‘SPACES’ BIM EVENT

PICK
EVERARD

Welcome

9.15 – 10.45 Part 1 – Not BIM & BIM Level 1

10.45 – 11.15 Refreshments

11.15 – 12.45 Part 2 – Towards BIM level 2

12.45 - 13:00 Closing Questions

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Introduction

Greg Keeling - SPACES

Introductions

Justin Ashworth
Project Architect
justinashworth@pickeverard.co.uk

Jenny Curtlin
Associate - Structural Engineer
jennycurtlin@pickeverard.co.uk

Chris Deacon
BIM Coordinator
chrisdeacon@pickeverard.co.uk

Recap of Last Event

- Last Meeting – Examples of Revit based projects
- Architect Led models
- Little input from other disciplines
- Not formal BIM projects or process
- Everyone keen to learn more

Pick Everard

10
office locations

440
staff

Multi Professional Consultancy

Architecture

Building Services Engineers

BIM Management

Civil Engineering

Cost Consultants

Facilities Management Consultants

Project Managers

Structural Engineering

Quantity Surveyors

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Why Pick Everard Started BIM

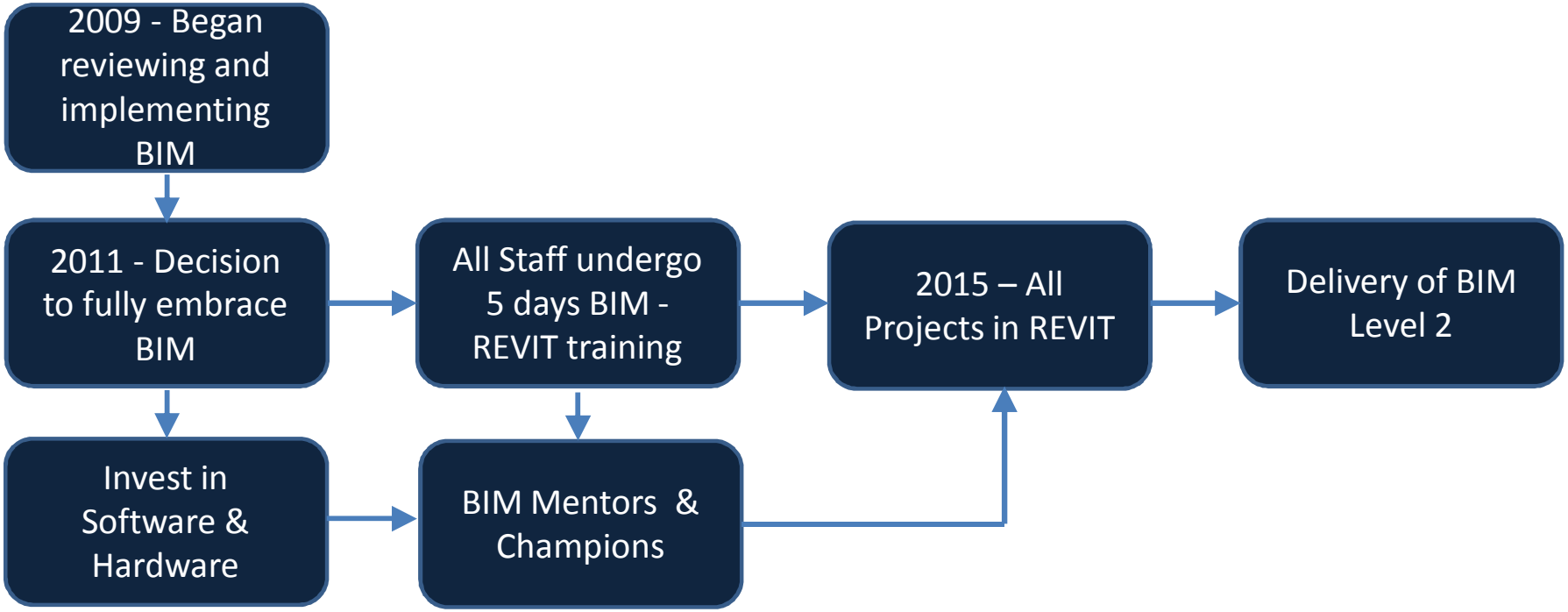
"The Government 2011 Construction Strategy (GCS) requires that: Government will require fully collaborative 3D BIM (with all project and asset information, documentation and data being electronic) as a minimum by 2016. This refers to all centrally procured Government projects as outlined in the GCS including new build and retained estate, vertical and linear." http://bim-level2.org/

Benefits to Pick Everard

- Improved coordination, productivity and reduced waste through redesign.
- Site based efficiency resulting from identifying clashes before reaching site

Pick Everards Journey

2009-2017



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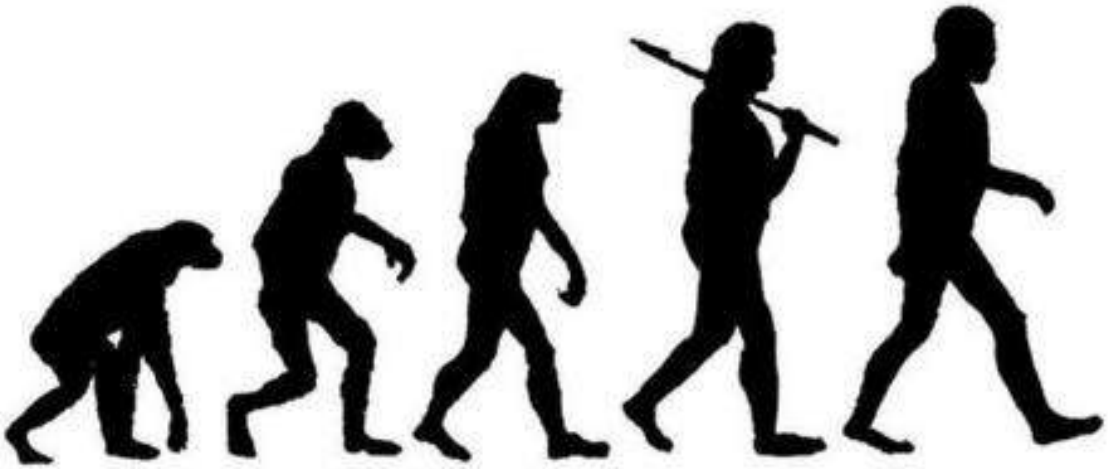
Question - Where are you?



Drawing Boards | 2D CAD | 3D Modelling | Multi D 3D Modelling | BIM Ready

BIM Level 2

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Learning and Sharing

Pick Everard are members of:

- Constructing Excellence – National Forum
- BIM Regions East
- NBS Beta Tester Group

Whilst also sharing our knowledge through:

- Links with National Contractors – Kier Construction, Willmott Dixon
- Educating Clients
- National Conferences & Exhibitions

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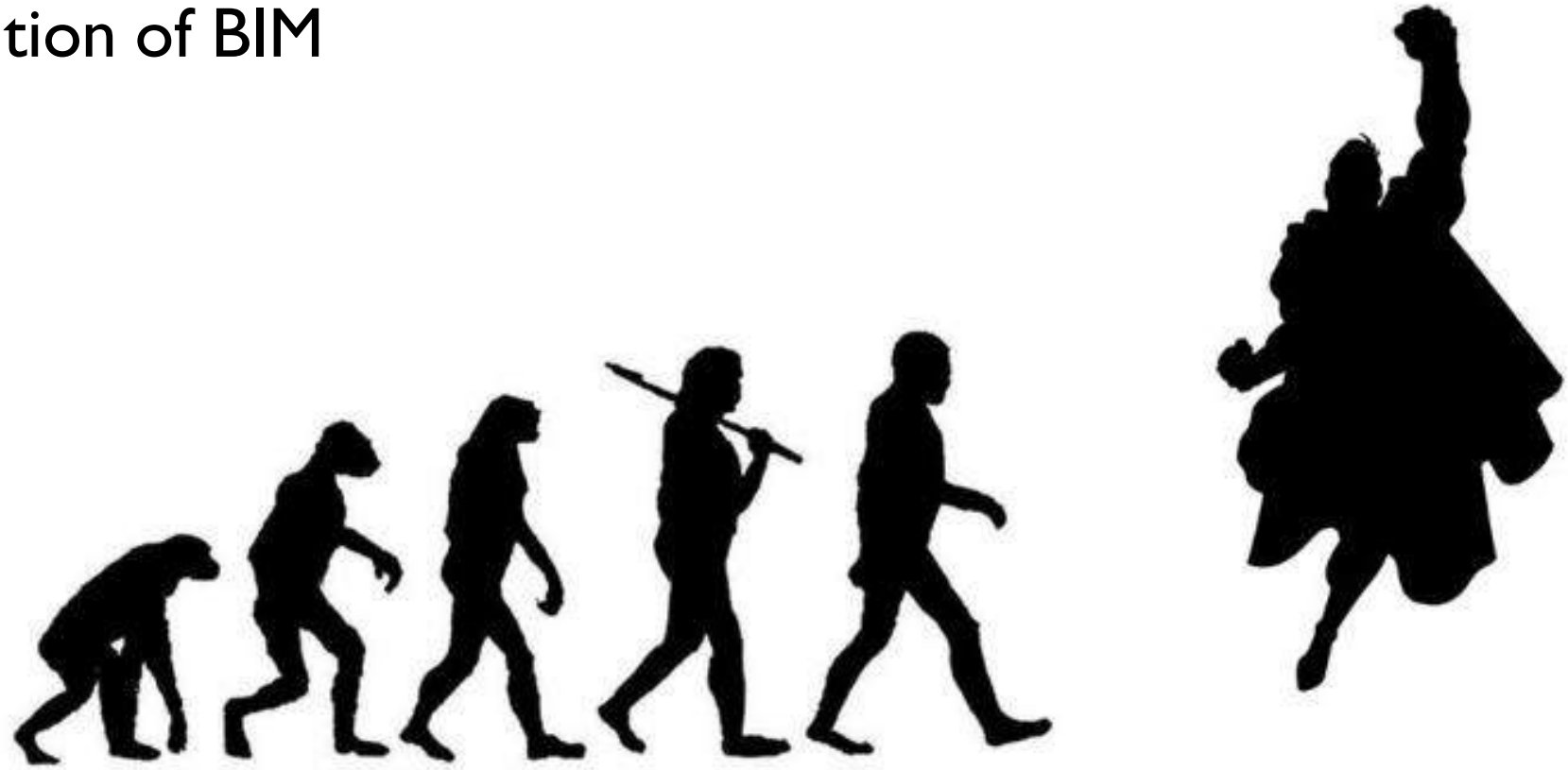
Software

- Architecture — Autodesk Revit
- Structures — Autodesk Revit
  Tekla Structures & S-FRAME
- Building Services — Autodesk Revit + MAGICAD
- Civils — Autodesk Civils 3D
- Environmental — IES
- Specifications — NBS Building / NBS Create

Pick Everards investment to date in Software & training – over £1m since 2009

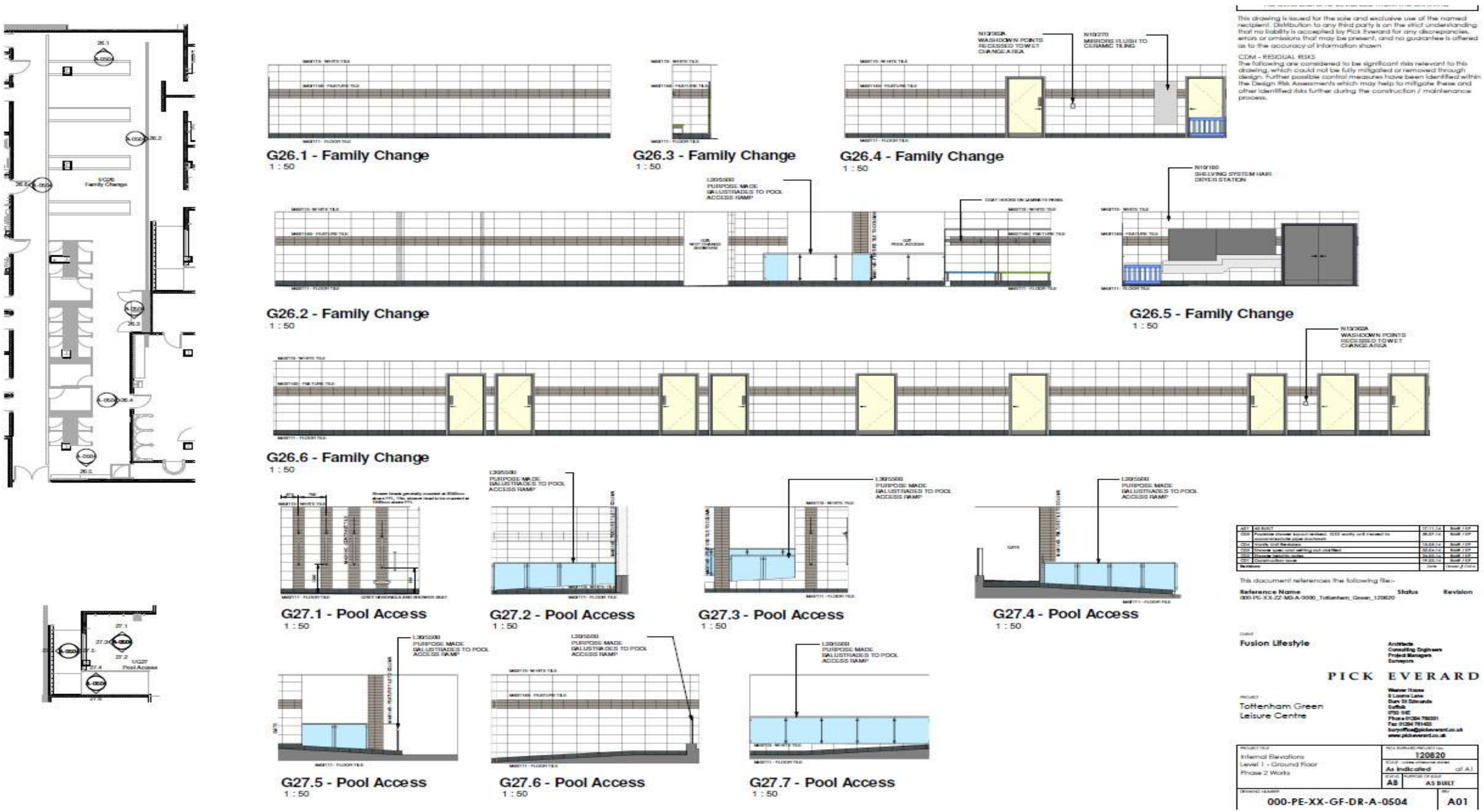
Question – What are you using?

Evolution of BIM



Drawing Boards | 2D CAD | 3D Modelling | Multi D 3D Modelling | BIM Ready | BIM Level 2

2012 – Tottenham Green Leisure Centre



G26.1 - Family Change
1 : 50
G26.3 - Family Change
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G26.4 - Family Change
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G26.2 - Family Change
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G26.5 - Family Change
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G26.6 - Family Change
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G27.1 - Pool Access
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G27.2 - Pool Access
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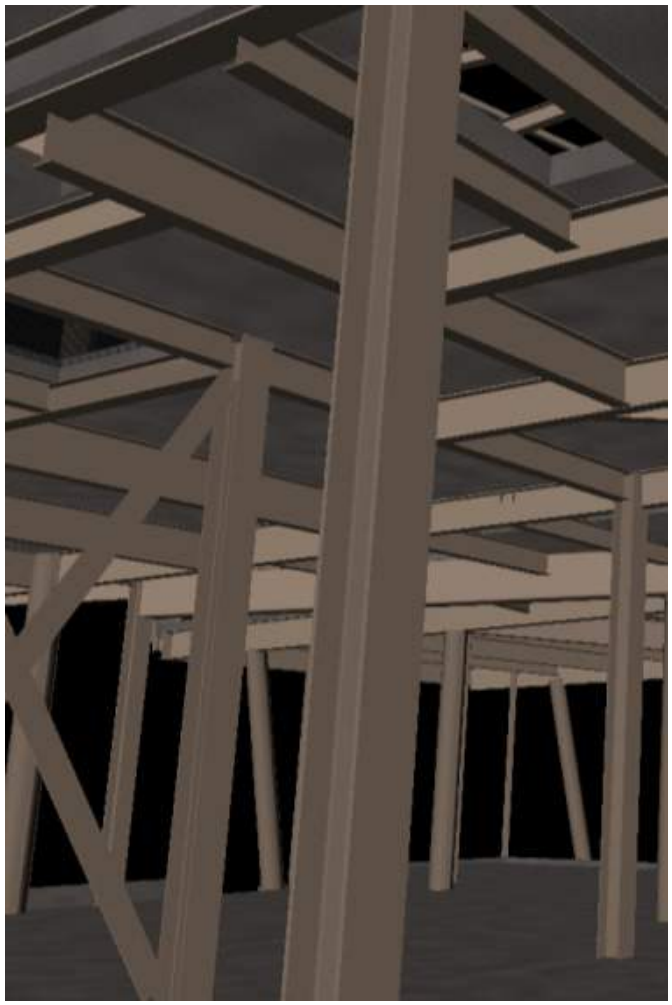
G27.3 - Pool Access
1 : 50
G27.4 - Pool Access
1 : 50
G27.5 - Pool Access
1 : 50
G27.6 - Pool Access
1 : 50
G27.7 - Pool Access
1 : 50
This document references the following file:-
Reference Name
Status
Revision
Fusion Lifestyle
Architects
PICK EVERARD
Tottenham Green
Leisure Centre
Internal Elevations
Level 1 - Ground Floor
Phase 2 Works
120820
As indicated
AB
AS BUILT
000-PE-XX-GF-DR-A-0504
A01

Benefits of 3D Modelling

- Early 3D massing and visualisations is quick.
- Early Environmental modelling – solar gain, daylight
- Useful for clients, planners & designers alike to visualise the design.
- Coordinates single discipline information.
- Quick for Layouts / Schedules
- Details / Dims can't be fudged (Mostly)



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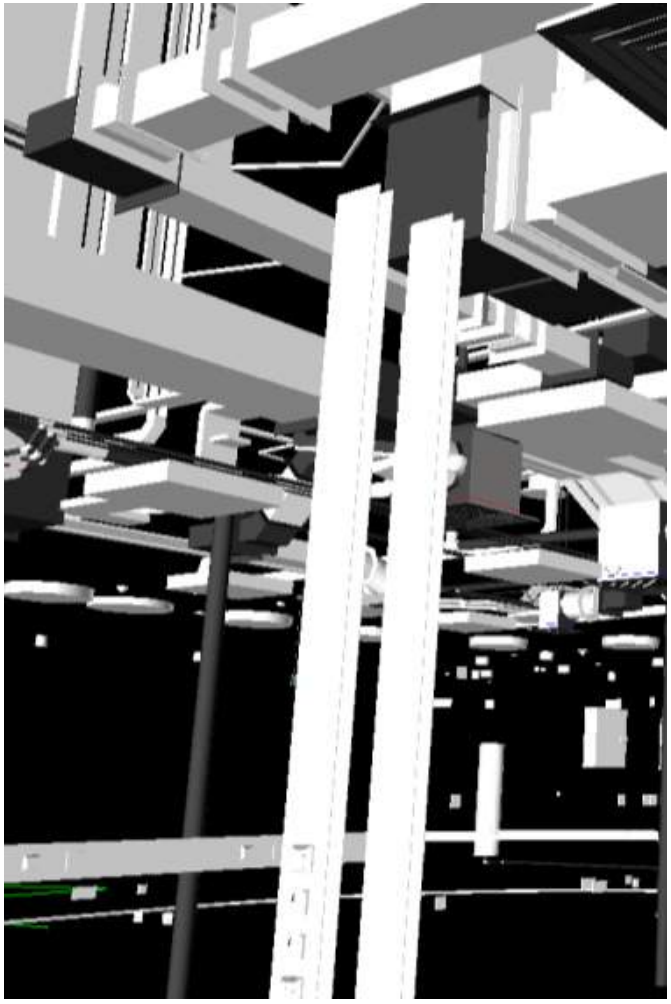
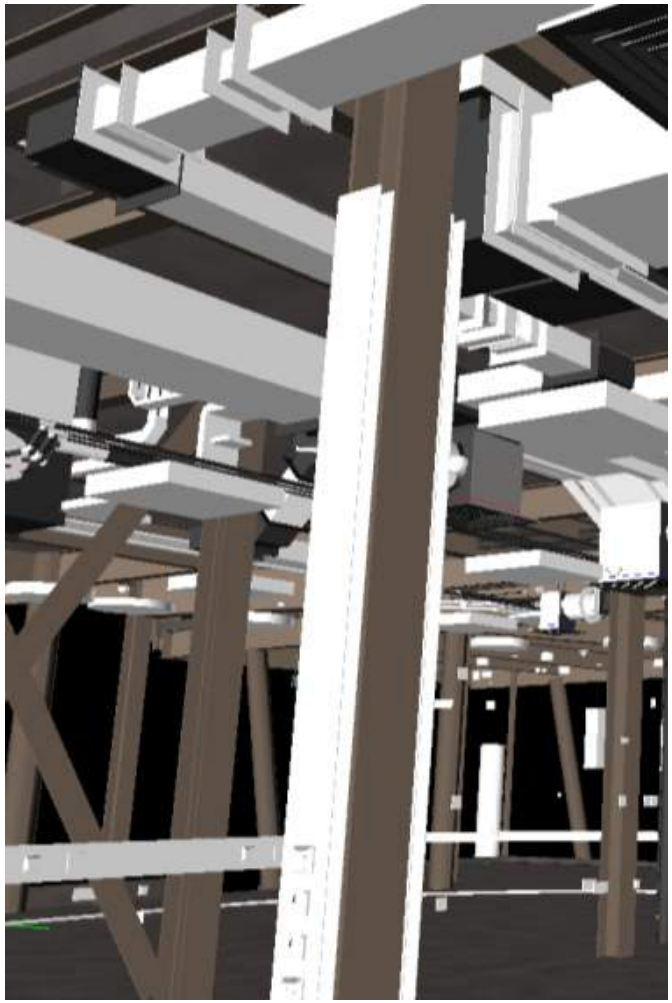
Issues of 3D Modelling

- Can only be used for coordination if the whole team is working in 3D
- Export to CAD Please!
- Requires strict modelling & sharing protocols between the team
- Can result in the architects filling in the gaps i.e. adding in structure FF&E etc. if not all disciplines are engaged.
- Good at modelling but not so great at detail. Stage set.
- Not so good at external works / site modelling.



