

Building Information Modelling

Scottish Futures Trust

BIM Case studies

Location Edinburgh

Client TH Real Estate
Value Total Project Value £1 Billion
Type New build
Sector Mixed Use

EDINBURGH ST JAMES

01	02	03	04	05	06	07
Brief	Concept	Definition	Design	Build and Commission	Handover & Close out	Operation In Use

Practical BIM for DFMA

→ The Project

Designed by AMA, BDP and Jestico+Whiles Edinburgh St James is currently one of the most significant regeneration projects taking place in Europe. The 1.7 million sq ft project is the vibrant new retail, leisure, entertainment and residential landmark development at the heart of a UNESCO World Heritage destination that replaces a 1970s shopping centre with 850,000 sq ft of retail space, a 214-bedroom luxury W Hotel, 30 restaurants, a multi-screen cinema, 150 apartments and 1,600 covered car parking spaces.

→ BIM Implementation

The Edinburgh St James project was initially commissioned in 2005 predating the UK BIM mandate with no BIM requirement in the initial stages of the project. In 2014, following successful adoption on similar projects BIM methodologies were introduced. Based on the experience gained from achieving both BIM level 2 accreditation BDP developed a strategy to transition the project from an initial informal BIM environment to a structured approach, adopting appropriate PAS 1192 standards allowing a collaborative 3D environment by the end of RIBA Stage 3.

Key Benefits



BIM 3D model environment used to generate drawings, visualizations, VR and feed a Design For Manufacture and Assembly process ensuring consistency across all elements



The DFMA front loads the design and construction programme but provides far greater high quality geometry to finalise coordination



The use of a collaborative BIM environment adopting the principles of BIM Level 2 with appropriate LOD and LOI has allowed rapid design development and coordination of information.

Building on this defined BIM strategy Main Contractor, Laing O'Rourke, through their in-house DFMA based supply chain further engaged with the design team allowing the project to utilise a Common Data Environment and BIM work-flows to transition from Design Intent, to Specialist Subcontractors Developed Design proposals, ultimately driving an offsite manufacturing process from a single dataset.

This approach allowed further opportunities for coordination as large scale elements manufactured offsite are Quality Assured in the factory and the model updated as necessary resulting in the 'As Built' model data being available during the construction process. This allows for the identification of any issues before delivery minimising risk and maximising quality. The project commenced on site in October 2016 with completion in 2020 with DFMA elements commenced manufacture in early 2018.

PROJECT TEAM

- Main Contractor Laing O' Rourke (LOR)
- Lead Consultant / Architect BDP
- Civil and Structural Arups
- M&E TUV SUD Wallace Whittle
- Landscape Architects Optimised Environments
- Transportation Consultant : Sweco

- LOR's In house supply chain
- Expanded
- Explore – With modelling by Bryden Wood
- Crown house Technologies
- Engineering Excellence
- Digital Engineering

SCOTTISH
FUTURES
TRUST

Fixing Type 1.2A

25-15-35/100 EWF101

EWF101-01-E11-004

01-E11-004-S14

01-E11-004-S04

Images Extracts from the live working model showing the high level of geometric LOD and working amalgamation of both design intent and DFMA model information.

Referenced Models include – BDP, Arup, Optimised Environments, Sweco, BHC, Bryden Wood

→ Client Value

The use of BIM to feed into a DFMA process helped shorten both the design and construction periods whilst the progression of LOD and LOI within a single BIM environment allows the design intent to be more closely coordinated compared to a standard 2D work flow.

↓ Lessons learnt & feedback



The model authoring requirements of DFMA require a rigorous approach, supported the BIM level 2 process and a strategy to manage this at both a hardware and software level through the life of the project.



The specific model requirements to feed the manufacturing process need to be identified as soon as possible in the design stage.



Design responsibility and project responsibility must be clearly defined, to suit the requirements of the supply chain and specialist capabilities the responsibility within the model environment does not necessarily need to align with project responsibility



The more detailed model geometry intrinsic to a DFMA workflow reduces the need for 2D annotation on details improving both the efficiency of drawing production and the consistency of output.



If the model is to be treated as a single source of truth the process for transitioning from design intent through subcontractor design, to as built, needs to be clearly identified. This allows the responsibility within the BIM environment at each stage in terms of element ownership, scope and model accuracy and the timings of key transitions to be clearly defined.



<http://www.scottishfuturestrust.org.uk/>



bimdeliverygroup@scottishfuturestrust.org.uk



+44 (0)131 510 0800

The Scottish Futures Trust (SFT) is an independent company established by the Scottish Government with a responsibility for delivering value for money across public sector infrastructure investment