

# Adopting Digital Construction in the Field – Robertson Construction and the BIM 360 Journey

John Paul Mann – Robertson Construction  
Emma Dowey - Autodesk



# Emma Dowey

Manager - UK & Ireland Construction  
Customer Success



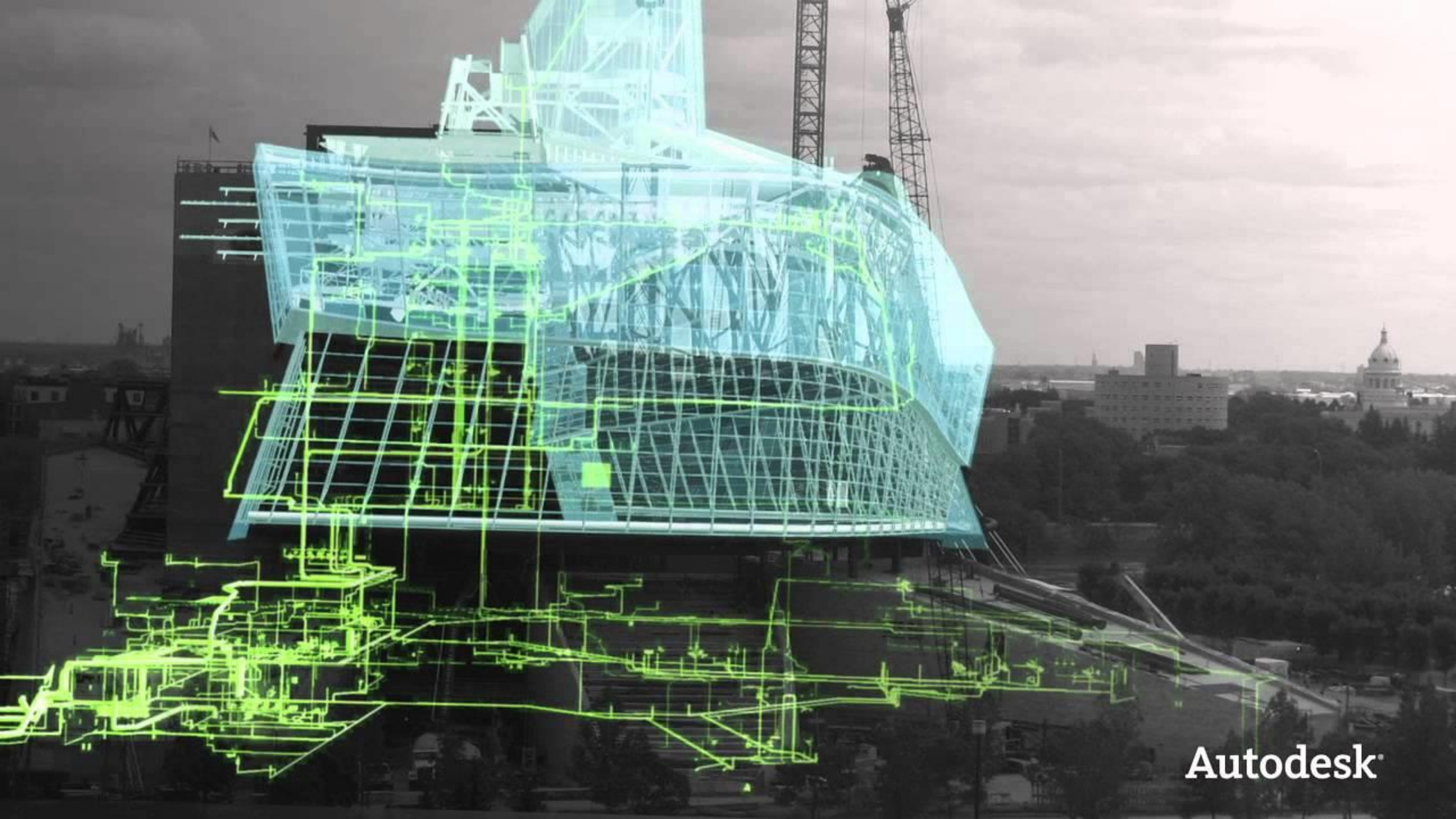


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Autodesk®





AUTODESK

Autonomous construction 4

Cloud & real time collaboration 8

Pre-fabrication & modular construction 1

Advanced building materials 2

Augmented reality & virtualization 5

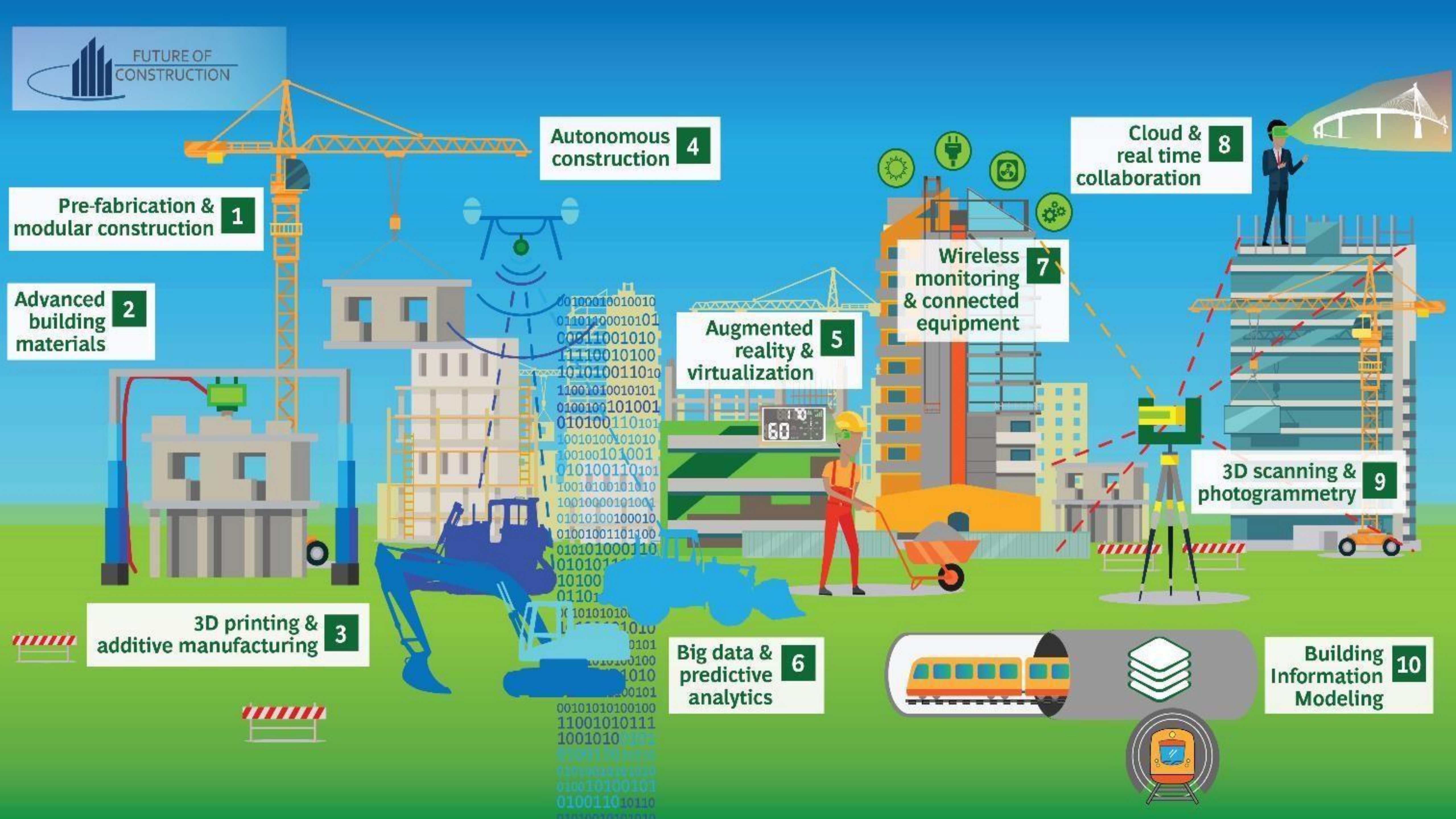
Wireless monitoring & connected equipment 7

3D scanning & photogrammetry 9

3D printing & additive manufacturing 3

Big data & predictive analytics 6

Building Information Modeling 10

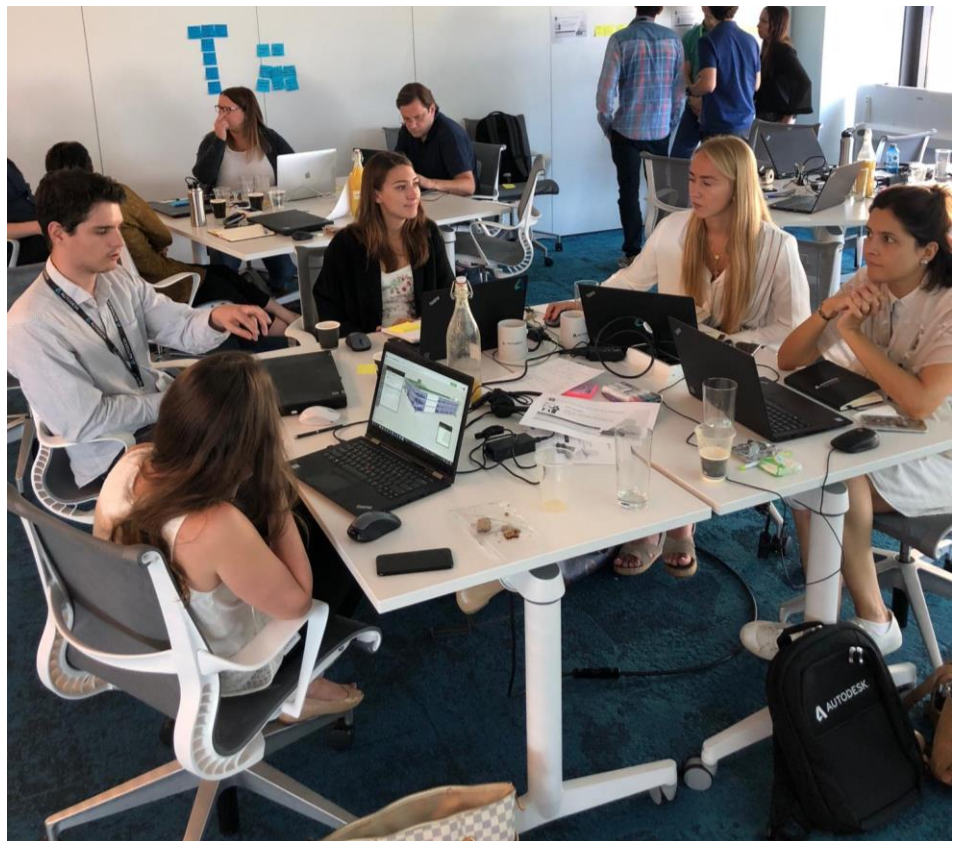
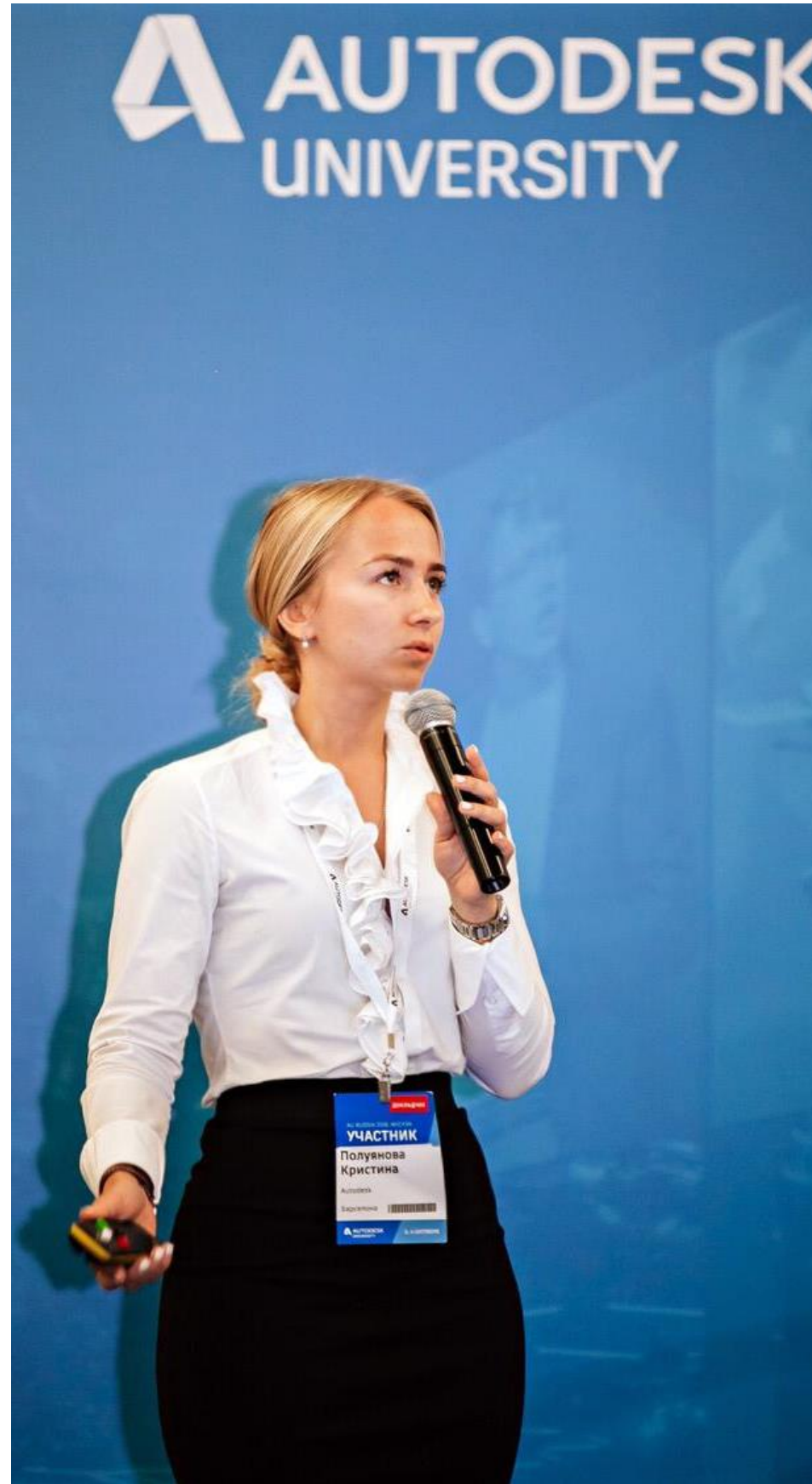






WHAT REALLY  
MATTERS?