3D Modelling Deliverables

- PDF
- DWG, DWFx



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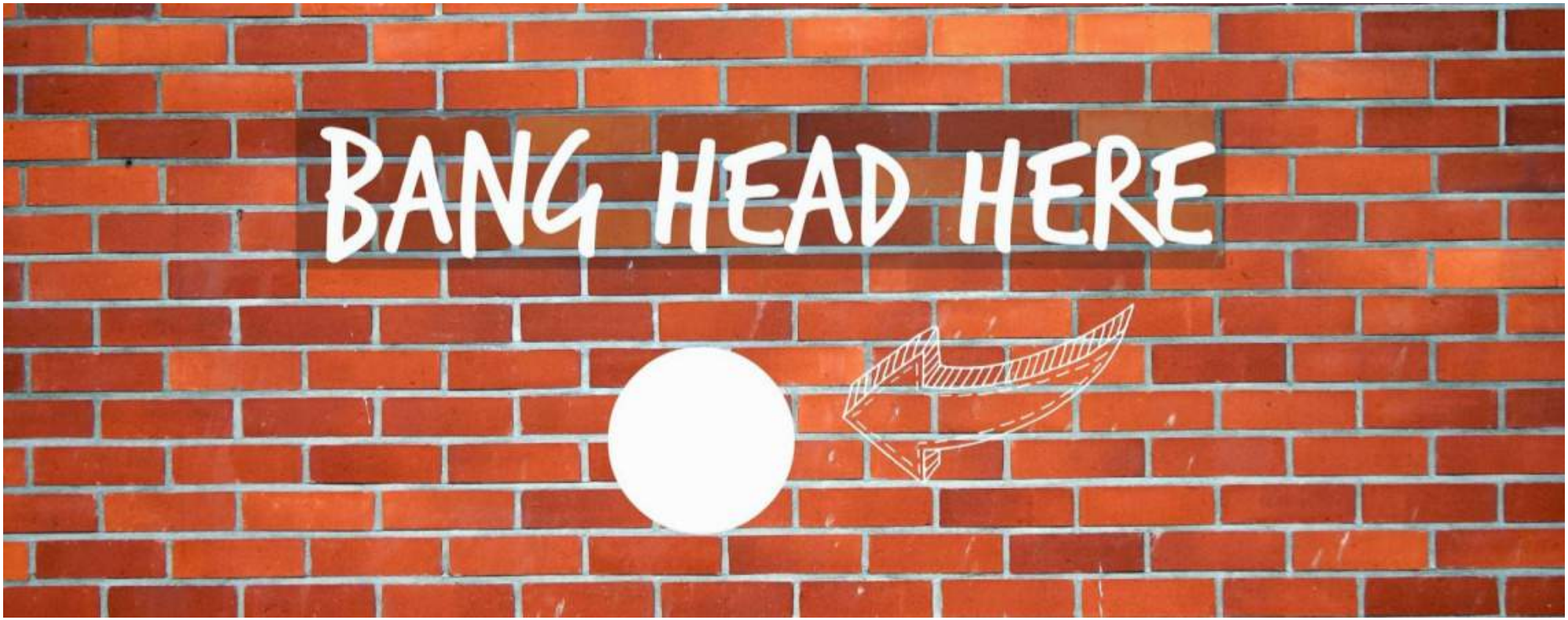
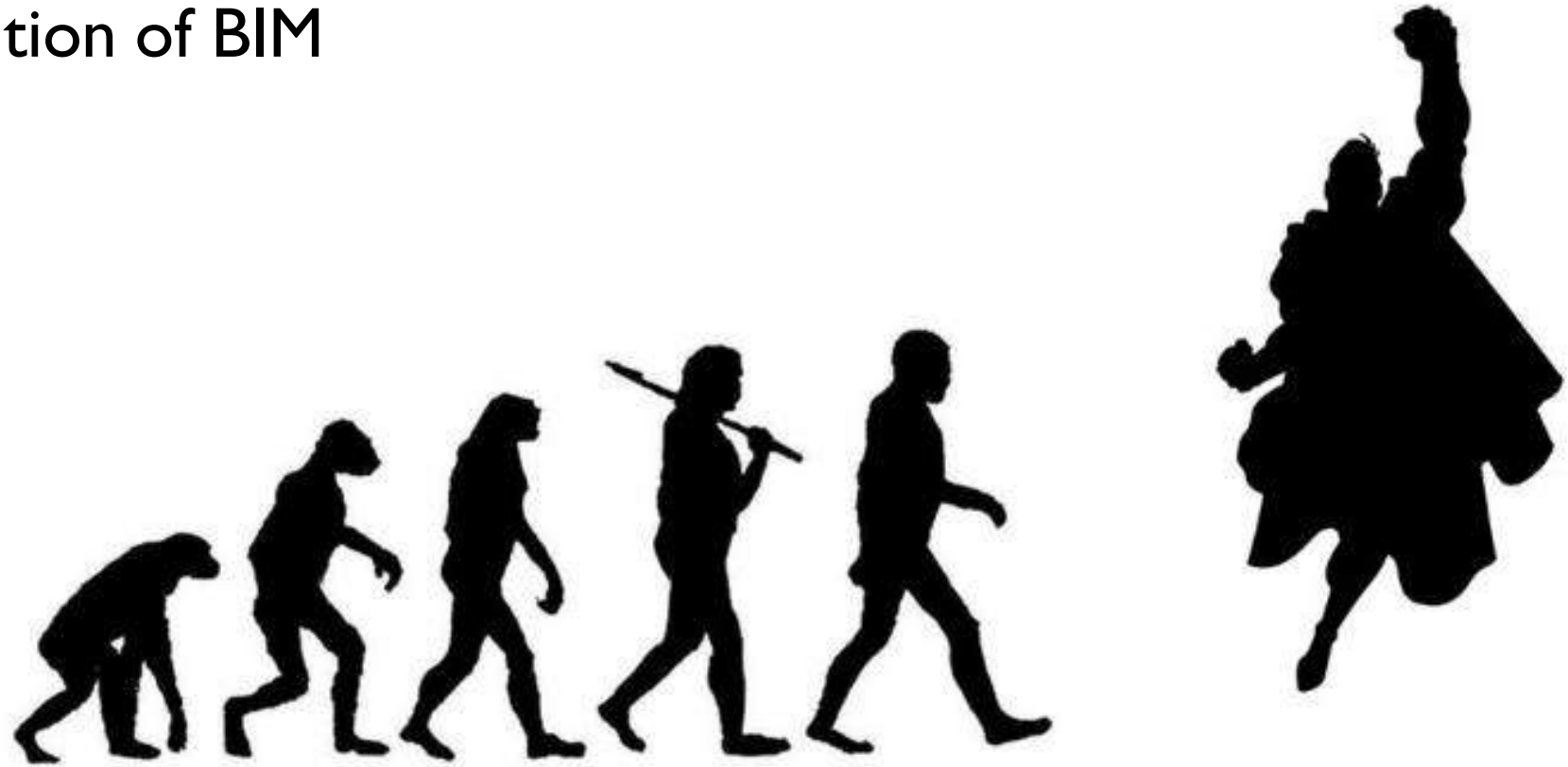
Question – Your experiences of 3D Modelling



Evolution of BIM



Drawing Boards | 2D CAD | 3D Modelling | Multi D 3D Modelling | BIM Ready | BIM Level 2

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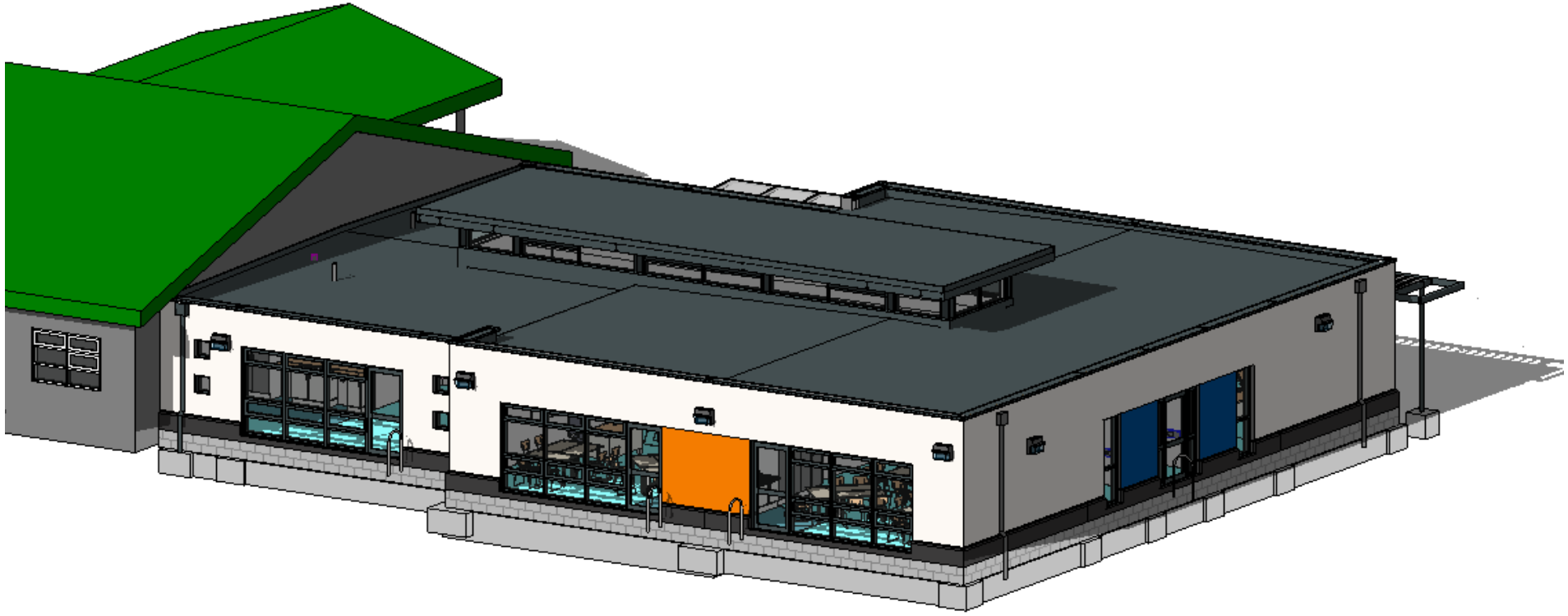
Project Example 2015



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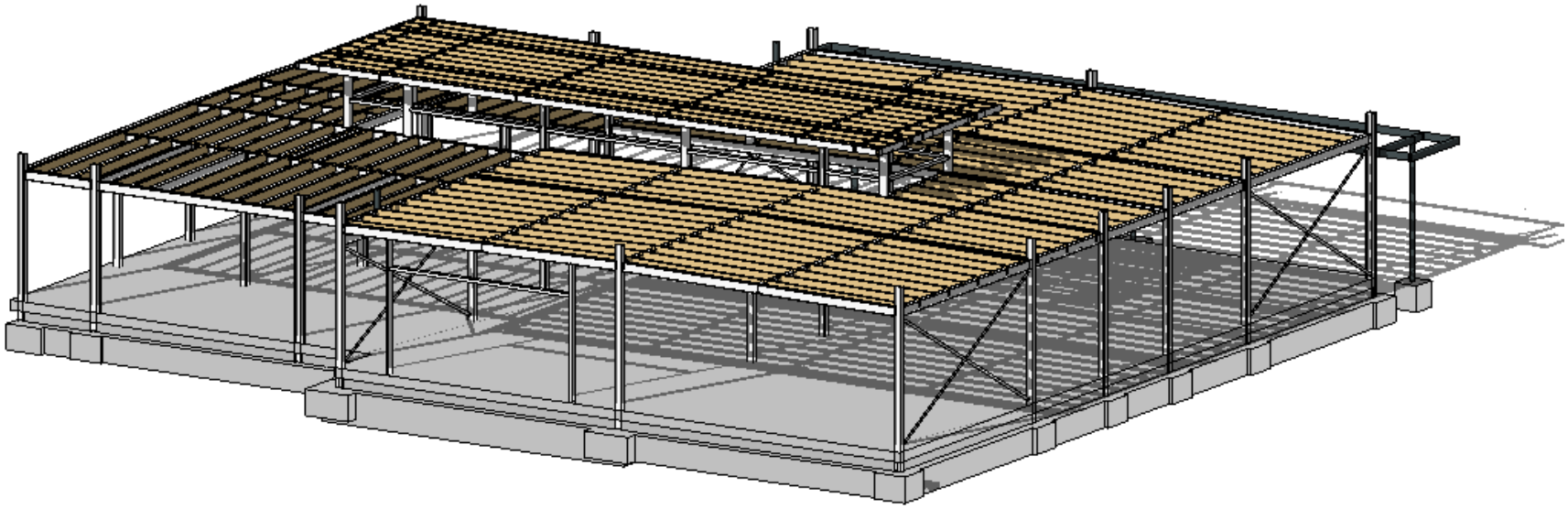
Project Example 2015 - Structural



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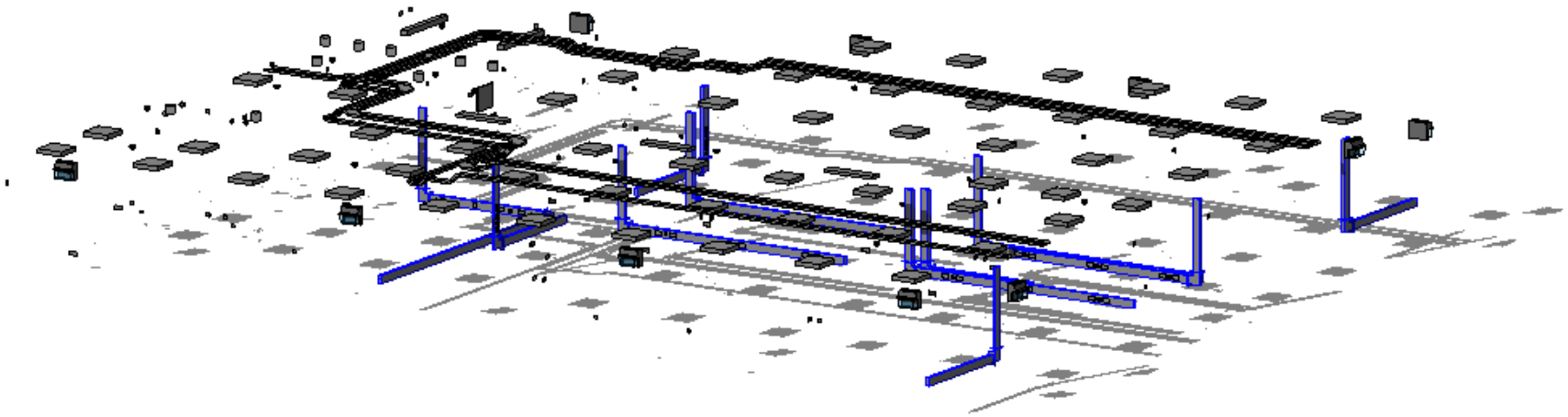
Project Example 2015 - Electrical



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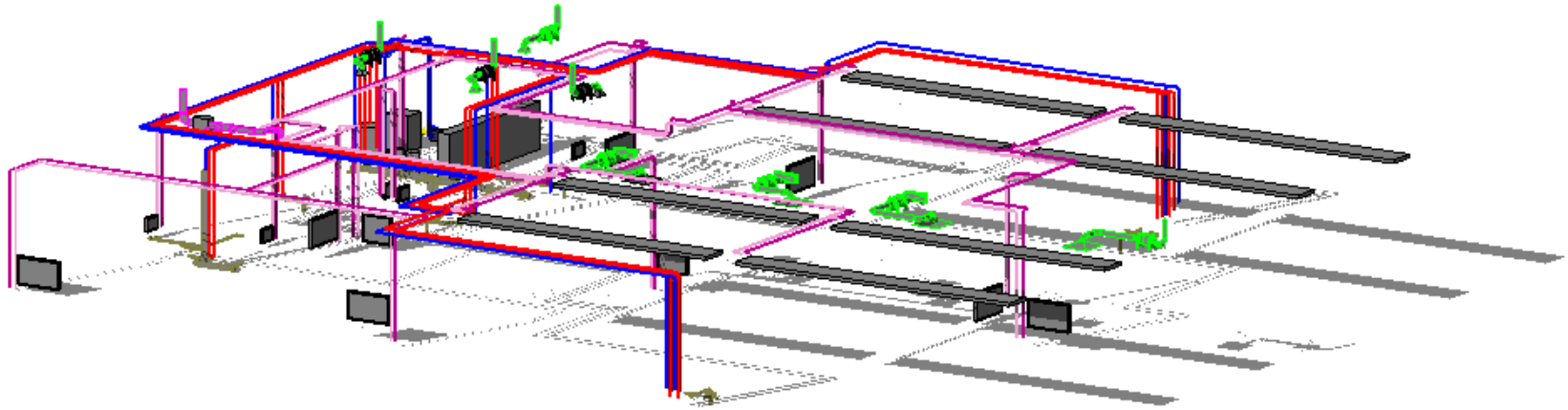
Project Example 2015 - Mechanical



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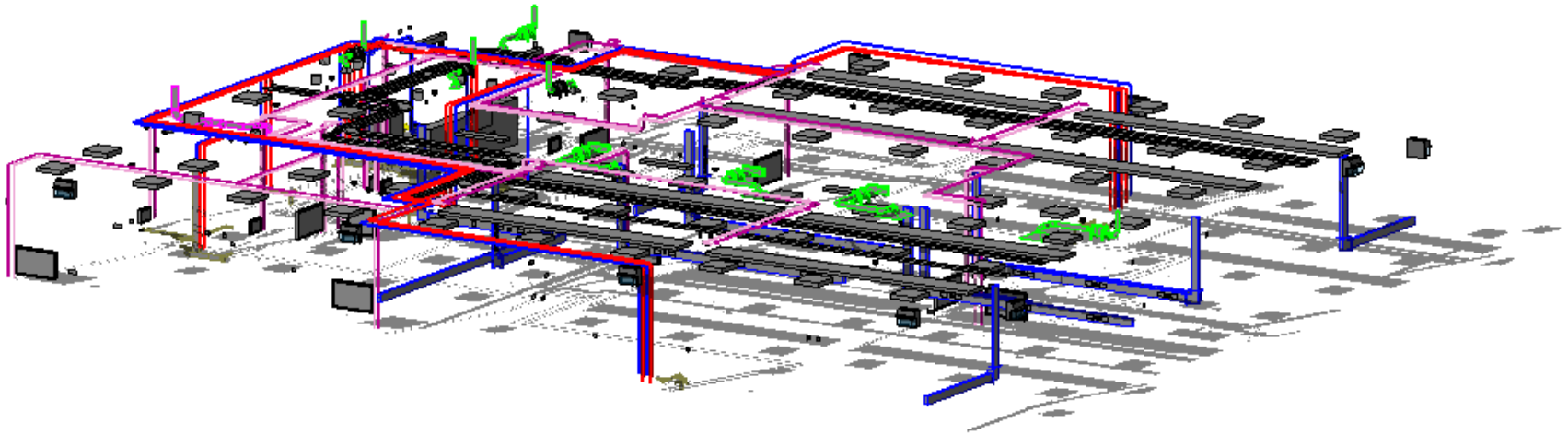
Project Example 2015 – Building Services



