CitA
BIM GATHERING

Building Capabilities in Complex Environments

CitA BIM Gathering 2017, Croke Park, November 23rd & 24th, 2017

CitA
BIM GATHERING

BIM Case Studies: James Kearney , O'Hare & Mc Govern Ltd

O'Hare & McGovern Ltd are an established Main Contractor with over 40 years' experience in delivering high quality projects across the UK and Ireland with a turnover in excess of £100m.

We deliver award winning construction projects for our clients across a range of sectors; and are recognised as an Industry leader in Innovation and construction excellence with a particular emphasis on Building Information Modelling and Sustainable Construction Development.

Wellcome-Wolfson Institute for Experimental Medicine

O'Hare & McGovern Ltd

Project Details:

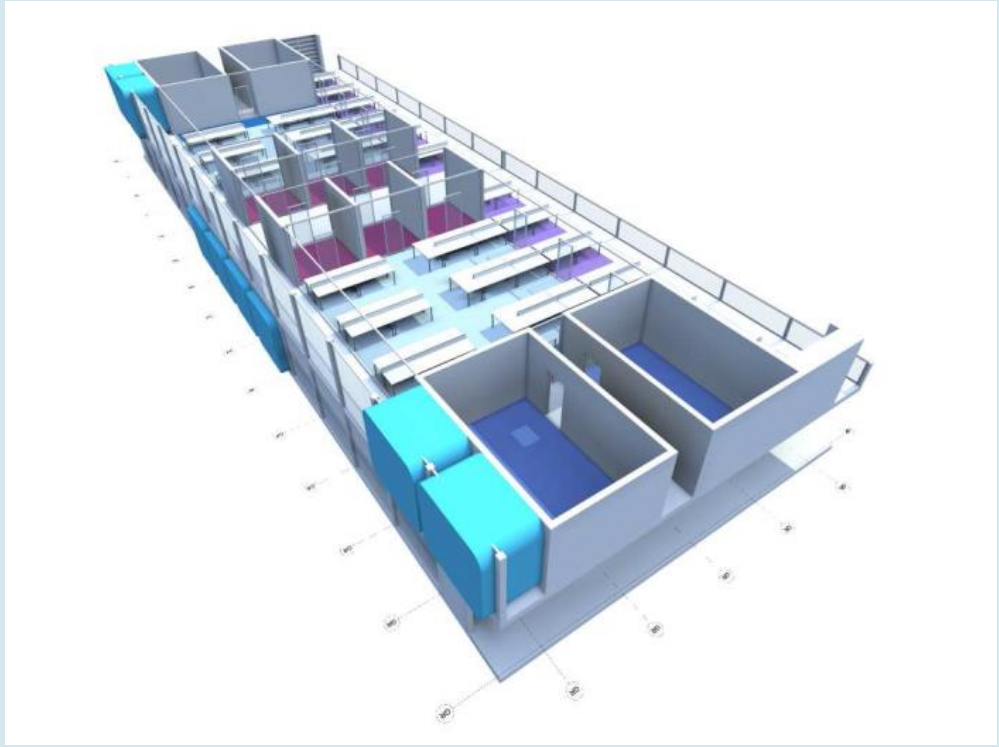
Project: Wellcome-Wolfson Institute for Experimental Medicine
Main Contractor: O'Hare & McGovern (OHMG)
Client: Queen's University Belfast (QUB)
Completed: 2015
Construction Value: £18.7m
Programme: 2 Years

Northern Ireland's Largest BIM project:

BIM Level 2 deliverables
COBie data
Asset Information model for FM

Awards Details:

RICS Awards 2016 – Overall Winner
RICS Awards 2016 – Design through Innovation
Considerate Constructors Scheme 2016 – Silver Award
CEF Excellence Award 2015 – Overall Winner
CEF Excellence Award 2015 – Education Winner



Building Introduction

The Wellcome-Wolfson Institute for Experimental Medicine (WWIEM) is an innovative biomedical research and development facility located on the Belfast City Hospital site for Queen's University. With an internal floor area of 9000m2, it accommodates 330 staff specialising in medical research into finding cures for eye disease & diabetes, and the development of a global programme to aid genetics of complex chronic diseases.

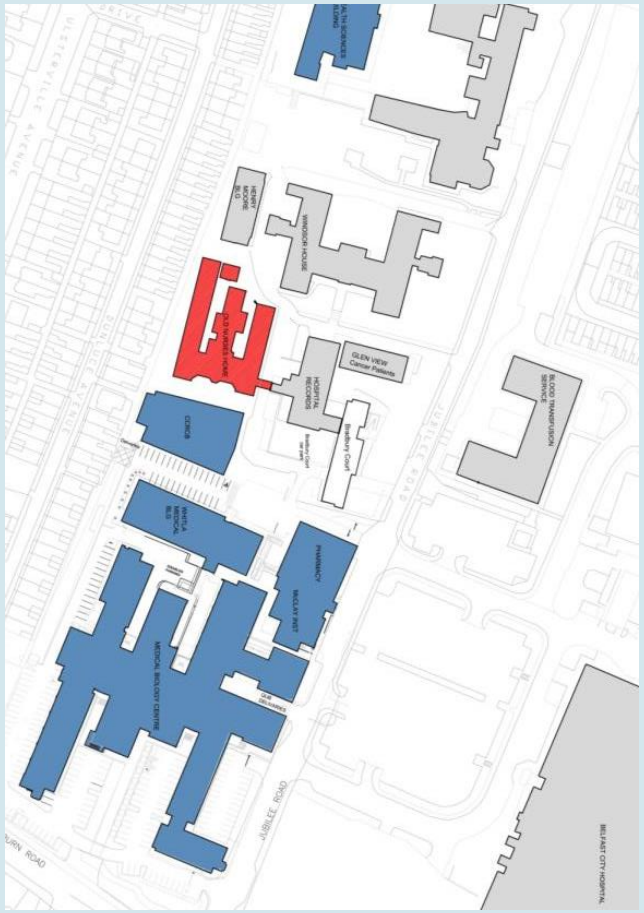
In accordance with the design concept, laboratories are arranged around a central atrium to encouraged collaborative working, with transparency through the building and between research spaces. The idea was to maintain a clear adaptable floor plate, free from service risers. This was achieved by routing essential ductwork vertically on the building perimeter within an energy efficient double skin façade. BIM was successfully used as a tool for the design development, fabrication, installation and operation of the facility.

