



**10 January 2024**

Neath Port Talbot County Council,  
Philip Schoeff,  
12 Rainy Sunny Ave, SA13 5HD.

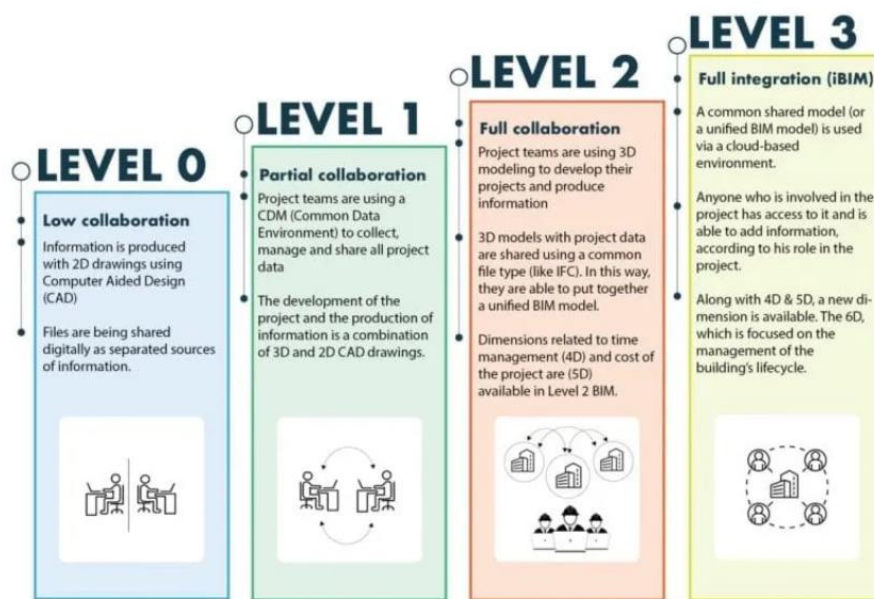
*RE: Direct information and procedures regarding the 'state of the art' infant school.*

Dear Mr. Schoeff,

I am writing to express how Building information Modelling (BIM) plays a crucial role in modern day construction. In essence, BIM integrates multi-disciplinary data to generate a detailed digital representation of the project; that can be used and managed for real-time collaboration. Therefore, BIM is essentially a shared platform that can be facilitated as a reliable basis for decision-making throughout its lifecycle, from the design and construction to the operation and maintenance. Furthermore, its ability to enhance and engage collaboration, streamline information management and its improved decision-making processes has undoubtedly made BIM an indispensable tool for modern day construction projects.

On the contrary, BIM can be distinguished into four distinct levels and is commonly described as 'milestones' for determining the level of BIM adoption in a specified project.

The range of BIM maturity levels can be visualised in the table below:



BIM Maturity Levels Elaborated (source: biblus)

(Source: Biblus, 2019)

To put it simply, level 0 represents a low level of collaboration with no inclusions of BIM at any phase of the building's lifecycle. During this stage, information management within a project will only occur with traditional methods such as manual documentation and 2D CAD drawings. Due to the lack of integration between project phases, it can significantly increase the potential for errors and reworks where cost savings and project outcomes are also limited as there's simply no way of being able to seamlessly access and share information throughout Level 0.

On the other hand, BIM level 3 is the most advanced stage out of the BIM maturity levels. All construction professionals involved in the project can simultaneously work in a given shared model space; which will ultimately eliminate the chance of conflicting information through a shared workspace. "At this level, building information is used to plan for future maintenance, cost savings, upgrades, or expansions and to make energy-efficient decisions. By removing the barrier of sharing information between project teams through interoperability, Level 3 BIM opens the opportunity of connecting the entire construction chain with the integration of 6D (sustainability) and 7D (facility management) data – all focused on the building's entire lifecycle." (Machon, 2022)

In order to achieve the scope and vision of BIM level 3, following the '*UK Government in Level 3 Strategic Plan*' document will help properly implement BIM level 3. This valuable document helps define how information will be shared, coordinated and managed for the duration of the scheme and into the operational stage.