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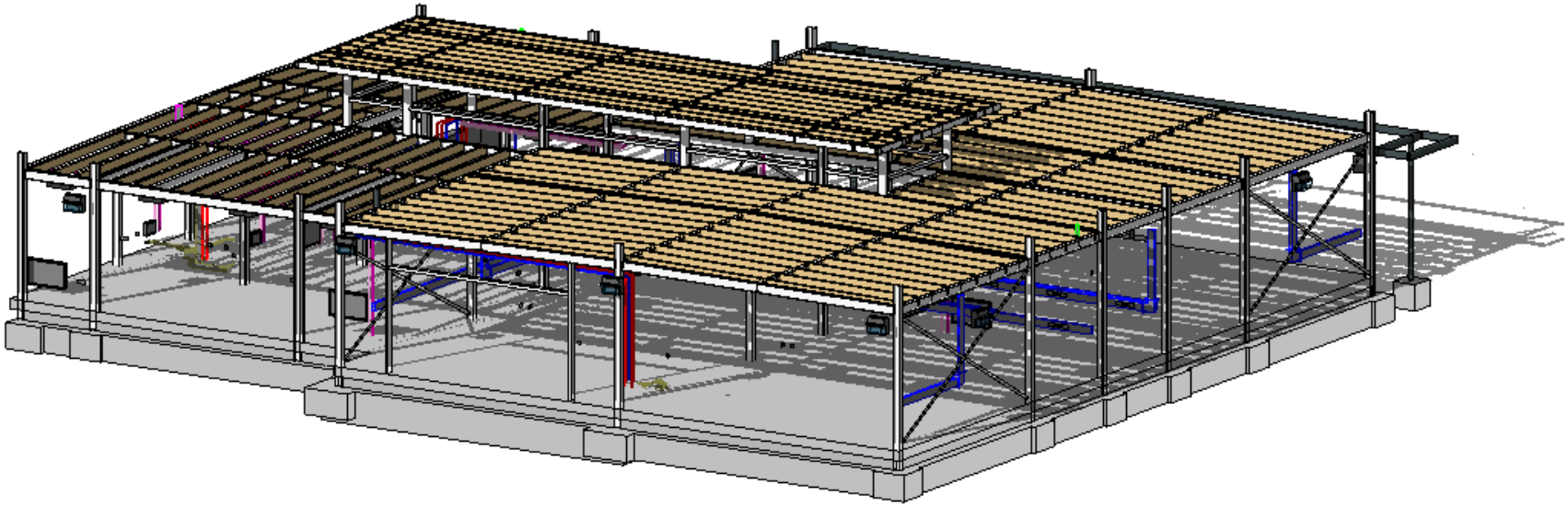
Project Example 2015 – Structures and Building Services



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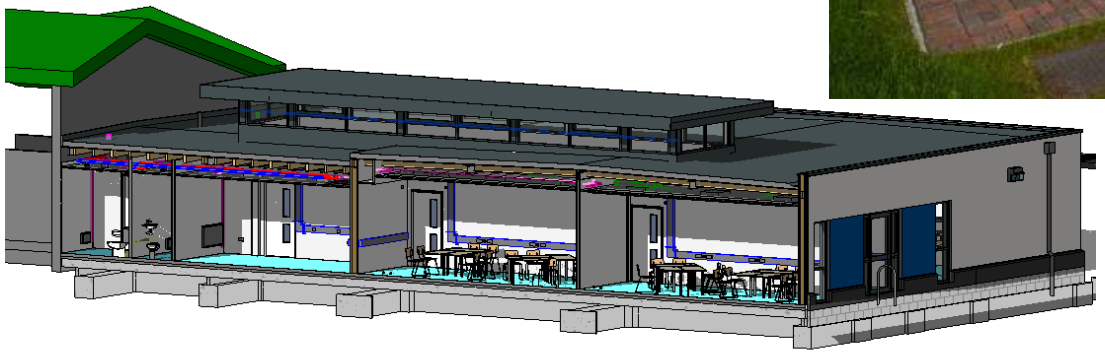
Project Example 2015



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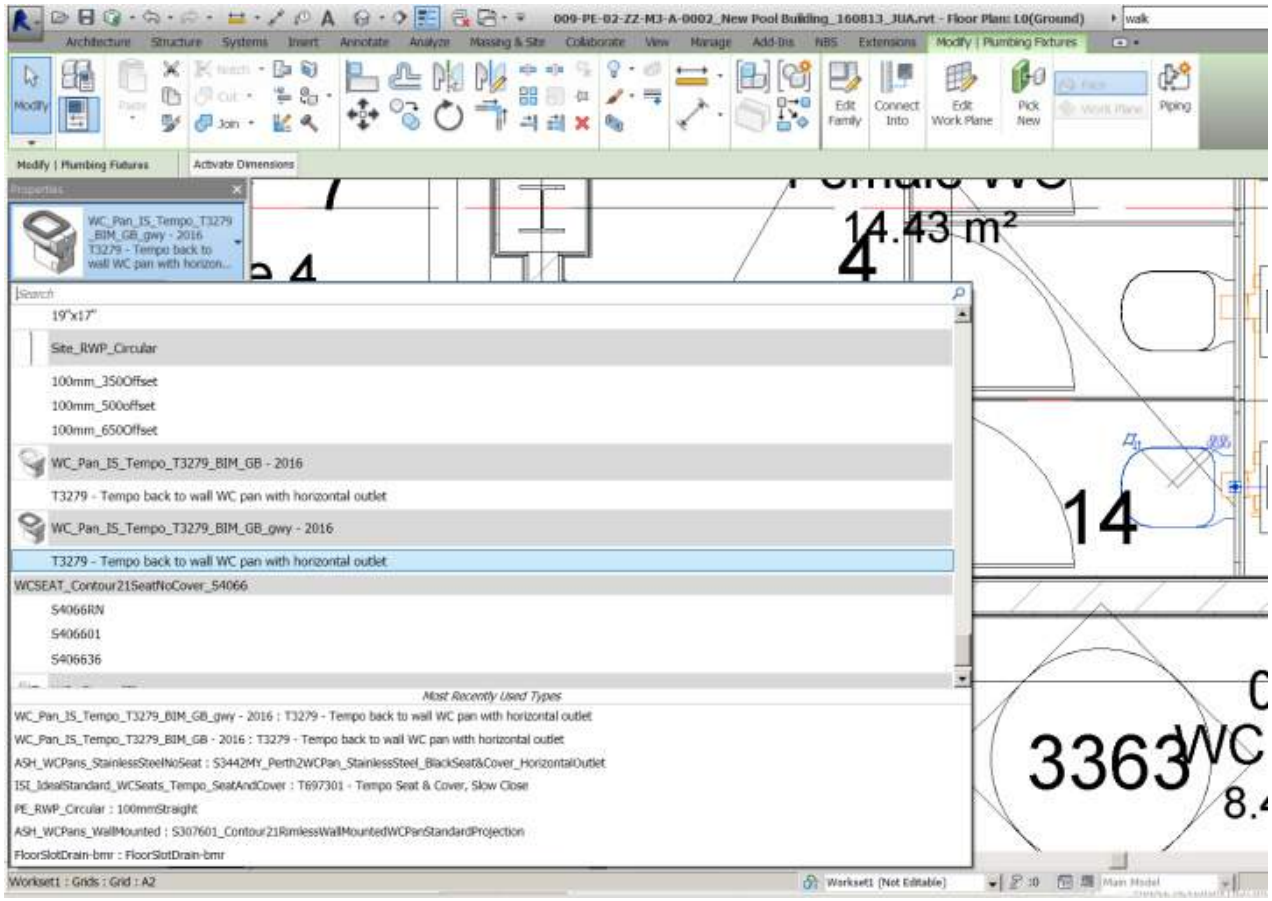
Project Example 2015

Developing the Model

- Families & Systems
- Tagging and referencing data EG Fire resistance



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Benefits of Multi-D 3D Modelling

- Early 3D massing and visualisations is quick.
- Coordinate disciplines early in the design
- Schedules directly from the Project Information Model (PIM)
- Environmental modelling – solar gain, daylight
- Clash Coordination
- Design & Construction Benefit to Client
  - Cost & Program

Issues of Multi-D 3D Modelling

- Export to CAD Please ! – Supply Chain
- Still requires strict modelling & sharing protocols between the team
- Not so good at external works / site modelling.
- Over reliance on Model Information – Inter team communication.
- Links to NBS Building was not intuitive.

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Multi-D 3D Modelling Deliverables

- Industry Foundation Class (IFC) files
- Native PIM format e.g. RVT
- PDF (Still required for contract)
- DWG, DWFx
- NBS Create information linked directly to PIM

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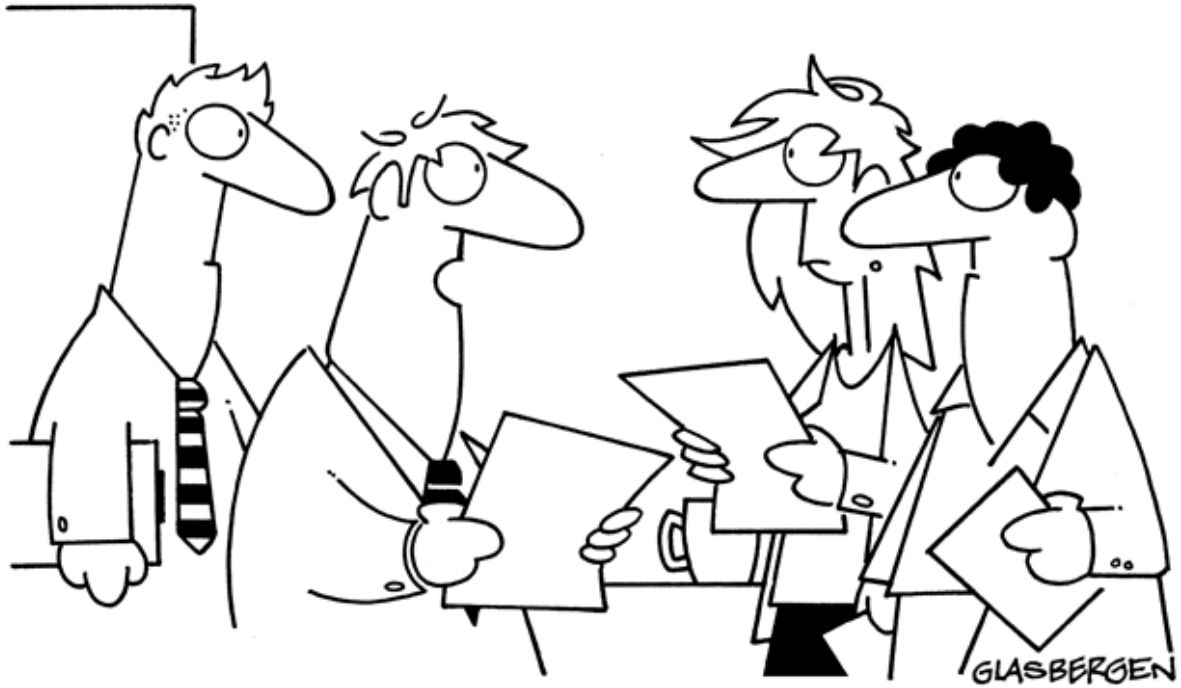
Question – Your experiences of Multi-D 3D Modelling



"If we want to succeed as a team, we need to put aside our own selfish, individual interests and start doing things my way."

Break for Refreshments

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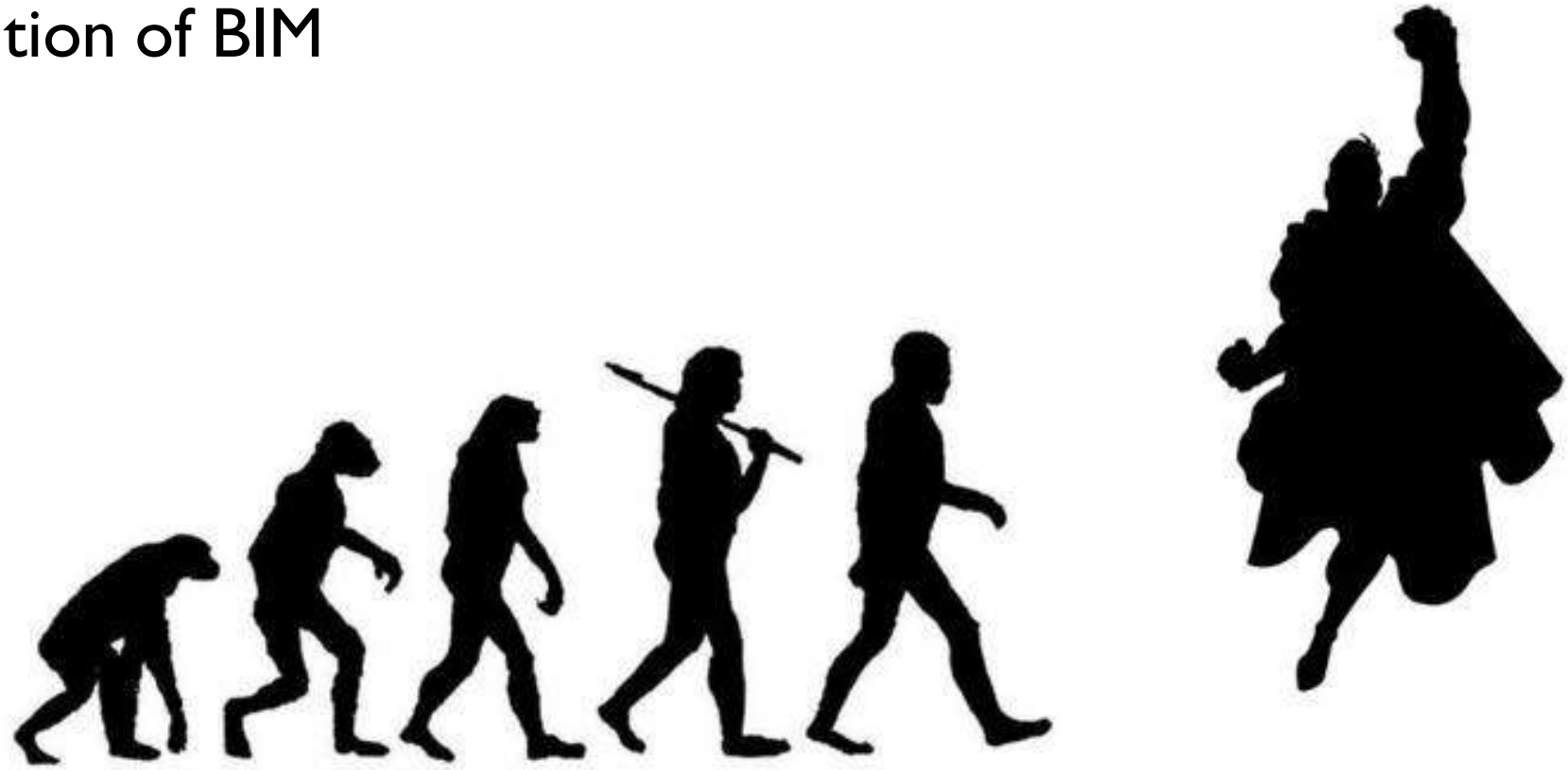
Evolution of BIM



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3D Modelling vs BIM

3D Modelling
Analogue Anakin

BIM Modelling
Digital Darth

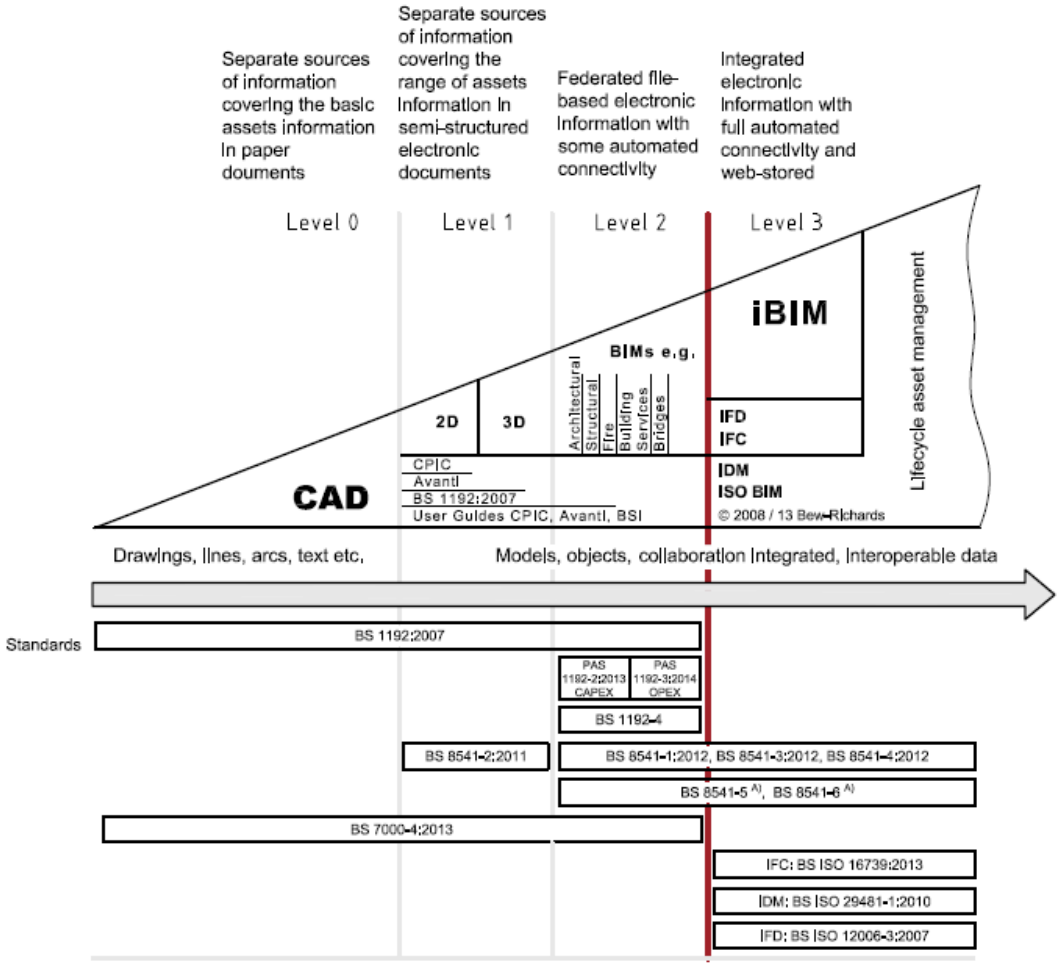
What is Level 2 BIM

BIM Level 2 maturity is a series of domain and collaborative federated models. The models, consisting of both 3D geometrical and non-graphical data, are prepared by different parties during the project life-cycle within the context of a common data environment. Using proprietary information exchanges between various systems, project participants will have the means necessary to provide defined and validated outputs via digital transactions in a structured and reusable form.

BIM Level 2 requires all project and asset information, documentation and data to be electronic, which supports efficient delivery at the design and construction phases of the project. At the design stage, designers, clients and end users can work together to develop the most suited design and test it on the computer before it is built. During construction BIM enables the supply chain to efficiently share precise information about components which reduces the risk of errors and waste.

http://bim-level2.org/

The 'Wedge'



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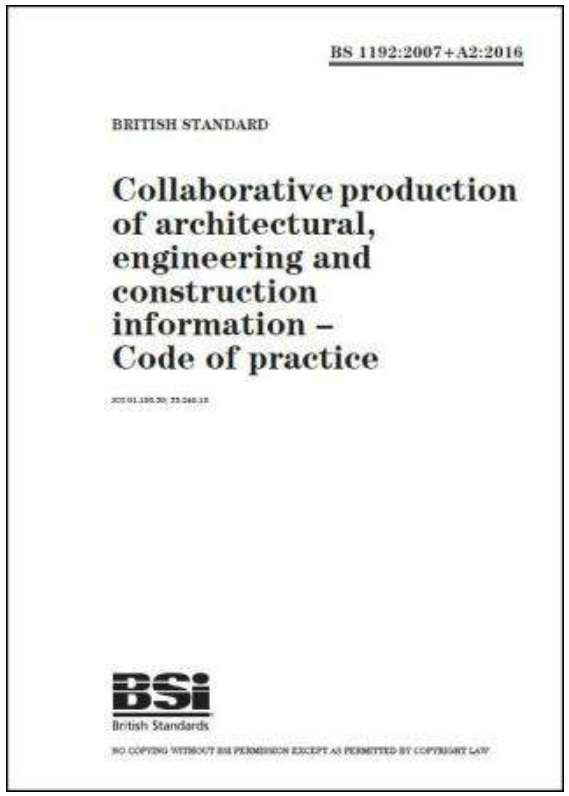
BIM Level 2 – The Standards



BS 1192:2007+A2:2016

Provides a 'best-practice' method for the development, organization and management of production information for the construction industry, using a disciplined process for collaboration and a specified naming policy.