Site Context

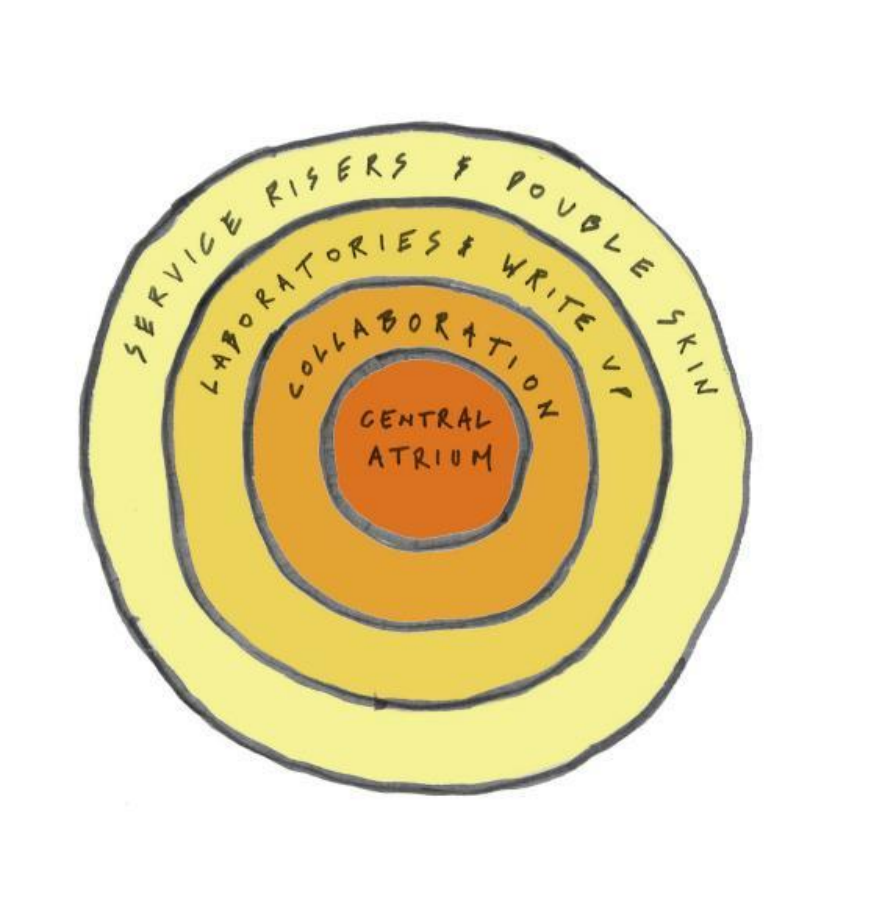
The site, surrounded by a fully operational Belfast Health Trust facility is also home to a number Queen's University buildings, where they form the joint health-sciences campus.

Initial works required the demolition of the 'old Nurses home' building to make way for the new facility. The site entrance shared the same road as the emergency blue light route used by the Belfast City Hospital which required high level stakeholder engagement, particularly during the construction phase.