#### How information will be shared, coordinated and managed

Simply put it, efficient and effective information sharing is a cornerstone for successful BIM implementation. For this project, a robust information sharing strategy will be introduced to accommodate seamless communication amongst stakeholders. There's a massive emphasis on the importance of maintaining data integrity and accuracy and therefore a computer aided facility management system (CAFM system) will be introduced to help monitor the life cycle of the asset, as suggest in the description. This cloud-based system will be employed to establish real-time access to the project data, cost control, regulatory compliances and most importantly central access to the information amongst all members involved in the project. A common

data environment (CDE) will be implemented to serve as a centralised repository for project information. Regular updates and synchronised protocols will be established to ensure the longevity and integrity of the shared information remains intact throughout the project's lifecycle. "When BIM and CAFM software are integrated, facility managers and other stakeholders can collaborate more effectively. For example, a maintenance team can access BIM models to understand the layout of the infant school and the location of equipment, while a design team can use CAFM software to review maintenance requirements and plan upgrades." (Prasad, A., 2023)

Managing information effectively can be achieved by implementing a structured data management plan and a classification system. Additionally, being compliant with standards such as BS1192; in providing BIM drawing numbers and other crucial naming conventions is crucial. On the other hand, integrating Metadata can help summarise basic information and help find specific data easier. To ultimately introduce a lucid information lifecycle management process to the project, the factors discussed above must be in cooperation and shared under a CDE. This will not only streamline the flow of information during the project, but it will also set the very foundation for efficient BIM facility management during the operational stage.

By providing a shared platform, clash detection tools will be utilised to be able to identify and resolve any potential conflicts during the design and construction phases before materialising on-site. Additionally, regular coordination meetings will be pro-actively scheduled to discuss and manage any emerging issues and to ensure the project continues to progress smoothly. All these factors lead to transparent communication by promoting collaboration and reducing the risk and delays associated with traditional methods of communication.

#### The use of BEP

Introducing a BIM Execution Plan (BEP) to deliver 'a state of the art' infant school is an imperative document that outlines how a BIM project will be managed, executed and delivered on time. BEP will not only define the foundational framework for the proposed project, but it will also ensure that all stakeholders are on the same page from the offset of the project. A well-developed BIM execution plan will include:

- Strict project timelines
- Clearly defining expected roles and responsibilities
- File naming conventions
- Data transfer management
- BIM iteration management

"In accordance with international ISO 19650 series, the prospective lead appointed party should produce a pre-appointment BIM execution plan (pre-BEP) to demonstrate the delivery team's proposed approach and the relevant information management competencies, to meet the exchange information requirements (EIR)." Simply put it, BEP outlines the required steps throughout each phase of the project by providing clear measures and guidelines in ensuring that the project remains on time and within budget. Project managers can input these detailed levels to effectively manage and programme the construction operations. This will ultimately reduce any possible cost overruns and risk delays for the 'state of the art' infant school. (CDBB, 2019, P. 9)

#### LOD and LOI

To achieve a successful project outcome, it's crucial to identify and meet the information requirements for you, the client. This can be achieved by employing the Level of Development (LOD) and Level of Information (LOI) formats. This will be covered through the Royal Institute of British Architects (RIBA) stages, by providing examples to illustrate each phase of the proposed project. Understanding how the client's level of information evolves during each stage is imperative for architects and other important construction bodies to deliver projects auspiciously.

Before enriching into the meticulous information, it's vitally important to establish a foundational understanding for the definitions of LOI and LOD. LOI helps define the extent to which each element is described beyond its visual representation (non-geometric information), encompassing attributes like criteria, maintenance and performance. On the other hand, LOD can be best described as the overall state of the model (in a graphical/ geometric form) at a particular point in the design process. For example, at the beginning of the project, the school building will be presented in a schematic form (solid objects) and represented as a conceptual model. However, as the RIBA stages progress, the school building will eventually develop a significant amount of information to be able to reflect actual construction.

