

Assessment 1: Building Information Modelling (BIM) (ACBA5010)

Client Letter

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I. Introduction to Assessment

Bens BIM Consultants Limited is created to demonstrate how a small consultancy company, bidding for local work and shortlisted for final selection, responds to a request to demonstrate their understanding and therefore capability in providing the functions and processes needed to manage the life cycle of a built structure in a Building Information Modelling (BIM) environment. (Traylor, 2024).

There will be multiple interested parties and stakeholders in the creation of this small primary school. Bens BIM Consultants Limited will be highly scrutinised by the client to ensure a modern high standard approach in their BIM capability.

For those not fully conversant with BIM this letter provides explanations of key areas before presenting what Bens BIM Consultant Ltd consider the most appropriate approach in each of those areas.

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Ref: BBCL-C1-01-5010

Date: 16th January 2024

For the Attention of: **Arthur Jones Procurement Manager**

**Re: Short List Stage, Clarification of Bens BIM Consultants Ltd (BBCL) Tender
Bid for Project 5010 - Design and Build of Ysgol-Yr-Afan.**

Dear Mr Jones

We thank you for informing us that our Bid to provide design services to Neath Port Talbot County Council (NPTCC) at the above project is now shortlisted for selection. We appreciate the opportunity to provide further clarification to our bid and to provide the additional information in those areas specifically requested. Our understanding is that those areas are:

1. The Welsh Governments Sustainable Communities for Learning Programme
2. BIM Maturity
3. Level of Complexity of Data Needed
4. Managing - Coordination, Information Sharing and Goals
5. Whole Life Monitoring of The Asset.
6. Appendices 1 to 4

All BBCL activities are completed in full compliance to UK Legislation and Industry Codes of Practice.

Yours Sincerely

Ben Jeffs

Lead Consultant

Bens BIM Consultants Ltd

1. The Welsh Governments Sustainable Communities for Learning Programme

BBCL appreciate the opportunity to once again be involved in the Welsh Governments Sustainable Communities for Learning Programme. (WGSCLP, 2019). BBCL aim to fully support NPTCC throughout this collaboration of the government, local authority and technical partners in the creation and improvement of the nations' schools and colleges.

BBCL understands that funding for Project 5010 will be delivered via the Welsh Governments new Joint Funded Venture Scheme for major capital projects as detailed in the document; Mutual Investment Model for Welsh Education Partnerships (WGMIM, 2018). BBCL are proud to confirm that during 2018 and 2019 the company played an active role in assisting the government in the development stages of this scheme.

Furthermore, BBCL can confirm their status as an approved and pre-qualified Technical Delivery Partner under these schemes.

2. BIM Maturity

There are 5 different levels of BIM maturity, each have their own purpose within the world of design and impact the uses of it throughout the building lifecycle. BIM Maturity Levels 0 through 4 are in place to govern and rate the level of complexity a project is designed to. (Mordue, 2016). For further explanation refer to Appendix 1.

BBCL are committed to delivering BIM requirements in accordance with the Welsh Governments document Welsh Education Partnership, Strategic Partnering Framework for Building Information Modelling, (WGBIM, 2018).

In order to meet the specific requirements of Project 5010 a Level 3 BIM Maturity will be delivered. BBCL will collaborate with the relevant stakeholders in order to ensure Level 3 BIM Maturity is upheld throughout.

Level 3 BIM Maturity includes a single online model comprising sequencing, costs and project lifecycle information. This stage is also referred to as integrated BIM – encompassing all information about the building, as well as including detailed information and geometrical information. Level 3 BIM Maturity is expected when a holistic application of BIM is needed for the creation and long-term care of critical assets. (PAS 1192, 2014)

3. Level of Complexity of Data Needed

BBCL recommend that the degree of complexity of data needed for Project 5010 is a Level of Detail (LOD) and Level of Information (LOI) rating of between 200 and 500, depending on the individual system and the client requirements. (Cohesive, 2024)

For further explanation of Level of Detail (LOD) and Level of Information (LOI) in general and in relation to the BBCL proposal please refer to Appendix 2.

