



5016-CI-ZZ-XX-RP-Z-0001 – BIM Strategy Report

Project description: 1 form entry infant school for 90 pupils, with 48 PT Nursery provision, and Twyn Community Hall and Caerphilly Story Gallery. It is envisaged that the functions can be operated independently.

Prepared for: Caerphilly Council/Welsh Government

Prepared by: Cubic Insights

Company Details: Cubic Insights

Lead Consultant: Dylan Horne, BIM Director

Contents Page

Introduction: Page 3

Team Structure: Page 3

Holistic BIM approach: Page 3

Standard of BIM Maturity: Page 5

Key Standards Adherence: Page 6

Definition and Application of LOIN: Page 7

Coordination and Collaboration Approach: Page 8

The Common Data Environment: Page 8

Practical Coordination and Clash Detection: Page 9

Collaborative Tools: Page 10

Whole Life Monitoring and CAFM: Page 10

Creating the Asset Information: Page 10

Integration with CAFM: Page 11

Operational Benefits Assurance: Page 11

Specific Benefits to Funding Objectives: Page 12

Conclusion And Recommendations: Page 12

Recommendations for Next Steps: Page 13

Reference List: Page 13



Introduction

The Ysgol Y Twyn project involves the design & construction of a new educational and community complex in Caerphilly town centre. The project will need to meet the facility requirements to accommodate 90 infant school pupils with a 48-part time nursery provision, the Twyn Community Hall and the Caerphilly Story Gallery. A major requirement under the brief was the ability for all facilities to be managed and act independently.

As the lead consultant, Cubic Insight is commissioned to develop a holistic BIM strategy for the project. Due to the joint funding of Welsh Government under the Sustainable Communities for Learning Programme, the project must adhere to stringent design & performance standards stipulated by the programme (**Welsh Government, 2024 Learning Programme**).

The purpose of this appraisal is to detail Cubic Insight's BIM strategy, displaying how BIM maturity, Whole Life Monitoring and collaborative practices will be applied to ensure efficient project delivery, risk mitigation and ensure all design requirements are met.

Holistic BIM Approach

Team Structure

For this project to successfully adhere to the programme requirements a holistic approach to BIM must be undertaken. To adhere to the specification of the programme, the project must have defined Information

Requirements (IR) and manage information through all disciplines involved in the project.

The following list aims to outline key project roles and their BIM responsibilities (Welsh Government, 2022 WEP Strategic Partnering Delivery Model).

- **Client (Caerphilly Council):** Acts as the appointing party, responsible for setting the Organisational and Asset Information Requirements (OIR & AIR).
- **Information Manager (Cubic Insight):** Acts as the information manager, managing project information and validating compliance (BSI, 2020a).
- **Architectural Lead (Wyn Harries):** Acts as lead appointed party to deliver the architectural model and ensure clash-free design
- **Structural Engineer (Shearwater):** Acts as lead appointed party, coordinating structural design and defining asset data
- **M&E Consultant (Cleddau M&E):** Acts as a lead appointed party, modelling service zones and service runs.
- **Main Contractor (Karn Construction):** Acts as lead appointed party, populating the Asset Information Model with as built data for handover (Hardin & McCool, 2015).

Holistic BIM Approach

By incorporating ‘information as an asset’, we move beyond BIM as a 3D model and into an information management process (BSI,2025). By incorporating this we can provide assurance that the project meets Welsh Government specifications (BIM Outsourcing. (n.d.)).