- Underpinning standard to the BIM Level 2 standards
- Provides the template for common naming conventions
- Provides approaches to collaborative working
- Equally applicable to building and infrastructure projects
- It also facilitates efficient data use in facilities management

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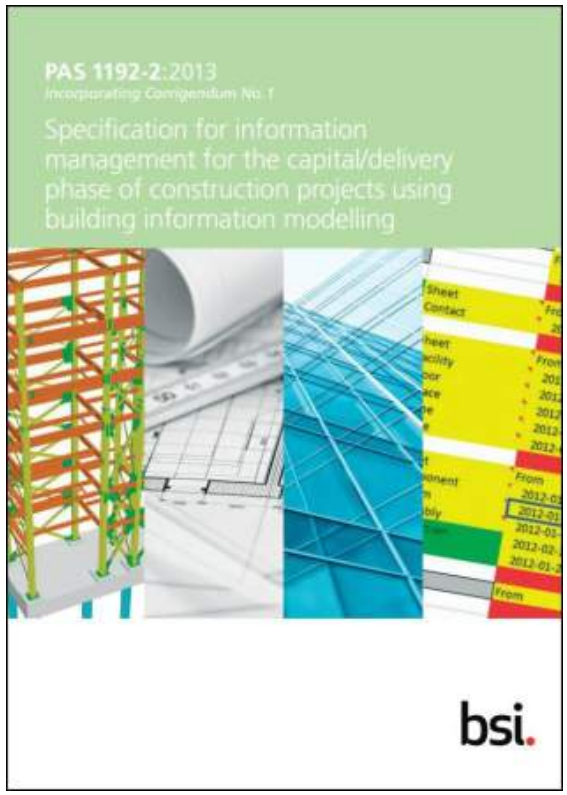
BIM Level 2 – The Standards



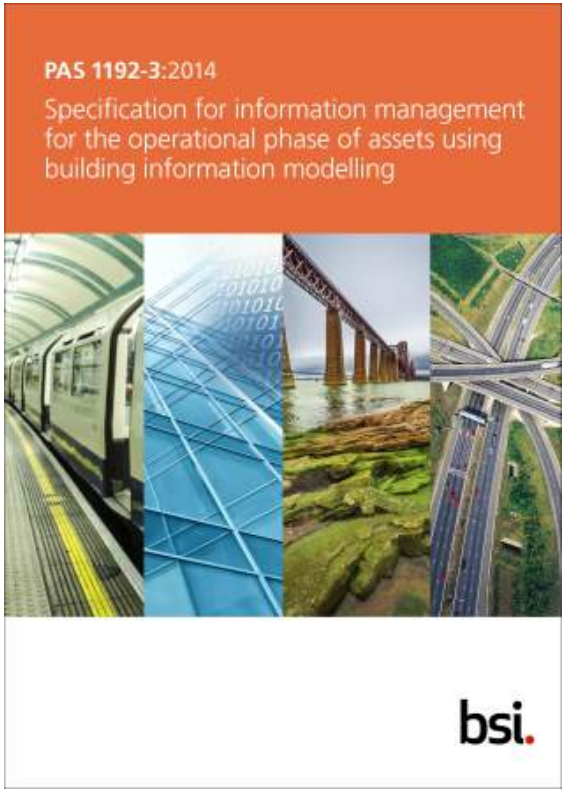
PAS 1192-2:2013

PAS 1192-2 builds on BS 1192:2007 + A2:2016.

- Focuses on the delivery of the Project Information Model
  - Graphical data, non-graphical data and documents
- Defines the requirements for the Project Implementation Plan (PIP), Pre-contract and Post-contract BIM Execution Plans (BEP)
  - Sets out the framework for collaborative working
  - Common Data Environment (CDE)
  - Details the standards and processes that should be adopted to enable consistent, structured, efficient and accurate information exchange

Applies to both building and infrastructure assets!

BIM Level 2 – The Standards

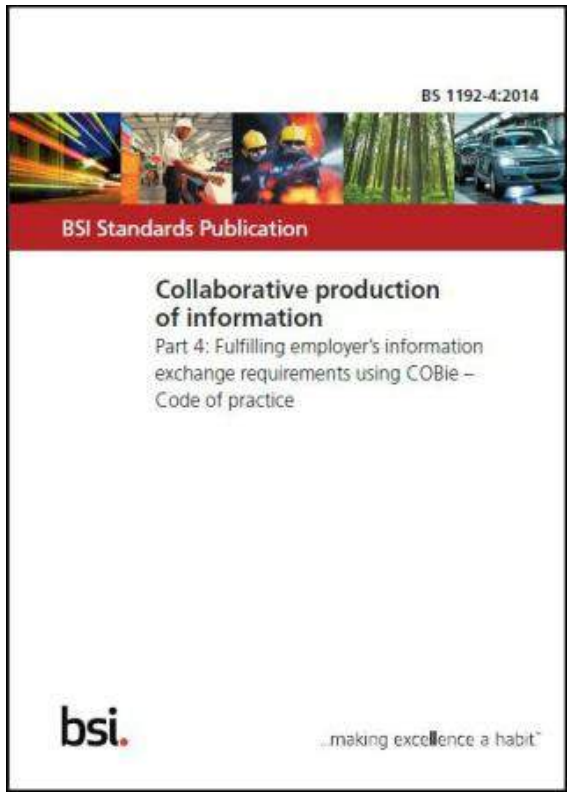


PAS 1192-3:2014

- Sets out a framework for information management for the whole life cycle of asset management
- The framework includes:
  - The creation of an Asset Information Model to manage information exchanges to and from a Project Information Model
  - The creation of external asset information models e.g. Computer Aided Facility Management (CAFM) systems
  - Direct supplier inputs e.g. digital surveys
  - Other enterprise information systems e.g. financial reporting.

Applies to both building and infrastructure assets!

BIM Level 2 – The Standards



BS 1192-4:2014

- Outlines the UK usage of COBie
  - An internationally agreed information exchange schema for exchanging facility information between the employer and the supply chain.
- Defines expectations for the exchange of information throughout the lifecycle of a Facility
- Provides a common structure for the exchange of information about new and existing Facilities
- Ensures that information can be prepared and used without the need for knowledge of sending and receiving applications or databases
- Ensures that the information exchange can be reviewed and validated for compliance, continuity and completeness.

Applies to both building and infrastructure assets!

BIM Level 2 – The Standards

PAS 1192-5:2015

- Specifies requirements for security-minded management of BIM and digital built environments.
- It outlines the cyber-security vulnerabilities to hostile attack when using BIM
  - Assessment process to determine the levels of cyber-security for BIM collaboration which should be applied during all phases of the site and building lifecycle.
- Relevant to any organization working with building information modelling, digital built environments and smart asset management.
- The approach outlined is applicable not only to projects employing BIM, but to any built asset where asset information is created, stored, processed and viewed in digital form.
- Also applicable to the capture of digital survey data as part of the day-to-day asset management processes.

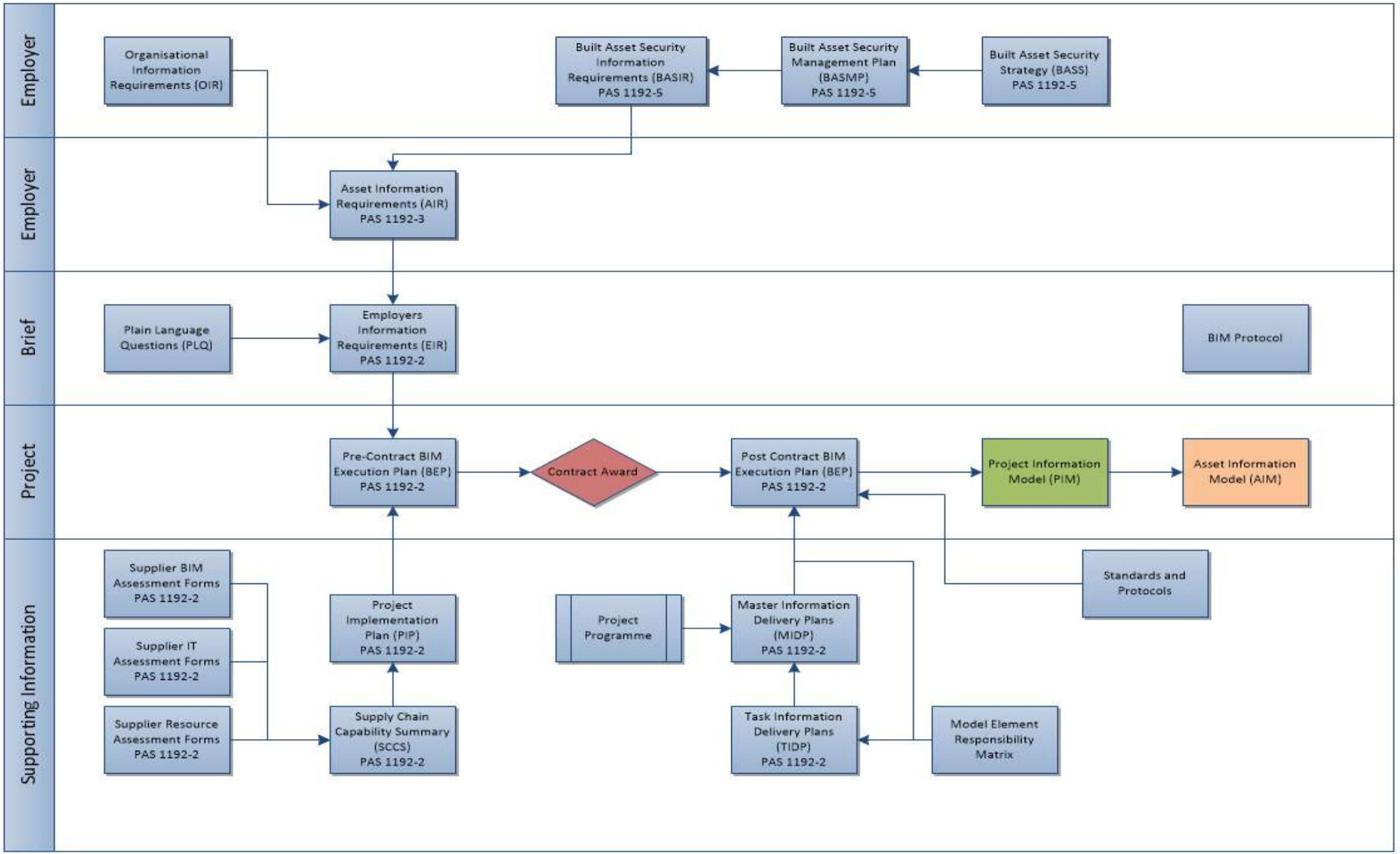
BIM Level 2 – The Standards – There's more!

- BS 7000-4:2013 Design management systems. Guide to managing design in construction
- BS 8536-1-2015_Briefing for design and construction. Code of practice for facilities management (buildings infrastructure)
- BS 8536-2-2016_Briefing for design and construction. Code of practice for asset management (linear and geographical infrastructure)
- BS 8541-1:2012 Library objects for architecture, engineering and construction. Identification and classification. Code of practice
- BS 8541-2:2011 Library objects for architecture, engineering and construction. Recommended 2D symbols of building elements for use in building information modelling – BIM Level 0-1 but still relevant.
- BS 8541-3:2012 Library objects for architecture, engineering and construction. Shape and measurement. Code of practice
- BS 8541-4:2012 Library objects for architecture, engineering and construction. Attributes for specification and assessment. Code of practice
- BS 8541-5:2015 Library objects for architecture, engineering and construction. Assemblies. Code of practice
- BS 8541-6:2015 Library objects for architecture, engineering and construction. Product and facility declarations. Code of practice

Coming Soon

- PAS 1192-6 Specification for collaborative sharing and use of structured Health and Safety information using BIM - Due September 2017
- PAS 1192-7 Construction product information – Specification for defining, sharing and maintaining structured digital construction product information - Due late 2017

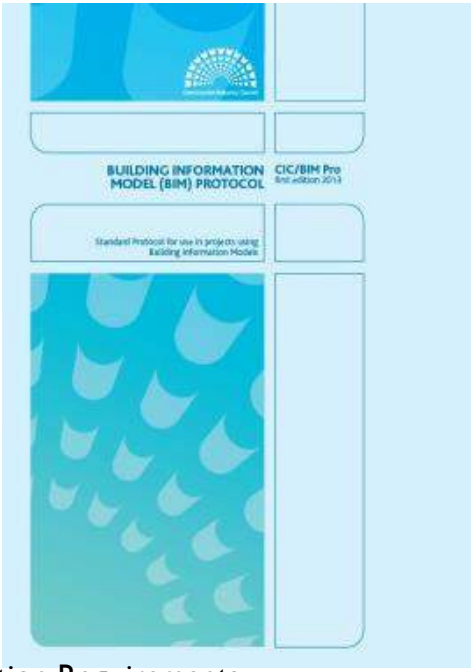
Also a full set of revised and "coordinated" standards due out by the end of November, aligning all of the current documents with each other.


Employer
Employer
Brief
Project
Supporting Information
Organisational Information Requirements (OIR)
Built Asset Security Information Requirements (BASIR) PAS 1192-5
Built Asset Security Management Plan (BASMP) PAS 1192-5
Built Asset Security Strategy (BASS) PAS 1192-5
Asset Information Requirements (AIR) PAS 1192-3
Plain Language Questions (PLQ)
Employers Information Requirements (EIR) PAS 1192-2
BIM Protocol
Pre-Contract BIM Execution Plan (BEP) PAS 1192-2
Contract Award
Post Contract BIM Execution Plan (BEP) PAS 1192-2
Project Information Model (PIM)
Asset Information Model (AIM)
Supplier BIM Assessment Forms PAS 1192-2
Supplier IT Assessment Forms PAS 1192-2
Supplier Resource Assessment Forms PAS 1192-2
Project Implementation Plan (PIP) PAS 1192-2
Supply Chain Capability Summary (SCCS) PAS 1192-2
Project Programme
Master Information Delivery Plans (MIDP) PAS 1192-2
Task Information Delivery Plans (TIDP) PAS 1192-2
Model Element Responsibility Matrix
Standards and Protocols

BIM Level 2 – Employers Information Requirements (EIR)

- The EIR form part of the appointment and tender documents [on a BIM Project].
- The EIR defines which models need to be produced at each project stage – together with the required level of detail and definition.
- The content of the EIR covers three areas:
  - Technical – details of software platforms, definitions of levels of detail etc.
  - Management – details of management processes to be adopted in connection with BIM on a project
  - Commercial – details of BIM Model deliverables, timing of data drops and definitions of information purposes
- As the BIM Protocol requires details of Building Information Models and Information Management processes, the EIR provides an effective platform to communicate these requirements as part of an appointment process.

BIM Protocol

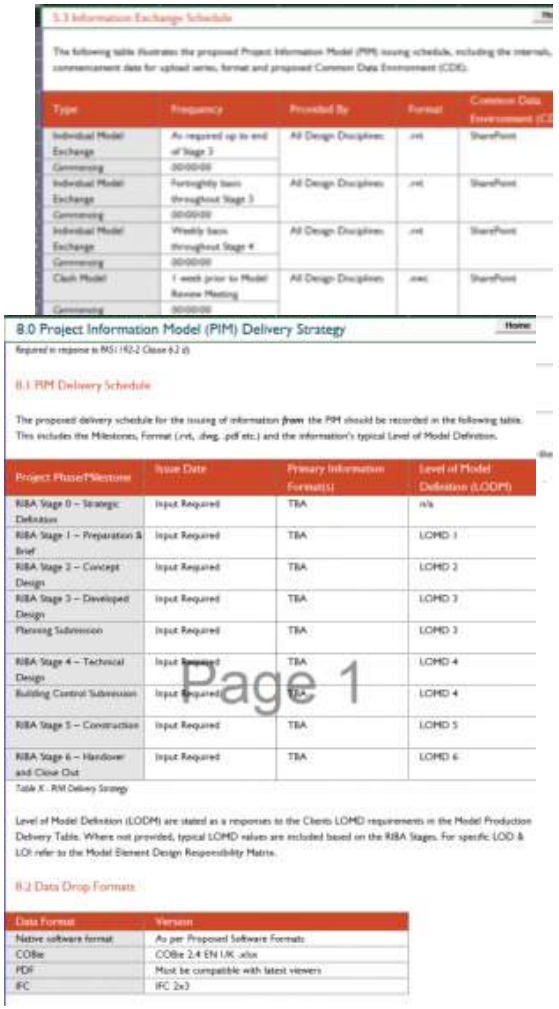


- Supplementary legal agreement incorporated into appointments and contracts.
- Creates additional obligations and rights for the employer and the contracted party.
- Based on the direct contractual relationship between the employer and the supplier.
  - It does not create additional rights or liabilities between different suppliers.
- The key principles of the application of the BIM Protocol are as follows:
  - All parties producing Models should have the Protocol in their contract/appointment.
  - The Protocol details all BIM Models to be produced by all parties.
  - The Appendices have to be completed with project specific information for all projects.
    - This should be available from pre-appointment documentation such as the Employer's Information Requirements.
  - Changes to the Protocol and its Appendices should be treated as variations to the Contract
- The CIC BIM Protocol Appendices are the only documents which need to be completed with specific project details.
  - Appendix 1 – Model Production and Delivery Table. This must include references to all Building Information Models that are required by the employer at each project stage.
  - Appendix 2 – Information Requirements. This details the information management standards that will be adopted on a project.

BIM Level 2 – BIM Execution Plans

"plan prepared by the suppliers to explain how the information modelling aspects of a project will be carried out".

- The BEP is developed both pre and post-contract/appointment award
- Forms a direct response to the Employer's Information Requirements (EIR).
- Details the project deliverables and the information exchange requirements.
- Will list the agreed targets for the timely delivery, exchange, reuse and final handover to clients.
- It will also list all of the agreed elements as outlined in the EIR, the brief, BS 1192:2007, PAS 1192-2:2013, the BIM Protocol and the contract documents.



5.3 Information Exchange Schedule

Type	Frequency	Provided By	Format	Common Data Environment (CDE)
Individual Model Exchange	As required up to end of Stage 3	All Design Disciplines	.rvt	SharePoint
Commencing	00/00/00			
Individual Model Exchange	Fortnightly basis throughout Stage 3	All Design Disciplines	.rvt	SharePoint
Commencing	00/00/00			
Individual Model Exchange	Weekly basis throughout Stage 4	All Design Disciplines	.rvt	SharePoint
Commencing	00/00/00			
Clash Model	1 week prior to Model Review Meeting	All Design Disciplines	.nwc	SharePoint
Commencing	00/00/00			

8.0 Project Information Model (PIM) Delivery Strategy

Required in response to BS1192-2 Clause 6.2 d)

8.1 PIM Delivery Schedule

The proposed delivery schedule for the issuing of information from the PIM should be recorded in the following table. This includes the Milestones, Format (.rvt, .dwg, .pdf etc.) and the information's typical Level of Model Definition.

Project Phase/Milestone	Issue Date	Primary Information Format(s)	Level of Model Definition (LOD/LOI)
RIBA Stage 0 – Strategic Definition	Input Required	TBA	n/a
RIBA Stage 1 – Preparation & Brief	Input Required	TBA	LOMD 1
RIBA Stage 2 – Concept Design	Input Required	TBA	LOMD 2
RIBA Stage 3 – Developed Design	Input Required	TBA	LOMD 3
Planning Submission	Input Required	TBA	LOMD 3
RIBA Stage 4 – Technical Design	Input Required	TBA	LOMD 4
Building Control Submission	Input Required	TBA	LOMD 4
RIBA Stage 5 – Construction	Input Required	TBA	LOMD 5
RIBA Stage 6 – Handover and Close Out	Input Required	TBA	LOMD 6

Table X - PIM Delivery Strategy

Level of Model Definition (LODM) are stated as a responses to the Clients LOMD requirements in the Model Production Delivery Table. Where not provided, typical LOMD values are included based on the RIBA Stages. For specific LOD & LOI refer to the Model Element Design Responsibility Matrix.

8.2 Data Drop Formats

Data Format	Version
Native software format	As per Proposed Software Formats
COBie	COBie 2.4 EN UK .xlsx
PDF	Must be compatible with latest viewers
IFC	IFC 2x3

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Task/Master Information Delivery Plans

ectural Task Information Delivery Plan

Each task team manager shall compile their own TIDP, with its milestones. These shall be used to convey the responsibility for delivery of each supplier's information.
For each deliverable, the TIDPs shall be used to indicate the team member responsible or to note that such responsibility has yet to be allocated.