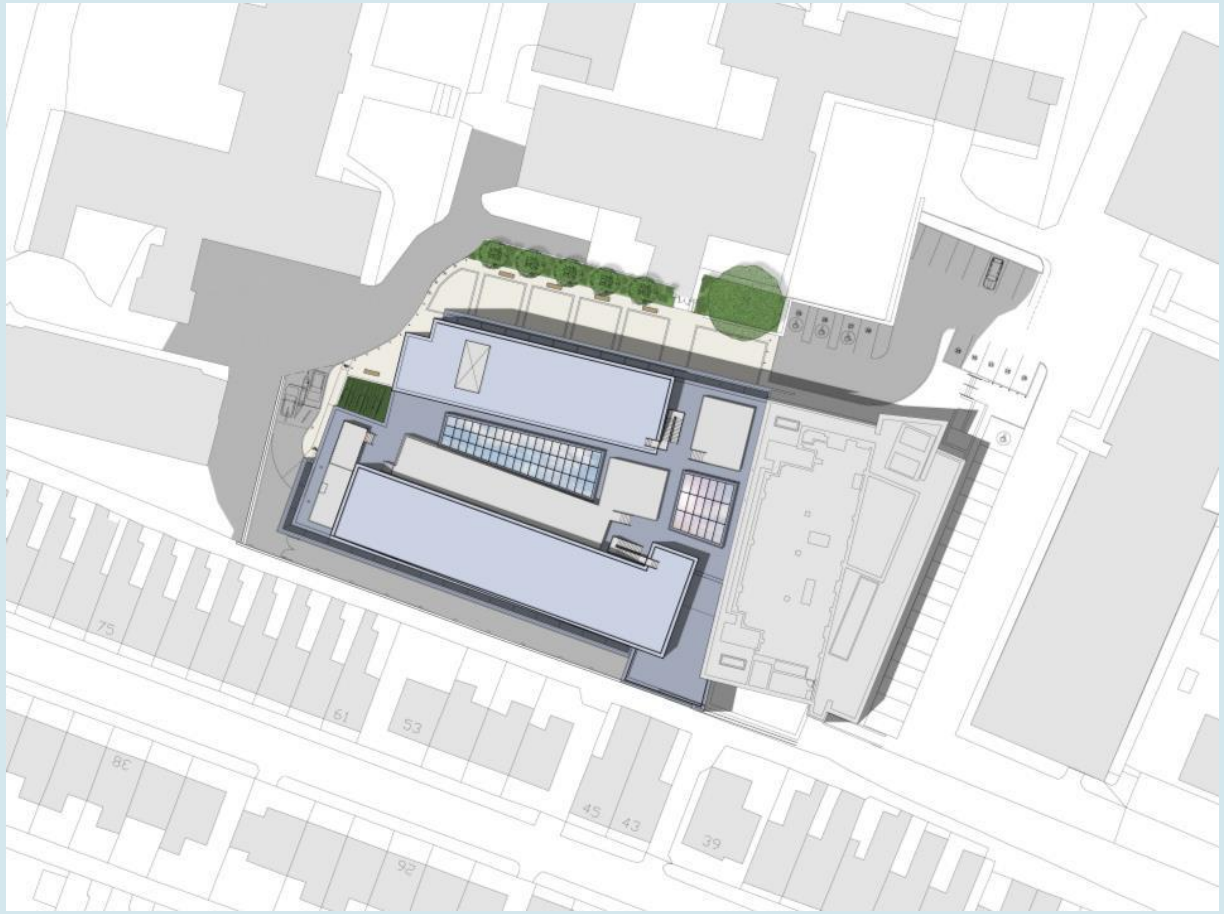
The WWIEM building also abuts the existing cancer research building, creating a single location for advanced biomedical research.