PEOPLE



PEOPLE



“Robertson has invested in digital technology, not only in the adoption of BIM 360 Field software but also in the training of our people and improvement of our processes.”

Elliot Robertson, Chief Operating Officer at Robertson



# John Paul Mann

Senior digital systems coordinator at  
Robertson Construction

In this session will look at how Robertson have embarked on a journey to digitally Construction and the successes and pitfalls of the implementation and adoption of BIM 360 Field and BIM 360 Glue.

# Introducing Robertson

**3000+**

Dedicated and expert employees

**10**

OFFICES, FROM  
INVERNESS TO SHEFFIELD

**22**

BUSINESSES COVERING THE  
ENTIRE BUILT ASSET LIFECYCLE

**£752m**

TURNOVER

**£2bn+**

ORDER BOOK

One of the largest privately  
owned infrastructure groups in  
the UK.





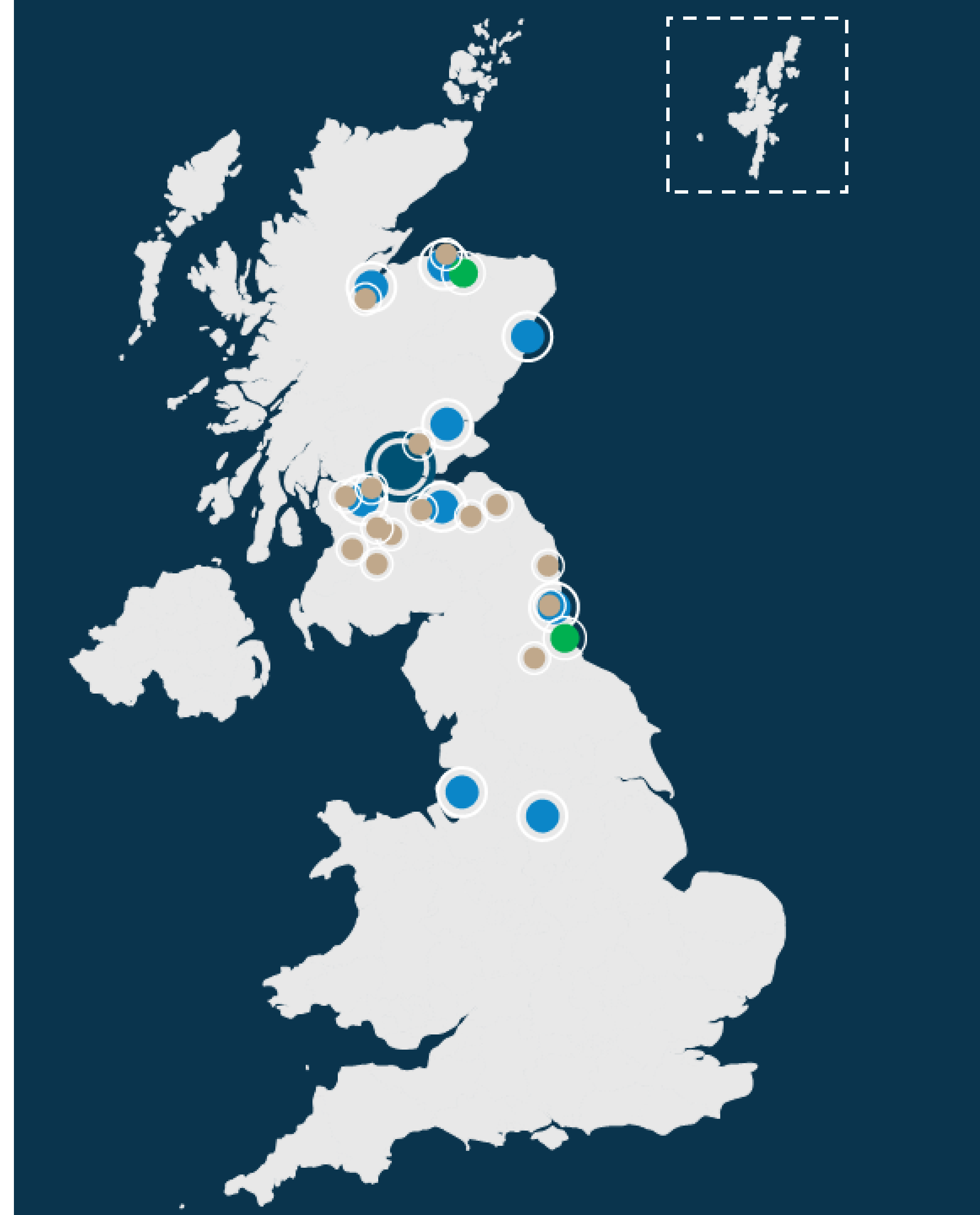
# National strength, local expertise

Founded in Elgin, HQ in **Stirling**.

**Offices** in Inverness, Elgin, Aberdeen, Dundee, Stirling, Edinburgh, Glasgow, Newcastle, Manchester and Sheffield.

Timber engineering **production facilities** in Moray and Northumbria.

Robertson **Homes developments** in Scotland and north England.

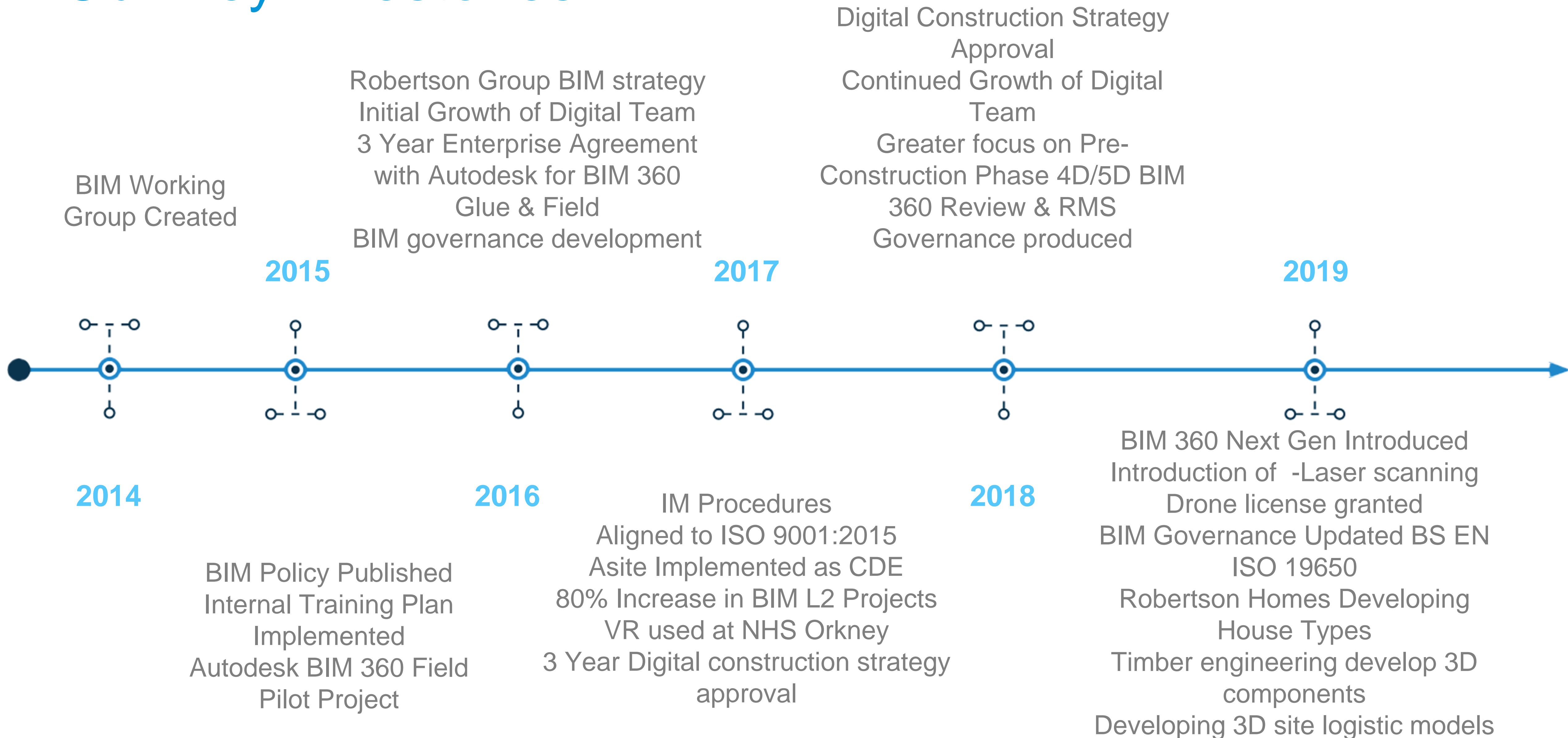


“Our vision for the Robertson Group is to utilise digital technology across all business units and over the full project lifecycle, enabling the Group to be productive, innovative and sustainable.”

Digital construction strategy



# Our Key Milestones





# Robertson Major Projects

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Combining first class project management skills with expertise in local conditions, our major projects division excels at building projects valued from £35m to in excess of £330m. Its track record includes projects in both busy city centre environments and in remote rural locations.