Client
Project
Project N
Project C
Rev
Date

rawing / Document Title						Coordination Requirements								
oor Name	Sheet Number	File Name	Format	Sheet Size	Scale	Critical Path Item e.g. RCP for lighting layout	Critical Path Item Date Required	Milestone RIBA Stage 2 – Concept Design	Author	Milestone RIBA Stage 3 – Developed Design	Author	Milestone Planning Submission	Author	Milestone
one		ABC123-PEV-XX-XX-DR-A-0100_Existing Site Plan_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
one		ABC123-PEV-XX-XX-DR-A-0200_Proposed Site Plan_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
one		ABC123-PEV-XX-XX-DR-A-0300_Existing Site Sections_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
one		ABC123-PEV-XX-XX-DR-A-0400_Proposed Site Sections_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
one		ABC123-PEV-XX-XX-DR-A-0500_Existing Site Elevations_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
one		ABC123-PEV-XX-XX-DR-A-0600_Proposed Site Elevations_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
one		ABC123-PEV-XX-XX-DR-A-0700_Boundary and Site Security_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
one		ABC123-PEV-XX-XX-DR-A-0800_External Details and FF&E_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
one		ABC123-PEV-XX-XX-DR-A-0900_Demise and Legal Plans_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
								-	TBA	-	TBA	-	TBA	-
								-	TBA	-	TBA	-	TBA	-
								-	TBA	-	TBA	-	TBA	-
round Floor	Sheet 1	ABC123-PEV-XX-00-DR-A-1200_Proposed GA Ground Floor Sheet 1_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
rst Floor	Sheet 1	ABC123-PEV-XX-01-DR-A-1210_Proposed GA First Floor Sheet 1_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
cond Floor	Sheet 1	ABC123-PEV-XX-02-DR-A-1220_Proposed GA Second Floor Sheet 1_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
oof Level	Sheet 1	ABC123-PEV-XX-03-DR-A-1230_Proposed GA Roof Level Sheet 1_180000	.pdf	A1	1:100			-	TBA	-	TBA	-	TBA	-
								-	TBA	-	TBA	-	TBA	-
round Floor	Sheet 1	ABC123-PEV-XX-00-DR-A-1300_Setting Out Ground Floor Sheet 1_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
round Floor	Sheet 2	ABC123-PEV-XX-00-DR-A-1301_Setting Out Ground Floor Sheet 2_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
round Floor	Sheet 3	ABC123-PEV-XX-00-DR-A-1302_Setting Out Ground Floor Sheet 3_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
round Floor	Sheet 4	ABC123-PEV-XX-00-DR-A-1303_Setting Out Ground Floor Sheet 4_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
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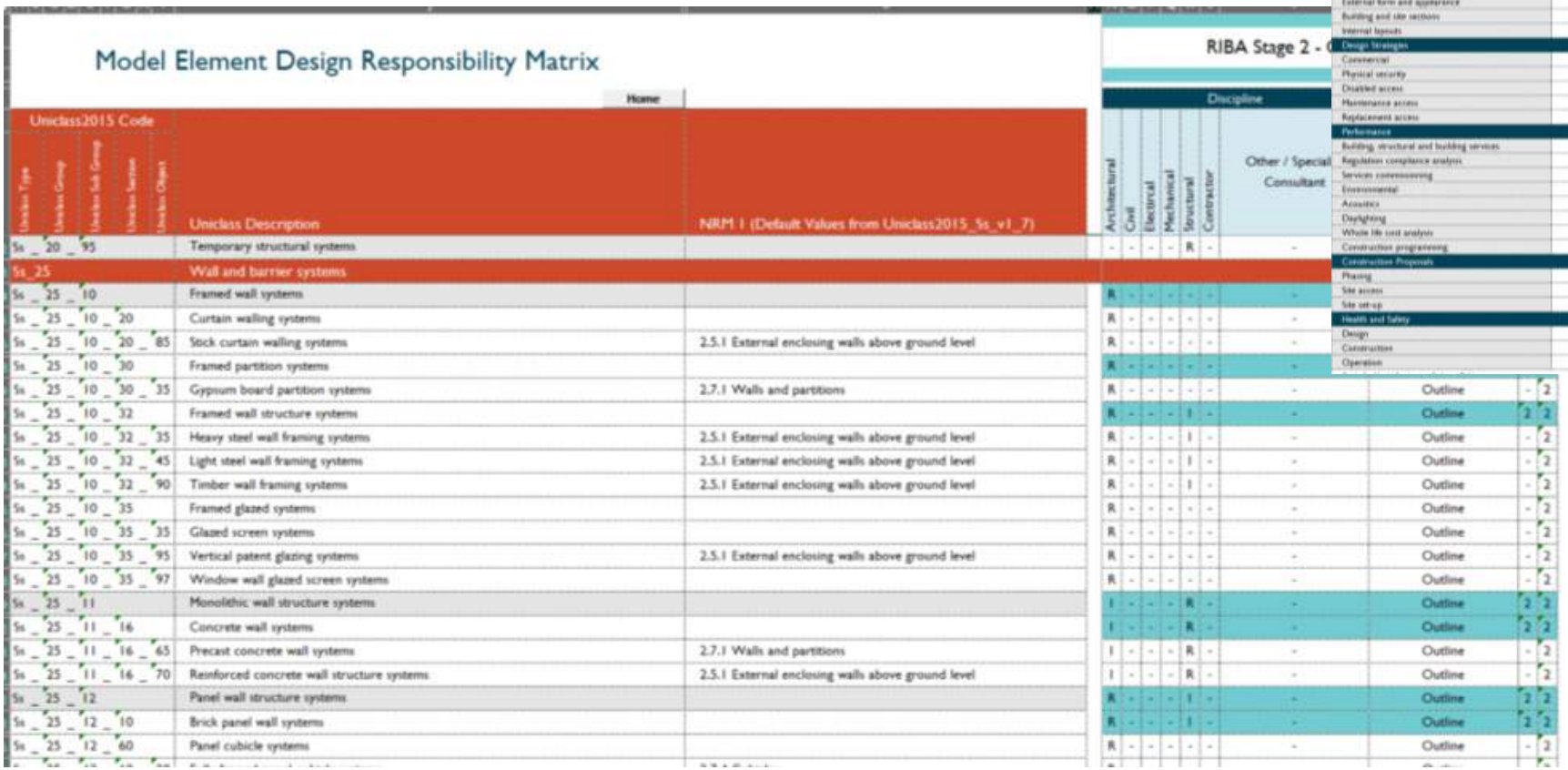
rst Floor	Sheet 2	ABC123-PEV-XX-01-DR-A-1311_Setting Out First Floor Sheet 2_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
rst Floor	Sheet 3	ABC123-PEV-XX-01-DR-A-1312_Setting Out First Floor Sheet 3_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
rst Floor	Sheet 4	ABC123-PEV-XX-01-DR-A-1313_Setting Out First Floor Sheet 4_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
cond Floor	Sheet 1	ABC123-PEV-XX-02-DR-A-1320_Setting Out Second Floor Sheet 1_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
cond Floor	Sheet 2	ABC123-PEV-XX-02-DR-A-1321_Setting Out Second Floor Sheet 2_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
cond Floor	Sheet 3	ABC123-PEV-XX-02-DR-A-1322_Setting Out Second Floor Sheet 3_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
cond Floor	Sheet 4	ABC123-PEV-XX-02-DR-A-1323_Setting Out Second Floor Sheet 4_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
oof Level	Sheet 1	ABC123-PEV-XX-03-DR-A-1330_Setting Out Roof Level Sheet 1_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
oof Level	Sheet 2	ABC123-PEV-XX-03-DR-A-1331_Setting Out Roof Level Sheet 2_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
oof Level	Sheet 3	ABC123-PEV-XX-03-DR-A-1332_Setting Out Roof Level Sheet 3_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-
oof Level	Sheet 4	ABC123-PEV-XX-03-DR-A-1333_Setting Out Roof Level Sheet 4_180000	.pdf	A1	1:50			-	TBA	-	TBA	-	TBA	-

Architectural Drawing Sets					
Sequence	Range Name	Sheets	Format	Sheet Size	Sheet Scale
0100	Existing Site Plan	0	.pdf	A1	1:100
0200	Proposed Site Plan	0	.pdf	A1	1:100
0300	Existing Site Sections	0	.pdf	A1	1:100
0400	Proposed Site Sections	0	.pdf	A1	1:100
0500	Existing Site Elevations	0	.pdf	A1	1:100
0600	Proposed Site Elevations	0	.pdf	A1	1:100
0700	Boundary and Site Security	0	.pdf	A1	1:100
0800	External Details and FF&E	0	.pdf	A1	1:100
0900	Demise and Legal Plans	0	.pdf	A1	1:100
1000	Existing General Arrangement Plan	0	.pdf	A1	1:100
1100	Demolition General Arrangement Plan	0	.pdf	A1	1:100
1200	Proposed General Arrangement Plan	1	.pdf	A1	1:100
1300	Setting Out Plans	4	.pdf	A1	1:50
1400	Fire Strategy Plans	1	.pdf	A1	1:100
1500	Reflected Ceiling Plans	1	.pdf	A1	1:100
1600	Acoustic Strategy Plans	1	.pdf	A1	1:100
1700	Finishes Plans	1	.pdf	A1	1:100
1750	Finishes Schedule	0	.pdf	A1	1:100
1800	Raised Access Floor Plans	0	.pdf	A1	1:100
1900	Fixtures and Fittings Plans	4	.pdf	A1	1:100
2000	Existing External Elevations	0	.pdf	A1	1:100
2100	Proposed External Elevations	1	.pdf	A1	1:100
2200	Detailed External Elevations	2	.pdf	A1	1:50
2300	Internal Elevations	0	.pdf	A1	1:20
4000	Existing Sections	0	.pdf	A1	1:100
4100	Proposed Sections	0	.pdf	A1	1:100
4200	Detailed Setting Out Sections	0	.pdf	A1	1:50
4300	Enhanced Sections	0	.pdf	A1	1:20
5000	Building Details	0	.pdf	A1	1:5
6000	Internal Door Schedules	0	.pdf	A1	NTS
6010	External Door Schedules	0	.pdf	A1	NTS
6050	Door Legends and Details	0	.pdf	A1	VAR
6100	Ironmongery Schedules	0	.pdf	A1	NTS
6200	External Window Schedules	0	.pdf	A1	1:20
6250	External Window Legends and Details	0	.pdf	A1	VAR
6300	Internal Window Schedules	0	.pdf	A1	1:20
6350	Internal Window Legends and Details	0	.pdf	A1	VAR
6400	Curtain Wall Schedules	0	.pdf	A1	1:20
6450	Curtain Wall Legends and Details	0	.pdf	A1	VAR
6500	Screen Schedules	0	.pdf	A1	1:20
6550	Screen Legends and Details	0	.pdf	A1	VAR
6600	RS (Roller Shutter) Schedules	0	.pdf	A1	1:20
6650	Roller Shutter Legends and Details	0	.pdf	A1	VAR
6700	Balustrade Schedules	0	.pdf	A1	1:20
6750	Balustrade Legends and Details	0	.pdf	A1	VAR
6800	Rooflight Schedules	0	.pdf	A1	1:20

Levels	
Level	Level Name
00	Ground Floor
01	First Floor
02	Second Floor
03	Roof Level
04	n/a
05	n/a
06	n/a
07	n/a
08	n/a
09	n/a
XX	None
ZZ	None

Model Element Design Responsibility Matrix



Model Element Design Responsibility Matrix

Uniclass2015 Code	Uniclass Description	NRM 1 (Default Values from Uniclass2015_Ss_v1_7)	Discipline: Architectural	Civil	Electrical	Mechanical	Structural	Contractor	Other / Specialist Consultant	RIBA Stage 2 - Outline		
Ss_20_95	Temporary structural systems		-	-	-	-	R	-	-			
Ss_25	Wall and barrier systems											
Ss_25_10	Framed wall systems		R	-	-	-	-	-	-			
Ss_25_10_20	Curtain walling systems		R	-	-	-	-	-	-			
Ss_25_10_20_85	Stick curtain walling systems	2.5.1 External enclosing walls above ground level	R	-	-	-	-	-	-			
Ss_25_10_30	Framed partition systems		R	-	-	-	-	-	-			
Ss_25_10_30_35	Gypsum board partition systems	2.7.1 Walls and partitions	R	-	-	-	-	-	-	Outline	-	2
Ss_25_10_32	Framed wall structure systems		R	-	-	-	I	-	-	Outline	2	2
Ss_25_10_32_35	Heavy steel wall framing systems	2.5.1 External enclosing walls above ground level	R	-	-	-	I	-	-	Outline	-	2
Ss_25_10_32_45	Light steel wall framing systems	2.5.1 External enclosing walls above ground level	R	-	-	-	I	-	-	Outline	-	2
Ss_25_10_32_90	Timber wall framing systems	2.5.1 External enclosing walls above ground level	R	-	-	-	I	-	-	Outline	-	2
Ss_25_10_35	Framed glazed systems		R	-	-	-	-	-	-	Outline	-	2
Ss_25_10_35_35	Glazed screen systems		R	-	-	-	-	-	-	Outline	-	2
Ss_25_10_35_95	Vertical patent glazing systems	2.5.1 External enclosing walls above ground level	R	-	-	-	-	-	-	Outline	-	2
Ss_25_10_35_97	Window wall glazed screen systems		R	-	-	-	-	-	-	Outline	-	2
Ss_25_11	Monolithic wall structure systems		I	-	-	-	R	-	-	Outline	2	2
Ss_25_11_16	Concrete wall systems		I	-	-	-	R	-	-	Outline	2	2
Ss_25_11_16_65	Precast concrete wall systems	2.7.1 Walls and partitions	I	-	-	-	R	-	-	Outline	-	2
Ss_25_11_16_70	Reinforced concrete wall structure systems	2.5.1 External enclosing walls above ground level	I	-	-	-	R	-	-	Outline	-	2
Ss_25_12	Panel wall structure systems		R	-	-	-	I	-	-	Outline	2	2
Ss_25_12_10	Brick panel wall systems		R	-	-	-	I	-	-	Outline	2	2
Ss_25_12_60	Panel cubicle systems		R	-	-	-	-	-	-	Outline	-	2

Model Production and Delivery Table (MPDT)

Project Stage (RIBA)	1	2	3	4	5	6	7
Data Drop	1	2a	2b	3	4	5	6	7
Responsible Party	Employer	Supply Chain					
	Level of Model Definition						
Overall form and content							
Space planning		2	2	3	4	4	4
Site and context		2	2	3	4	4	4
Surveys			2	3	4	4	4
External form and appearance			2	3	4	4	4
Building and site sections				3	4	4	4
Internal layouts			2	3	4	4	4
Design Strategies							
Commercial			2	3	4	4	4
Physical security			2	3	4	4	4
Disabled access			2	3	4	4	4
Maintenance access					4	4	4
Replacement access					4	4	4
Performance							
Building, structural and building services			2	3	4	4	4
Regulation compliance analysis			2	3	4	4	4
Services commissioning					4	4	4
Environmental							
Acoustics					4	4	4
Daylighting							
Whole life cost analysis							
Construction programming			2	3	4	4	
Construction Proposals							
Phasing			2	3	4	4	
Site access			2	3	4	4	
Site set-up					4	4	
Health and Safety							
Design			2	3	4	4	
Construction					4	4	
Operation						4	4

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Benefits of BIM Level 2

- Coordinated design and construction information
  - Reducing issues on site, saving time and money
- Linking NBS Create Specification directly to PIM
- 'Data' is stored and exchanged within models, reducing the need to review PDF information from other disciplines
- Can analyse, extract and interrogate information

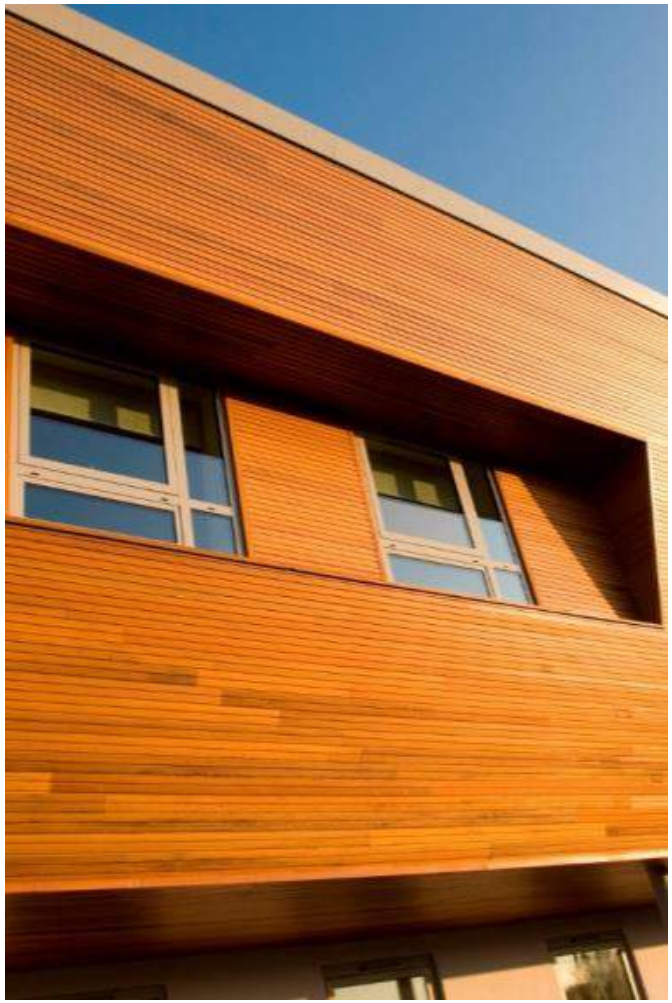
Issues of BIM Level 2

- Many Clients do not have EIRs but have a BIM aspiration
- Clients expectations of BIM deliverables exceed reality
- Contractors supply chain are not yet BIM ready
- Contractors adding BIM costs as an add on cost over traditional info
- NBS Create format is different and takes some getting used to
- Quantity Surveyors (5D) not taking advantage of digital information
- Programmers (4D) not taking advantage of digital information
- Facilities Management industry not yet fully engaged with BIM

BIM Level 2 Deliverables

- COBie Information Exchanges
- Industry Foundation Class (IFC) files
- Native PIM format e.g. RVT
- PDF (Still required for contract)
- DWG, DWFx

- Information formatted for FM



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BIM Level 2 In Practice

- Start with a clearly defined EIR
- Appoint a dedicated Information Manager
- Develop and agree the BEP with the Project Team
  - What are the goals of BIM for this scheme
  - Agree who models what, when and how the information is shared and coordinated
  - Common Data Environment (CDE)
  - Common nomenclature – make sure everyone is doing the same
- Review Meetings – Talk to each other!
  - Model review, clash coordination, progress and programme review
- Its all about the templates

It's a live document, keep it up to date!

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Is that Clear !!!!