Design Concept



Site Layout Plan

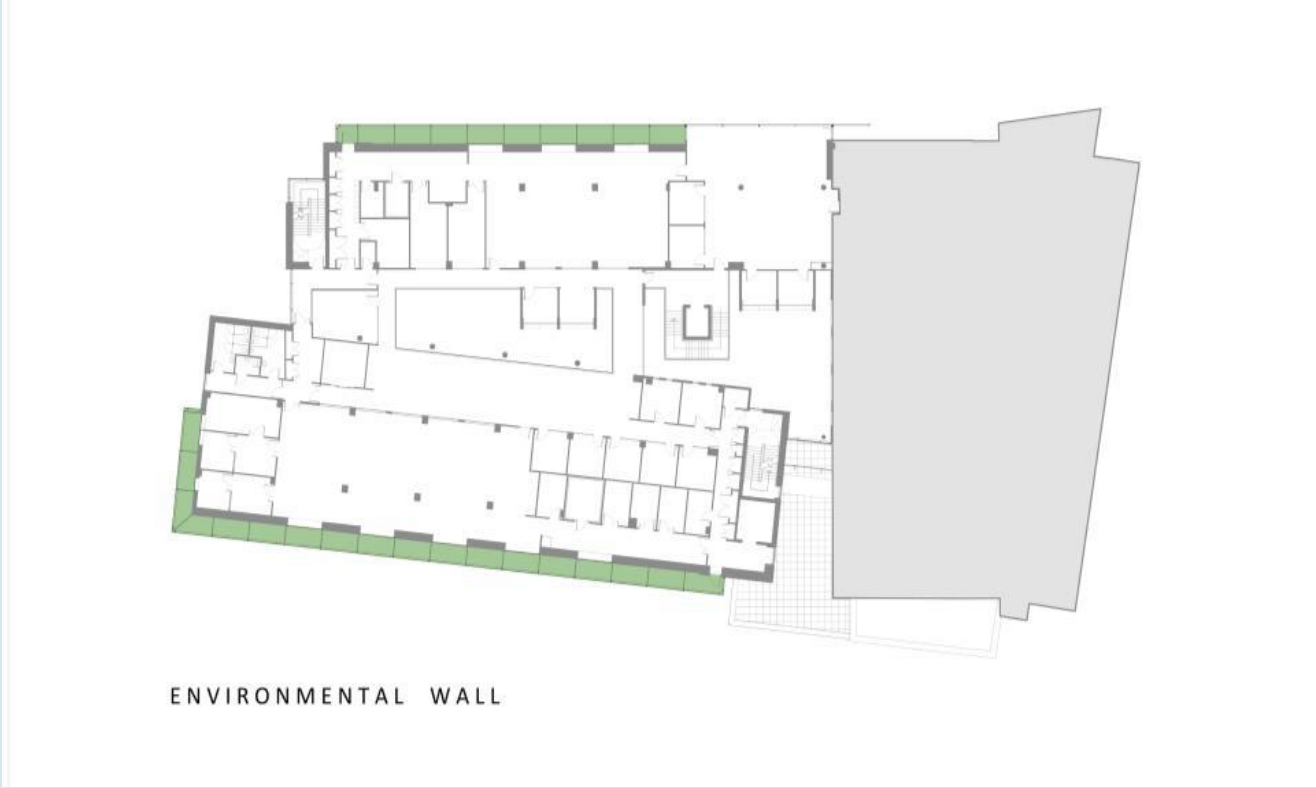


Design Concept – Collaboration Zone

Design Concept – Write up & Offices

Design Concept – Primary & Secondary Labs

Design Concept – Environmental Wall



Project Drivers for BIM

The Client on the project was Queens University, Belfast, who's asset portfolio is managed by their Estates Directorate. QUB's design team were already experienced in delivering complex buildings at BIM level 2 and OHMG was a BIM ready contractor.

Facilities Management was the key driver in the implementation of BIM within the project for post tender operations.

The use of BIM was seen as a pathfinder project for OHMG on the WWIEM and for future projects across the QUB estate, which we are currently now delivering.

The WWIEM project broke new ground for OHMG and QUB as this was our first BIM project together. The lessons learnt on the WWIEM have directly influenced both our internal BIM processes and QUB's Estates department's direction towards being an informed Client with aspirations towards creating a 'smart campus'.

OHMG BIM Objectives

Adopt and deliver BIM in accordance with GSL (Government Soft Landings).

Develop PAS 1192-2:2013 compliant documentation – BIM Execution Plan & Master Information Delivery Plan.

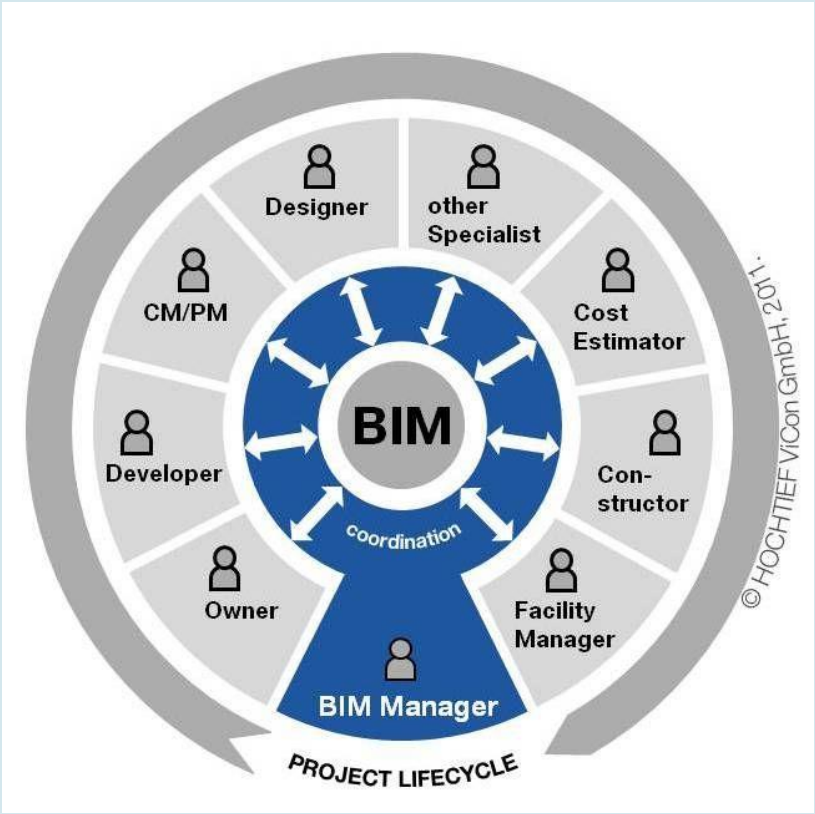
Develop a BIM ready supply chain.

Provide data in COBie format for Client FM

Maximise feedback in BIM reviews with Client, Design Team and end users through the use of 3D models.

Use BIM to co-ordinate the distribution of M+E services within the building fabric and structure and provide a BIM model outputs to inform O+M documents.

OHMG Role in the BIM Process



In line with the EIR and in compliance with the PAS 1192-2:2013 specification; OHMG undertook the roles of:

- Project Information Manager
- Project Delivery Manager

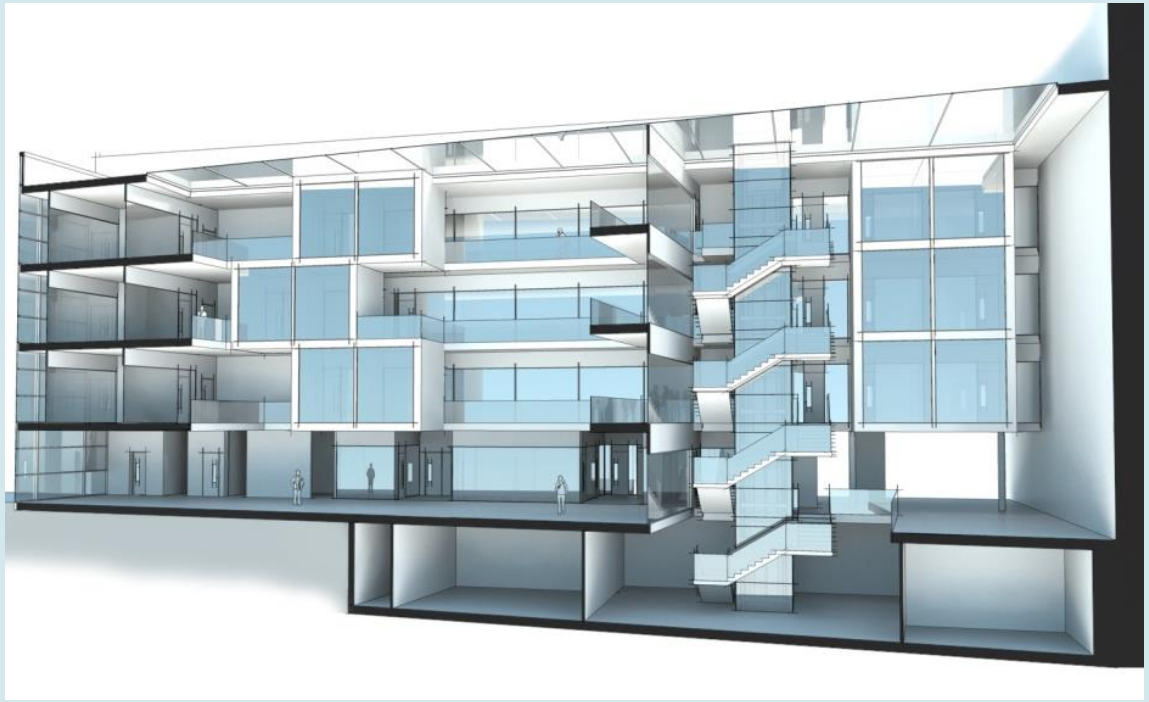
Facilitating and managing the project CDE (common data environment).

Managing and approving BIM deliverables from supply chain.

Co-ordinating information received from the Design Team and other specialists into the PIM (project Information model).

Clash detection and delivery of an Asset Information Model for FM.

OHMG BIM Implementation Goals



Accurate Works Information through consistency of drawings and reports.

Collaboration and Integrated team working achieved by building common goals and managing communication through the CDE .

Clash Avoidance & Detection to eliminate interface and co-ordination challenges using Navisworks.

Lean Techniques to minimise wasted design and construction effort.

3D Simulation to demonstrate safe methods of working, construction logistics, planning and movement

OHMG Design Development Challenges

Twin wall Installation

Twin wall Complete

The most complex Contractor designed element was the external envelope

OHMG appointed:

- Architectural Design Validator
- Structural Design Validators
- M+E Design Validator

Design & Technical Workshops held to develop twin wall interfaces and to ensure continuous collaboration with the Client's Design Team.

BIM visualisation and clash detection were used to aid the integration of building services within the twin wall system.

OHMG Sustainability Challenges

Energy Savings achieved by the twin skin acting as a solar collector.

Air Tightness of the external envelope and twin wall skin was a major factor in targeting a BREEAM rating of Excellent.

Weather Protected Service Zone creates an enclosed weather protected zone with access to services for maintenance.

Solar gain/ glare into the labs was controlled using automated louvres fitted within the twin wall system.

OHMG Construction Challenges

Site Logistics

Heavily restricted by the constraints of a live site, surrounded by sensitive and fully operational healthcare facilities, pre-planning and the promotion of off site fabrication was essential in the delivery of a high quality project.

