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Dear Sir / Madame,

I would like to thank you for the award of this project to my company through the 21st century school's framework. We are delighted to be working on this project and look forward to seeing it through till its completion.

As per our tender document and agreed with the Welsh Government under the framework requirements, BIM Level 2 will be included within this scheme and will enhance the design process dramatically through its collaborative process.

"BIM is a collaborative way of working underpinned by digital technologies. It uses a shared digital representation of an asset to facilitate design, construction, and operation processes to form a reliable basis for decisions. Greater efficiencies can be realised due to significant pre-planning during the design and construction phases, providing comprehensive information at handover stage." (Little Book of BIM 2021)

BIM Level 2 consists of true collaboration mindsets and processes (not software) to produce a design which will meet all parameters, with minimal mistakes, whilst utilising all the design team's unique skills at once. BIM Level 2 is further defined as "developing building information in a collaborative 3D environment with data attached but created in separate discipline models" and how information should be created, shared, and managed.

The processes necessary to achieve level 2 BIM are set out in:

- PAS 1192-2 Specification for information management for the capital/delivery phase of construction projects using Building Information Modelling. (Now replaced by BS EN ISO 19650)
- PAS 1192-3 Specification for information management for the operational phase of construction projects using building information modelling.

EDM Dragon Consultancy has undertaken 4 separate education projects which have required BIM Level 2 and we fully understand our requirements, duties, and responsibilities. Full collaboration through linked models, design sessions and shared information portals will be utilised to ensure that the specification of BIM Level 2 is met, and the project is fully optimised.

An internal system known as "OneMind" will be utilised by all design team members, internal and external to EDM Dragon Consultancy to ensure that everyone receives the same information, in the same format, at the same time. This ends with miscommunicated information, reduced wait times between companies and mitigates tangents.

I hope this information helps expand your understanding and I look forward to working alongside you in the years to come.

Finally, as requested by yourselves, a BEP has been created for the scheme. Please review the BEP (BIM Execution Plan) to the rear of this letter for full details.

Yours Faithfully,

Ellis Moore

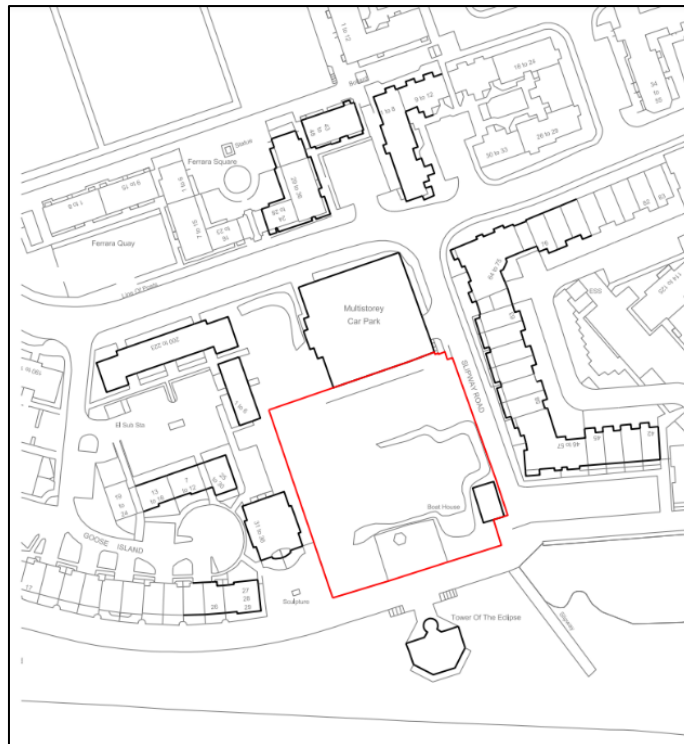
Head of Projects Design
EDM Dragon Consultancy Limited

Ysgol Bae Abertawe (YBA)

Draft BIM Execution Plan (BEP) - 5010-EDMDC-XX-XX-SP-Z-0001



EDM Dragon Consultancy (EDMDC)



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1.0 Project Information

1.01 BIM PROJECT EXECUTION PLAN OVERVIEW

To successfully implement Building Information Modelling (BIM) on a project, the project team has developed this detailed outline BIM Project Execution Plan (BEP). The BIM Project Execution Plan defines uses for BIM on the project (e.g. design authoring, cost estimating, and design coordination), along with a detailed roadmap of the process for executing BIM throughout the project lifecycle. It is essential that the project team comply with the requirements of the BEP to support the successful delivery of the Employers objectives in relation to the BIM requirements.