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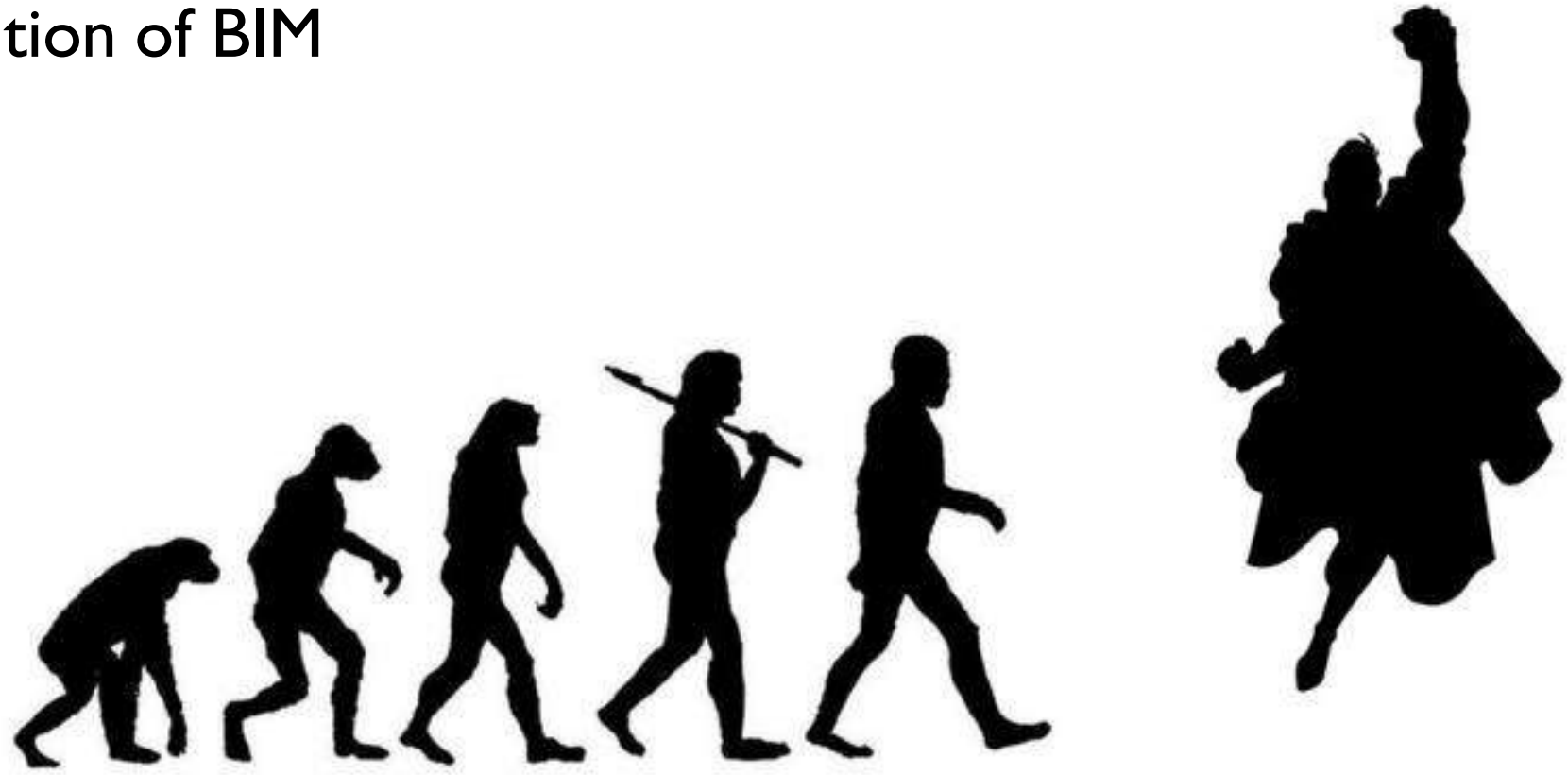
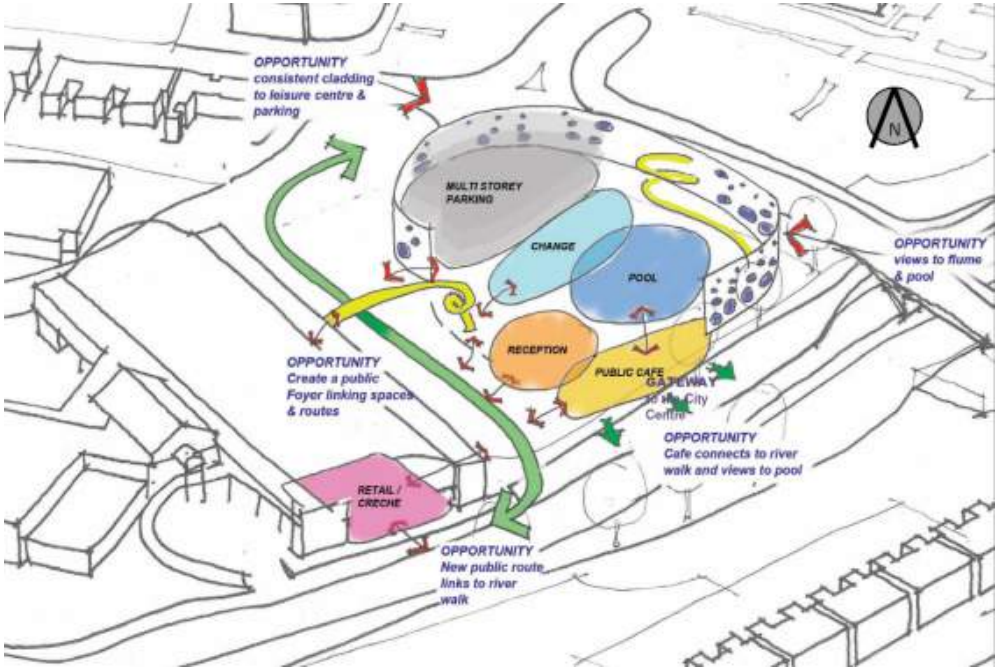
Evolution of BIM

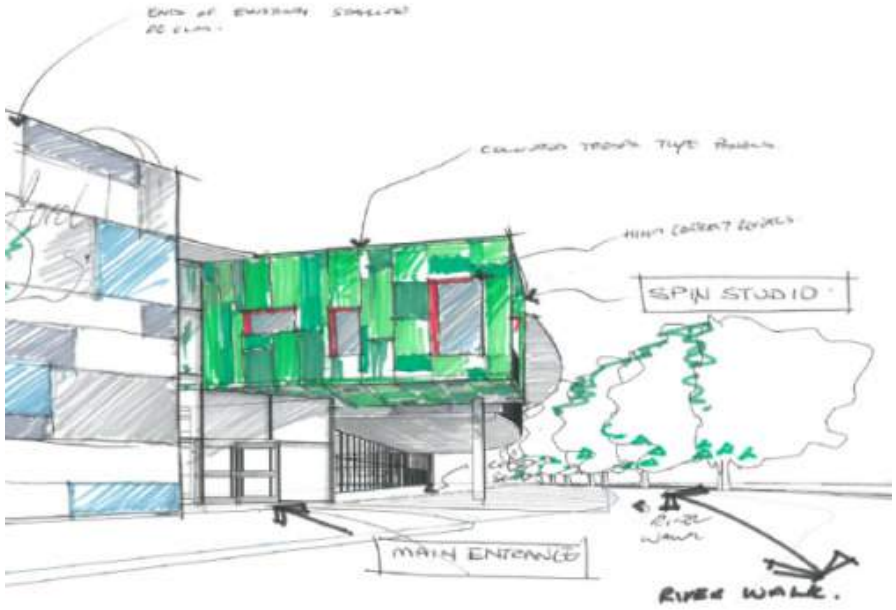


Drawing Boards | 2D CAD | 3D Modelling | Multi D 3D Modelling | BIM Ready | BIM Level 2

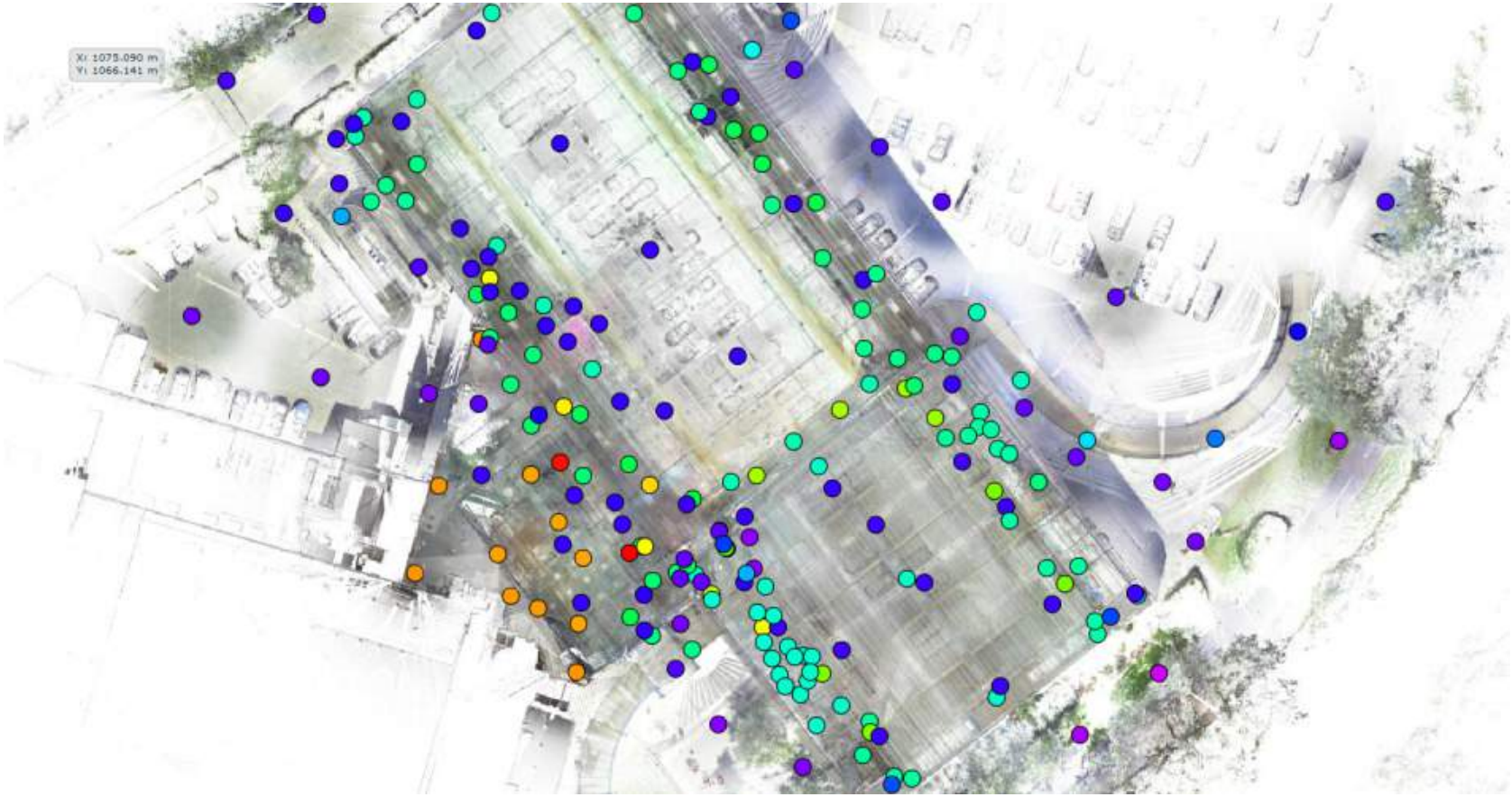
How does a project work?

Still begins with a brief and a pencil (apparently).





3D Survey – Point Clouds



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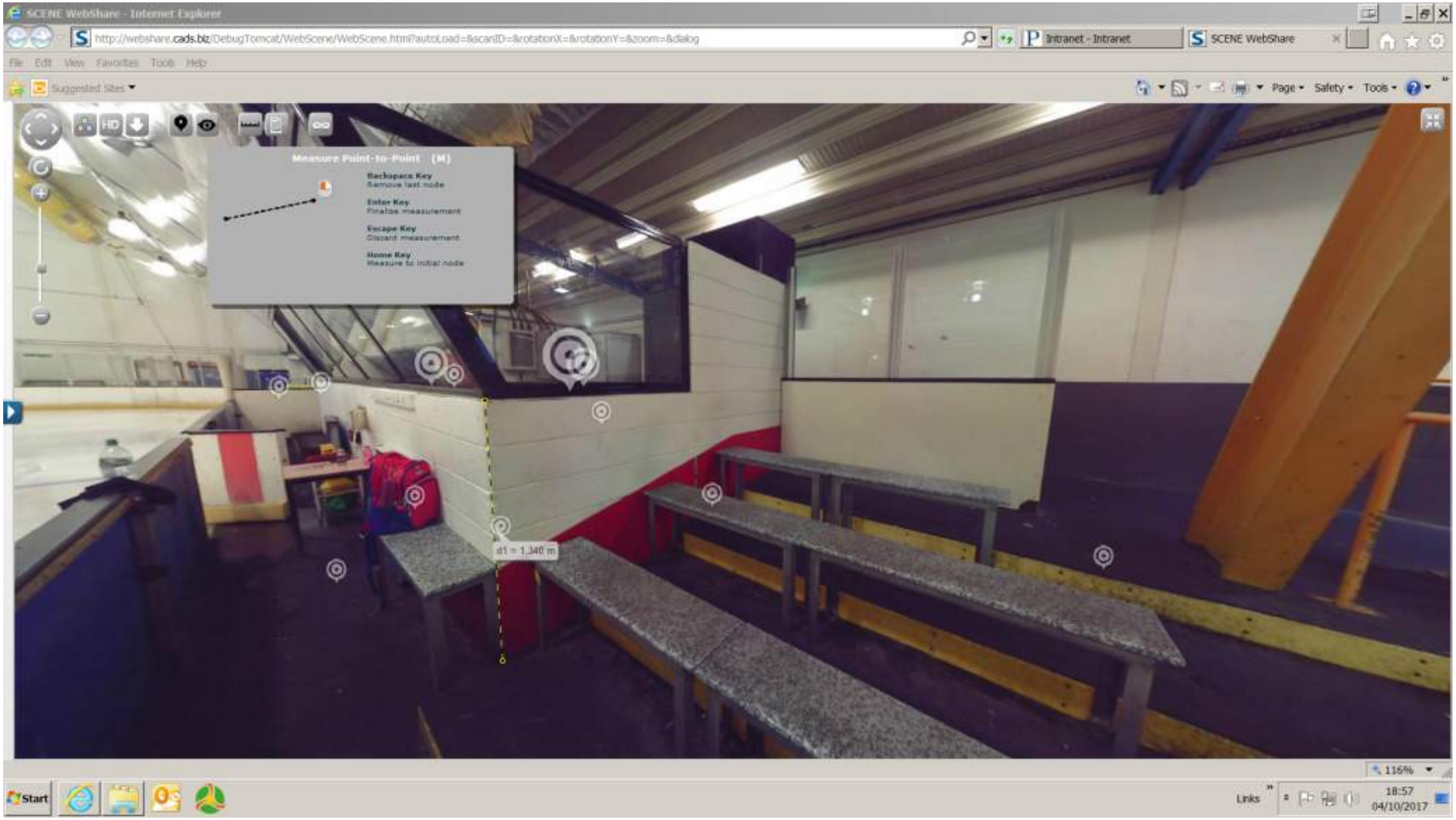

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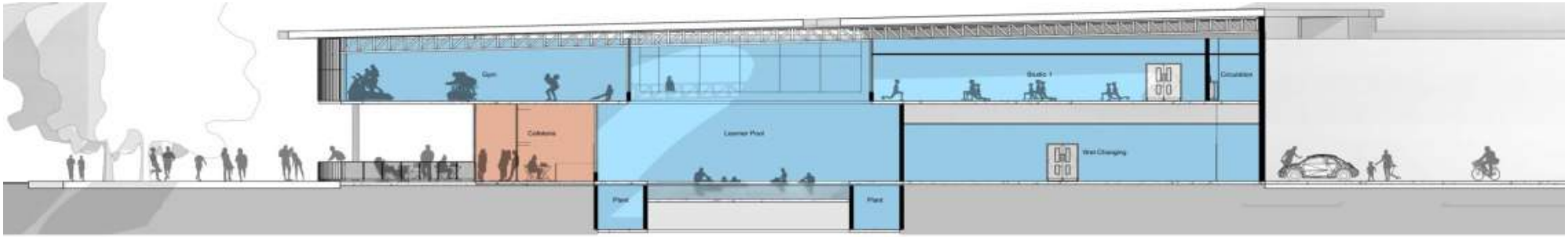
Early Stages

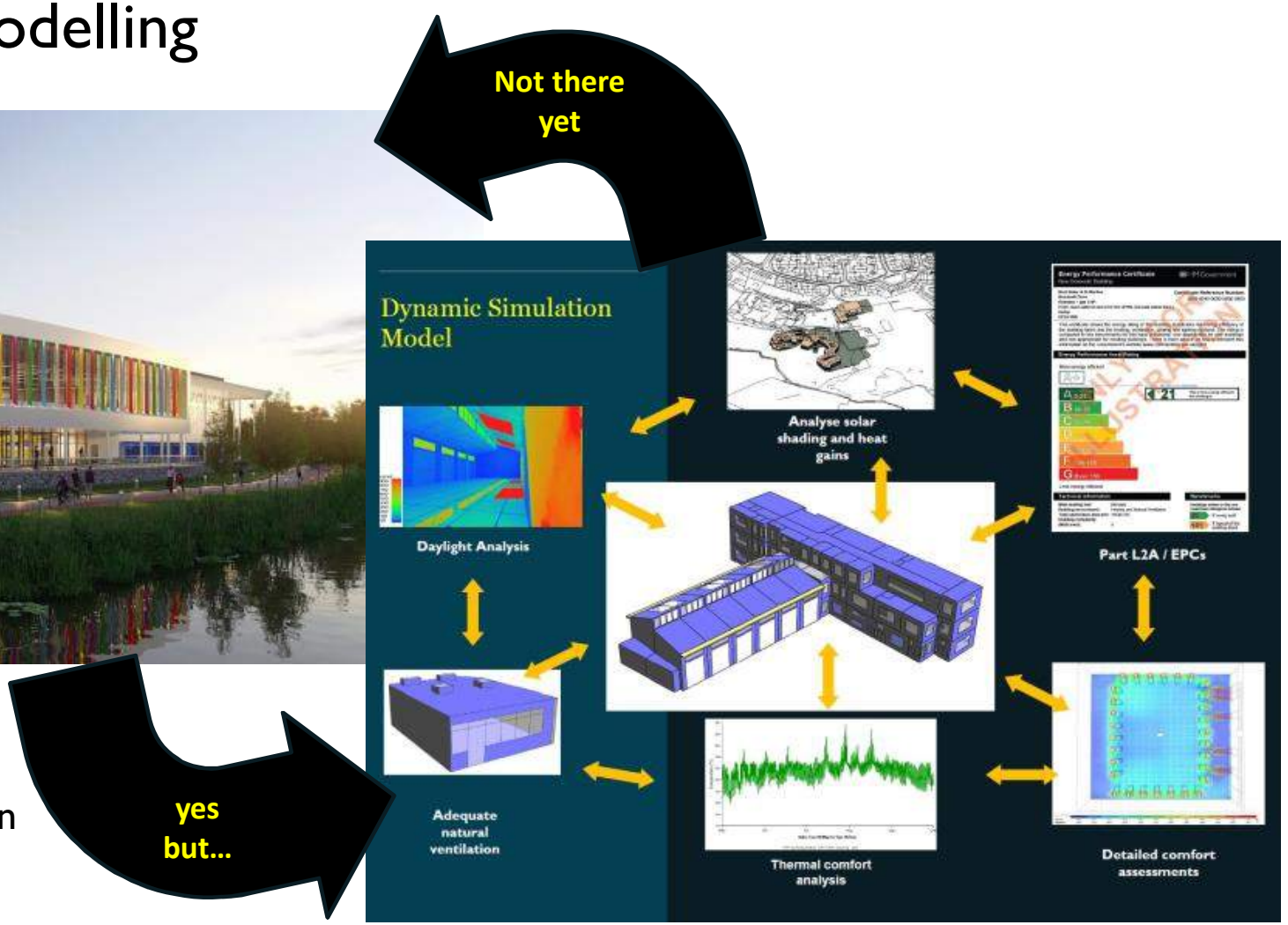
Early Modelling used to generate RIBA Stage 1 & 2 models using generic systems



Section Through Learner Pool
1 : 100

Environmental Modelling

Leveraging the building information model for design and analysis…



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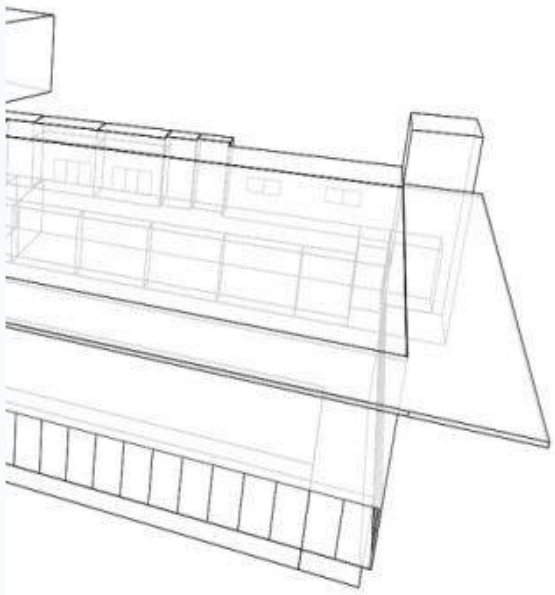
Environmental – Passive Design

- Export the model to analysis software;
- Optimise façade performance;
- Design shading elements;

Evaluate fabric improvement options;

Identify most energy and capital cost efficient means of improvement.