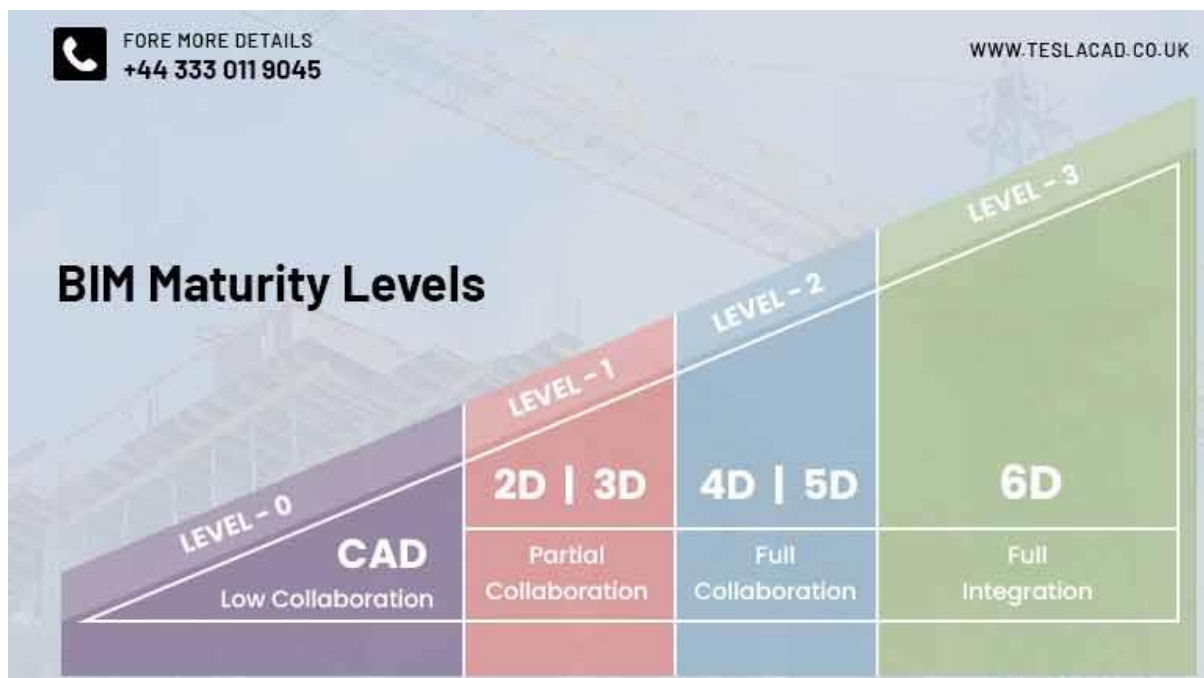
The strategy is structured around four pillars:

1. **Compliance:** Adherence to ISO 19650 standards, to ensure contractual alignment (UK BIM Framework, 2022).
2. **Collaboration:** Incorporating strong processes to ensure all information is relevant and up to date.

3. **Containment:** Clear definition of information requirements (LOIN) to prevent the production of unnecessary data (BSI, 2021).
4. **Continuity:** Prioritising usable data for the planned maintenance of the building using CAFM (Yesilyurt & Söğüt, 2021).

Standard of BIM Maturity

Welsh Government's requirement for the standard of BIM maturity is understood by Cubic Insight as aligning with the UK BIM Framework. The introduction of the international standard ISO 19650 has replaced the previous standard of BIM Levels 0-3. This shift has changed the to a continuous level of Information Management (UK BIM Framework, 2022).



(TeslaCAD. (n.d.))

For the Ysgol Y Twyn project, this distinction makes the appointing party (Caerphilly Council) responsible for the specifying the maturity level on elements of the project.

A high standard of BIM maturity in this context means that the council, guided by Cubic Insight, will have to clearly define why they need information for each designed element prior to development, this is the Organisational Information Requirements (OIR). This ensures that unnecessary information is not created and stored as a technological

exercise. This process directly aligns with the Sustainable Communities for Learning Programme (Welsh Government, 2022)

This strategy requires the following mature information functions:

- Federation over unification: This means that rather than having one heavy centralised model, we will use individual models for each discipline. Architectural, structural and M&E models remain distinct but are linked and coordinated. This ensures that liability for each model remains clear but also allows for combined analysis to identify clashes (Succar, 2009).
- Standardised Exchange: Maturity also includes the exchange of information while reducing data loss. To prevent data loss Industry Foundation Classes, formally ISO 16739 (ISO, 2018), for all model exchanges. This prevents vendor lock-in and is essential for a public sector client. As such, Caerphilly Council will be able to access the school's data regardless of the software used to create it (Mordue et al, 2016).

By adopting this maturity level, we provide Welsh Government that the project is compliant with the international standards required for public sector developments.