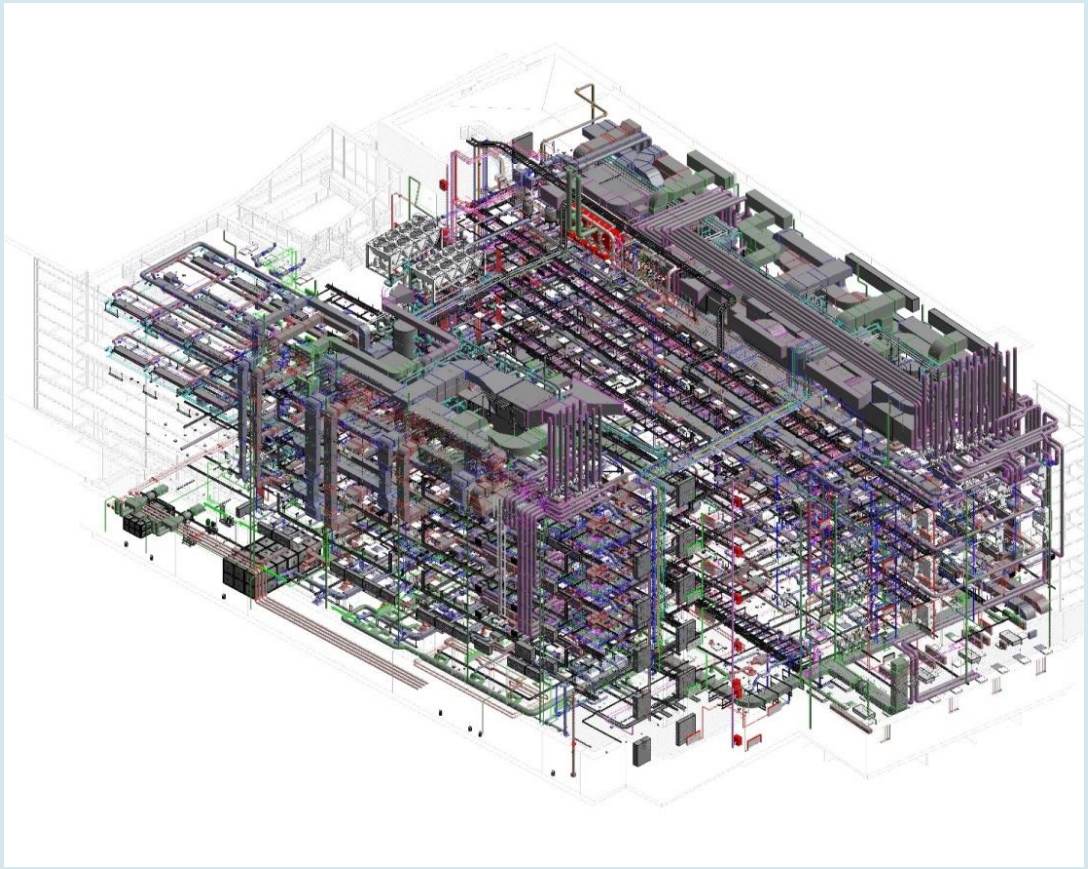
Business Continuity

Existing buildings located in the immediate vicinity of the site were unaffected during construction and remained active, with research and treatment able to take place during normal working hours.

Lean Construction

The use of 3D models during the design stage and prior to construction fed into what was a very efficient, lean construction programme.

OHMG Construction Challenges



M&E Coordinator

Key role in the development of the final co-ordinated design to meet QUB & BIM requirements.

M+E Contract details

£7.5 Million.

48 Weeks installation time.

16 Weeks commissioning time.

M&E BIM Methodology

Develop the Design.

Discuss the Issues.

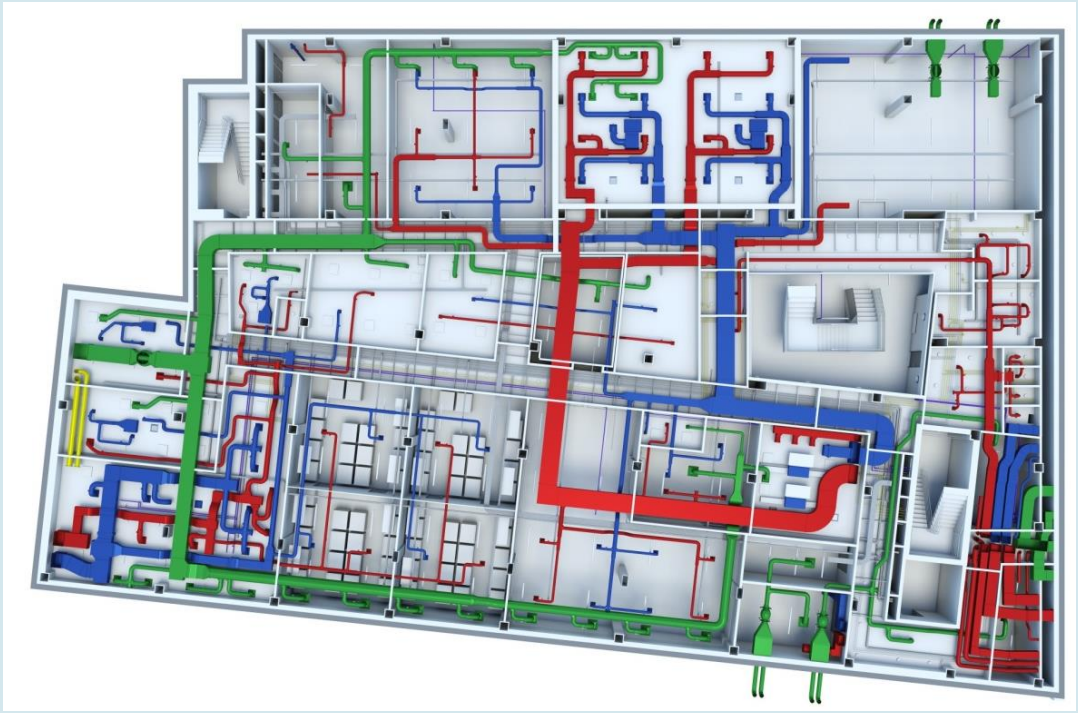
Detail the Fabrication.

Drive the Programme.

Deliver the Project.