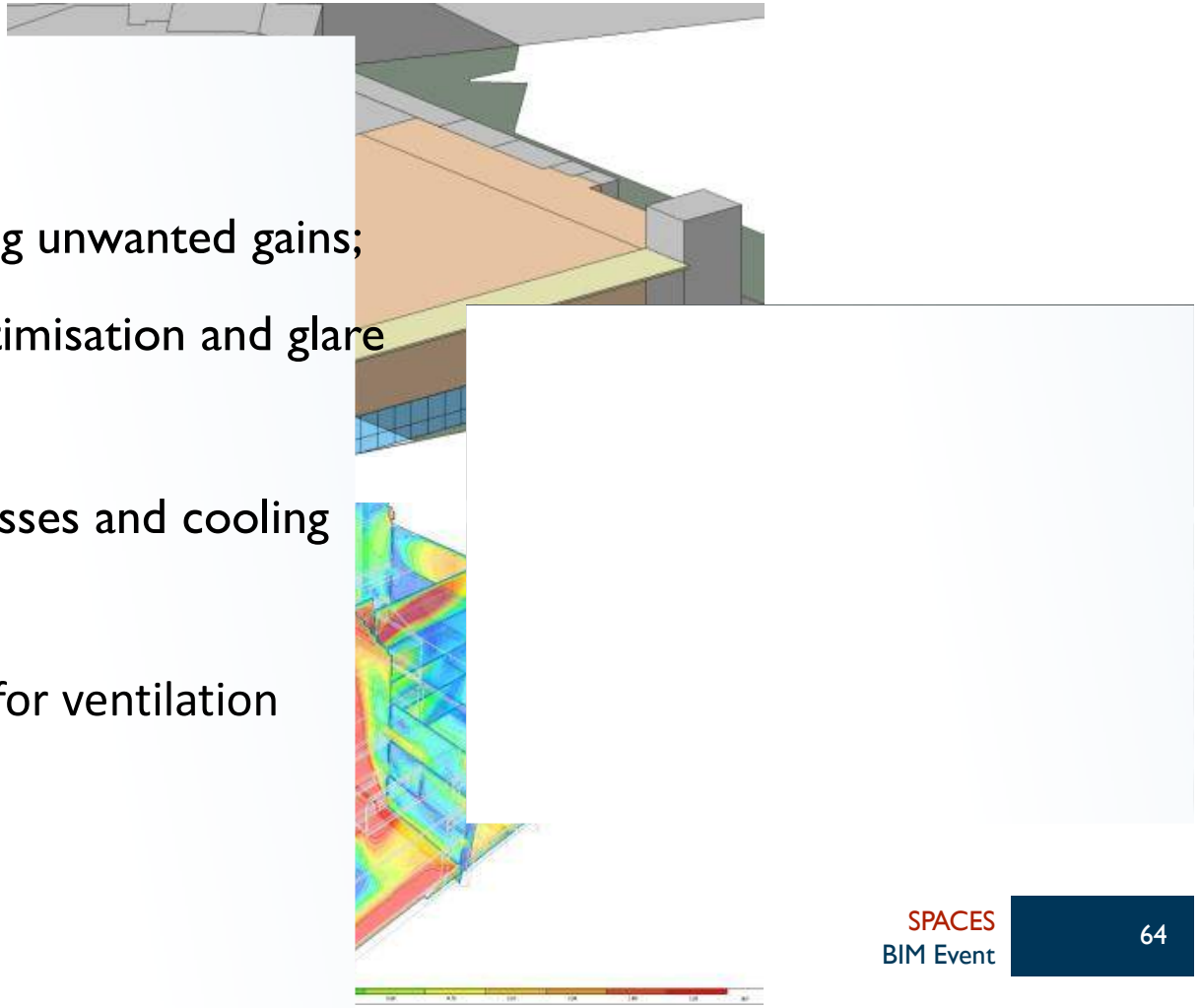
Environmental – Passive Design

Analysis tools available;

- Solar shading for minimising unwanted gains;
- Ray tracing for daylight optimisation and glare control;

Fabric performance for heat losses and cooling loads;

Computational fluid dynamics for ventilation modelling.



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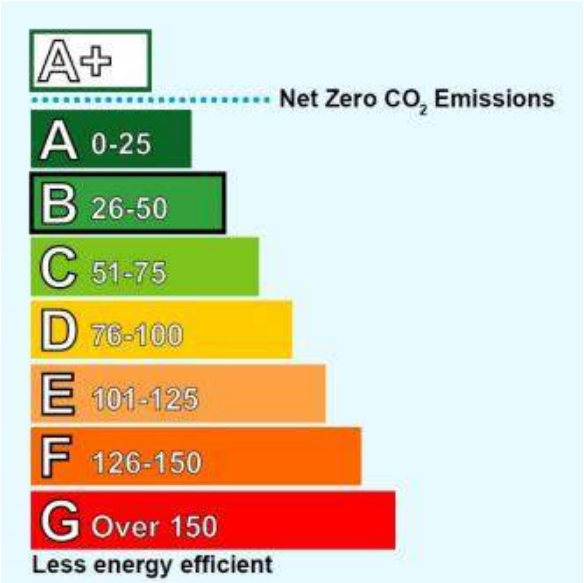
Environmental – Services Design

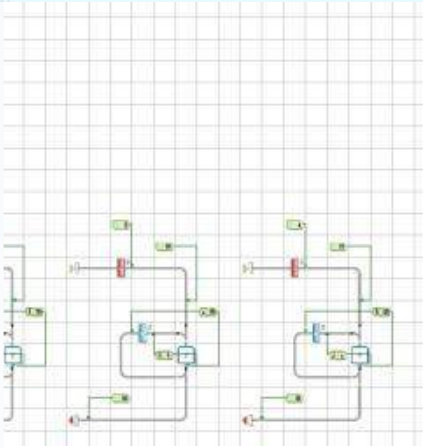
Analysis tools available;

- HVAC modelling for plant optimisation;
- CIBSE TM54 energy analysis to bridge the performance gap;

Compliance tools for regulatory assessment (Part L, MEES, ESOS, local sustainability targets);

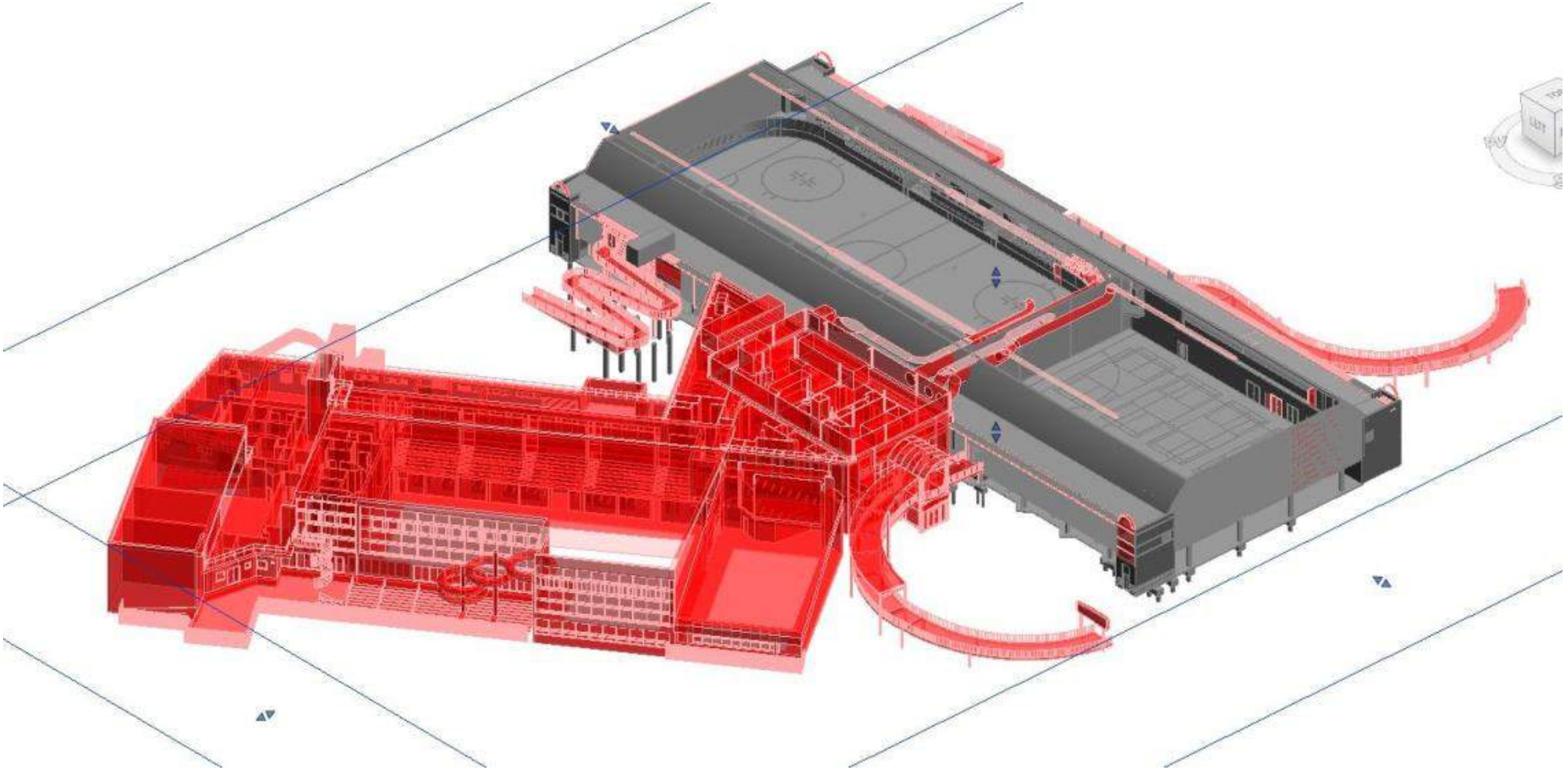
Future tools such as ERGON to bridge the gap between CAFM and predictive modelling.





Question – Your Experiences of BIM Level 2

BIM Level 2 Model
Chelmsford City Council – Riverside Ice & Leisure Centre



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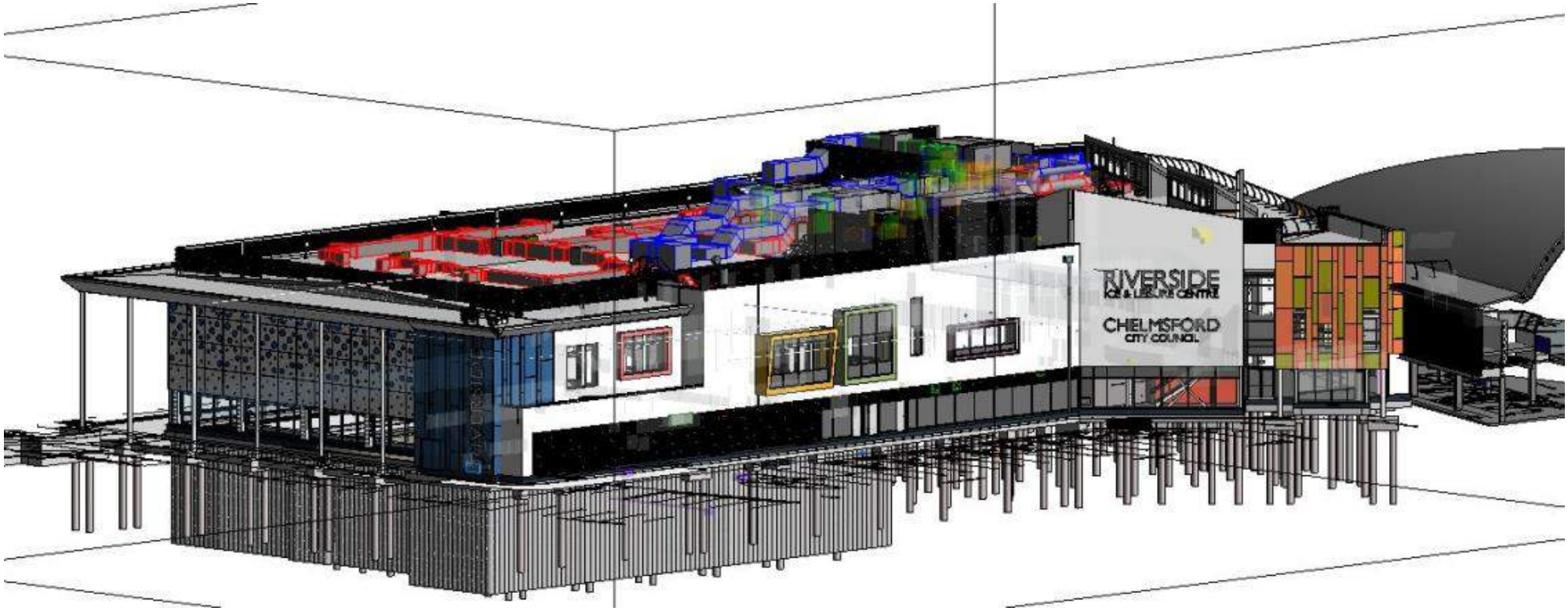
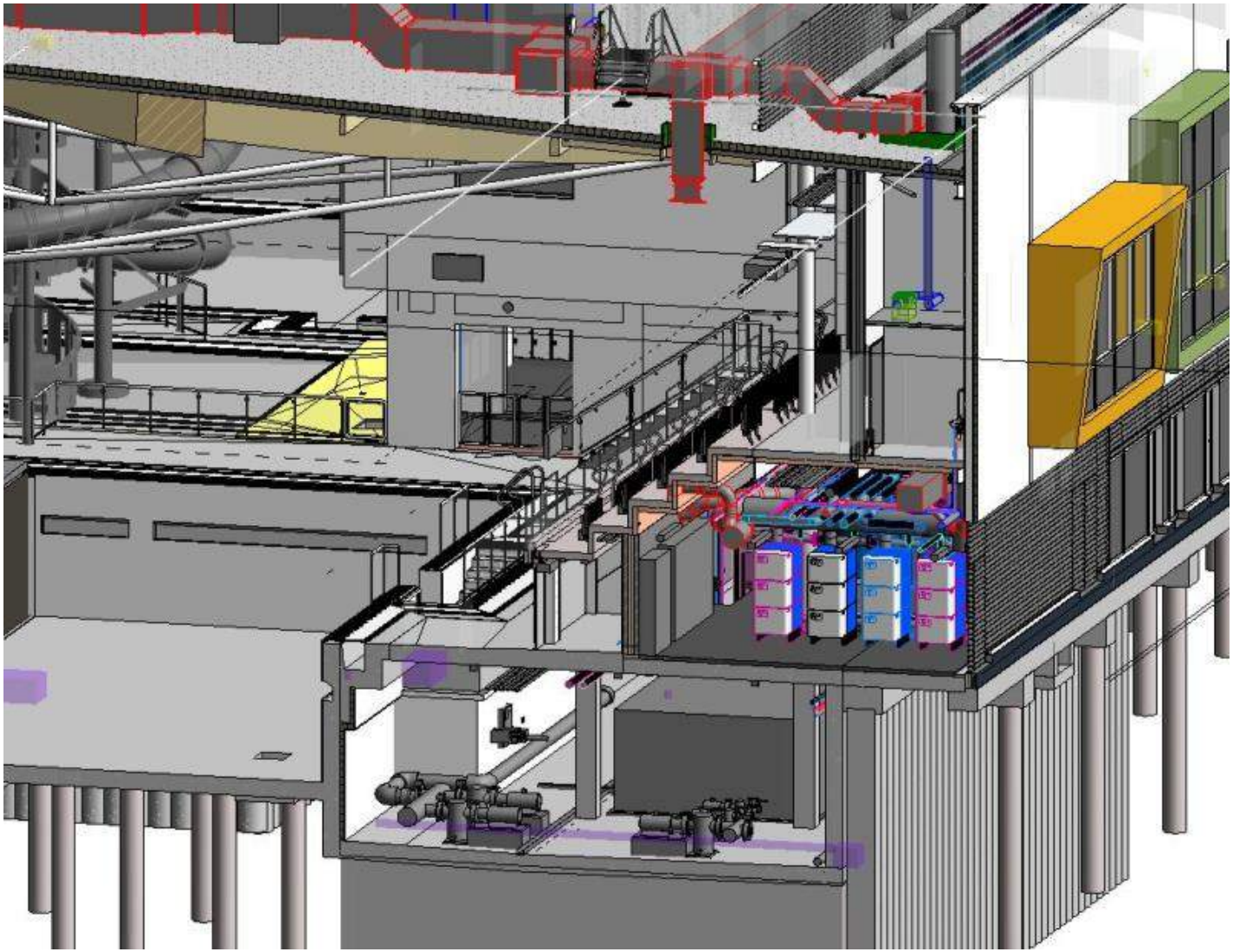

RIVERSIDE
CHELMSFORD
CITY COUNCIL

PICK EVERARD



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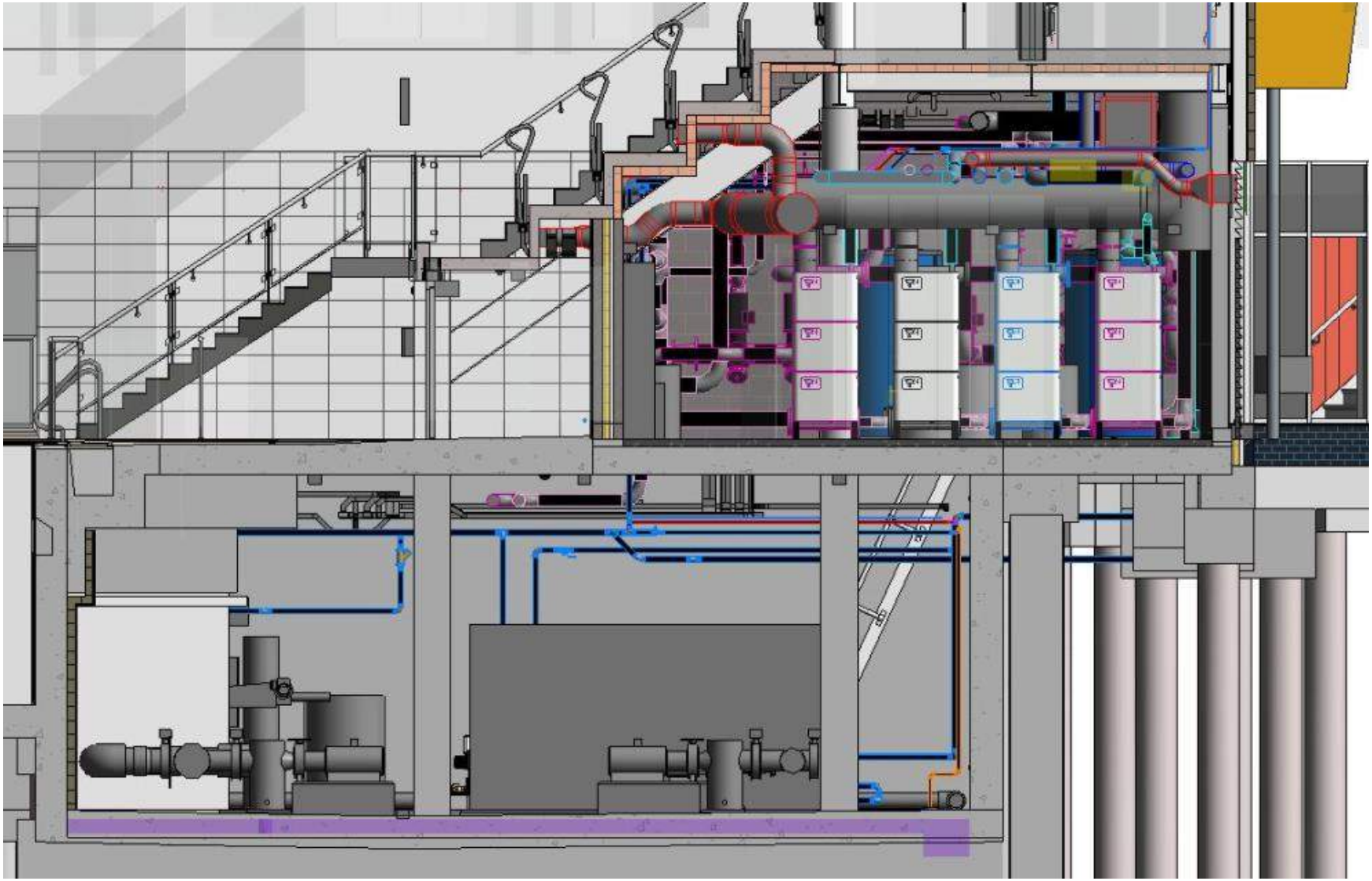