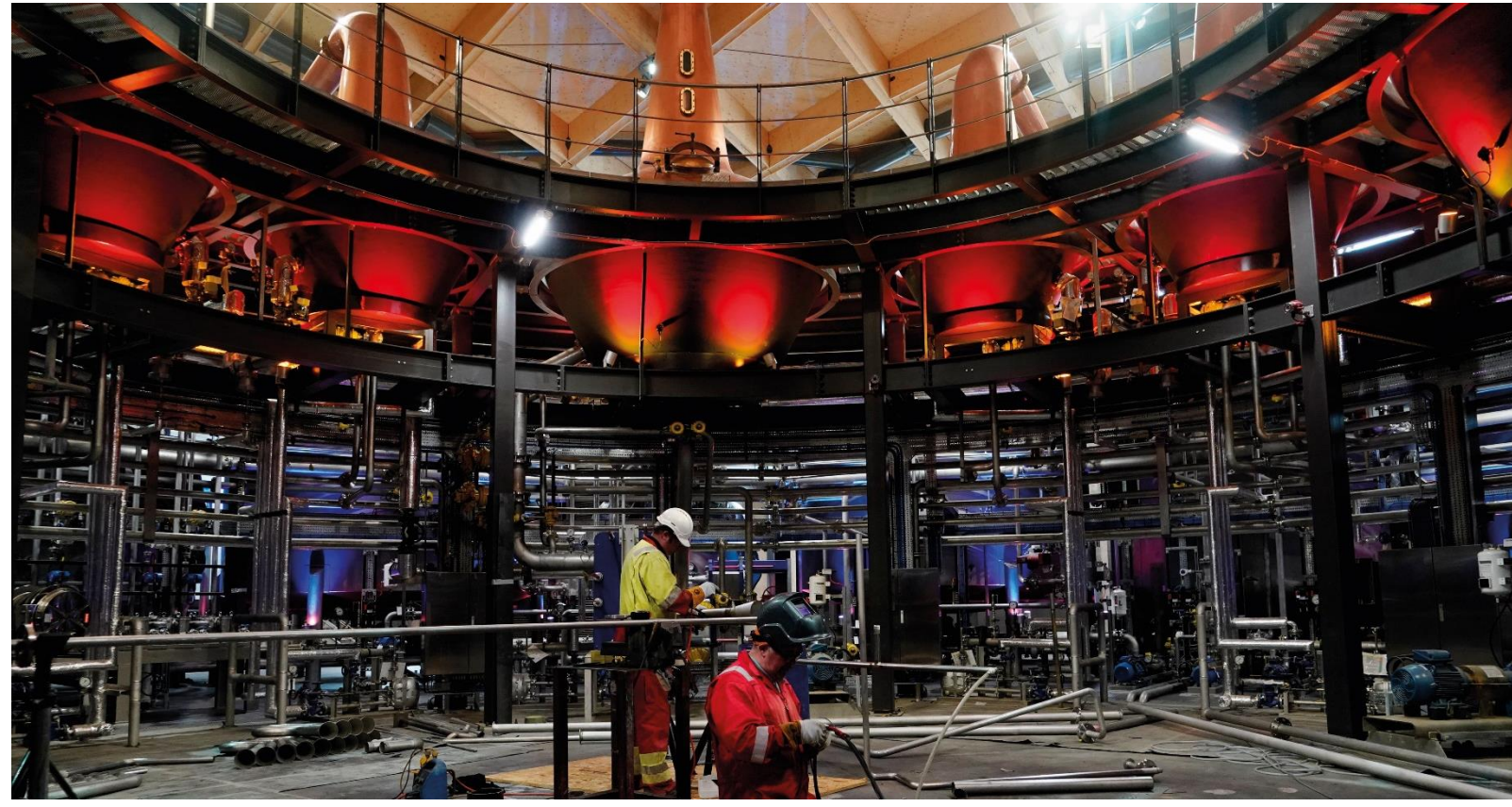
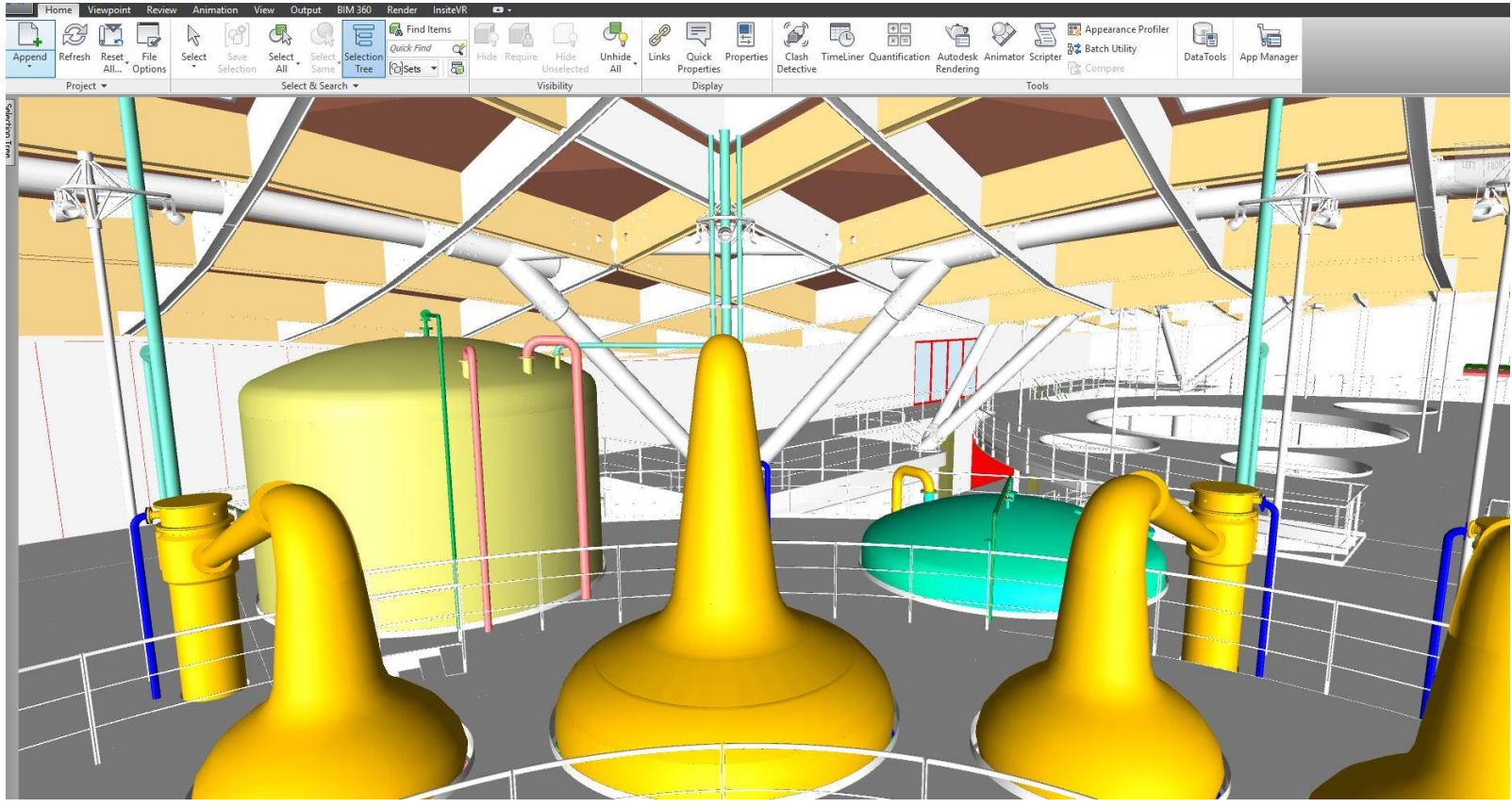


**£140m**  
The Macallan  
distillery and  
visitor centre

**£65m**  
NHS Orkney  
Hospital

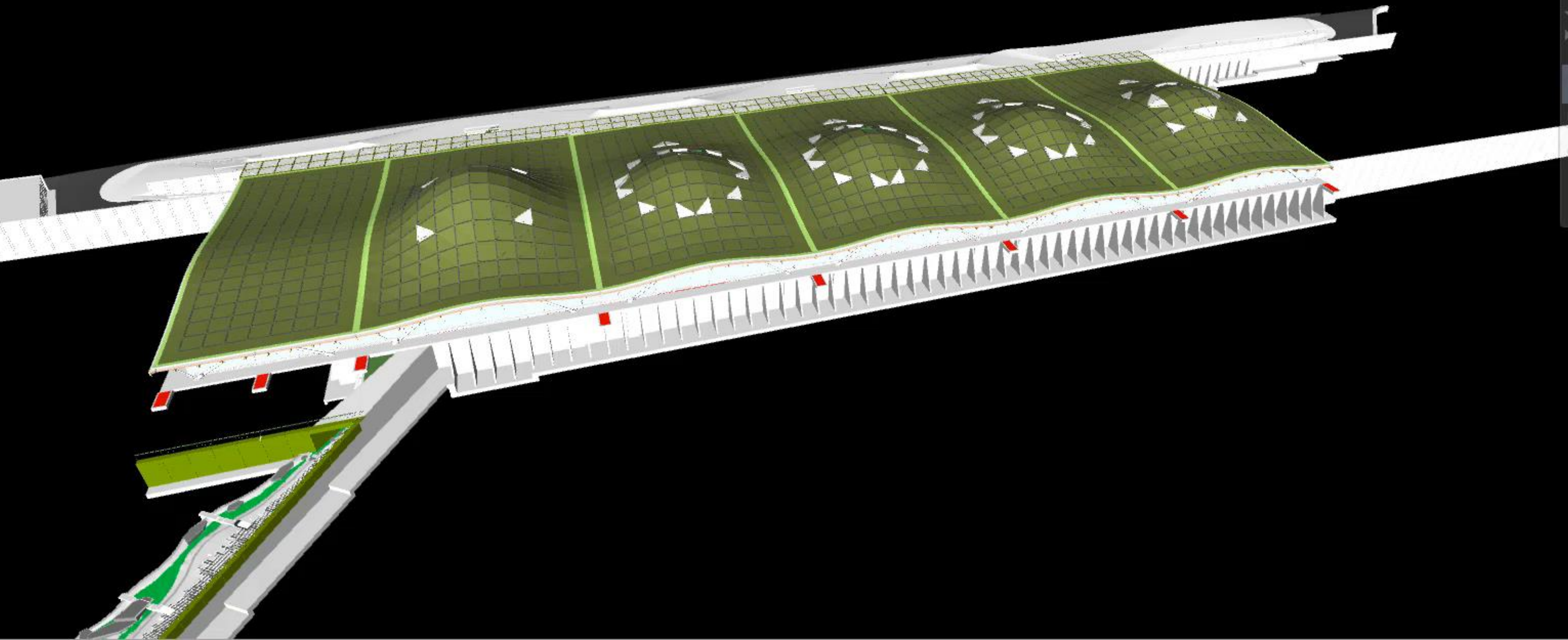
**£330m**  
Aberdeen  
Exhibition and  
Conference  
Centre





# THE MACALLAN





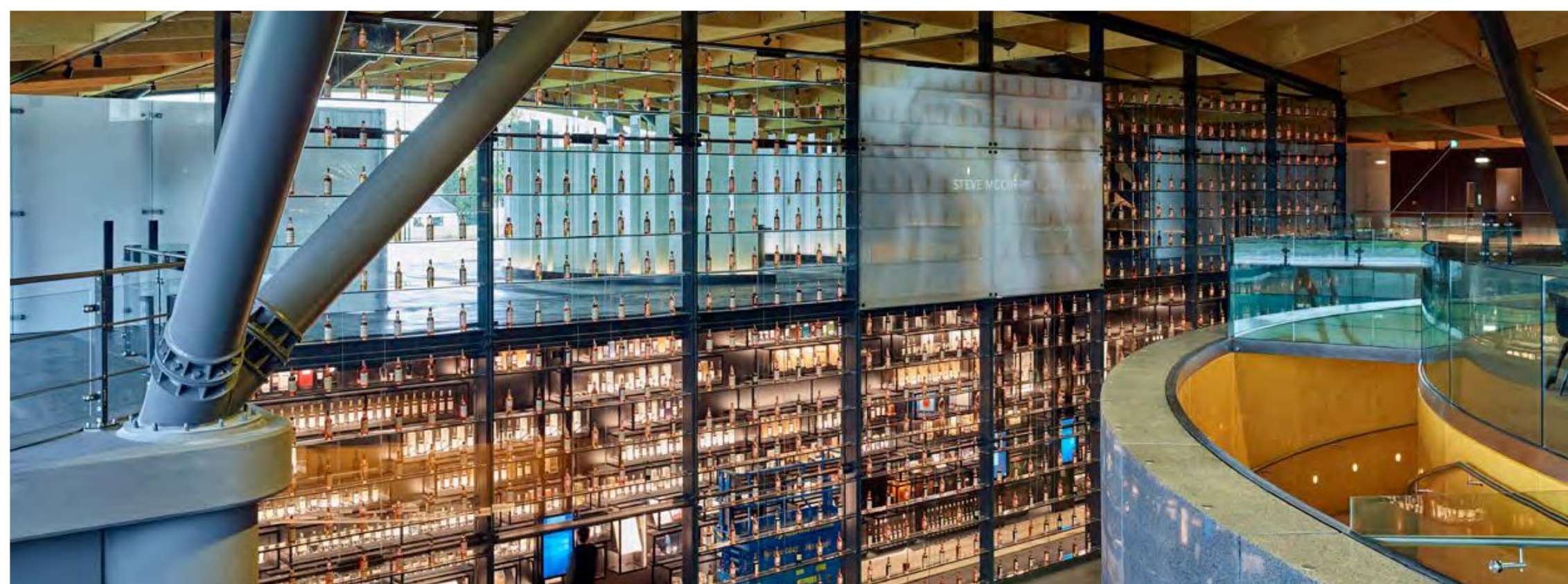


# BIM 360 Field

## Quality Control and Health & Safety

- Transition from a paper based to digital system
- Introduced technology to daily site operations
- Helped increase productivity of site workers
  - **The Macallan Distillery - 20 mins saved per check sheet / 7 hours saving per week**
  - **20% productivity gain**
- 108 active members
- 36 partner companies





## George McKenzie – Edrington Group’s Engineering Manager

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*“Robertson managed the project in a professional manner from the initial design brief, through the tendering process, construction phase and on to final commissioning, snagging and handover. At all times the Robertson team delivered their service with a level of integrity that was in keeping with the objectives of Edrington.”*

