Building Information Modelling (BIM) pilot project
Meadow Road affordable housing scheme
Interim report March 2015
Meadow Road is a design and build scheme for 12 houses in three blocks and host to Partner Clearbox. The host project – Meadow Road is a design and build scheme for 12 houses in three blocks and host to Clearbox. The research project is being led by The Business, Innovation and Skills, the mean value of central government projects is closer to £2.5 million. Most of the government's BIM pilot projects have a value of £10+ million whereas according to a 2013 report by the Department of Business, Innovation and Skills, the mean value of central government projects is closer to £2.5 million. PAS 1192-2 is set as a standard for all BIM projects, however, we found that we needed to adopt a more flexible approach to the standard, especially in this smaller contract, where there are fewer people and less data than would normally be the case on a major government scheme. PAS 1192-2 is a very difficult document to read, we found that using PAS terminology consistently, so that everyone is speaking in a common language, for example by the difference between an 'Information Manager' and a 'BIM Coordinator' and their responsibilities. The design is being developed by the architect, structural engineer and project manager. The tendering process used a federated BIM model*, integrating the information written into the Employer's Information Requirements (EIR). This approach gives the team access to powerful visualisation and clash detection tools via Clearbox's central BIMXtra platform. The tendering process was split into two stages, with a sub-contractors' stage and a design and build stage. An early stage in the tendering process included inviting the BIMXtra on board, this allowed the contract to be priced without the normal risk premium. BIMXtra has nevertheless helped to expose the maturity of the BIM contributors, alongside the process, behavioural and cultural changes that have occurred. This is where someone has to make a judgement call in terms of the difference between a BIM Information Manager and a BIM Coordinator and their responsibilities. The biggest challenges have related to the training required to upskill contributors, alongside the process, behavioural and cultural changes that have occurred. The biggest challenge is not the tools and processes, but the people involved. Individuals need to have a level of trust and confidence in one another to work collaboratively using BIM as well as embrace technological change. You have to work very hard to win people over to the concept of change being a good thing, neuroscience shows us that brains are far more likely to go into fight or flight mode when confronted with things they are not familiar with. We have had to work very hard to win people over to the concept of change being a good thing, concludes Bullen.

Why this project is special

By employing a BIM level 2 standard on a £1.5 million project, the team can evaluate the benefits and challenges of using BIM on an average scale contract. The impact on the tendering process

The approach was to develop a federated BIM model and integrate the design via Clearbox's central BIMXtra platform. The approach gives the team access to powerful visualisation and clash detection tools via Clearbox's central BIMXtra platform — allowing design teams to be quickly and easily identified and involved. The design is being developed by the architect, structural engineer and a number of sub-contractors who have design responsibility in resulting tools such as Autodesk Revit. These details are then imported into a central middleware platform to create a federated level 2 BIM model.

The significant change in the usual design process. "It’s far less inherent design risk in a BIM project and hence little point in pre-contract award BIM Execution Plans and associated capability assessments. This is where someone has to make a judgement call in terms of the difference between an Information Manager and a BIM Coordinator and their responsibilities.

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Getting the basics right

In today’s world, there are many benefits of using BIM to some extent, yet to access BIM enabled solutions within your own sphere of operation, for instance when there are no relevant standards for use in valuations such as for kerbstone preparation. This is a completely new process that we have prescribed by the team. The other sub-contractors’ stage comprised the main design and build tender. The aim was to evaluate the benefits and challenges of using BIM on an average scale contract.

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Behavioural and cultural change

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Software compatibility

Several software tools are being used by the project team and supply chain. Data is organised in Autodesk Revit with interfaces with BIMXtra. A cloud-based data hub that consolidates the information and facilitates the construction schedule, cost planning, asset information as well as other functions. BIMXtra is currently used by a range of construction businesses and has performed well. However, some members of the supply chain have not yet to access BIM enabled solutions within their own sphere of operation, for instance when there are no relevant standards for use in valuations such as for kerbstone preparation. This is a completely new process that we have prescribed by the team. The other sub-contractors’ stage comprised the main design and build tender. The aim was to evaluate the benefits and challenges of using BIM on an average scale contract.

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**Benefits and challenges**

At the time of compiling this interim report, The Clarkson Alliance captured the benefits and challenges so far encountered.

**BIM housing positives**
- Great potential for off-site manufacturing processes.
- Early use of modelling tools will provide improved layouts which consider topography and site constraints at development appraisal stage.
- Possible to generate good asset information that will provide benefits to maintenance teams.
- Ability to remodel very quickly when changes occur without having to change numerous drawings.
- Ability to quantify and schedule quantities from the model, thereby reducing waste and monitor more closely use of materials by labour only sub-contractors.

**BIM challenges**
- Current smaller supply chain contractors undertaking limited design do not have the BIM capabilities.
- Manufacturing software does not easily link with design authoring software e.g. timber frame required some coding from software engineers to Clearbox to generate a file converter to ensure all project data could be included.
- Lots to learn on ‘first’ projects.
- Not used to providing more detailed information earlier which enables design issues to be resolved.
- Procurement needs to be reviewed to engage teams earlier in the process.
- Not all families of objects available.

**Meadow Road project targets**
- 10% reduction in design costs measured at end of design and on completion
- 20% reduction in construction costs measured on completion
- 75% reduction in post-contract change measured on completion
- 10% reduction in time on-site measured on completion
- 25% reduction in notified defects measured at end of defects liability period
- 25% reduction in construction waste measured on completion
Worthing Homes
Host project
and research partner

The Clarkson Alliance
Research partner

PMC Construction
Main contractor

ECE Architecture
Designer

Clearbox Limited
Innovate Research Partner

Allwood Timber
Timber frames

Helmsley Orrall Partnership
Structural engineer

AD Mechanical
Mechanical engineer

MR Electrical Services
Electrical engineer

Rund Partnership
Employer’s agent