Therefore, LOD formats are typically divided into stages as the project progresses, ranging from LOD 100 (as a conceptual model) to LOD 500 (as-built model). LOD 100 would represent the "pre-design stage where the model would consist of 2D symbols and the masses to signify an element's existence. By LOD 500, the Model Element is a field verified representation in terms of size, shape, location, quantity, and orientation." On the other hand, LOI extends from LOI 0 (indicating a lack of information) all the way to LOI 5 (which evidently contains an exhaustive amount of detail). (Victor, L.,2022)

### Adopting LOI and LOD formats throughout the RIBA Plan of Works

#### ★ Stage 0: Strategic Definition

From the offset of the project, the client's level of information will mostly consist of the broad concepts, overreaching goals and aspirations for the 'state of the art' infant school. Thus, LOD will undoubtedly be at its lowest, sitting at around LOD 100. However, to envision the future of the infant school, visualisation tools can be utilised to convey the possible design intents and potential appearance. On the other hand, LOI would also be minimal, focusing mostly on the project parameters and constraints such as the building's purpose, project timelines, design directions and the projects budget.

*Example:* Given the scale of the 'state of art' school, architects will adopt basic massing objects (LOD 100) to help visualise the spatial qualities; whilst also establishing basic project deadlines and cost estimates (LOI 2).

#### ★ Stage 1: Preparation and Brief

During this stage, it's vital that the client's level of information becomes clearer and more refined, providing a more detailed model with regards to approximate quantities, location, orientation, size, shape and measurements. Furthermore, confirming and establishing the client's main priorities and vision for the project is a high-level requirement for this stage. Additionally, as the LOD increases throughout this stage, the LOD will moderately increase from LOD 100 to LOD 200. Moreover, LOI will also develop by establishing further levels of information with regards to the suitable materials, structural systems and rudimentary sustainability considerations.

At the end of this stage, the information exchange should include:

- A Project Brief
- Feasibility Studies
- Site Information
- Project Budget
- Project Programme
- Procurement Strategy
- Responsibility Matrix
- Information Requirements

(RIBA, 2020)

*Example:* As the client and architect work collaboratively, developing designs to LOD 2 can help decide on systems for example a HVAC system. This might be represented as a set of block models for the plantroom locations and distribution risers. “As an educational facility, it’s important to choose HVAC systems with the pupil’s wellbeing at the forefront. Additionally, as LOI advances, adherence to cost, funding and financial aspects too”. (Biddle, 2022)

★ Stage 2: Concept design

The concept design stage reflects a notable advancement in LOD, extending to LOD 300 or higher. Additionally, design concepts adopt a more tangible form, mirroring the evolving vision for the project at a greater level of detail. Furthermore, carefully integrating feedback from stage 0 (preparation and brief) can help refine the design concepts and delve into further variations based on the clients demand for the infant school. Additionally, beginning to fully quantify the spatial requirements by confirming the brief for the technical design stage will help provide a suitable visual representation of proposals.

As the LOI continues to develop, enriching on further levels of information based off the key design features, preliminary performance criteria, spatial relationships. The LOI will increase to LOI 3. This stage will showcase the initial sketches, 3D visualisations and mood boards as illustrative representations of the concept designs. By developing and sharing information amongst all professions, beginning to establish feasibility will occur through providing rough cost estimates where a quantity take-off will be aligned with the financial expectations outlined by Neath Port Talbot’s County Council budget.

*Example:* Collaborative working between trades (MEP, Structural and Architect), incorporating more definitive information with regards to the interior layout, quantity, materials and the mechanical systems installed throughout the infant school. This is fundamentally built upon the massing models constructed in the earlier stages of the project.