# 2016 – 2019 Key BIM 360 Projects

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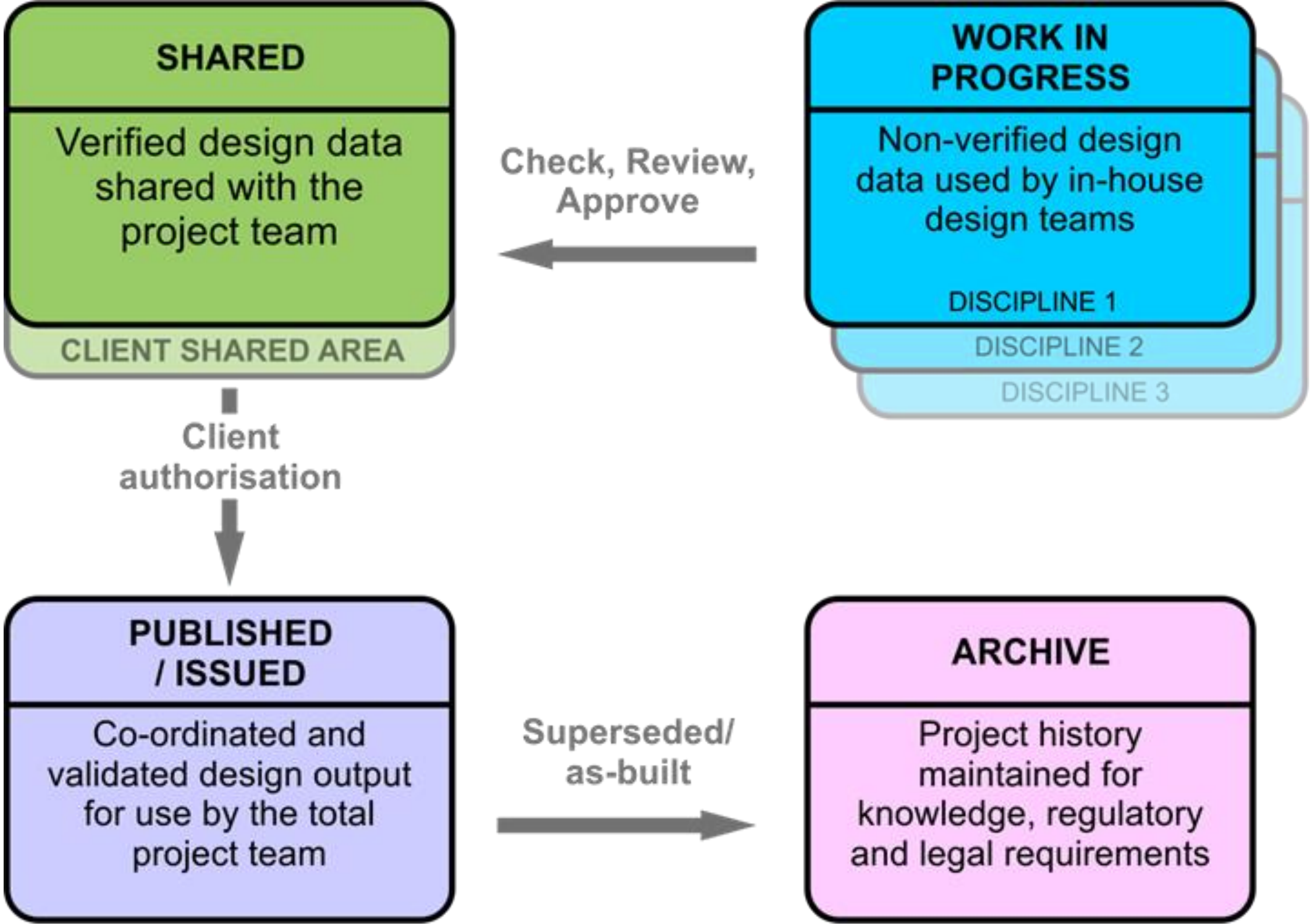
Robertson are now streamlining design, construction and maintenance process using BIM 360 Glue and BIM 360 Field to deliver a wide range of primary care, education, housing and social infrastructure projects for the public sector.

**£34m**  
Stirling Health & Care  
Village

**£65m**  
NHS Orkney Balfour  
Hospital

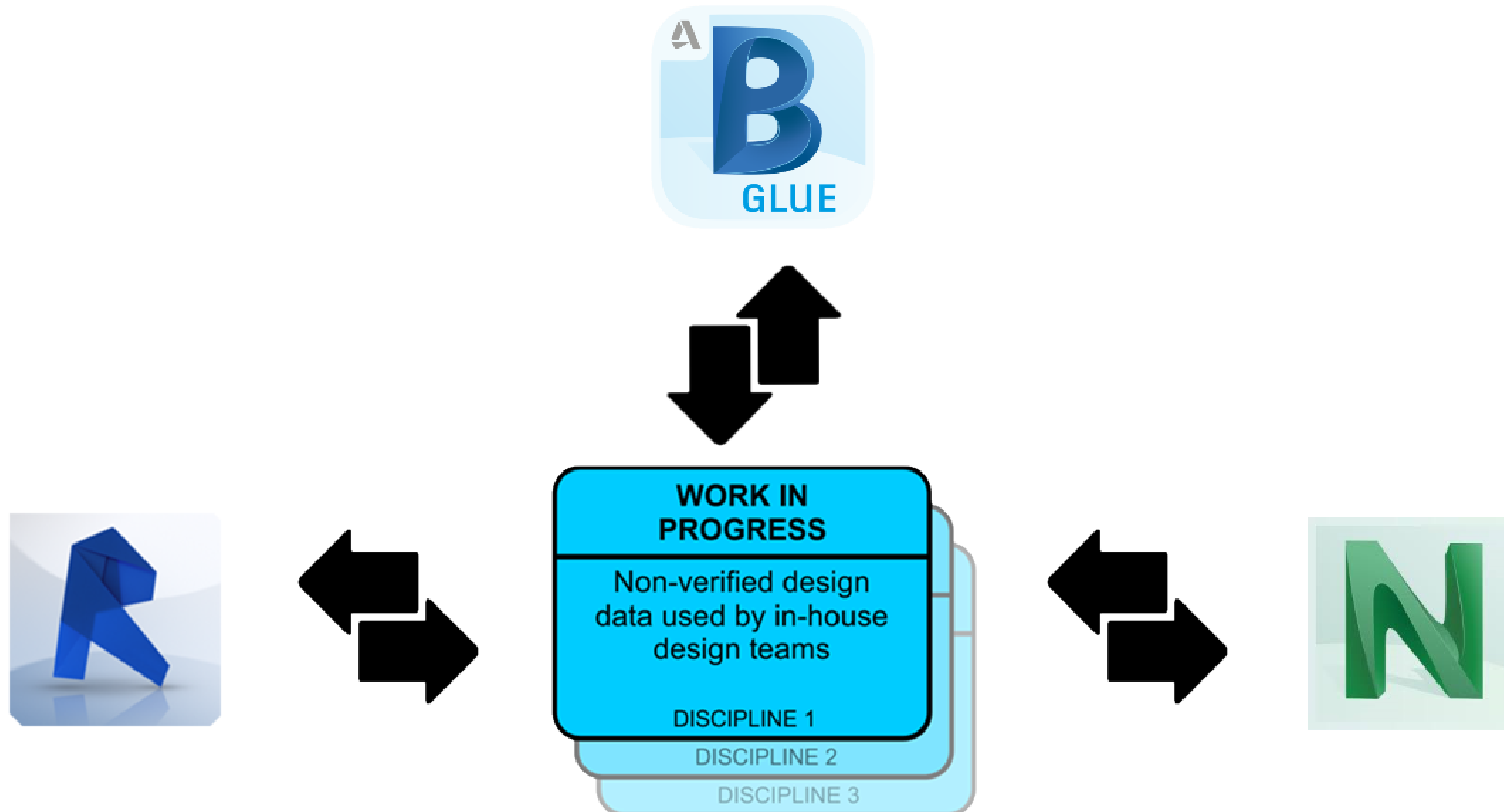


# Information Management - Workflow



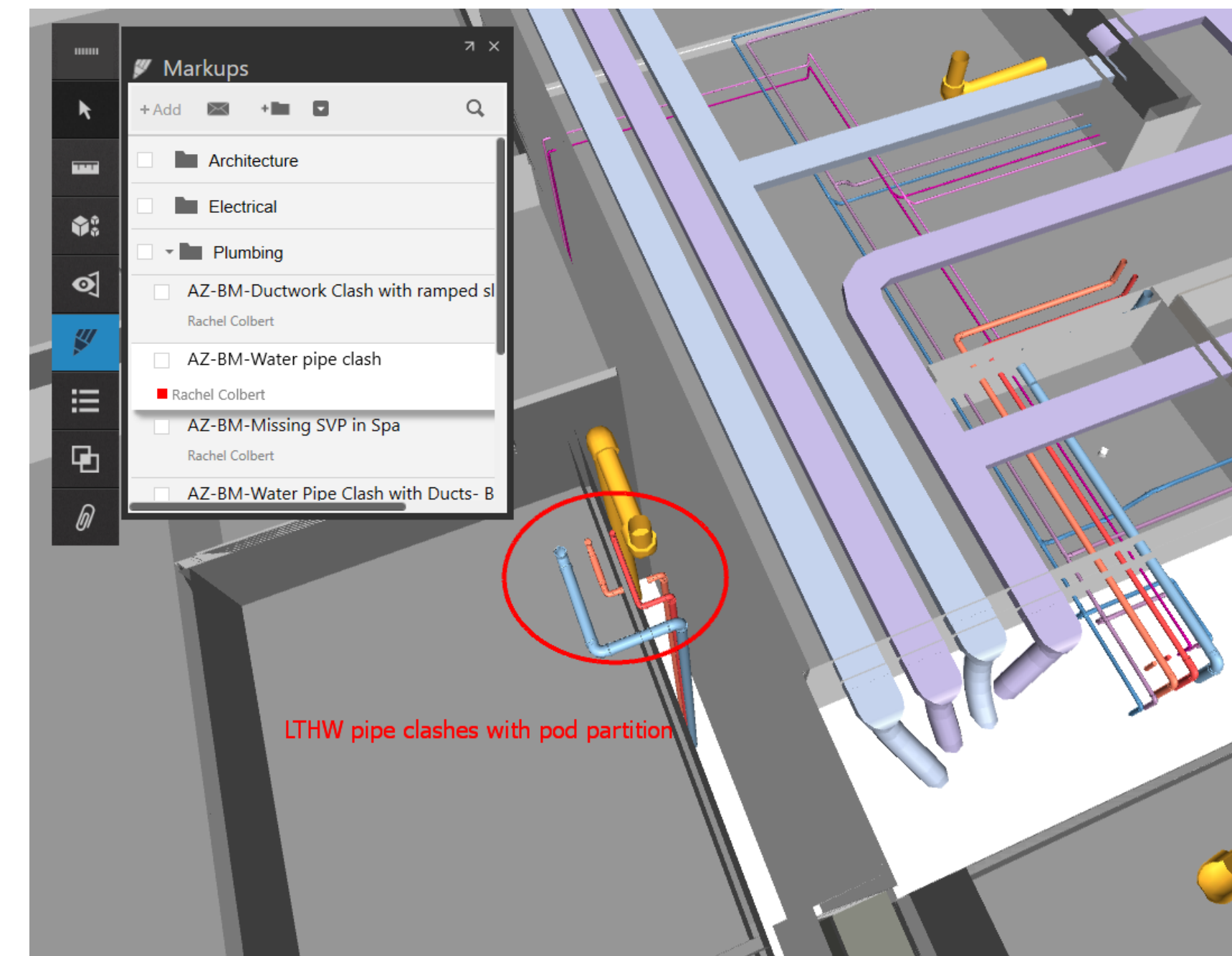
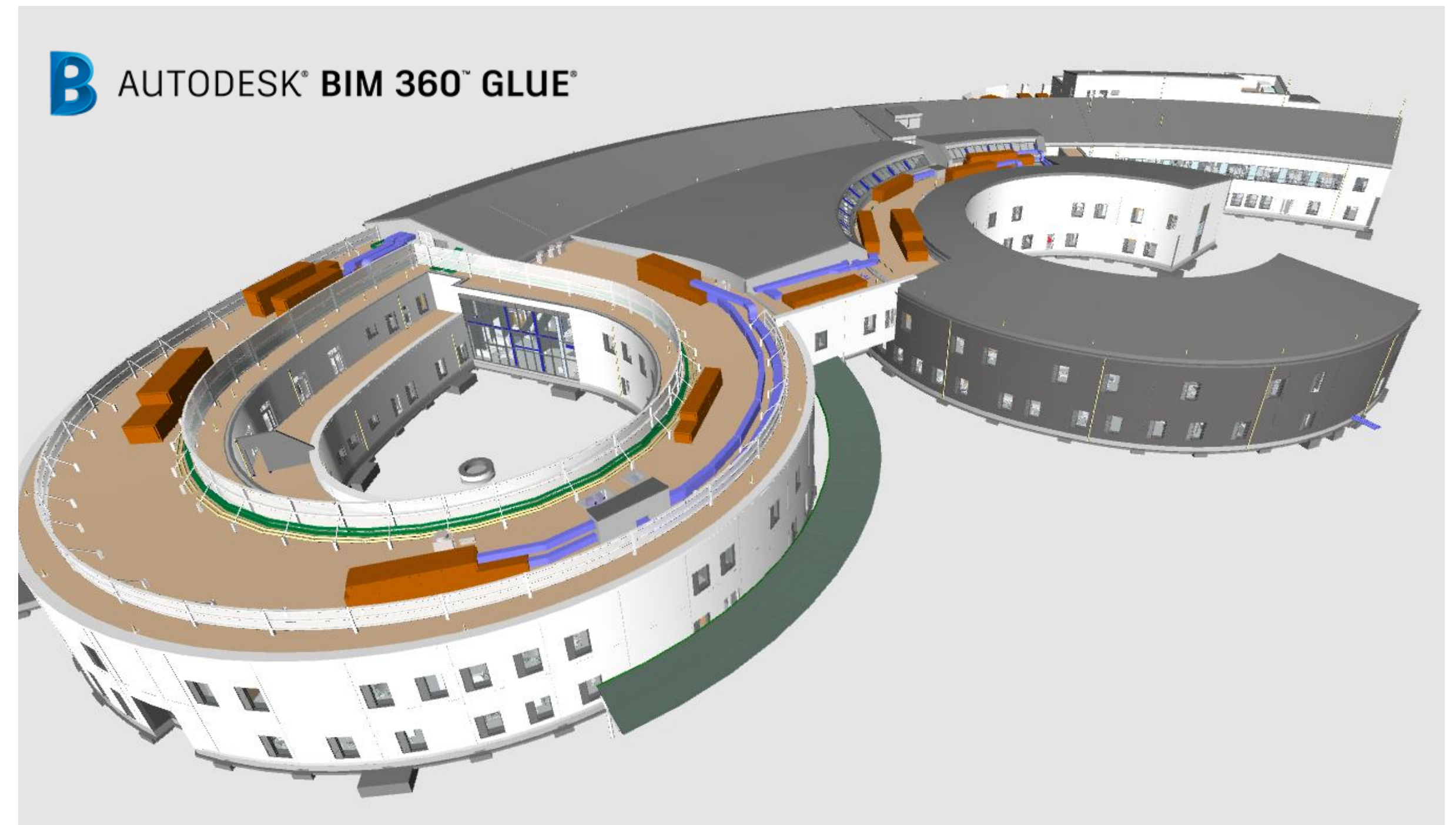
# BIM 360 Glue - Workflow

Improved 3D Design Coordination during Stage 4 design with regular intermediate exchanges on BIM 360 Glue between the formal CDE uploads.