4. Managing - Coordination, Information Sharing and Goals

Managing informational needs and goals as Project 5010 progresses would be via a detailed BIM Execution Plan (BEP). (Mordue, 2016),

The BBCL Bid included a Project Implementation Plan that detailed not only experience, competencies and capabilities but also sets the post contract award BIM Execution Plan and maps how it is to be produced.

A summary of the content of the BEP, is attached as Appendix 3.

5. Whole Life Monitoring of The Asset

The ability for NPTCC to apply Whole Life Monitoring to Project 5010 will be provided via the aforementioned BBCL BIM Execution Plan.

BBCL will be applying the Construction Operations Building Information Exchange (COBie). COBie is a non-proprietary data format for the publication of a subset of BIM, it is focused on delivering asset data as distinct from geometric information. This format would be complied by BBCL using our BIM Software package; Autodesk Revit. (Revit, 2024)

The COBie and BIM software (Revit) is integrated with and will feed data into the Computer Aided Facility Management (CAFM) software; FMS (FMS,2024). This will enable the asset manager to plan, execute and monitor all activities involved in reactive and planned preventative maintenance, space and move management, asset management, operational facility services, room reservations and other customer services. For further detail see Appendix 4.

6. Appendices

Appendix 1. BIM Maturity Explained

There are 5 different levels of BIM maturity: (BSI, 2024)

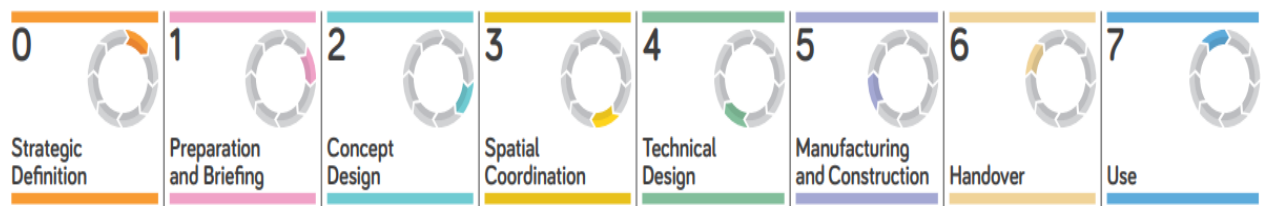
Level 0	Very basic level of 2D CAD design, at this level, the design would be limited to a rough sketch, with no accurate dimensions and no collaboration.
Level 1	More detailed design incorporating both 2D and 3D to create concept work for draft purposes. Data is shared electronically via the Common Data Environment (CDE) but no collaborative work.
Level 2	Individual, trade specific 3D models are made and there will be a federated model at this stage. Data is exchanged and design is collaborative.
Level 3	Design is fully collaborated between all trades within a single federated model, held in a commonly accessible location for all to use.
Level 4	Encompasses all of level 3, but includes such concepts as wellbeing and social outcomes. However, this is not commonly used.

Appendix 2. Complexity of Data Needed

The Level of Detail (LOD) and Level of Information (LOI) refer to the level of complexity of the data and information.

LOD pertains to the complexity of graphical and geometric data, and is categorised into progressive stages from LOD 100 (conceptual) to LOD 500 (as-built). While the LOI relates to the different levels of complexity of non-geographical data such as model numbers of items. As with LOD, LOI levels provide a clear framework for sharing information. From LOI 100 (no information) to LOI 500 (full information). These classifications aid in aligning expectations, streamlining communication, and fostering collaboration among architects, engineers, contractors, and facility managers. (Cohesive, 2024)

