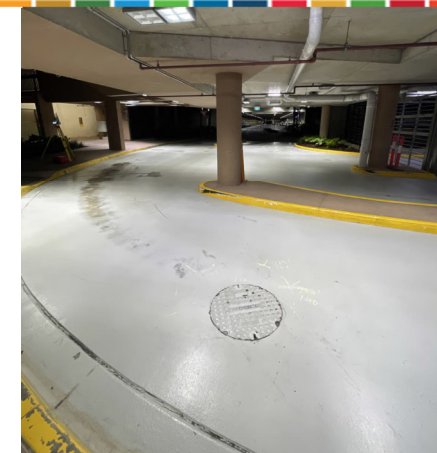
- Multi Levelled
- Extremely Complex
- Interconnectivity between buildings
- Vertical tolerance
- Design Level cloud





## Utilities

- Hands Dirty
- Methodical tracing
- Scanning and Photos
- Survey attribution
- FME used for models





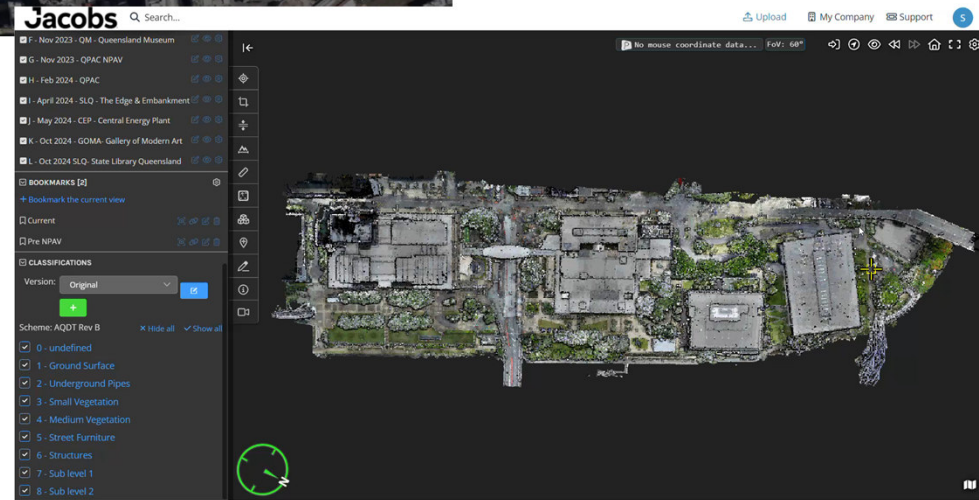
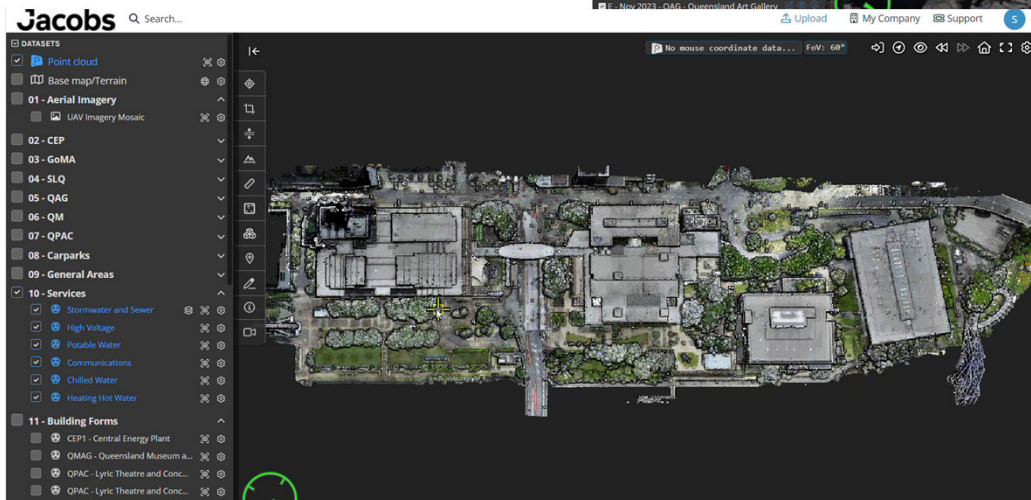
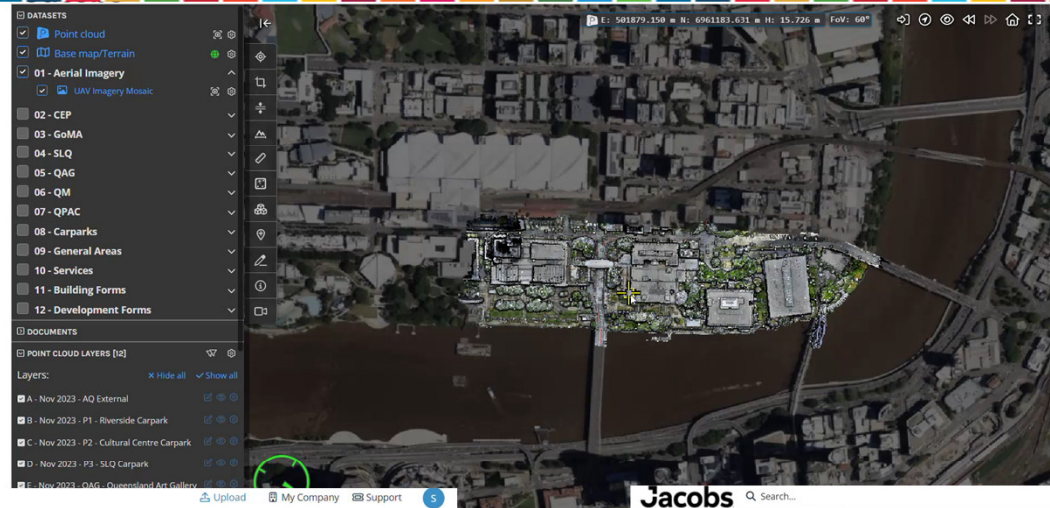
## Power of the Utility Model