# BIM 360 GLUE NHS ORKNEY

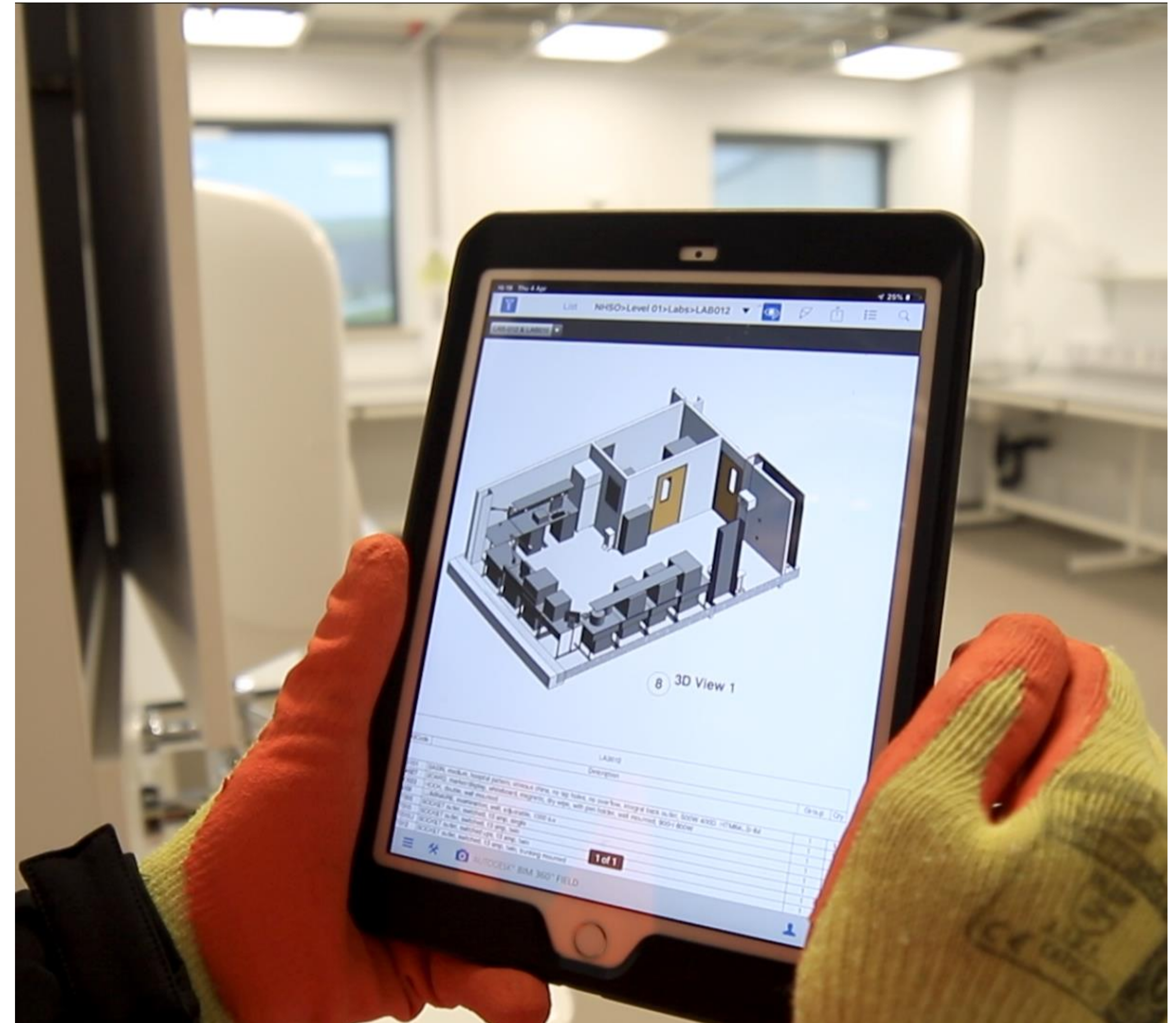
- Greater collaboration between designers
- Models accessed by wider project team
- Models used during design team meetings – Less reliance on paper
- Helped decrease design coordination issues
  - 364 BIM Glue activities during Stage 4 design
  - 50% reduction in issues during Clash Detection exercises in the CDE workflow.
- Now live across 28 projects



# BIM 360 Field

## Quality Control and Health & Safety

- On average each person could snag 2 rooms in 1.5 hours using the old paper process.
  - However, using BIM 360 Field the **productivity increased to 4 rooms 1.5 hours.**
  - **45% improvement** in the time take for a subcontractor to complete corrective work and close issues.
- 
- 1558 active members
  - 1325 partner companies





- Permeable Paving
- Concrete Flag Paving
- Bound Gravel Footpaths
- Fire Tender Access Route
- Specimen Trees
- Woodland Planting
- Native Shrub Planting
- Amenity Shrub Planting
- Amenity Grass Areas
- Native Grass Areas
- Wetland Willowow Areas
- Hedge
- Boulders (site won)
- Open Water
- Shelters (Cycle / Bus)  
Refer to detail drawing REF-XXX-XX-4540-017
- Timber Bridge
- Timber Benches
- Car Parking Space  
(3.0 x 2.4m, Disabled 3.0 x 3.6m, Total No: 320m)
- Dry Stone Wall

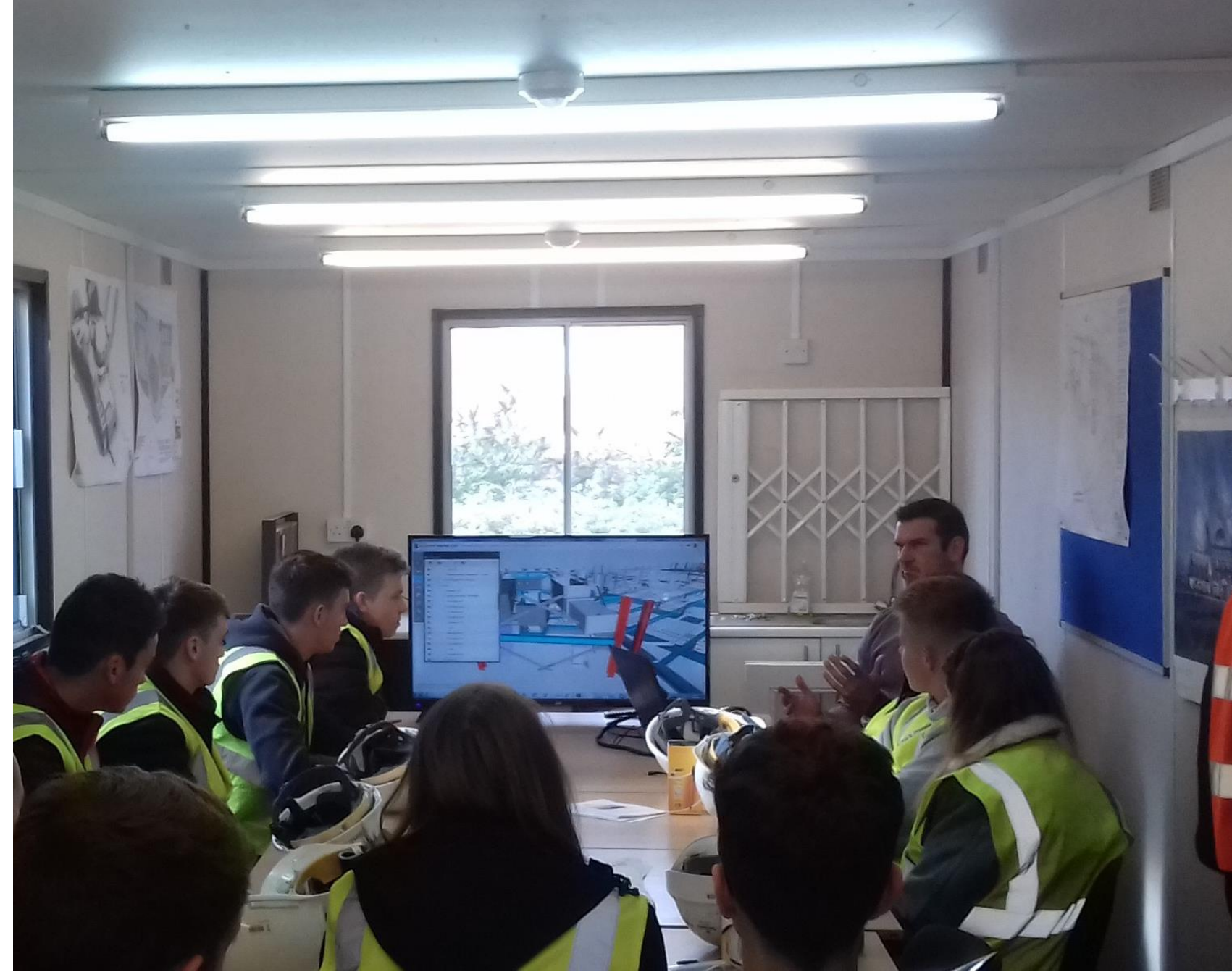
- A. Main Site Entrance
- B. Blue Light, Public & Mainland Entrance
- C. FM, Clinical Services or Mortuary Entrance
- 1. Main Entrance
- 2. Renal Entrance
- 3. Ambulance Entrance
- 4. Public Emergency Department Entrance
- 5. Macmillan Entrance
- 6. Hearse Entrance
- 7. Public Mortuary Entrance
- 8. Facilities Management & Service Entrance
- Ba. FM Compound Area
- Bb. FM / Community Nurse Parking (electric recharge point)
- Bc. Service Yard
- 9. Clinical Services Entrance
- 10. Energy Centre
- 11. SAS Washing Area
- 12. Main Car Park
- 13. Car Drop-off Zone
- 14. Bus & Taxi Drop-off Zone
- 15. Ambulance Parking
- 16. Public ED Parking
- 17. Macmillan Parking
- 18. Clinical Services Parking
- 18. Fire Tender Access Route
- 20. Pedestrian Avenue
- 21. Children's Activity Area
- 22. Seating Area
- 23. Cycle Parking - Refer to detail drawing REF-XXX-XX-4540-017
- 24. Courtyard Gardens
- 25. Macmillan Terrace Gardens
- 26. Therapy Garden
- 27. Mental Health Transfer Garden
- 28. External Restaurant Area
- 29. Seales (Refer to Engineers Drainage Layout)
- 30. Wetland Grassland (Overland Flooding Route)
- 31. SUDS (Refer to Engineers Drainage Layout)



# (AECC) TECA - 2019







# BIM 360Field Training

In the last 6 months Robertson have provided across the business.

- 224 hours of formal BIM 360 training
- To 242 people across the business



# Snagging with Barcodes or QR

B1\_1stF\_P 7\_

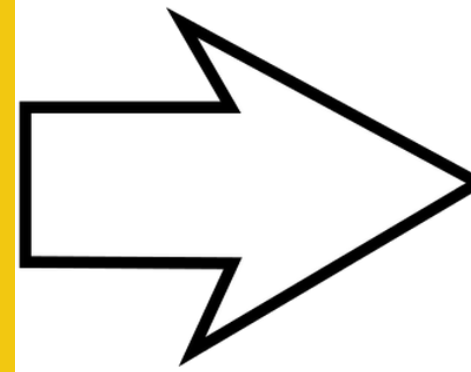
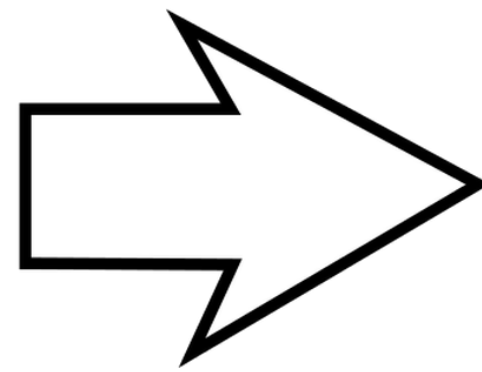


\_Bathroom

- Consolidate project issues onto a single issue list and provide documentation for inspections.
- Provides comprehensive reports with locations and track the time taken to close out issues.
- Open and create issues in the field much faster.
- Issues and locations can be easily linked to drawings for using pins workflows.
- When the system is setup and easier to use it is more likely to be used by project teams.



