

# Building Information Modelling

Scottish Futures Trust

## BIM Case studies

Location Aberdeen

Client Muse  
Value £107 Million  
Type New build  
Sector Mixed use

Photo credit: marischalsquare.com

## MARISCHAL SQUARE

### Relevant project stages

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

## REDUCING WASTE & CHANGE



### The Project

Marischal Square will deliver a vibrant new mixed-use quarter for Aberdeen and include offices with associated car parking, hotel, retail, cafés, restaurants and civic space, along with public access, landscaping and public realm improvements around a site once dominated by the former council headquarters building, St. Nicholas House.

The development situated in the heart of the city centre forms a keystone of the council's city centre master plan proposals, providing a new civic space for Aberdeen and creating an enhanced setting for both Provost Skene's House and Marischal College.



### BIM Adoption

The project is being developed by Muse who are a national developer with regional operations in Manchester, London, Leeds and Glasgow

In 2013, Morgan Sindall Construction (MS) was very much at the formative stages of their BIM development and had formed a Core group to lead the implementation of BIM into the business over a 5 year period. This limited the opportunities for BIM in respect of projects. Although MS had a portfolio of projects to further their own knowledge, they felt Marischal Square presented an ideal opportunity to further their BIM offering.

## Key Benefits



Trialling model linked mobile site applications on tablets and smartphones to maximise the use of modelled information and smarter ways of working.



The use of collaborative BIM elevated the designers' perceptions of BIM beyond 'Revit' 3-dimensional modelling.



BIM delivered efficient design appraisals, the use of BIM for the fibre optic cables redesign potentially saved circa £90

There was no BIM brief on the project and certainly no EIRs coming from the client. However, as MS were involved from the inception of the project right through to handover it was their considered opinion that it would be the ideal environment to push BIM.

Firstly, they sought to understand the capabilities of all the stakeholders involved in the project, MS elected to undertake 3d, 4d & 5d implementation for the project. 6D was considered but, as the properties would eventually be let to tenants that MS did not have access to at this time, they elected not to write a pre-emptive brief for the 6d element.

Additionally, as part of their overall BIM development, they had invested in a product called VICO, which was a software that had considerable traction in USA and promised to combine 3d/4d & 5d under one umbrella.

## Project Team

Structural Engineers – Fairhurst Engineers  
Contactor – Morgan Sindall Construction

Architects – Halliday Fraser Munro Architects  
MEP Design – Atelier 10 Services Design

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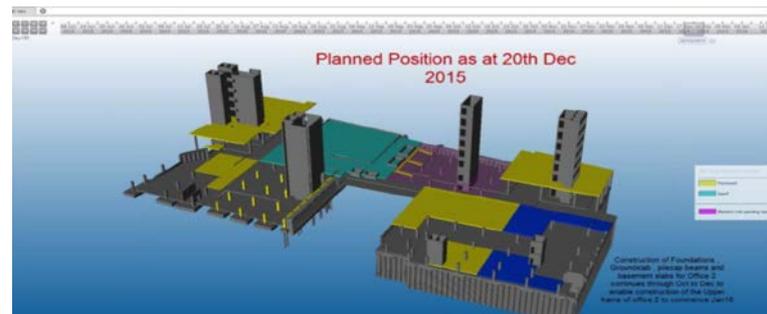
The premise of this software was that any change made to the model environment would be reflected in outputs on both 4d planning and 5d costs, thus making it a very powerful tool for making true 'Value Engineering' decisions.

## ➔ Innovation

The project used 4D planning which greatly enhanced visualisations and helped in the design as well as construction stages. A key benefit was the ability to make a comparison between the Planned model vs actual work completed. This was useful for demonstrating recovery or improvement if required. It also proved valuable during sub briefing and collaborative meetings.

## ↓ Lessons learnt & feedback

The return on investment is harder to measure as BIM is very often about the things you don't do (waste, rework etc.). The measurable KPIs set for the project have not all been reached as they only become tangible and measurable at handover. However, some very positive conclusions can be drawn as outlined below:



Images (Top) Misaligned columns coordination in design

(Bottom) Comparison of Planned & Actual

10	Impact	Incorrect drawings and setting out	
	Issue	Column misaligned (along gridline 2-01)	
	Proposal	Fairhurst to coordinate Revit model with current HFM model - (Office 2 only)	



**Waste** – measured in terms of skips off site. It has been difficult to draw on an exact parallel for Marischal Square that was completed pre-BIM but MS were able to draw on projects with a similar nature or project spend. Overall, to date, it looks to be running 60/70% less than its predecessors which has to be regarded, out with the cost of handling waste materials, as a major triumph for environmental control.



**QAR (Quality Audit reports)/Clash** – it is clear that the pre-emptive design coordination works through federation has greatly reduced rework or error on site. There are hundreds of clashes that featured in the model environment that have not found their way to site and, to date, there are only four areas of minor rework required to some minor services that have had to be undertaken on site.



**RFIs** – well down and around 40 in number during the post-contract stage – for a project of this size this would normally be measured in several hundred.



<https://bimportal.scottishfuturestrust.org.uk/>



[bimdeliverygroup@scottishfuturestrust.org.uk](mailto:bimdeliverygroup@scottishfuturestrust.org.uk)



+44 (0)131 510 0800

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