The BEP is structured in accordance with PAS1192-2:2013 with reference to BS1192:2007+A1:2015 but also includes variations to suit the specific project agreed BIM requirements (also known as EIRs (Employers Information Requirement's) (Assumed at this stage).

1.02 BIM MISSION STATEMENT

EDMDC set out to develop BIM Level 2 from the outset of a project for this to inform the design development, coordination, quantity take off, sequencing, and hand over information for this project reflected in the Scope of Services of the project.

The BIM model will be a collaborative model assembled and validated to a level of detail suitable for construction requirements. The model will contain sufficient coding and information to produce drawn elements of the contractor's proposals information for construction and project handover.

The model will also include standard and predefined coding fields ultimately for facilities management and lifetime records for the building(s). Any deviation from this procedure must be agreed with the EDMDC BIM Management Team before being undertaken.

1.03 PROJECT INFORMATION TABLE

This section defines basic project reference information and determines project milestones.

Project Owner	Swansea County Council / Welsh Government
Project Name	Ysgol Bae Abertawe (YBA)
Project Location and Address	The Slipway, Maritime Quarter, Swansea
Contract Type	NEC 3 Option A, Traditional Contract
Brief Description	1 form entry infant school for 90 pupils

Constraints / Key Items	The site plan attached, shows the proposed location of the school adjacent to the existing observatory within the residential district south of the Maritime Quarter in Swansea. There are remains of warehouse retaining walls and foundations on the site which are to be removed. The boat shed and sculpture on the site are to be demolished. The school is to be single storey though the hall space should be double height. Schedule of accommodation at BB99 opposite. Each classroom should have access the outside. Car parking for 5 vehicles including 2 disabled bays Drop off point for deliveries and minibuses. Hard surface playground Soft landscaped playground
Project Timescales	Yet to be fully agreed with the client. EIRs to be issued before confirmation of timescales can be stated.

1.04 COSTING

Cost is yet to be defined by the client but as per the 21st century school's framework, the project should equate to £2,000.00 per m² at the conclusion of the scheme. This information is vital for the design team as all designers must be aware of their restraints.

1.05 INFORMATION REQUIRED BY THE CLIENT TO PRODUCE A PROVISIONAL EIR

PAS1192-2:2013 Clause 5.3 defines the minimum contents of the Employers Information Requirements.

1.06 Co-ordination and Clash Detection

Required in response to the draft EIR by PAS1192-2 Clause 5.3 a) 4). This section of the BEP contains the projects proposals for managing the co-ordination process. The requirements for co-ordination are stated in PAS1192-2 Clause 9.4.

The model will be used for coordination and interference detection and will be central to the design review process. The following applications will be utilised:

- Autodesk Revit for day-to-day coordination checks between models.
- Autodesk Navisworks Manage for clash detection.
- Revizto for Markups and issue Tracker (Licenses will be provided for Revizto, 1x per BIM originator Company)

All design team members are to take responsibility for ensuring they have taken the necessary steps to coordinate and resolve clashes before uploading the models for review by the Design Team Lead within the associated firm (EDMDC) and the client's agent. The Design Review sessions (which are utilised across the industry) will be implemented as a means for project team members to highlight any areas of risk that may need auditing of the models for any undetected clashes by EDMDC.

1.07 GENERAL PRINCIPLES

Several methods exist which enable collaborative working in a BIM environment, including working practices and team management, as well as the technological solutions covered by the remit of this document. The terminology refers primarily to the Revit subjects of Worksets and Linking both of which are referred to herein as Model Sub-division. The following sub-division practices shall be followed:

- The methods adopted for data segregation shall consider and be agreed by all internal and external disciplines to be involved in the modelling. This will be agreed at the BIM Kick Off Meeting.
- Models shall initially be created as isolated, single-user files. The model will be sub-divided as it becomes larger or additional members of the design team are introduced. Where a large project is to be undertaken and it can be reasonably assumed that, based on previous experience, the model files will exceed 50MB a methodology by which to split the model into parts from the outset will be described to avoid any abortive work associated with retrospectively splitting models.
- No more than one building shall be modelled in a single file.
- A model file shall contain data from one discipline / project stakeholder only (although exceptions may apply for Building Services where multiple disciplines converge).
- Further segregation of the geometry may be required to ensure that model files remain workable on available hardware. Files shall not exceed 300MB.