★ Stage 3: Developed Design

Fundamentally, as the phases develop the LOD and LOI will also increase from LOD 300 to LOD 400 and LOI 3 to LOI 4. Throughout the developed design stage, the LOD becomes significantly noticeable, offering a comprehensive portrayal of the proposed project. Further development amongst the design team will provide fixed principles of the design that’ll support the procurement route taken. Graphical depiction of the system, accurately to scale; will help convey the primary performance characteristics. “Ultimately, refining the design concept, ensuring compliance and preparing the necessary documentation for the next stage (Technical Design Stage) is crucial.”. (Tekla, 2024)

★ Stage 4: Technical Design

During the Technical Design stage, LOD attains the vertex of LOD 500, closely mirroring the final as-built project. In similar fashion, LOI reaches its pinnacle, evolving from the comprehensive technical details which include; the fabrication intricacies, specifications and maintenance prerequisites. As the LOD reaches its zenith, continuous development and coordination amongst the design team should reflect the main components of the project model and address any technical challenges. Any performance related work must be addressed, where suitable information for applications for statutory approval are to be successfully completed.

Additionally, errorless clash detection should demonstrate precise dimensionally accurate graphical representation of the model, which indicates primary performance characteristics. In context of the RIBA framework, “the core documents at the start of Stage 4 are the Responsibility Matrix, the Information

Requirements and the Stage 4 Design Programme, which is heavily influenced by the Procurement Strategy. Once the client is satisfied with the technical design, as the lead consultant, freezing both the design and specifications to introduce a change in control procedures and remaining statutory approvals and other approvals should be completed.” These important documents include highly detailed models at LOD 500, engulfing in exhaustive technical information which include the construction methodologies, accurate material specifications and maintenance guidelines, denoted as LOI 5. (DesigningBuildings, 2021)

*Example:* Furthermore, the LOI during this stage consists of sharing in-depth technical information that’s sustainable for both regulatory compliance and construction. This will include project strategies, construction schedules, detailed specifications and any further modes of documentation. Given the scale and intricacies of the ‘state of art infant school’, discussions are held to explore potential implications by adopting pro-active solutions to effectively address issues within the technical design framework.

#### ★ Stage 5: Manufacturing and Construction

During the Construction stage, LOD continues to remain at LOD 500 as the focus centralises to executing the design. Despite remaining at LOD 500, LOD continues to operate in monitoring the construction progress by addressing any unforeseen issues that may arise. As quality is undoubtedly one of the main priorities for the ‘state of the art’ school, careful adherence to quality measures will be taken place at this stage to ensure the project aligns with the specification of the project (LOI 4). For example, as the lead consultant, “making sure the Architect attends regular site visits to oversee the construction process, ensuring that the project stays true to the design intent and adheres to quality standards is crucial. By doing regular site visits, Architects can monitor progress, identify and address any issues that arise, and maintain clear communication with contractors, engineers, and other stakeholders.” In essence this will illustrate the competency of the project team in reaching the BIM Maturity requirements for the project. (SiteCam, 2023)

On the other hand, while LOI is still important, it becomes more operational, quality assurance protocols, detailing construction sequences and like LOD, addresses any unforeseen challenges during construction. This will be achieved by providing real-time information and support from on-site decision-making. Collaboratively sharing progress reports and updates on the project timeline is crucial, where responding promptly to requests for modifications and clarification is fundamentally just as important.

*Example:* As the architect works closely with the contractors to construct the infant school, providing detailed construction documentation (LOD 500) and any further additional information to ensure correct implementation, such as quality control measures, construction sequencing and any necessary modifications (LOI 4).

#### Stage 6 and 7: Handover and Use

Hand over and use stages, marks the eventual conclusion to the project. As LOD continues to remain at LOD 500, reflecting the as-built conditions. LOI transitions from pre-construction information to post construction information (LOI 5). This information will include the operation and maintenance manuals, the as-built drawings with any further modes of information that the Neath Port Talbot County Council requires to control the facility.

Therefore, correctly employing LOI and LOD formats can provide a well-structured approach to be able to address the evolving needs of the client and by ensuring that the information shared throughout the stages aligns with the project’s maturity. Through successful execution of the RIBA Stages, construction professionals

involved within the project can tailor their communication and deliverables to foster a collaborative and lucrative project outcome.

Sincerely,

Jeremey Philosophing, Richard HersheW, Steven HersheW and Clarke HersheW.

Please reply to this email through my consultant partner James HersheW,

JamesHersheW42@hotmail.com

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