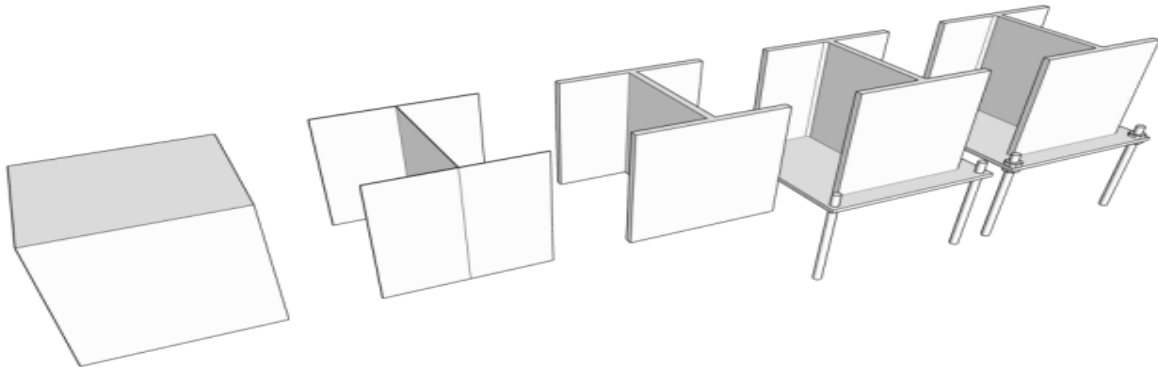
The LOD and LOI will be developed throughout Project 5010, in correlation with the RIBA Stages. This is to say, for example, that there will not be detailed, finalised design until the manufacturing stage. RIBA Stages: (RIBA, 2024)



The table below is an example explanation of how BBCL will apply LOD LOI using a building item that can take multiple shapes, such as a steel beam column:

LOD/LOI	Stage	Example (steel beam column)
100	Concept Design	The beam would be a simple box.
200	Schematic Design	The beam would take on the simplified correct shape, e.g. T beam or L beam.
300	Detailed Design	The beam would have its exact profile.
350	Construction Documentation	The beam would include connection plates, bolts, anchors etc.
400	Fabrication & Assembly	The beam would even include washers and nuts at this stage due to its detail.
500	As-Built	The beam would be altered, if necessary, to include any changes that occurred during the installation phase. Information only available after fabrication and installation such as serial numbers will be included

This increase in complexity (LOD/LOI 100 to 500 from left to right) of the steel beam is demonstrated graphically below: (Cohesive, 2024)



BIM LOD and LOI levels commonly run adjacent to each other, however; different items can have different levels of each depending on project needs.

With Project 5010, being a school build, BBCL recommend that the most important areas of the build will be to LOD LOI 500.

Ultimately, not everything has to be designed to the same level; items such as the walls, roofs, floors and foundations may be designed to LOD 500 in anticipation of any future structural repairs or alterations such as extensions. However, for items such as false ceilings or lighting positions, the design is taken to LOD and LOI 300, as knowing the exact information is not necessary and as such, accurate positional representation in the BIM model would be enough.

Safety and sanitation facilities such as fire alarms, toilets and the boiler(s) should have a schematic model design (LOD 200) but have all information possible entered in to LOD 500 standard of information, to make maintenance and replacements as minimally disruptive as possible.

Aside from this, there is little need for highly detailed modelling or information, basic item information such as its dimensions, product name or type and it being in the correct location would suffice, as contained in LOD 300.

The key is to mix and match to suit the project needs and not create too extensive of a model or overload the CAFM system with intricate designs and extensively detailed information that is not needed and will not be used. It should be noted that despite the recommendations of BBCL, at handover the client will have ultimate control over the LOD and LOI.

Appendix 3. Summary of the BIM Execution Plan

BBCL will create a Post-Contract BIM Execution Plan (BEP) for Project 5010.

The BIM Execution Plan, a dynamic document, will outline how the project team will use BIM workflows, tools, and techniques to achieve the desired project outcomes. It will include details such as the roles and responsibilities of those involved, the timeline for the project, and the deliverables that will be produced. Furthermore; the deliverable strategy will include, templates, tolerances and information on annotative data such as dimensions or abbreviations. It will also include details of software versions.

BBCL wish to highlight that BIM is a very intricate process that is difficult to carry out effectively if not managed correctly, therefore placing vital importance on collaboration and communication, this is the best way to keep the process moving on track.

