

ACBA 5010 - BIM

Assignment 1

Jordan Jones (2114985)
2114985@student.uwtsd.ac.uk

Table of Contents

Abbreviations Glossary	2
Letter RE: Project 5010, Ysgol Yr Afan	3
Level of Information.....	7
RIBA Stage 0: Strategic Definition	7
Level of Detail:	7
Level of Information:.....	7
RIBA Stage 1: Preparation and Brief	7
Level of Detail:	7
Level of Information:.....	7
RIBA Stage 2: Concept Design	7
Level of Detail:	7
Level of Information:.....	8
RIBA Stage 3: Spatial Coordination	8
Level of Detail:	8
Level of Information:.....	8
RIBA Stage 4: Technical Design	8
Level of Detail:	8
Level of Information:.....	8
RIBA Stage 5: Construction	8
Level of Detail:	8
Level of Information:.....	8
RIBA Stage 6: Handover	8
Level of Detail:	8
Level of Information:.....	8
RIBA Stage 7: In Use	9
Level of Detail:	9
Level of Information:.....	9
Examples:	9
Summary	9
Conclusion.....	9
Bibliography	10

Abbreviations Glossary

- CAD – Computer Aided Design
- BIM – Building Information Modelling
- RIBA – Royal Institute of British Architects
- CDE – Common Data Environment
- EDMS – Electronic Document Management System
- IFC – Industry Foundation Class
- COBie – Construction Operations Building Information Exchange
- iBIM – Integrated Building Information Modelling
- ISO – International Organisation for Standardisation
- BS – British Standard
- EN – European Numbering
- 3D – Three-dimensional geometry
- 4D – Construction Sequencing Information
- 5D – Cost Information
- BEP – BiM Execution Plan
- EIR's - Employers Information Requirements / Exchange Information Requirements
- LOI – Level of Information
- LOD – Level of Detail

Jordan Jones
JJ Consult Ltd
Unit 16,
Harbour Way,
Neath Port Talbot,
SA12 5LH

Joe Bloggs,
Neath Port Talbot Council,
The Quays,
Brunel Way,
Neath Port Talbot,
SA11 2GG

Dear Mr Bloggs,

Letter RE: Project 5010, Ysgol Yr Afan

I hope that this letter finds you well. I would like to take this opportunity to express my gratitude in appointing JJ Consult Ltd as your lead consultant in delivering this prestigious project involving the construction of 1 form entry infant school for 90 pupils with 48 part time nursery provision which will provide state of the art facilities to the local community. We value the trust that you have placed within us and are committed to delivering the project to the highest level of service to meet your expectations.

Within this letter we'll provide our understanding of the requirements of BIM Maturity for this project and provide information and proposals on how we believe that the information should be shared, coordinated and managed throughout the BIM process for the duration of the project and into the occupation of the building by the end user.

Prior to the BIM Process, the Employers Information Requirements needs to be produced. This is a specification that defines the information that will be required by the Employer for the development of the project and the operation of the completed built asset. It both informs suppliers of the Employer's methodology for use of digital data in design, delivery, and operation of its assets and sets the requirements for suppliers to deliver for the Employer's key stage assessments. The EIR gives clear direction on the BIM delivery process and structures the methods for collaborating, coordinating and managing information to successfully deliver the asset in line with BIM Level 2 requirements. The main body of the EIR should be structured in three sections:

- Section 1 - Management Requirements.
- Section 2 - Commercial Requirements.
- Section 3 - Technical Requirements.

Each section is divided into areas of interest for BIM delivery. Each area contains a Purpose and a Requirement statement providing both advice and specification to the parties to the project.

Section 1 outlines the following management areas of interest used by the Employer in the design, delivery, and operation of its assets:

- Roles and Responsibilities.
- Standards.
- Licensing Requirements.
- Planning the Work and Data Segregation.
- Security.
- Coordination and Clash Detection.
- Collaboration.
- Health and Safety/Construction (Design and Management) Regulations (UK) 2015.
- Systems Performance.
- Compliance Plan.
- Training.
- Delivery Strategy for Asset Information.
- Construction Operations for Building information exchange (COBie-UK-2012) requirements.

Section 2 outlines the following commercial areas of interest used by the Employer in the design, delivery, and operation of its assets:

- Data Drops and Project Deliverables.
- Employer's Strategic Purposes.
- Work Stage Delivery Process.