## Pointerra

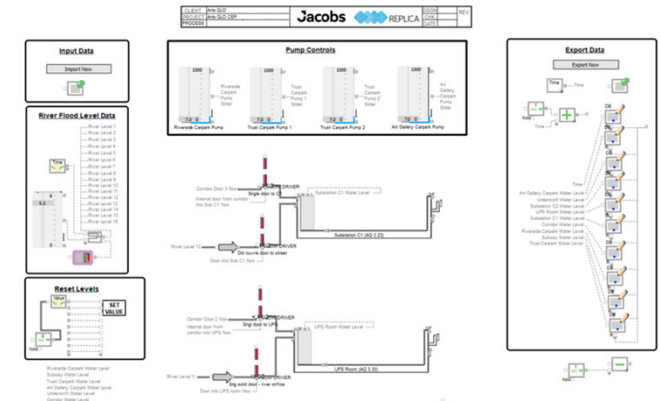
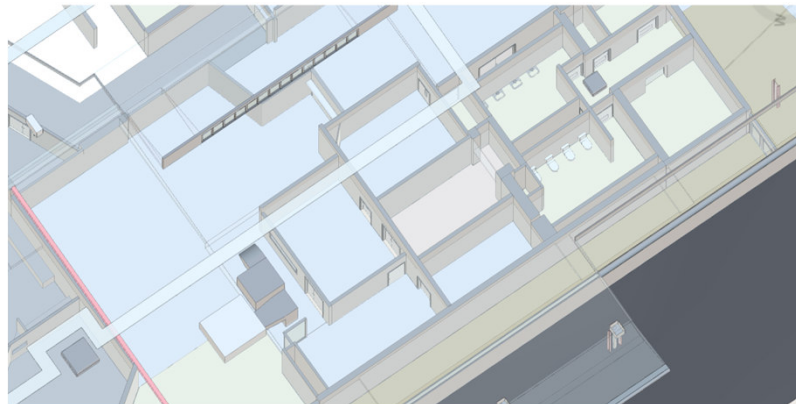
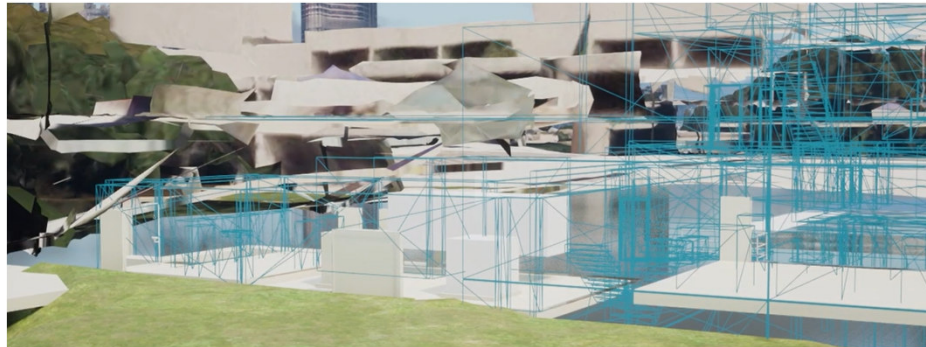
- Fast
- Hosted online
- Common Data Environment
- Easily understand data relationships
- Useable by the masses