Wellcome-Wolfson Institute for Experimental Medicine

O'Hare & McGovern Ltd



BIM - Advising Programme

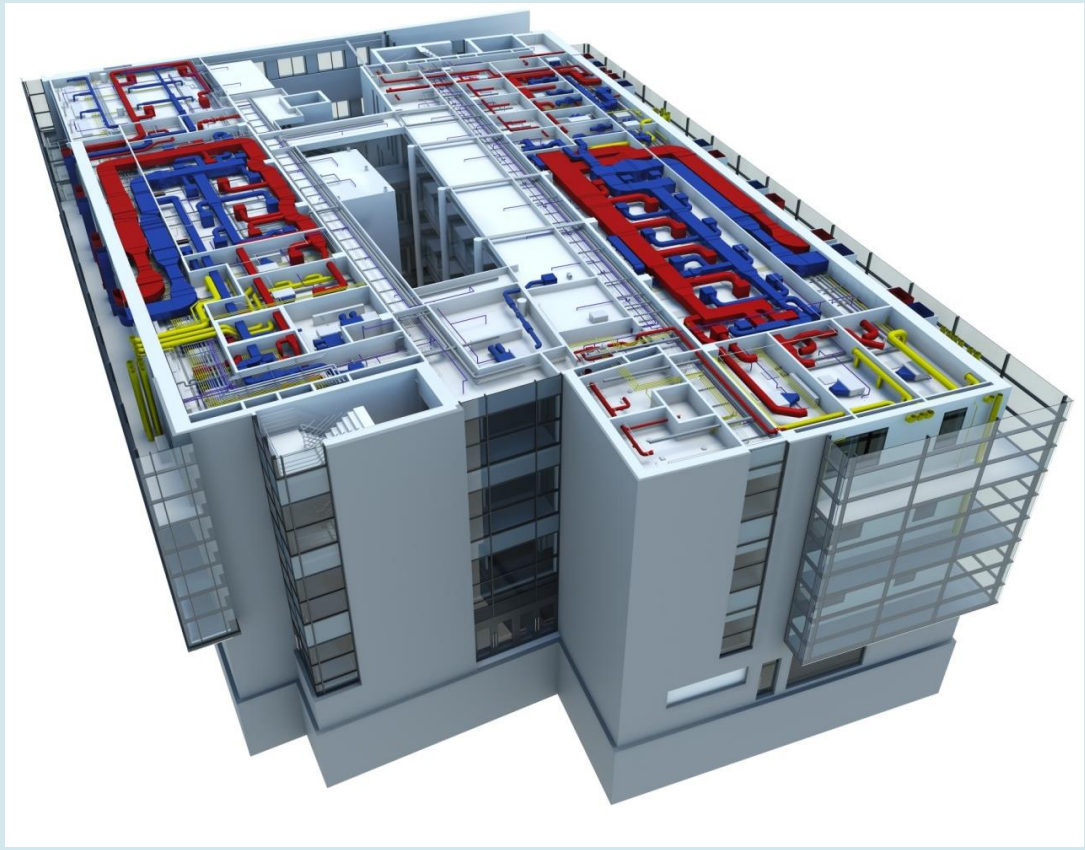
This 2 year project was completed on time. Adopting the processes for BIM level 2 has been credited as one of the key reasons in accomplishing this demanding programme.

Accurate pre-construction co-ordination helped inform the 3D M+E services model which was interoperable with the fabrication of the ductwork.

The integration of BIM and 4D construction scheduling helped maximise off-site fabrication which delivered the time benefits expected of a lean construction project.

Wellcome-Wolfson Institute for Experimental Medicine

O'Hare & McGovern Ltd

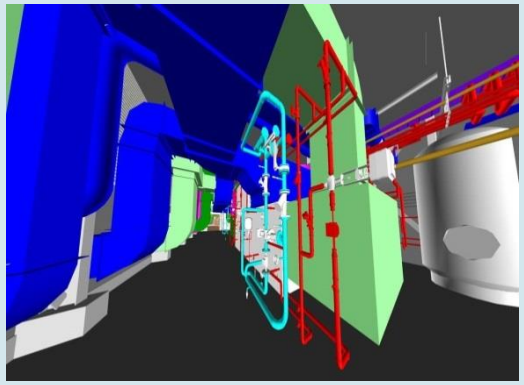


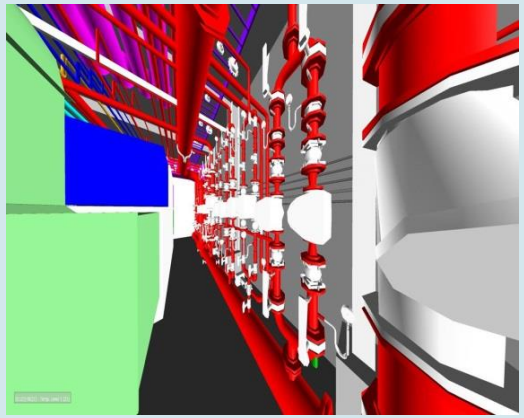
BIM - Ensuring Quality

The completed project benefitted greatly from pre-construction clash avoidance and off-site fabrication.

The integration of our proven ISO 9001 processes with BIM helped deliver award winning quality.

The project was the overall winner in the NI Construction Excellence Awards 2015 and RICS Project of the Year for 2016. The use of BIM was cited by the judges as having a major contribution to the high quality of the completed project.





BIM - Monitoring Cost

The project was delivered on budget. Reporting was consistent throughout the construction period.

There were very few site changes or outstanding RFI's to throw the project cost management off track through use of BIM and 'Getting it right first time'.

BIM Level 2 processes improved predictability of outcome and positively influenced the successful management of project costs.