Section 3 outlines the following technical areas of interest used by the Employer in the design, delivery, and operation of its assets:

- BIM authoring software.
- Digital document management software, also known as a Common Data Environment (CDE).
- Facilities and Asset Management software.
- Data exchange formats.
- Geospatial (Ordnance Survey) coordinates.
- Level of Detail (LOD) and Level of Information (LOI) required.

Simply, BIM is a process and not a technology software such as AutoCAD. It is a collaborative process that is facilitated by technology to integrate various stakeholders and disciplines involved in a project. BIM spans the entire life cycle of an asset from the initial stages of design, right the way through the construction process to the operational and maintenance phases. The process ensures that there is one 'central hub' for information, and it is continuously managed throughout the life cycle of the building. The principles of BIM enhance collaboration, data management and decision making across the various sectors within the industry.

BIM was previously defined by PAS 1192-2:2013 as a process of designing, construction or operating a building or infrastructure assets using electronic object-oriented information. There were numerous different Building Information Modelling (BIM) Maturity Levels that were set standards that define the level of development and

implementation of BIM within a project. The levels were typically used to assess and communicate the efficiency and in utilising the BIM process. The different levels of BIM Maturity levels could be defined below:

- Level 0 BIM – This means that there is little to no collaboration within the project. 2D CAD drawings will be utilised throughout the RIBA Plan of Work 2020 stages to provide the necessary information to the project team. The information produced would typically be shared as separated sources of information.
- Level 1 BIM – This is typically where there's partial collaboration throughout the project teams where they are using a Common Data Environment (CDE) to collect, manage and share all project data across the various parties involved in the scheme. In addition, the drafting process for designs will utilise both 3D CAD & 2D CAD for producing the necessary information required. These standards are managed to BS 1192:2007. To achieve this level the following should be implemented and achieved: Roles & Responsibilities to be agreed on, naming conventions should be used, project specific codes should be adopted across all parties' practises, a CDE or EDMS should be shared between all parties and a suitable information hierarchy should be agreed upon.
- Level 2 BIM - Is where there is full collaboration in the process. The project team will be utilising 3D modelling software such as Revit to develop the scheme and produce the necessary information required for RIBA Stage 5. Any software that is used at this level must have the ability to be exported to an IFC or COBie format. This allows anyone with any software to open the file and create a unified BIM Model for the project. This level has been set as a minimum target for all government schemes in the public-sector.
- Level 3 BIM – This is a full integration process which can also be know as iBIM. This process would include using a unified BIM Model via a cloud-based environment All members of the project would have access to the model and would be able to add information dependant on their role in the project. Furthermore, 4D & 5D dimensioning would be available at this level to focus on the management of the building's lifecycle.

To caveat the levels above, these levels were relevant up until the end of 2018. However, BIM is now defined by the "UK BIM Framework" comprising BS EN ISO 19650 series of standards and remaining parts of BS/PAS 1192 standards which was introduced in 2019.

The BS EN ISO 19650 defines BIM as the use of shared digital representation of a built asset to facilitate design, construction and operation processes to form a reliable basis for decisions. The BS EN ISO 19650 series of standards relates to the organisation and digitalisation of information regarding buildings & civil engineering works using BIM. The standards provide a framework for managing information throughout the life cycle of assets. Whilst the BS EN ISO 19650 series doesn't explicitly define BIM Maturity levels like previous frameworks do, it now details its requirements in stages (Figure 1). The ISO 19650 series emphasises the collaboration of information and the importance of structured data throughout the life cycle of a built asset.