In order to close the loop of management and ensure the BEP is being properly executed BBCL propose three separate weekly calls on this project in regards to the development of the project:

- **Every Monday**, there will be a coordination meeting, aimed at encouraging communication and the cooperative and adaptive design of subcontractors in order to pre-empt issues such as clashes further down the line.
- **Every Wednesday**, there will be a clash detection meeting. The purpose of this would be to look at any major model clashes and work together to decide on the best course of action, i.e. who is best placed to make alterations to their design with minimal knock-on effect.
- **Every Friday**, will be reserved for a short meeting without agenda, focused on encouraging open communication and collaboration. Any issues from that week or concerns for the week to follow are to be voices to fix problems before they materialise and become more difficult to resolve down the line.

For the purposes of information sharing, firstly, there are the aforementioned meetings, secondly, the federated model will be updated in real time whenever updates are introduced, and because all parties have constant access, all parties will have the latest and most up to date information. Furthermore, BBCL will also look to provide a Common Data Environment (CDE) in the form of a cloud-based server, to which all parties will have access. The CDE will contain project specific files and information, for example the federated model, asset registers and technical documents such as hydraulic calculations. CDE's are vital for project efficiency and information sharing, as parties can find information in one place and update the live document, rather than documents being traded between disciplines and people working on outdated, superseded documents.

Appendix 4. Whole Life Monitoring

NPTCC has expressed a need for Whole Life Monitoring (WLM) to be achievable from Project 5010. The BBCL BEP will ensure the necessary complexity of data is captured to enable this. WLM is a qualitative and quantitative process that looks at the costs and outcomes during the design, construction, operation and disposal stages for a built asset, via the appraisal tool (CAFM) software (FMS,2024).

Data is collected using the COBie standard, it was created by the US military but can be referenced via the international standard ISO 16739 (ISO16739, 2018). BBCL will collate a detailed Construction Operations Building information exchange (COBie) file. Using the extension within the BIM Software package; Autodesk Revit. (Revit, 2024), it will automatically create a real time, live COBie document. The COBie and BIM software (Revit) is integrated with and will feed data into our Computer Aided Facility Management (CAFM) software.

The information compiled within COBie, alongside the finalised federated model will allow for access to any information needed. Furthermore, if there are any repairs, replacements or other future works that change the location, item used or any other information, if this is changed within the model, it will also update within the COBie file, meaning less complicated procedures to facilitate updates and changes.

The LOI provided by BCCL will include warranty start and end dates as well as maintenance information and logs within the live COBie file, making hard copies redundant as all information will be stored, accessible and updateable from one centralised digital location. Furthermore, the Level 3 BIM Maturity that is recommended will give NPTCC facility management teams the clarity of information that is needed for as seamless of a transition into building use as possible. All necessary information will be in place and accessible via the CAFM software upon handover without having to finalise or add in any additional information.

Information relevant to the operation and maintenance of the school will be included within the document. The COBie information fed directly to the CAFM software is completed as the stages of the project progress in line with the RIBA stages. Therefore, it is ready to use as soon as the project is completed.

III. Conclusion to Assessment

The functions and processes of the BIM environment create a modern holistic approach to the lifecycle of an asset, from its conception at early planning stages (and even at the financing stages of the WGSCLP in this case), through to its death at demolition.

Like all technology-based systems BIM improves at a substantial rate, it is indeed a complex environment that keeps growing. The BBCL letter has attempted to demonstrate an understanding of these complexities and hopefully in providing a recommended approach has demonstrated an appreciation of the functions and processes needed to manage the life cycle of a built structure.

What is clear is that the BIM environment already provides a joined-up approach, in setting maturity requirements, defining the complexity of data needed, employing structured management plans and considering the whole life of the asset. Even more impressive is how the progress of technology is allowing all of these functions and processes to be integrated, thus avoiding the duplication of effort that the construction industry is renowned for.

Despite all of this interdependency there remains enough flexibility to tailor the BIM environment to specific needs.

IV. References

References (accessed January 2024, in alphabetic order)

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