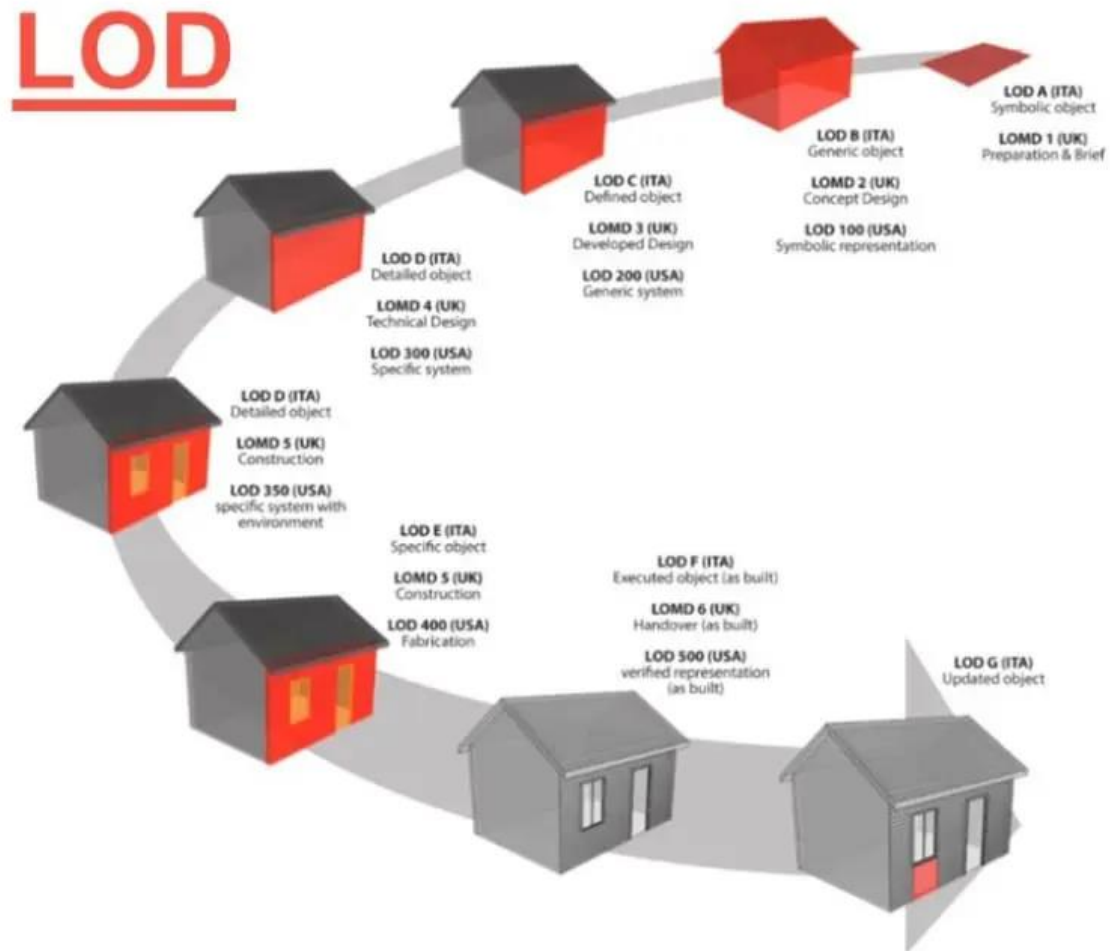
Key Standards Adherence

To satisfy the requirements from Welsh Government for this project the following will need to be adhered to:

- ISO 19650-2: Delivery Phase of Assets: This governs the delivery phase and ensures a standardised process for tendering, appointment and information management (BSI, 2025)
- BS EN 17412-1: Defines the Level of Information Need, this prevents data overproduction by specifying the requirements. (BSI, 2021).
- PAS 1192-5: Implements security protocols for the Common Data Environment (CDE), critical for protecting sensitive school and community data (BSI, 2014).