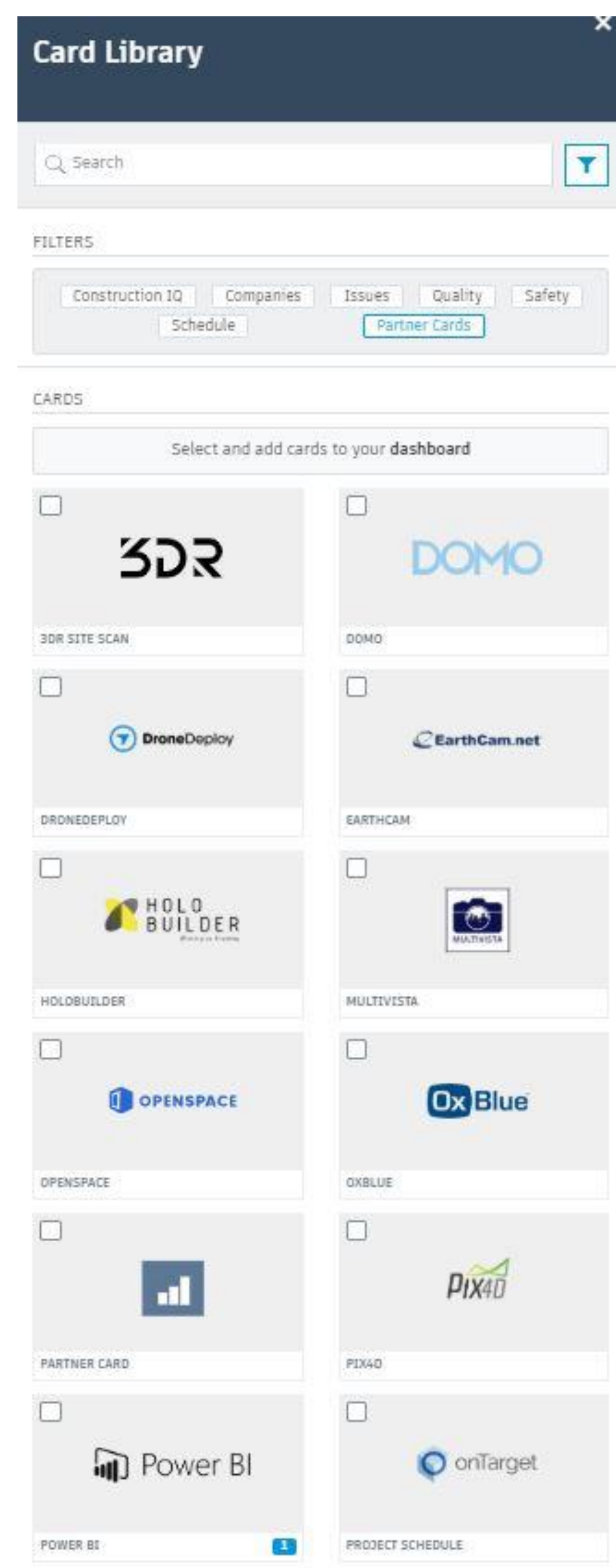
# BIM 360 Field to Power BI Workflow



- Harvest BIM 360 Field Data

- Analyse in Power BI

- Visualise on BIM 360 project dashboard



# DATA Insight – Project IQ Dashboard

**Insight** RISK QUALITY SAFETY REPORTS

Robertson Group RCG\_AECC Robertson Quality Observations

Project Dates: Fri Jan 01 2016 - Thu Aug 01 2019

**Customize Dashboard** [Cancel] [Save]

Organize the order and add new cards to your dashboard. [Card Library]

**Quality Risk**

Risk Today: High

Quality Risk Trend

**Weather**

11°

Clear

Thu 13° Fri 12° Sat 10° Sun 11°

**Quality Risk Factors**

- HIGH RISK SUBCONTRACTORS: 7
- HIGH RISK ISSUES: 61
- WATER RISK ISSUES: 103
- CHECKLIST ACTIVITY: 36
- OVERDUE ISSUES: 607

**Subcontractor Risk Today**

- FES Group Ltd: High
- StopFire Ltd: High
- Robertson Construction: High
- METALtech uk: High
- P J Careys PLC (Civil Engineering): High
- Linear Projects Ltd (Glasgow): High
- Thomas Johnstone: High
- J & D Pierce Contracts Ltd: Med
- McLaren & Co Ltd: Med
- Robertson Roofing & Cladding: Med
- Wingate: Med
- Miller Fabrications Ltd: Med
- Kone Plc (Glasgow): Med
- P1 Solutions Ltd: Med
- Havelock Europa Plc: Med
- A De Cecco Ltd: Med
- Fortress Sefa: Med
- IFT (Integrated Flooring Technologies): Med

**High Risk Quality Issues**

**Water Risk Issues**

**Insight** RISK QUALITY SAFETY REPORTS

Robertson Group RCG\_AECC Robertson Quality Observations

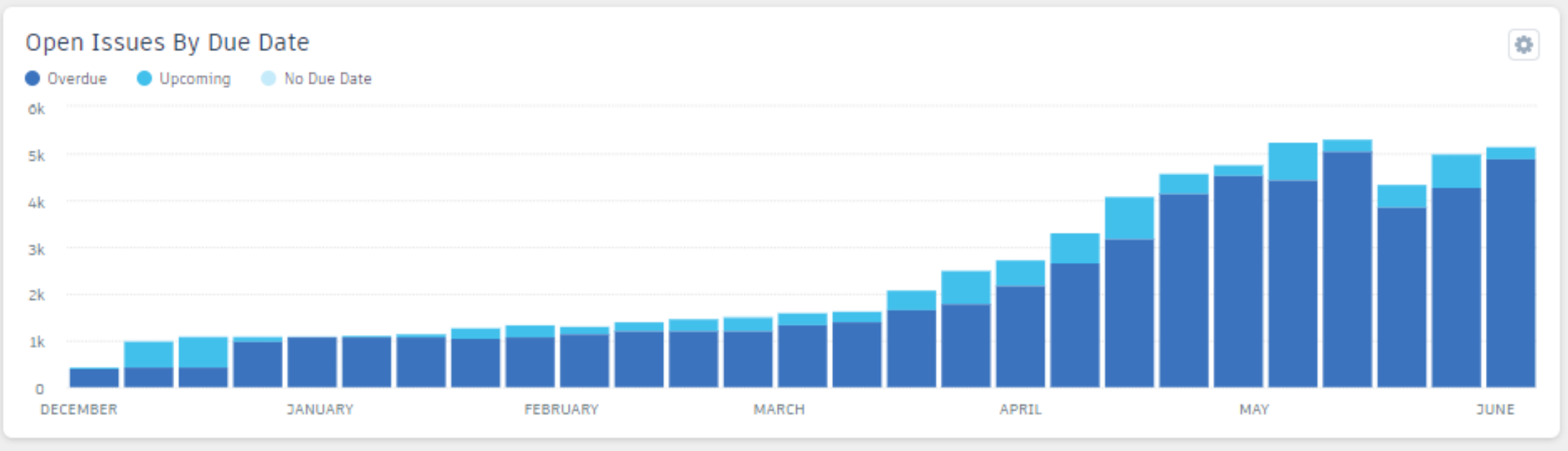
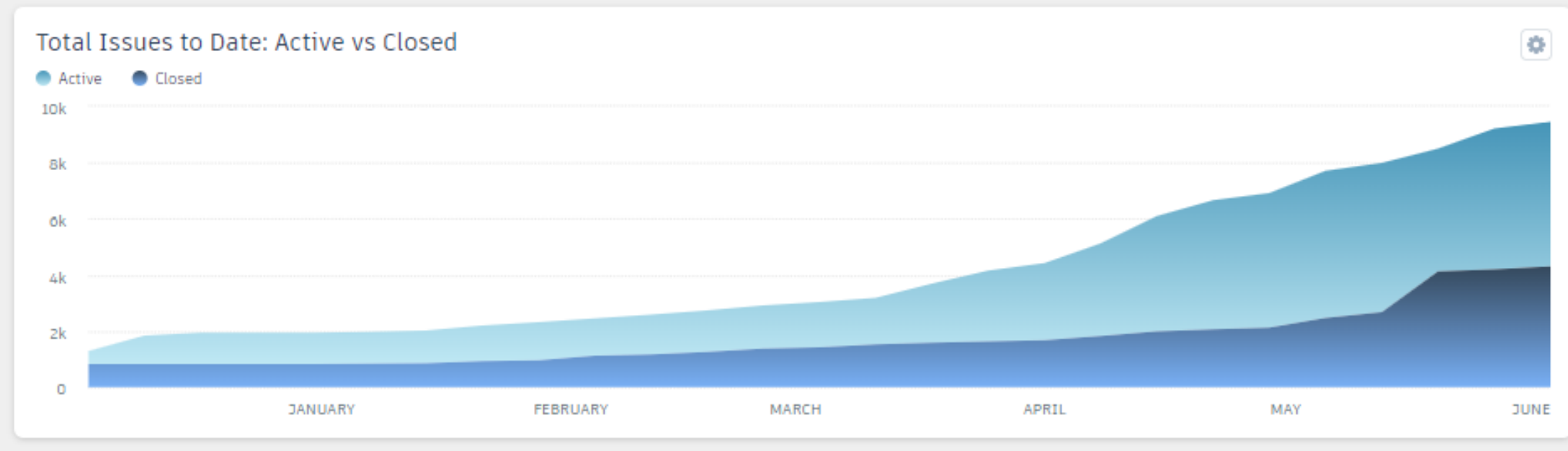
Project Dates: Fri Jan 01 2016 - Thu Aug 01 2019

**Subcontractor Quality Risk Trend**

7 High 13 Medium 35 Low

**Subcontractor Daily Quality Risk Trend**

Subcontractor	Jun '18	Jul '18	Aug '18	Sep '18	Oct '18	Nov '18	Dec '18	Jan '19	Feb '19	Mar '19
FES Group Ltd	High	High	High	High	High	High	High	High	High	High
Linear Projects Ltd (Glasgow)	High	High	High	High	High	High	High	High	High	High
METALtech uk	High	High	High	High	High	High	High	High	High	High
P J Careys PLC (Civil Engineerin...	High	High	High	High	High	High	High	High	High	High
Robertson Construction	High	High	High	High	High	High	High	High	High	High
StopFire Ltd	High	High	High	High	High	High	High	High	High	High
Thomas Johnstone	High	High	High	High	High	High	High	High	High	High
A De Cecco Ltd	High	High	High	High	High	High	High	High	High	High
Fortress Sefa	High	High	High	High	High	High	High	High	High	High
Havelock Europa Plc	High	High	High	High	High	High	High	High	High	High
IFT (Integrated Flooring Techn...	High	High	High	High	High	High	High	High	High	High
J & D Pierce Contracts Ltd	High	High	High	High	High	High	High	High	High	High
Kone Plc (Glasgow)	High	High	High	High	High	High	High	High	High	High
Lesterose Scotland Ltd	High	High	High	High	High	High	High	High	High	High
M.N. Hamilton & Sons	High	High	High	High	High	High	High	High	High	High
McLaren & Co Ltd	High	High	High	High	High	High	High	High	High	High
Miller Fabrications Ltd	High	High	High	High	High	High	High	High	High	High
P1 Solutions Ltd	High	High	High	High	High	High	High	High	High	High
Robertson Roofing & Cladding	High	High	High	High	High	High	High	High	High	High
Wingate	High	High	High	High	High	High	High	High	High	High