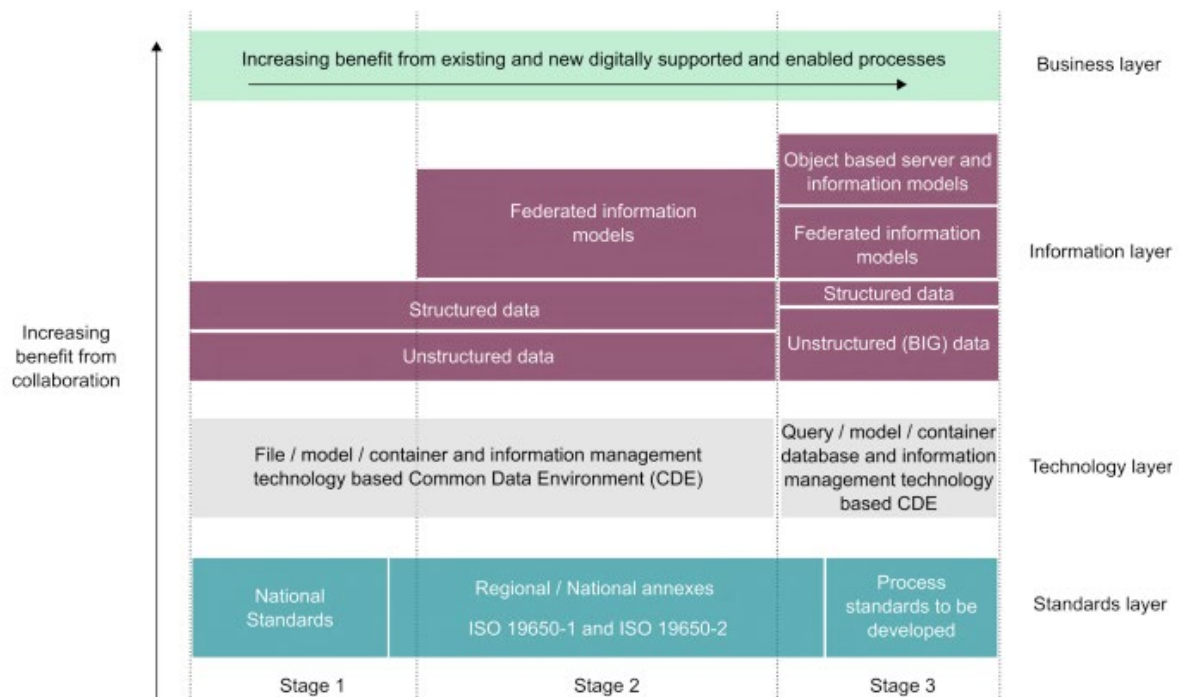


Figure 1 – Source - [An introduction to-Building Information Modelling BIM.pdf \(istructe.org\)](https://www.istructe.org/publications/An-introduction-to-Building-Information-Modelling-BIM.pdf)

Throughout the duration of the Ysgol Yr Afan project the sharing, coordination and management of the information are key components that need to be upheld throughout the entire life cycle of the project. International standards such as the BS EN ISO 19650 series provide a framework for these processes. In addition, the BEP is a key document that outlines how information will be managed and exchanged throughout the project. During the design and construction phases, the sharing of information involves creating and exchanging (amongst design consultants) 3D models, documents and data. BS EN ISO 19650-2 provide the guidance on the processes for exchanging and sharing information in a collaborative environment. Coordination is crucial to identify and resolve clashes or conflicts among various building interfaces which involves clash detection tools and collaborative platforms. BS EN ISO 19650-3 outlines the process for managing and coordinating information throughout this stage. During the design and construction phases information management is covered by ISO 19650-1 which established the principles and concepts for information management. A BIM Execution Plan (BEP) should be produced that outlines how this management process will be executed, specifying roles, responsibilities and procedures for the project team. As the project transitions into the operational stage, the sharing of information shifts towards the facility management aspect of the scheme. BS EN ISO 19650-3 provides guidance on the process for maintaining and updating the information model during this stage. Facility managers are able to use the BIM Model for ongoing maintenance and operations. However, this model needs to be continued to be updated with as-built data, maintenance records and other relevant information. Throughout this stage the BIM model will become an invaluable tool for the facilities managers. To summarise, the sharing, coordination and management of information during the BIM process are systematic and well-documented processes guided by international standards with the

BIM Execution Plan serving as a crucial document that outline how the BIM process will be executed on a project specific basis.

Level of Information

In relation to Building Information Modelling (BIM), the Level of Development (LOD) and Level of Information (LOI) are critical concepts that help define the extent and detail of information within a model at various stages of a project. The Royal Institute of British Architects (RIBA) stages outline the architectural design and construction process. The following explain the required level of information that the client should provide throughout the various RIBA stages:

RIBA Stage 0: Strategic Definition

Level of Detail:

- **Conceptual Model:** A basic model is created to visualise the project concept.
- **Minimal Detail:** Elements might be represented in a generalised way to convey design intent.

Level of Information:

- **Strategic Information:** General information about project goals, constraints, and initial parameters.
- **Key Decisions:** Information on strategic decisions influencing the design.

RIBA Stage 1: Preparation and Brief

Level of Detail:

- **Schematic Design Model:** Basic geometry is refined, and key design elements are developed.
- **Spatial Relationships:** Basic spatial relationships and massing are established.

Level of Information:

- **Functional Information:** Information about the intended functions and spatial requirements.
- **Client Requirements:** Detailed client requirements, preferences, and initial performance criteria.