Definition and Application of Level of Information Need (LOIN)

The Level of Information Need (LOIN) is the most crucial planning tool for our strategy. This replaced the previous concept of Level of Detail (LOD), which would stipulate the LOD of the whole project. LOIN changes this by specifying the deliverables for each asset using a Model Production and Delivery Table (MPDT), which has been used by the Department for Education and Scottish Futures Trust. This approach allows for the LOD to be prioritised during the early design stage (Stage 3), while LOI, such as warranty details, maintenance schedules and fire safety ratings are prioritised at handover (Stage 6) to be introduced to the client Computer Aided Facility Management (CAFM) system. By using Uniclass 2015 classification codes, we can ensure that delivered data aligns with Caerphilly Council's requirements, preventing unnecessary information (Hardin & McCool, 2015).



(ACCA Software. (n.d.))

Coordination and Collaboration Approach

Effective collaboration is achieved through the effective management of information; this removes the reliance on technology (Sacks et al. 2025). Our strategy establishes a structured and auditable collaborative process centred on the common data environment (CDE).

The Common Data Environment (CDE)

For Ysgol Y Twyn, we will use a cloud-based platform accessible to all appointed parties as the CDE. A CDE strictly governs the four ISO 19650 states (BSI, 2025):

- Work in Progress: Information created and shared between only a single disciplines team.

- Shared: Information ready for coordination and review by the wider team. I.e Creating a federated model to identify clashes.
- Published: Information approved for use in downstream tasks like the construction phase.
- Archive: Record of all exchanges.

This workflow allows only quality-controlled information to be issued for construction, this reduces the risk during the construction phase and reduces the need for on-site reworks (Azhar, 2011).

Practical Coordination and Clash Detection

Coordination and collaboration will be achieved by undertaking weekly digital model coordination meetings, as Cubic Insight is the information manager, they will chair these meetings. To have an effective clash detection strategy we will align with the federated model approach described in the BIM Handbook (Sacks et al, 2025). To achieve this discipline models are overlaid to identify conflicts early as opposed to merging them into a single file. Effective coordination requires more than simply viewing models and can be aided by the above processes.

For this project, we will categorise coordination issues into three distinct groups as highlighted in Building Information Modelling for Dummies (Mordue et al, 2016):

1. Hard Clashes: These are physical intersections between two solid objects, for example, a steel beam passing through a ventilation duct. These are critical issues that would require expensive re-working on site to rectify.
2. Soft Clashes: This relates to the long-term operation of the building. This occurs when an object breaches the “buffer zone” of another (Sacks et al, 2025). For example, a heat pump in a plant room that might physically fit, however a pipe blocks the door necessary to change a component. We would incorporate maintenance zones into the models to ensure that future maintenance can be carried out.

3. Workflow/4D Clashes: Issues that would affect the sequence of installation or construction on the project. This would include large M&E equipment that would have to be installed prior to finishing the structural facade.

This approach helps to leverage the MacLeamy Curve (Hardin & McCool, 2015). This curve demonstrates how the cost of design changes is low during the digital coordination phase but increases once construction begins due to clashes. By ensuring a clash free model at the end of RIBA Stage 4 (Technical Design), we can account for these costs during the design phase.

To ensure this automated rule sets will be used to check for clashes weekly, these clashes will then be assigned as tasks to the Discipline Managers. This ensures that clashes are documented and addressed. Additionally, this provides an audit trail for the Welsh Government with evidence that this has been considered prior to the construction phase.

Collaborative Tools

To enforce an effective information exchange process, Cubic Insight will mandate the use of a BEP as the central contract document. All parties must use approved naming conventions as defined by ISO 19650-2 (BSI, 2025), for every file, model and sheet. This will ensure that all information is easily readable and identifiable for the facility management team.

Whole Life Monitoring and CAFM

The Sustainable Communities for Learning Programme requires the project to be designed and constructed for its 60-year lifespan (Welsh Government, 2024). This demands a Whole Life Monitoring approach where the BIM process aids in managing the operational phase.

Creating the Asset Information Model (AIM)

The BIM model will transition from the Design Intent Model (DIM) into a validated Asset Information Model (AIM) at the handover. This transition is managed by ensuring additional unmodelled information like manufacturer

details and warranties are attached to the 3D elements. This forms the Golden Thread of information required for future facility management (BSI, 2020; HM Government, 2011)

For the Community Hall, the information delivery plan will require the main contractor to populate the model with crucial product information. Due to the intended independent functionality of the Community Hall, it's important to provide product information supporting the design choices and validating performance.