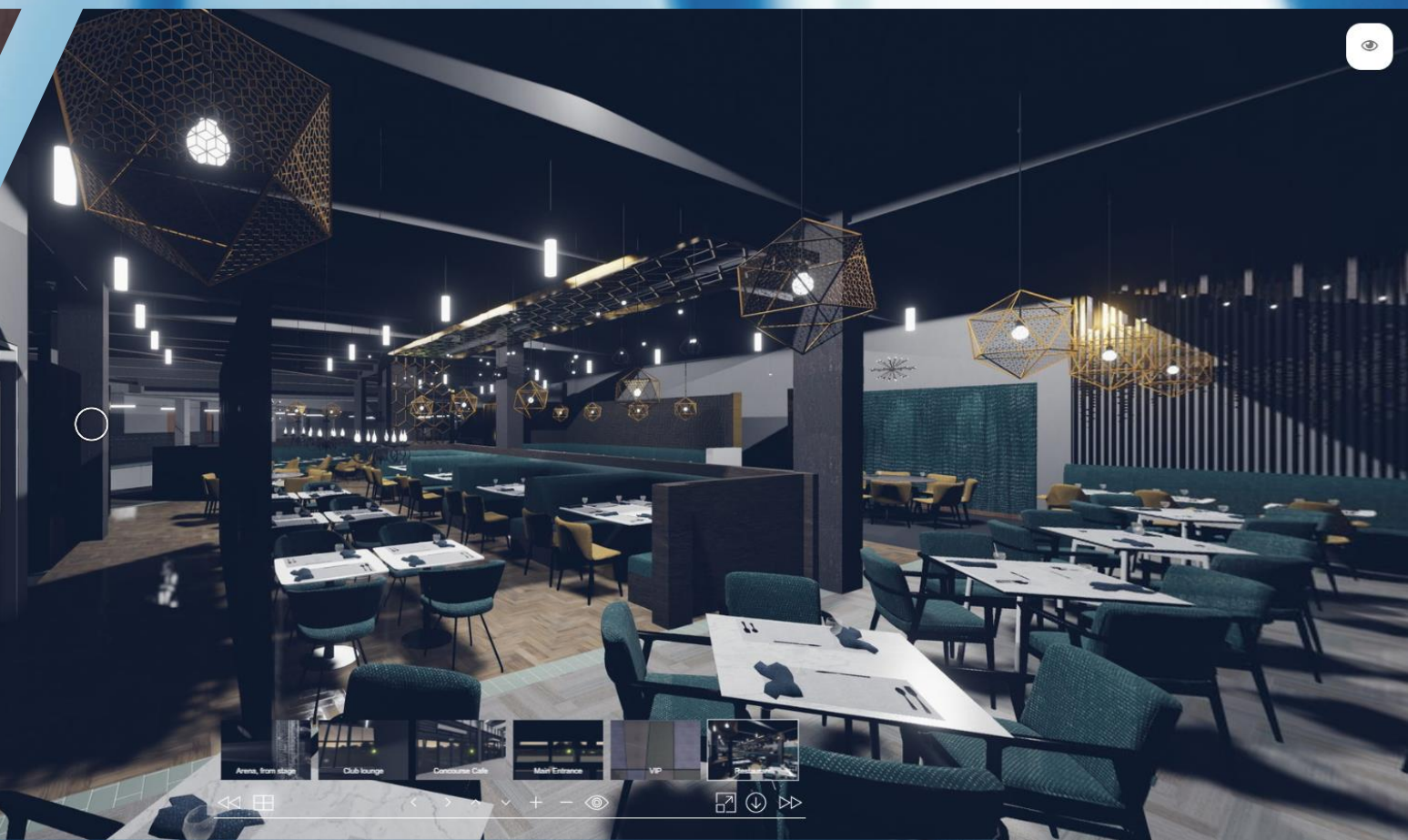
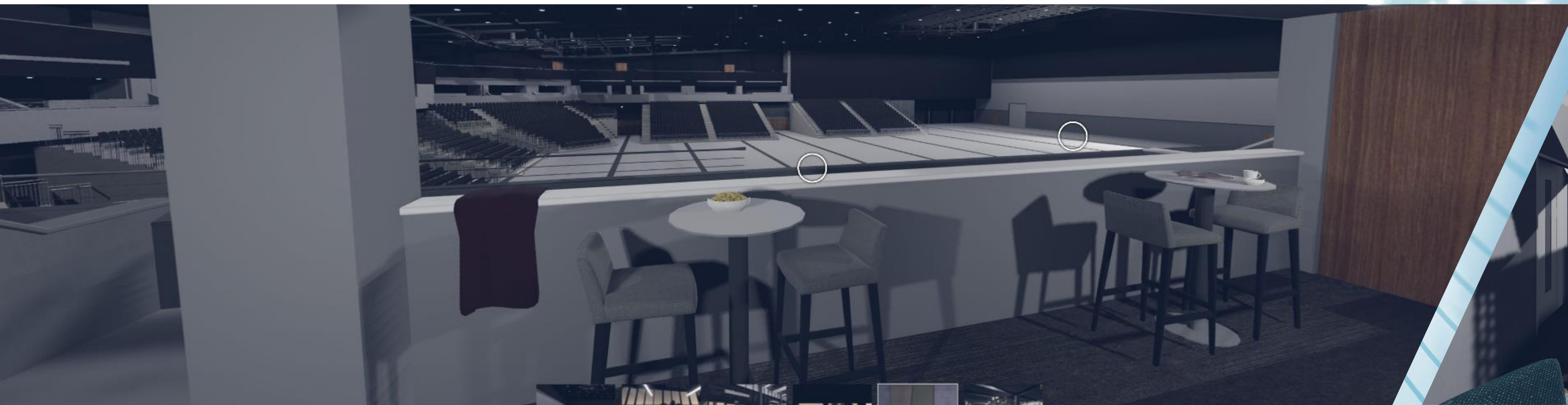