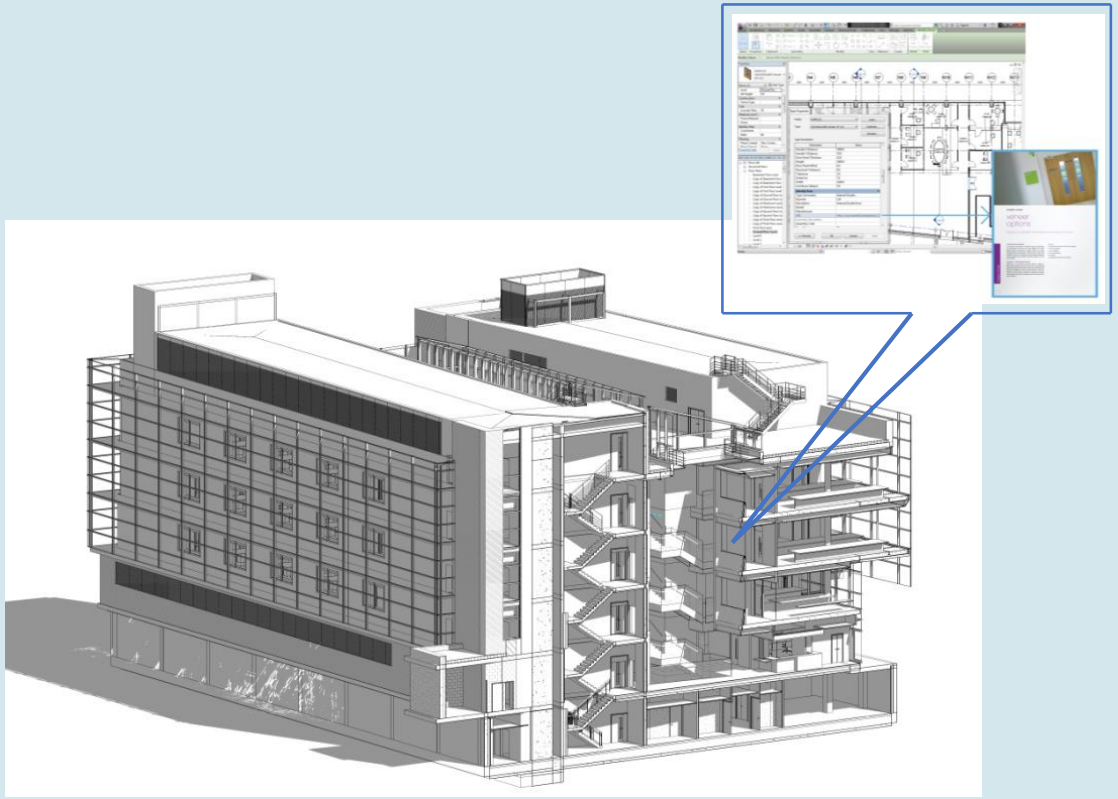
BIM - Client & Supplier Engagement

OHMG and their supply chain proactively engaged in the application of BIM on the WWIEM project as a pathfinder.

The drive has been from Director level which was fundamental to the project's success.

Regular BIM co-ordination meetings improved day to day construction management and acted as a means to work collaboratively.

Soft landings extended OHMG's involvement in the project through post occupancy reviews and seasonal commissioning.



BIM - Facilities Management

The overarching aim was to integrate the use of BIM within the operation and maintenance of the new facility.

The O+M manual was hyperlinked to the Navisworks version of the federated models.

3D Navisworks models combined with the extracted 2D DWF's of the sheets were combined into a single Navisworks file.

The QUB FM Team are now able to view 2D intelligent drawings and view the same component in 3D.

BIM - Enhancing Collaboration

Design co-ordination meetings took place regularly throughout the construction period between OHMG, QUB, the design team and specialist suppliers.

Conducted by the Architect at pre-construction, OHMG took on the role of chair during the construction phase.

3D views were used to aid navigation and help inform design changes.

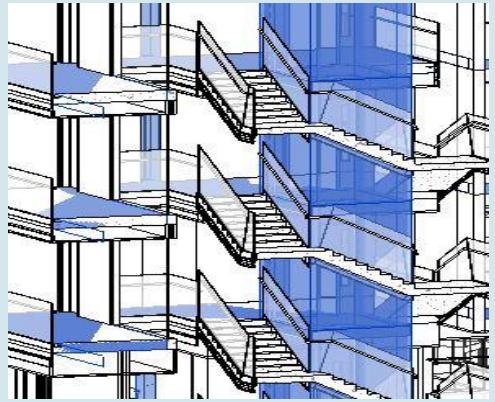
Coloured filters within Navisworks were utilised to great effect for distinguished M+E services by system type.

QUB - BIM Lessons Learnt

The Client, having adopted the fundamentals of BIM, throughout the project, subsequently sought to formalise this adoption and optimise the processes involved so as to implement **BIM Level 2 for all future projects.**

Subsequent to a GAP analysis of the Estates Directorate's capabilities, a **'BIM Implementation Group'** was set up and tasked with sharing the knowledge gained and overseeing the wider scale of implementation of BIM processes across the QUB Estates Directorate.

Adopting the BIM spirit **'Starting with the end in mind' to** develop a clear set of organisational and asset information requirements.



OHMG - BIM Lessons Learnt

OHMG now have internally **developed BIM processes** which are being adopted for future BIM Level 2 projects.

Key members of our company regularly attend courses to up skill and provide training to others on key **BIM roles** such as the **Project Information Manager** and **Project Delivery Manager.** OHMG are currently preparing for a **3rd party audit** against PAS 1192-2:2013 procedures.

Importance in developing a **BIM Level 2 Ready Supply Chain**.

We are continuously updating and improving our own in house document management system to become a fully complaint **CDE** (common data environment).

OHMG have proven processes and procedures in place, integrated within the company's **ISO 9001** Quality Management System. These are in full compliance with the relevant government standards including **BS 1192:2007** and **PAS 1192-2:2013**. These have been and will be further developed by our company BIM Champions who will in turn achieve Level 2 Accredited Professional status.

CitA
BIM GATHERING

Thank you

James Kearney

ohmg
O'HARE & McGOVERN