Integration with CAFM

Computer aided facility management is the operational phase software used by Caerphilly Council to manage the maintenance and reactive repairs of their assets (Won et al, 2019).

- **Data requirements:** The AIM will be produced to meet the requirements of the Council's CAFM system. This involves using a Construction Operations Building Information Exchange which is a non-proprietary spreadsheet including all key data from the construction team to the facility management team (Hardin & McCool, 2015).
- **Energy Management:** For the infant school, energy efficiency is a major consideration during the asset's operation. As such, the model will tag smart meters and control with the specific UPRN (5016) to ensure accurate data linkage. The AIM will also include precise location and maintenance schedules of all service systems to allow for predictive maintenance as per the manufacturer's guidance, to reduce the operational costs (Kassem et al, 2015)

Operational Benefits Assurance

The BIM strategy has been developed to support the Government Soft Landings framework. This aims to provide a smooth transition from the construction to occupation of the building. This has been introduced due

to a performance gap between predicted and actual energy usage, this is often due to the poor facility management and a lack of understanding of the complex systems (Kassem et al, 2015).

Our strategy uses the Asset Information Model to close this gap by strictly adhering to BS 8536:2022 (Design and construction for operability) (BSI, 2022). By ensuring the model is accurate with verified data during the construction phase, we allow Caerphilly Council's facility management team to simulate maintenance strategies.

Specific Benefits to Funding Objectives:

- **Carbon Reporting:** Due to the strict net-zero targets set by the Welsh Government the BIM model will contain material passport for key elements that detail their embodied carbon. This aids Caerphilly Council by providing the opportunity for automated carbon reporting and future reuse (Ysilyurt & Söğüt, 2021).
- **Predictive and Reactive Maintenance:** Traditionally facility management is reactive i.e fixing the boiler once it has broken. By linking BIM data to the CAFM system, the Council can use a predictive maintenance schedule (Won et al, 2019). This will alert the FM team to service based on the manufacturer guidance.
- **Disaster Recovery:** In the event of damage (fire or a leak), the AIM provides a record of what was installed. This accessible information greatly reduces the insurance risks and downtime (Kean, 2019; BSI, 2020).

Conclusion and Recommendations

Cubic Insight's BIM strategy for the Ysgol Y Twyn Project is a professional and analytical approach designed to exceed the requirements of the project outline and the Sustainable Communities for Learning Programme. By adopting the principles of ISO 19650 (BSI, 2025), clearly defining the Level of Information Need (LOIN) (BSI, 2021), and implementing rigorous CDE, we guarantee a coordinated and efficient design and construction process.

The core strength of this strategy lies in its focus on the end-user (Caerphilly Council) by prioritising Whole Life Monitoring and CAFM integration. This ensures the digital asset delivered is immediately usable for operational management, maximising the long-term value of the public investment.

Recommendations for Next Steps:

- Formal Appointment of the Information Manager (IM): The IM should be officially appointed to manage the overall project information management function (BSI, 2020a).
- EIR Finalisation: The Exchange Information Requirements (EIR) document must be formally signed off by Caerphilly Council to freeze the LOIN requirements.
- BEP Kick-off: All appointed parties must attend a mandatory BIM Execution Plan (BEP) kick-off meeting to formally agree upon the CDE protocols, naming conventions, and clash resolution process before Stage 3 commences.

This comprehensive approach provides the necessary reassurance to all stakeholders that the project's funding is sufficiently met through the effective management and delivery of structured information.

Reference List

1. ACCA Software. (n.d.). What are LOD and LOIN in BIM and what are they for? [online] Biblus. Available at: <https://biblus.accasoftware.com/en/what-are-lod-and-loin-in-bim-and-what-are-they-for/> [Accessed 12 Dec. 2025].