# VR TECA

<https://xr.wsp.com/aecc/unpopulated.html>

VR TECA







# Our Digital Construction Strategy 2018 - 2021



# Digital Construction Adoption Stages

## TECHNOLOGY

AUTODESK BIM 360

## PROCESS

INFORMATION  
MANAGEMENT

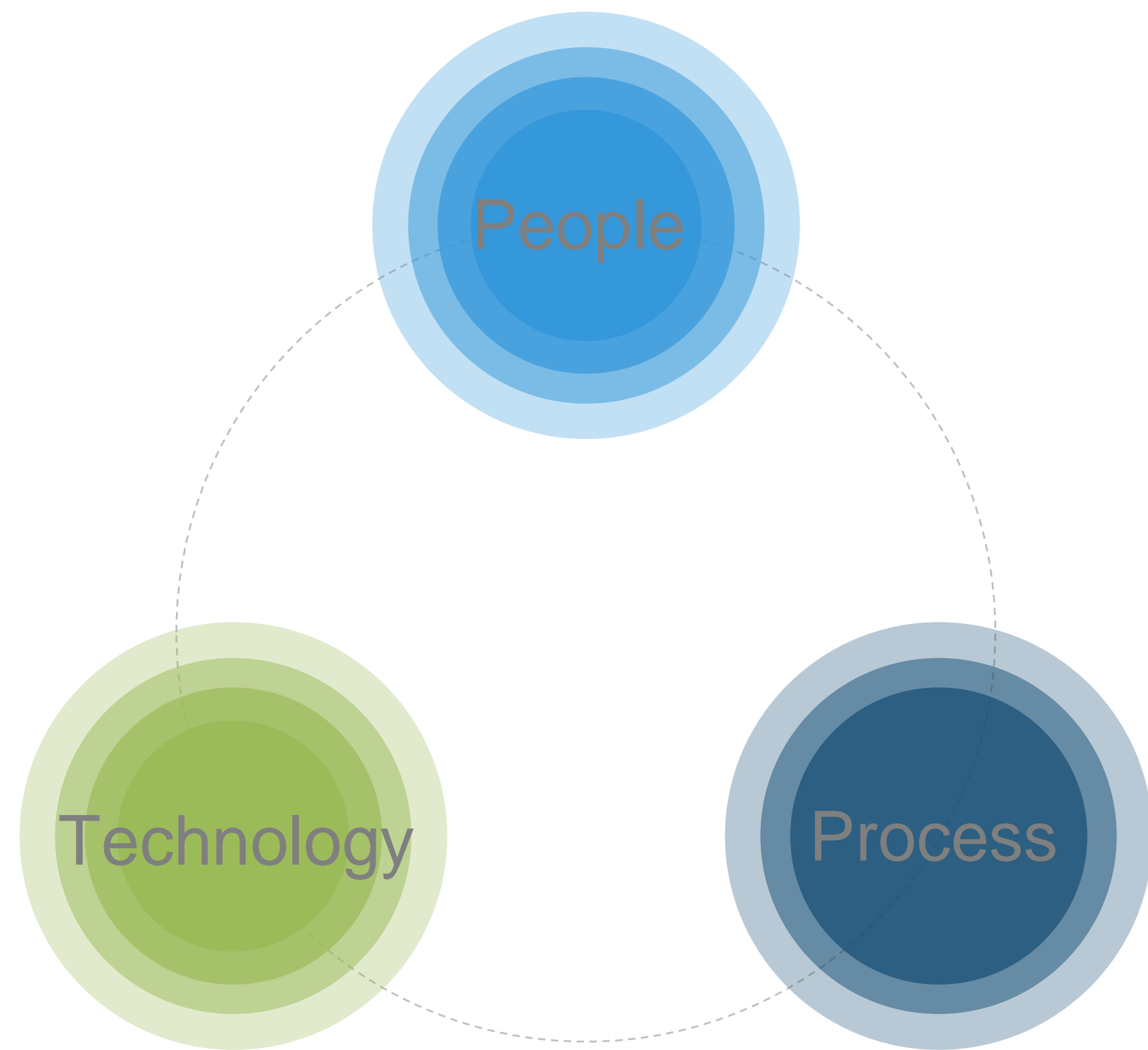
## PEOPLE

UPSKILLING &  
DEVELOPMENT

## ACTION PLAN

COMMUNICATION

# Digital Construction Strategy – 2018 to 2021



**Goal 1** Better project delivery throughout our project lifecycle

**Goal 2** Build more safely and with fewer mistakes

**Goal 3** Become more proactive & less reactive

**Goal 4** To become an enabler for digital growth

# BIM 360 Adoption Plan



Top down  
Support

+

Bottom up  
adoption

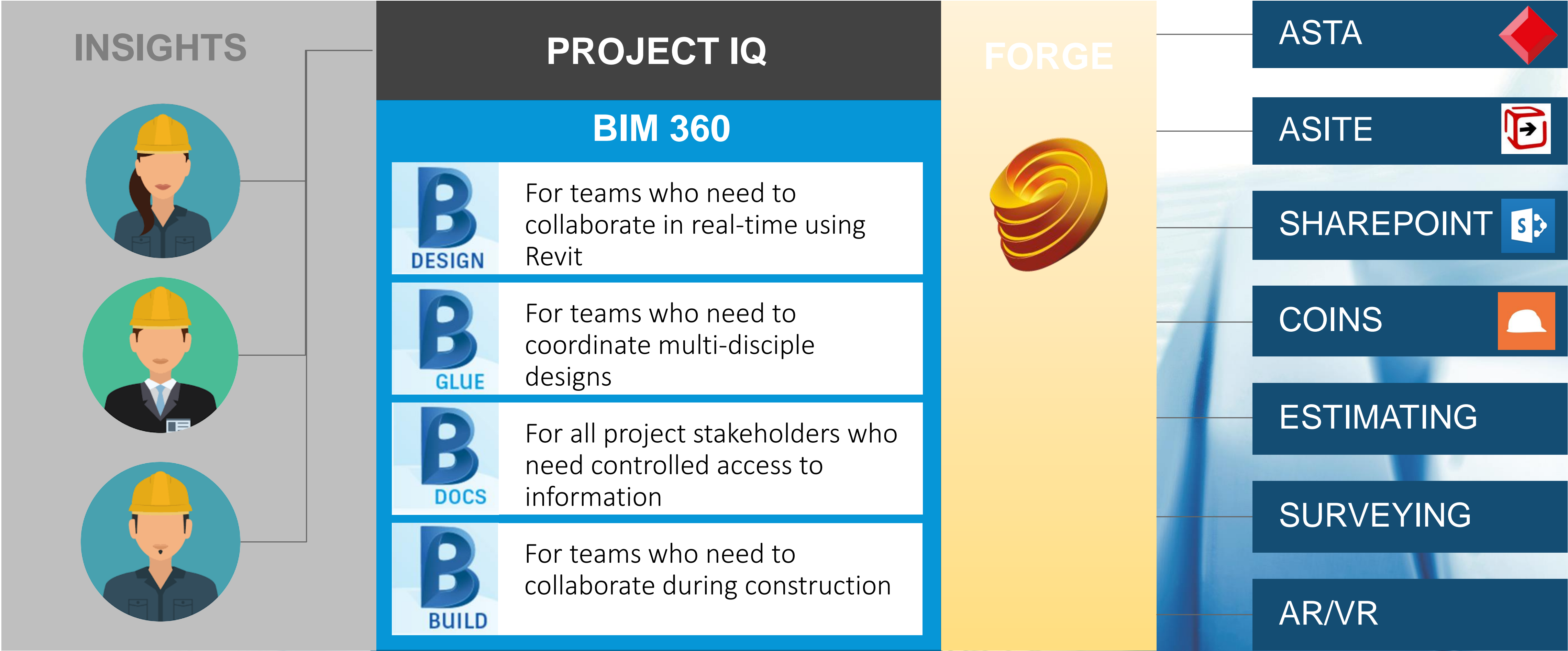


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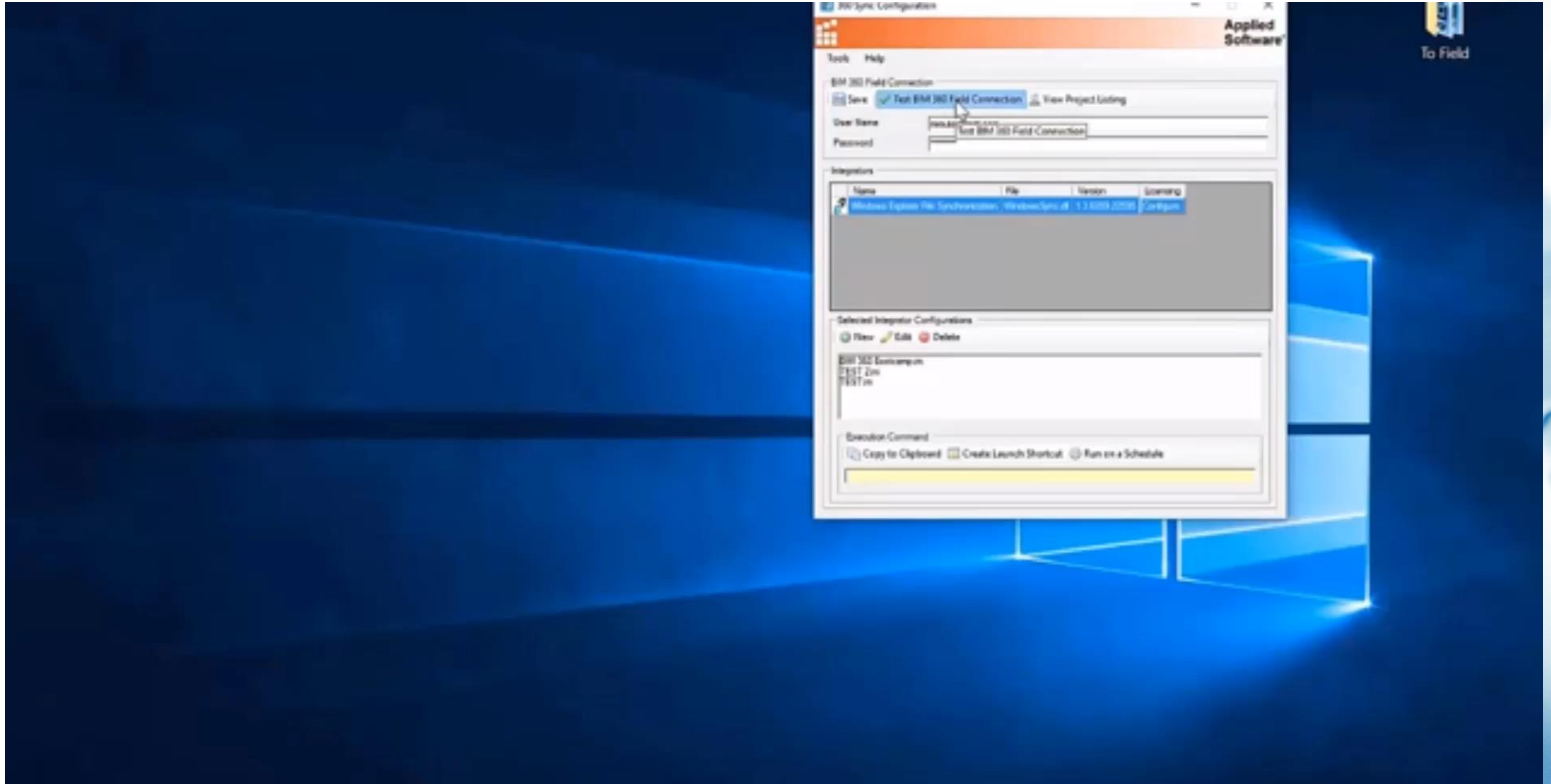


360 Degree Approach  
Equals Success

# BIM 360 Next Generation – process & productivity



# ASTI 360 Sync



Making Digital

Construction

Scalable





# Robertson Residential Group

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2018 - 2019

Extending the digital workflows  
and using BIM 360 across the  
Residential businesses.

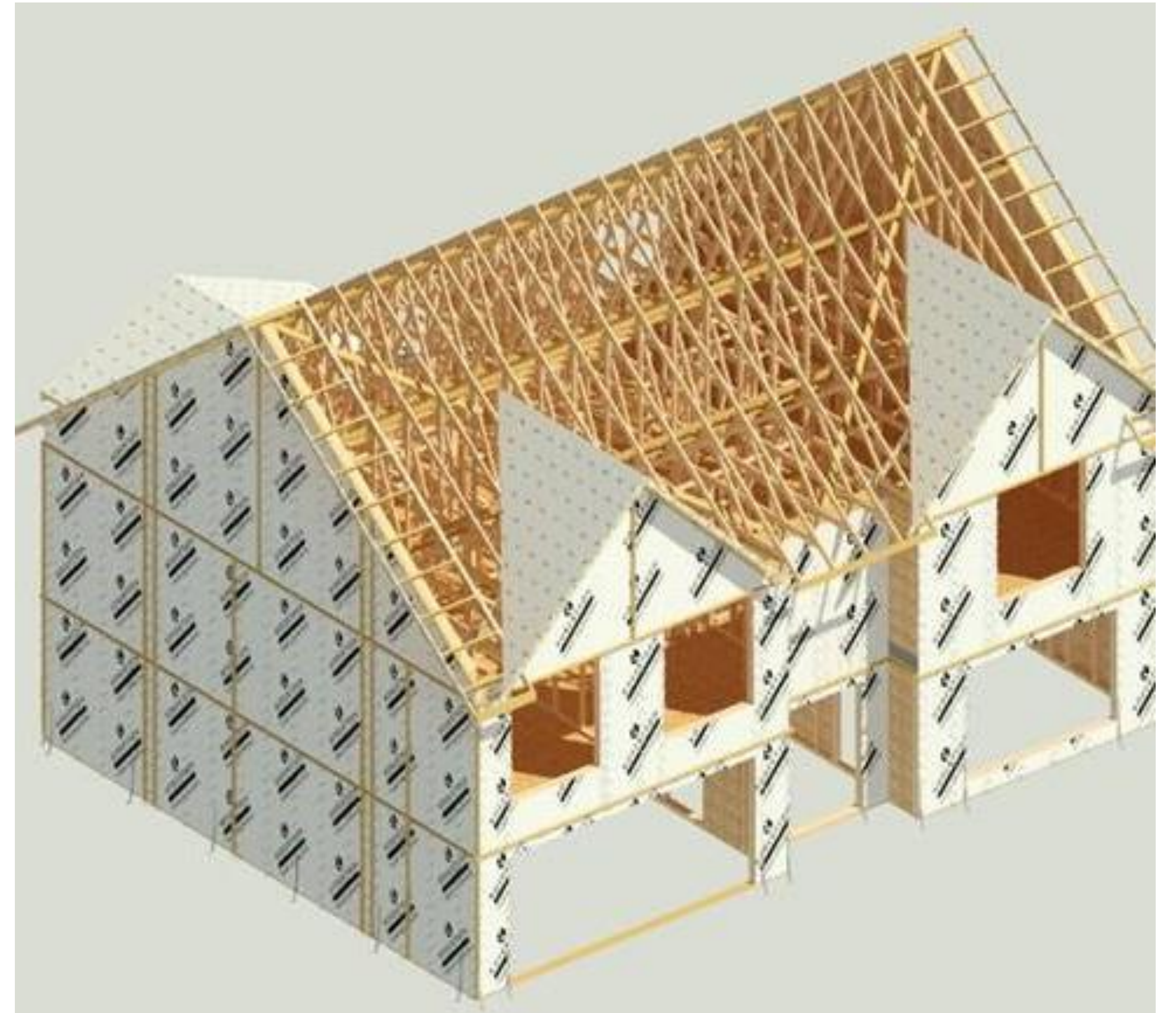
Scottish Housebuilder of the Year 2017 and  
Home of the Year 2018, Scottish Home  
Awards



# Modelling of standard house types

## Making Digital Construction Scalable

- Key Target
  - Improving processes and efficiencies within the Robertson Residential Group
- Solutions
  - Pilot project with Robertson Homes and Timber Engineering.
  - Data rich 3D components created.
  - Utilise equipment tracking through BIM 360 Glue and Field.





Architecture Structure Steel Systems Insert Annotate Analyze Massing & Site Collaborate View Manage Add-Ins BIM Interoperability Tools Modify

External Tools Batch Print Transmit a model Help About Check Manage View Launch WSM Clash Pinpoint Equipment Properties Convert RFA to Formit About Formit Launch Screencast STL Exporter for Revit

External Batch Print eTransmit Model Review WorksharingMonitor BIM 360 Formit Converter Screencast STL Exporter

Properties

3D View

View: 3D Full house Coordir Edit Type

Scale 1 : 100

Value 1: 100

Detail Level Fine

Visibility Show Original

Visibility/Graphics ... Edit...

Graphic Display Op... Edit...

Discipline Architectural

Show Hidden Lines By Discipline

Default Analysis Di... None

Path

View

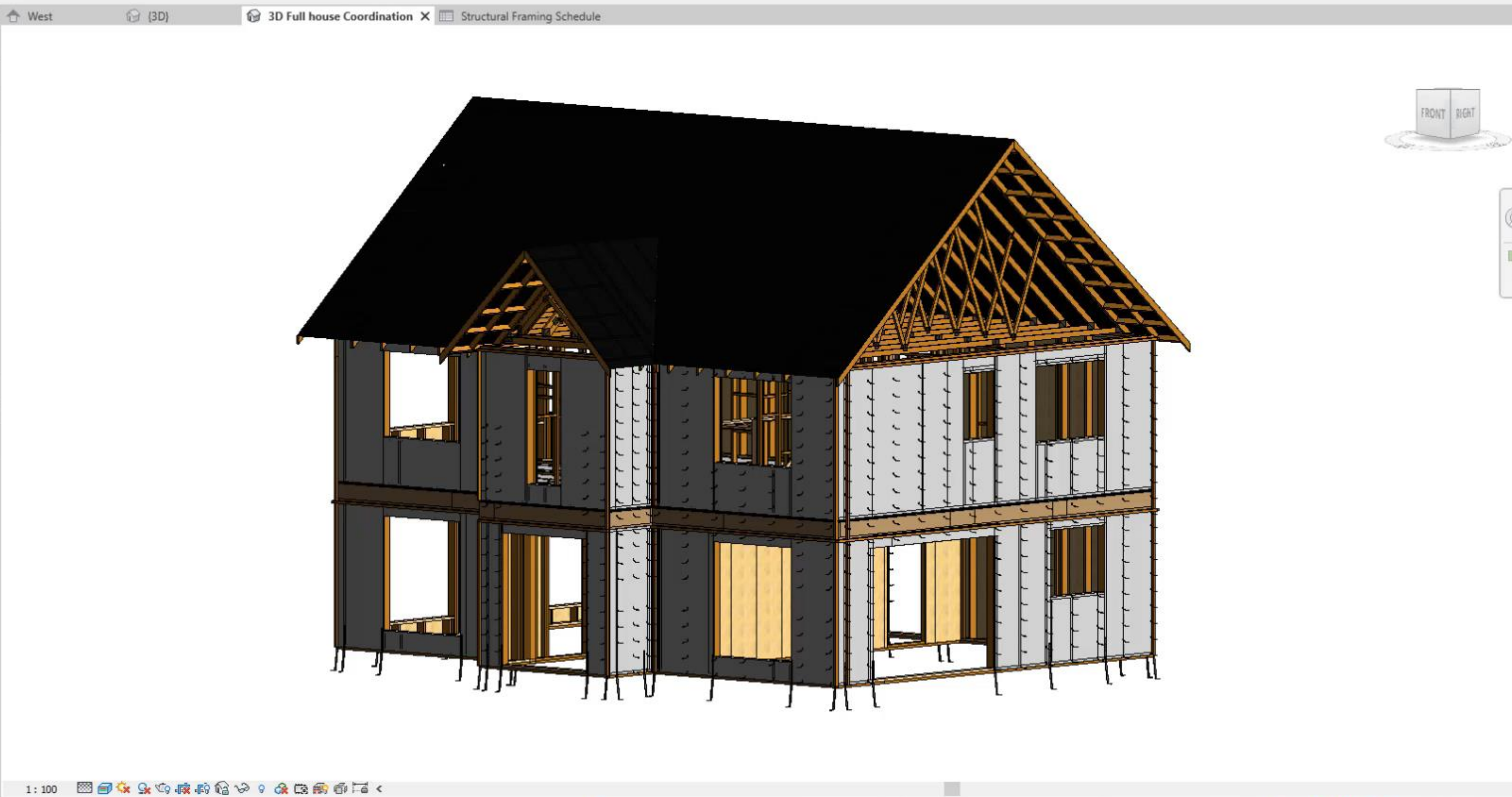
Region Visible

Rotation Crop

Apply

Project Browser - Guimard-18-AS (kit\_detac...

- Ground Floor Panels
  - Level 0
  - Level 1
- Site
  - Soleplate
- Ceiling Plans
- 3D Views
  - 3D Full house Coordination**
    - {3D}
- Elevations (12mm Circle)
  - East
  - North
  - South
  - West
- Sections (Building Section)
  - Section 1
- Legends
- Schedules/Quantities (all)
  - Room Schedule
  - Structural Framing Schedule
  - View List
- Sheets (all)





“BIM helps our team to be more efficient and maintain high quality throughout all phases of a project. Meanwhile, it gives our clients a clear view of progress and supports open, honest communication and stronger relationships.”

Elliot Robertson, Chief Operating Officer at Robertson

# Thank you!



VR TECA



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JPMann