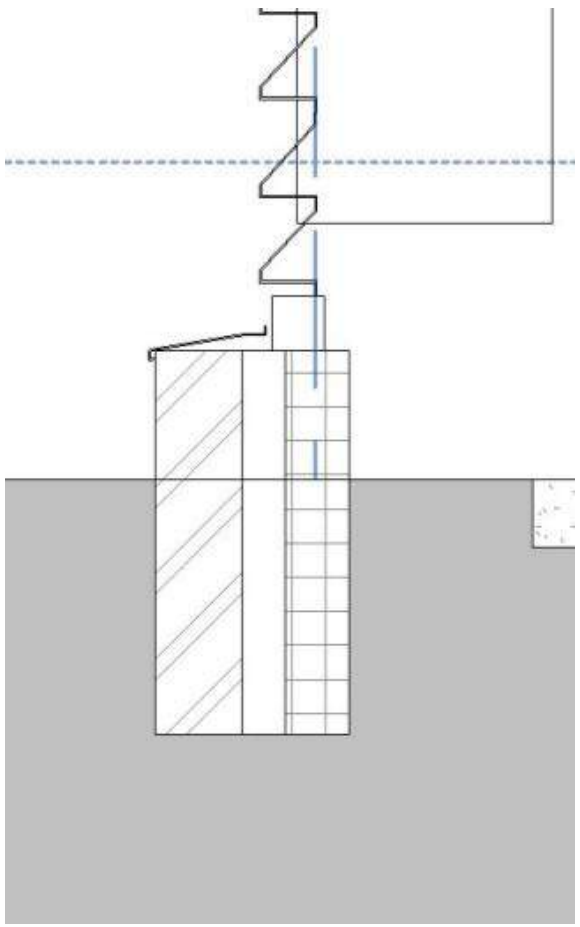

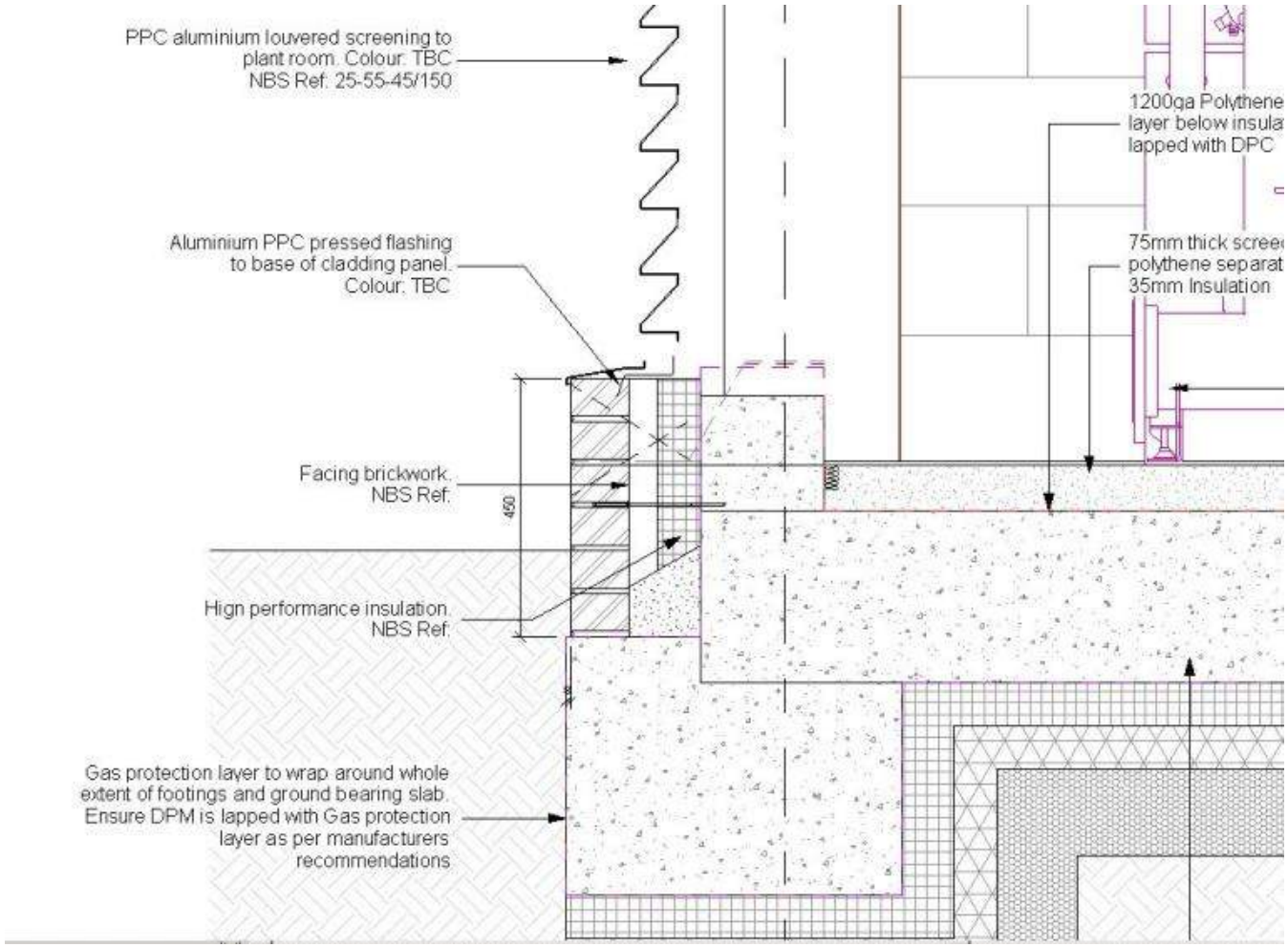

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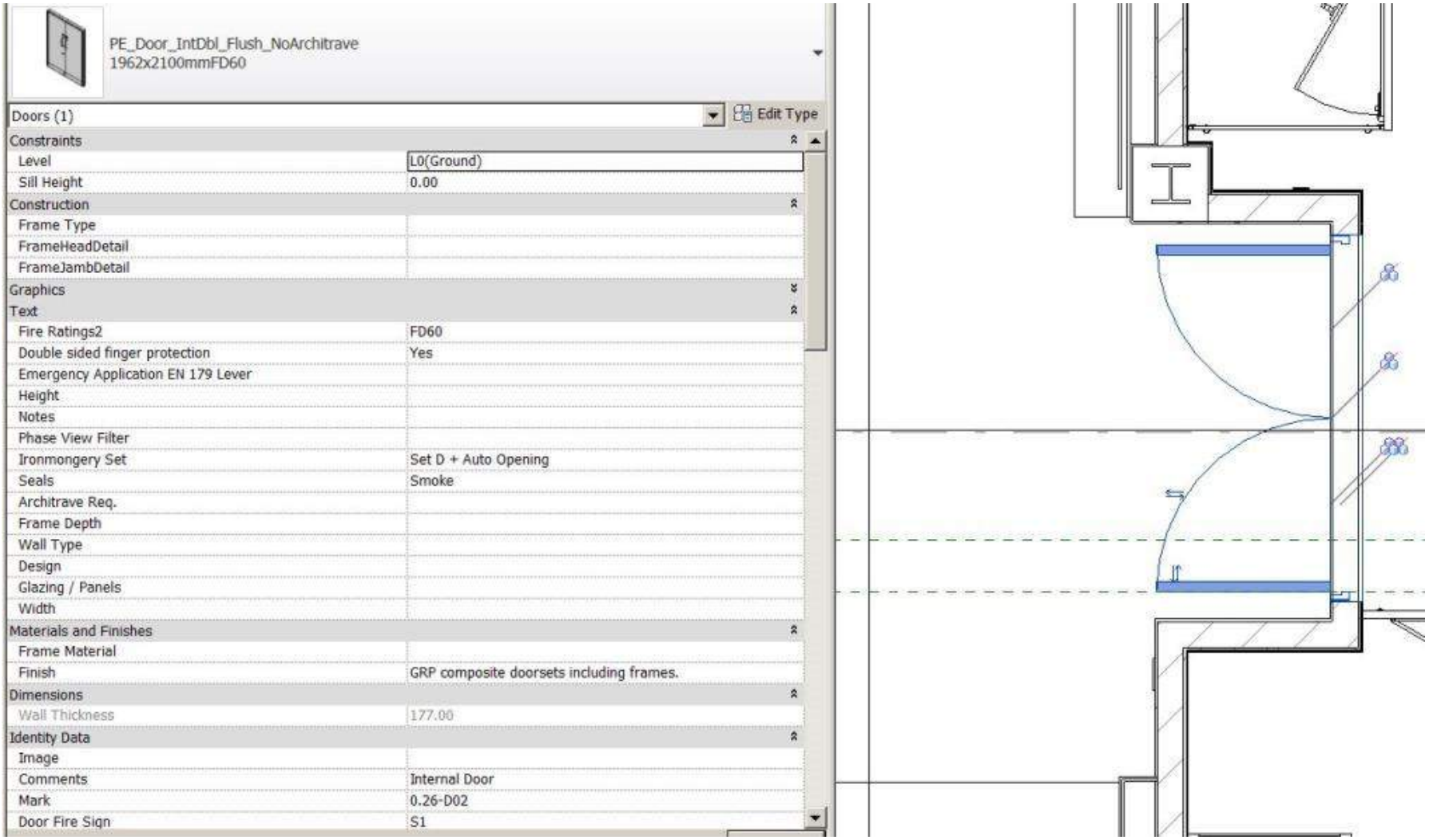

PE_Door_IntDbl_Flush_NoArchitrave
1962x2100mmFD60

Doors (1) | Edit Type

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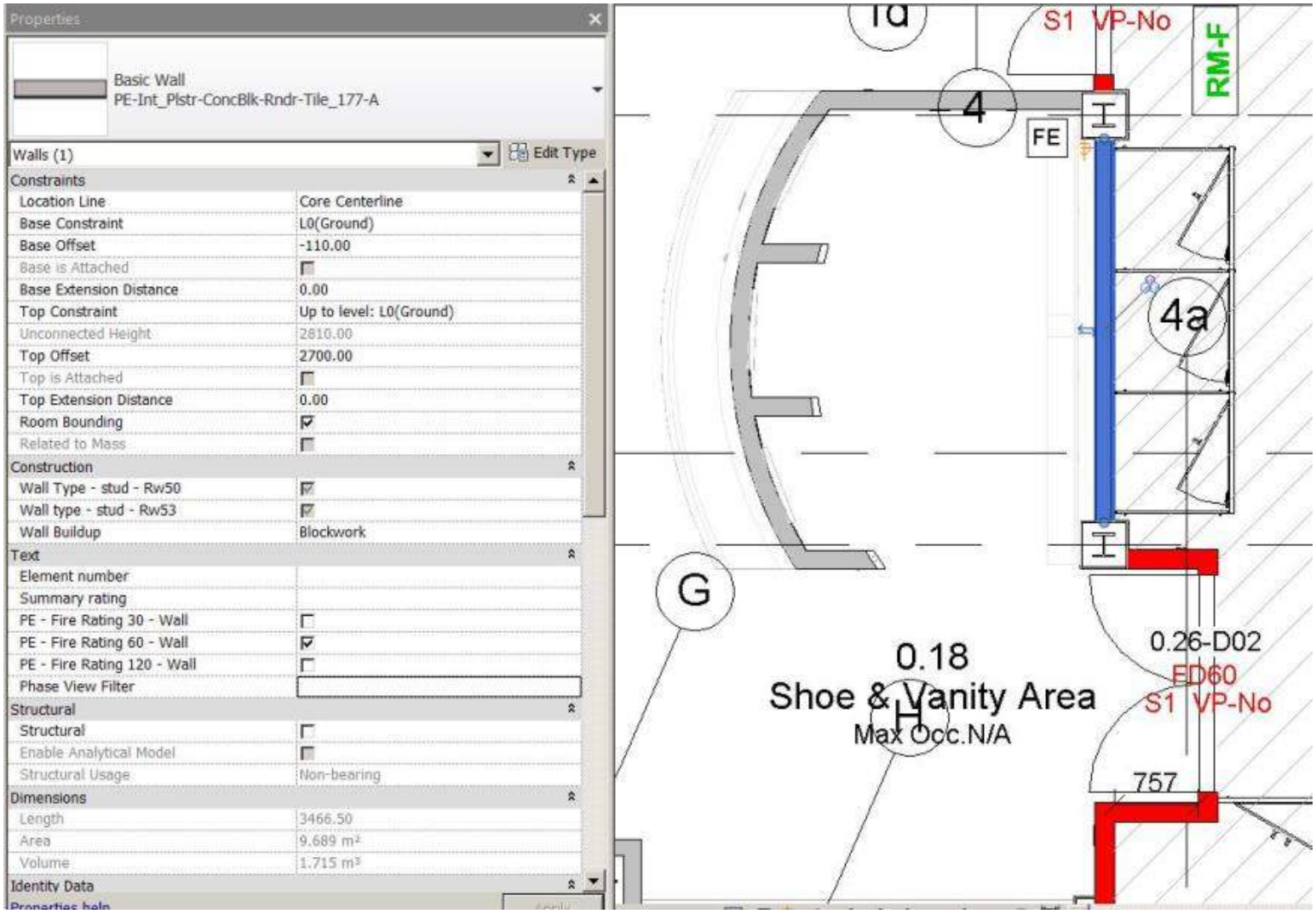
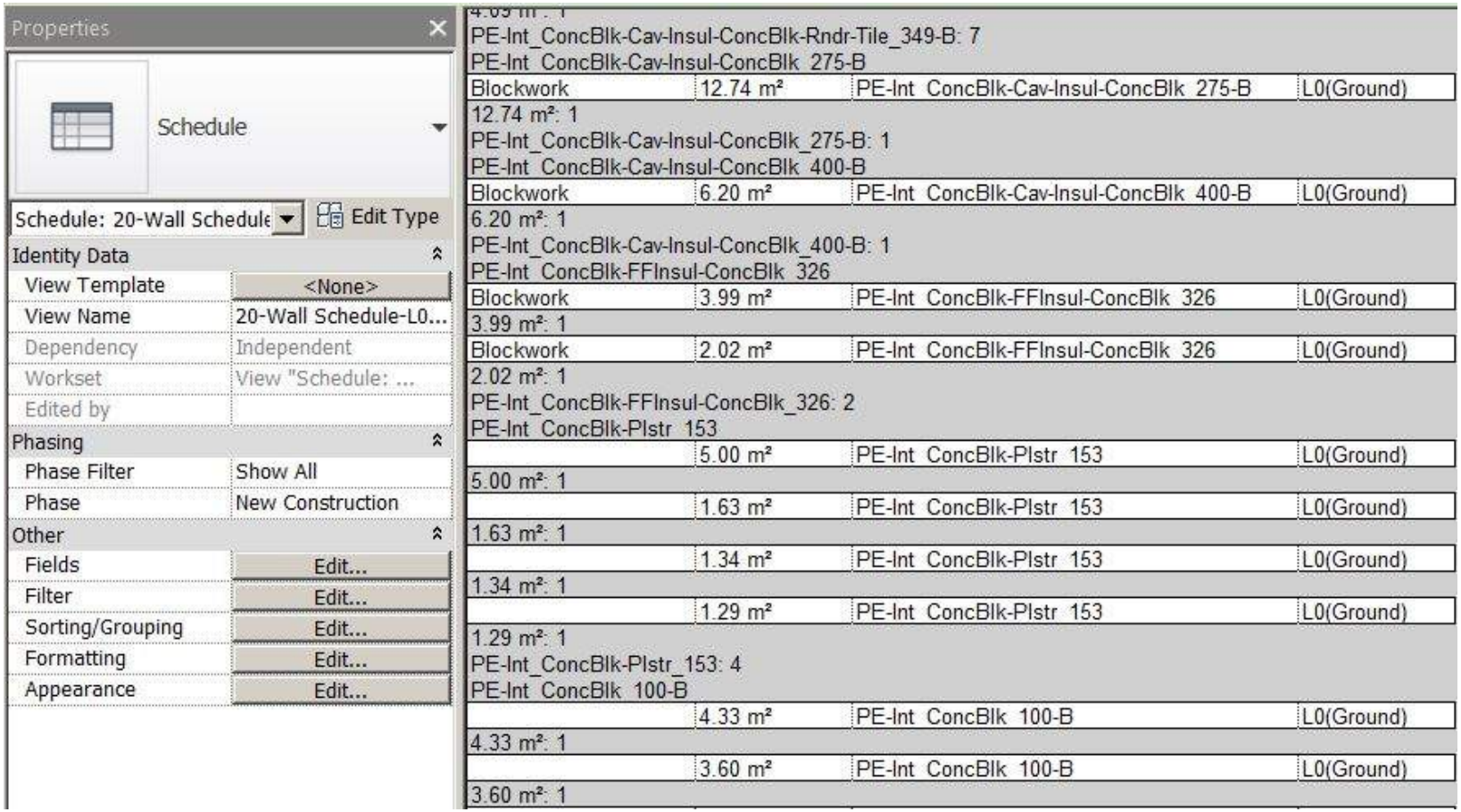
Level	L0(Ground)
Sill Height	0.00
Construction	
Frame Type	
FrameHeadDetail	
FrameJambDetail	
Graphics	
Text	
Fire Ratings2	FD60
Double sided finger protection	Yes
Emergency Application EN 179 Lever	
Height	
Notes	
Phase View Filter	
Ironmongery Set	Set D + Auto Opening
Seals	Smoke
Architrave Req.	
Frame Depth	
Wall Type	
Design	
Glazing / Panels	
Width	
Materials and Finishes	
Frame Material	
Finish	GRP composite doorsets including frames.
Dimensions	
Wall Thickness	177.00
Identity Data	
Image	
Comments	Internal Door
Mark	0.26-D02
Door Fire Sign	S1


Properties
Basic Wall
PE-Int_Plstr-ConcBlk-Rndr-Tile_177-A
Walls (1)
Edit Type
Constraints
Location Line
Core Centerline
Base Constraint
L0(Ground)
Base Offset
-110.00
Base is Attached
Base Extension Distance
0.00
Top Constraint
Up to level: L0(Ground)
Unconnected Height
2810.00
Top Offset
2700.00
Top is Attached
Top Extension Distance
0.00
Room Bounding
Related to Mass
Construction
Wall Type - stud - Rw50
Wall type - stud - Rw53
Wall Buildup
Blockwork
Text
Element number
Summary rating
PE - Fire Rating 30 - Wall
PE - Fire Rating 60 - Wall
PE - Fire Rating 120 - Wall
Phase View Filter
Structural
Structural
Enable Analytical Model
Structural Usage
Non-bearing
Dimensions
Length
3466.50
Area
9.689 m²
Volume
1.715 m³
Identity Data
Properties help
Apply
1d
S1 VP-No
RM-F
4
FE
4a
G
0.18
Shoe & Vanity Area
Max Occ.N/A
H
0.26-D02
FD60
S1 VP-No
757


Properties
Schedule
Schedule: 20-Wall Schedule
Edit Type
Identity Data
View Template
<None>
View Name
20-Wall Schedule-L0...
Dependency
Independent
Workset
View "Schedule: ...
Edited by
Phasing
Phase Filter
Show All
Phase
New Construction
Other
Fields
Edit...
Filter
Edit...
Sorting/Grouping
Edit...
Formatting
Edit...
Appearance
Edit...
PE-Int_ConcBlk-Cav-Insul-ConcBlk-Rndr-Tile_349-B: 7
PE-Int_ConcBlk-Cav-Insul-ConcBlk_275-B
Blockwork 12.74 m² PE-Int_ConcBlk-Cav-Insul-ConcBlk_275-B L0(Ground)
12.74 m²: 1
PE-Int_ConcBlk-Cav-Insul-ConcBlk_275-B: 1
PE-Int_ConcBlk-Cav-Insul-ConcBlk_400-B
Blockwork 6.20 m² PE-Int_ConcBlk-Cav-Insul-ConcBlk_400-B L0(Ground)
6.20 m²: 1
PE-Int_ConcBlk-Cav-Insul-ConcBlk_400-B: 1
PE-Int_ConcBlk-FFInsul-ConcBlk_326
Blockwork 3.99 m² PE-Int_ConcBlk-FFInsul-ConcBlk_326 L0(Ground)
3.99 m²: 1
Blockwork 2.02 m² PE-Int_ConcBlk-FFInsul-ConcBlk_326 L0(Ground)
2.02 m²: 1
PE-Int_ConcBlk-FFInsul-ConcBlk_326: 2
PE-Int_ConcBlk-Plstr_153
5.00 m² PE-Int_ConcBlk-Plstr_153 L0(Ground)
5.00 m²: 1
1.63 m² PE-Int_ConcBlk-Plstr_153 L0(Ground)
1.63 m²: 1
1.34 m² PE-Int_ConcBlk-Plstr_153 L0(Ground)
1.34 m²: 1
1.29 m² PE-Int_ConcBlk-Plstr_153 L0(Ground)
1.29 m²: 1
PE-Int_ConcBlk-Plstr_153: 4
PE-Int_ConcBlk_100-B
4.33 m² PE-Int_ConcBlk_100-B L0(Ground)
4.33 m²: 1
3.60 m² PE-Int_ConcBlk_100-B L0(Ground)
3.60 m²: 1

BIM Implementation – Lessons Learned

- Early Client engagement – EIR's (BIM Creep)
- Good BEP is essential
- Show and Tell inter discipline communication more important than ever

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BIM Level 2 – What's next for Pick Everard

- Continued development of our Standards and Protocols.
- Progress implementation of 5D CostX
- Progress implementation 4D Programming & Phasing
- Digital Validation and Verification of models
- Template development
- Reduce the use of AutoCAD to legacy schemes only

Question – What's next for you?

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