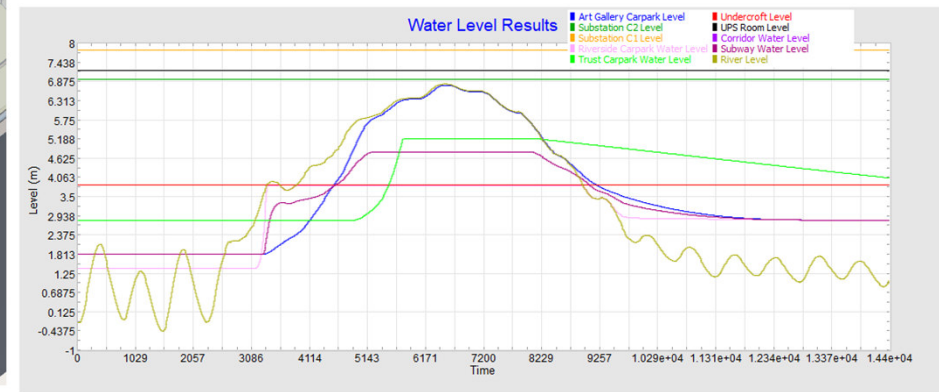


## Digital Smarts Flood Modelling & Simulation

- Building space geometry
- Complex level and building inter-relationship
- Flood and scenario modelling
- Design Level cloud
- Asset assessment



### RESULTS





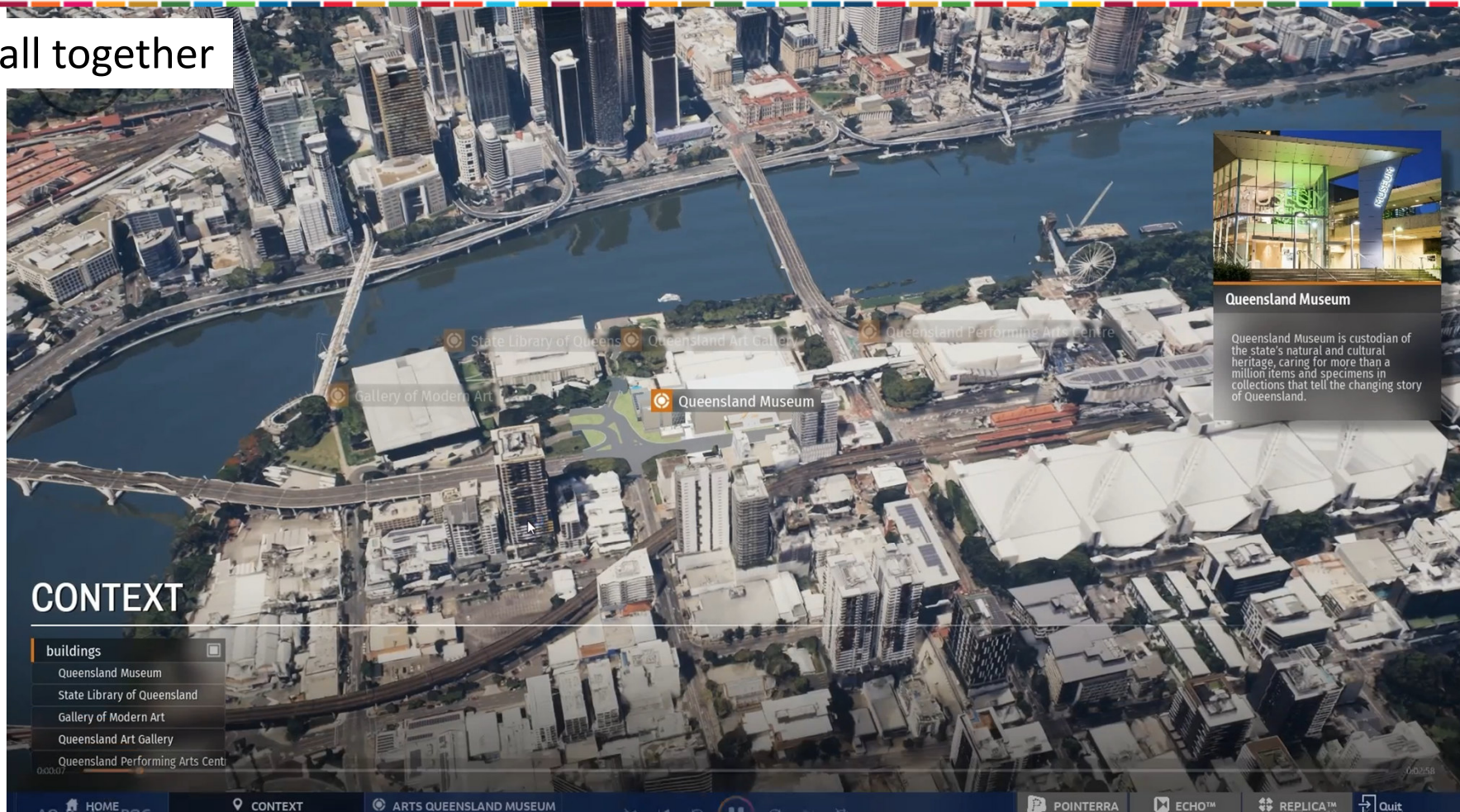
## Flood Engineering Solutions

- Risk Based
- Key infrastructure prioritised
- Interconnectivity between building
- Design Level cloud utilised for design





## Bringing it all together





## What's Next

- Unable to protect entire site
- Risk based approach to critical infrastructure
- Ultimately AQ precinct in a more resilient position
- NPAV (New Performing Arts Venue) completed late 25 and open to public early 26