2. Azhar, S. (2011). Building Information Modeling (BIM): Trends, Benefits, Risks, and Challenges for the AEC Industry. *Journal of Leadership and Management in Engineering*, 11(3), 241-252.
3. BIM Outsourcing. (n.d.). Harnessing Building Information Modelling: A Pathway to Sustainable Construction Practices. [online] Available at: <https://www.bimoutsourcing.co.uk/harnessing-building-information-modelling-a-pathway-to-sustainable-construction-practices/> [Accessed 12 Dec. 2025].
4. British Standards Institution (BSI). (2020a). BS EN ISO 19650-2: Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) – Delivery phase of the assets. BSI Standards Ltd. Available at: https://products.ihserc.com/tmp_stamp/00496350774/SBWJPIAAA.AAAAAAA.pdf?sess=00496350774&prod=CIS1
5. British Standards Institution (BSI). (2020b). *Little Book of BIM*. London: BSI.
6. British Standards Institution (BSI). (2022). BS 8536:2022 Design, manufacture and construction for operability – Code of practice. BSI Standards Ltd.
7. British Standards Institution (BSI). (2021). BS EN 17412-1: Level of information need – Concepts and principles. BSI Standards Ltd.
8. British Standards Institution (BSI). (2014). PAS 1192-5: Specification for security-minded building information modelling, digital built environments and smart asset management. BSI Standards Ltd.
9. Department for Education (DfE). (2020). *Employer's Information Requirements (EIR): Standard Output Specification*. London: DfE.
10. Hardin, B. & McCool, D. (2015). *BIM and Construction Management: Proven Tools, Methods, and Workflows*. 2nd ed. Indianapolis: Sybex.
11. HM Government. (2011). *Government Construction Strategy*. Cabinet Office.
12. International Organization for Standardization (ISO). (2018). ISO 16739-1: Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries — Part 1: Data schema. Geneva: ISO.

13. Kassem, M., Dawood, N., & Whyte, J. (2015). BIM in facility management: An overview of the current research trends and future directions. *Journal of Information Technology in Construction (ITcon)*, 20, 350-363.
14. Kean, D. (2019). BIM and the Golden Thread. BIMplus. Available at: <https://www.google.com/search?q=https://www.bimplus.co.uk/bim-and-golden-thread/>
15. Mordue, S., Philp, D. & Swaddle, P. (2016). *Building Information Modeling For Dummies*. Chichester: John Wiley & Sons Ltd.
16. Sacks, R., Lee, G., Burdi, L., & Bolpagni, M. (2025). *BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers*. 4th ed. Newark: Wiley.
17. Scottish Futures Trust (SFT). (2017). *BIM Level 2 Guidance: Stage 3 – Model Production Delivery Table*. Edinburgh: Scottish Futures Trust.
18. Succar, B. (2009). Building information modelling maturity levels and proposed benchmarks. *Automation in Construction*, 18(4), 439-446.
19. TeslaCAD. (n.d.). *What are BIM Maturity Levels?* [online] Available at: <https://www.teslacad.co.uk/blog/what-are-bim-maturity-levels/> [Accessed 12 Dec. 2025].
20. UK BIM Framework. (2022). *Guidance Part A: Overview of the UK BIM Framework*. Available at: <https://www.ukbimframework.org/>
21. UK BIM Framework. (2021). *Guidance Part D: Developing information requirements. Edition 2*. Available at: https://www.ukbimframework.org/wp-content/uploads/2021/02/Guidance-Part-D_Developing-information-requirements_Edition-2.pdf
22. Welsh Government. (2022). *Template MIM Education Project Agreement: Schedule 30 - Building Information Modelling Protocol*. Welsh Government. Available at: <https://www.gov.wales/sites/default/files/publications/2022->

[07/template-education-project-agreement-building-information-management-protocol.pdf](#)

23. Welsh Government. (2024). Sustainable Communities for Learning Programme Technical Guidance. Welsh Government Publication.
24. Won, J., Lee, G., Park, C., & Kim, H. (2019). The application of BIM for effective facility management: Focusing on the classification of facility management information. *Sustainability*, 11(16), 4478.
25. Yesilyurt, A. & Söğüt, K. (2021). A review of facility management approaches for sustainable building lifecycle. *Journal of Building Engineering*, 39, 102283.