RIBA Stage 2: Concept Design

Level of Detail:

- **Conceptual Design Model:** More detailed geometric representation.
- **Basic Systems:** Inclusion of basic building systems to evaluate their impact.

Level of Information:

- Performance Criteria: Detailed performance criteria and requirements for systems.
- Materials and Systems Selection: Initial selection of materials and systems.

RIBA Stage 3: Spatial Coordination

Level of Detail:

- Spatial Coordination Model: Further refinement of spatial relationships.
- Basic Elements: Key elements are developed with more detail.

Level of Information:

- Detailed Performance Requirements: Detailed performance specifications.
- Regulatory Compliance: Information on compliance with regulations and standards.

RIBA Stage 4: Technical Design

Level of Detail:

- Detailed Design Model: High detail in design elements and systems.
- Construction Details: Inclusion of construction details.

Level of Information:

- Product Information: Detailed product information for selected materials and systems.
- Quality Standards: Detailed quality and performance standards.

RIBA Stage 5: Construction

Level of Detail:

- Fabrication and Assembly Model: High level of detail for fabrication and construction.

Level of Information:

- Installation Information: Information on installation procedures and coordination.
- As-Built Documentation: Beginning of the as-built documentation.

RIBA Stage 6: Handover

Level of Detail:

- As-Built Model: Finalised as-built model with accurate details.

Level of Information:

- Operation and Maintenance Manuals: Comprehensive information for facility management.

- Warranty Information: Details on warranties and maintenance requirements.

RIBA Stage 7: In Use

Level of Detail:

- As-Maintained Model: Ongoing updates to the model reflecting changes and maintenance.

Level of Information:

- Performance Monitoring: Information on the ongoing performance of building systems.
- Lifecycle Information: Continued updates to lifecycle information.

Examples:

At RIBA Stage 2, the LOD might include a conceptual model of a house with basic geometric shapes. At RIBA Stage 4, the LOD could feature a detailed 3D model with intricate design elements and construction details.

At RIBA Stage 1, the LOI might involve high-level functional requirements for an office space. At RIBA Stage 5, the LOI could include detailed specifications for installation procedures and as-built documentation.

Summary

By aligning LOD and LOI with RIBA stages, clients can ensure that their information needs are met at each phase of the project, facilitating effective decision-making and project management.

Conclusion

We thank you once again for providing us with the opportunity to assist you in delivering this scheme and we trust that our expertise in this field has been helpful to you in providing information on how information will be shared, coordinated and managed throughout the duration of the BIM Process and also explaining the level of information you need through the LOD & LOI format throughout the various RIBA stages of the project.

Yours sincerely,

Jordan Jones
JJ Consult Ltd

Bibliography

BSI. "BIM - Building Information Modelling - ISO 19650." *Www.bsigroup.com*,

www.bsigroup.com/en-US/bim-iso-19650/. Accessed 12 Jan. 2024.

Department of Education. "Construction Framework Handbook 2021." *GOV.UK*, 30 Nov.

2021, www.gov.uk/government/publications/school-buildings-construction-framework-2021/construction-framework-handbook-2021.

Designing Buildings. "BIM Glossary of Terms." *Designingbuildings.co.uk*, 21 Oct. 2014,

www.designingbuildings.co.uk/wiki/BIM_glossary_of_terms.

Eischet, Oliver. "BIM Maturity Levels Explained." *Specter Automation Insights*, 26 Jan. 2023,

medium.com/specter-automation-insights/bim-maturity-levels-explained-922060c163ef.

McPartland, Richard. "BIM Levels Explained." *NBS*, www.theNBS.com, 1 Nov. 2014,

www.thenbs.com/knowledge/bim-levels-explained.

---. "What Is a BIM Execution Plan (BEP)?" *NBS*, www.theNBS.com, 28 Feb. 2017,

www.thenbs.com/knowledge/what-is-a-bim-execution-plan-bep.

Scottish Futures Trust. "New BIM Standards - ISO19650 1 & 2 - BIM Level 2 Guidance."

Scottishfuturestrust.org.uk, 2016, bimportal.scottishfuturestrust.org.uk/page/new-international-bim-standards.

Shillcock, Paul. "From BS 1192 to ISO 19650 and Everything in Between." *NBS*,

www.theNBS.com, 15 Jan. 2019, www.thenbs.com/knowledge/from-bs-1192-to-iso-19650-and-everything-in-between.

UK BIM Framework. "UK BIM Framework – BIM Standards, Guides & Resources."

[Https://Www.ukbimframework.org/](https://Www.ukbimframework.org/), 2023, www.ukbimframework.org/.