2.0 Management

2.01 COMPLIANCE PLAN

The coordination process is to be managed in accordance with the requirements of PAS1192 part 5.3 a) 10). This section of the BEP contains the projects proposals for managing the co-ordination process. EDMDC will check all models received by the task team members to ensure their integrity and compliance with BIM protocol, process and standards set. The project will consist of federated models for each building comprising of individual discipline models.

2.02 TRAINING

Adapting to the advantages BIM offers requires investment in staff, the supply chain, processes, and technology. EDMDC recognise this and are fully committed to the training and investment of all our employees. We have the necessary training arrangements in place to ensure clients, employees and supply chain have sufficient skills and understanding to implement and deliver projects in accordance with the policy and procedures established to achieve Level 2 BIM Maturity. The compiled Design Team are introduced to our BIM Management documentation prior to and during the project BIM Kick-Off Meeting and are guided as to how to correctly implement BIM throughout the project. In addition to the above, EDMDC also offer training on specifics such as Viewpoint for Projects and Navisworks (when requested by the Design Team).

The proposed Training Schedule is for implementation of our tools across the team can be summarised as follows.

- Client 'What is BIM' Presentation. (Simple breakdown of what BIM is and what it entails for a project, pre and post construction)
- BIM Implementation Plan Workshop (BEP, Protocols, Standards and Audit documentation)
- Revit Training (To facilitate regular BIM reviews)
- CPD sessions will be undertaken with all staff to give basic competency knowledge to all staff members, designers or otherwise.
- EDMDC Document Management System (Viewpoint for Projects),
- Advanced BIM courses, equivalent to Level 7 (Masters)
- Chartership (if applicable)

NOTE: This will exclude training on any BIM Authoring Software such as Autodesk Revit / AutoCAD / Navisworks.

2.03 BIM MODELLING GOLDEN RULES

General:

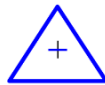
- Model file data must comply with all sections of the EDMDC BEP
- The EDMDC BIM Model & Drawing Validation Checklist Template must be completed
- Individual BIM Files must not exceed 300MB
- Federated BIM should not exceed 300mb (Federated IFC'S)
- Model file data must be located at the agreed origin & orientation as identified within the BIM Project Execution Plan.
- Model files must be audited/purged/compressed prior to issue.
- 2D construction lines are such that their visibility control can be isolated.
- Model file format(s) shall be in accordance with BIM Standard and Project Execution Plan.
- Model file naming convention shall be in accordance with BIM Standard and Project Execution Plan.
- Model file zone/system strategy shall be in accordance with BIM Standard and Project Execution Plan.

3.0 Planning and Documentation

3.01 BIM MEASUREMENT AND COORDINATE SYSTEMS

To ensure a coordinated Design, a chosen Coordinate System needs to be utilised through the project, it is defined as the agreed coordinates below: The information used as the coordinates for the location of this project has been taken from the internal design collaboration agreement (pending approval). Please see an extract from this internal document below.

Point	Position	E Coordinates (mm)	N Coordinates (mm)	Angle to True North
Project Base Point		265976.9	192364.7	19.2

Project Survey Point		265976.9	192364.7	19.2
Scale:	1:50 Scale (Viewpoints may vary)			
Units	All 3D Models and Associated 2D drawings / views will be generated in Millimeters .			

3.02 INFORMATION MANAGEMENT PROCESS

This standard helps ensure better information management and establishes the methodology for managing the production, distribution and quality of construction information. This includes that generated by CAD systems, using a disciplined process for collaboration and a specified naming policy. BS 1192:2007 helps in the implementation of a structured collaborated environment and a standard structured compliant configuration. A PIM must also be utilised for the project and follow all conventions of this BEP.

The standard highlights that the following elements should be in place:

- Roles and responsibilities should be agreed
- Naming conventions should be adopted
- Arrangements should be in place to create and maintain the project specific codes and project spatial co-ordination.
- A "Common Data Environment" (CDE) approach should be adopted to allow information to be shared between all members of the project team, for example a project extranet or electronic document management system.
- A suitable information hierarchy should be agreed that supports the concepts of the CDE and the document repository

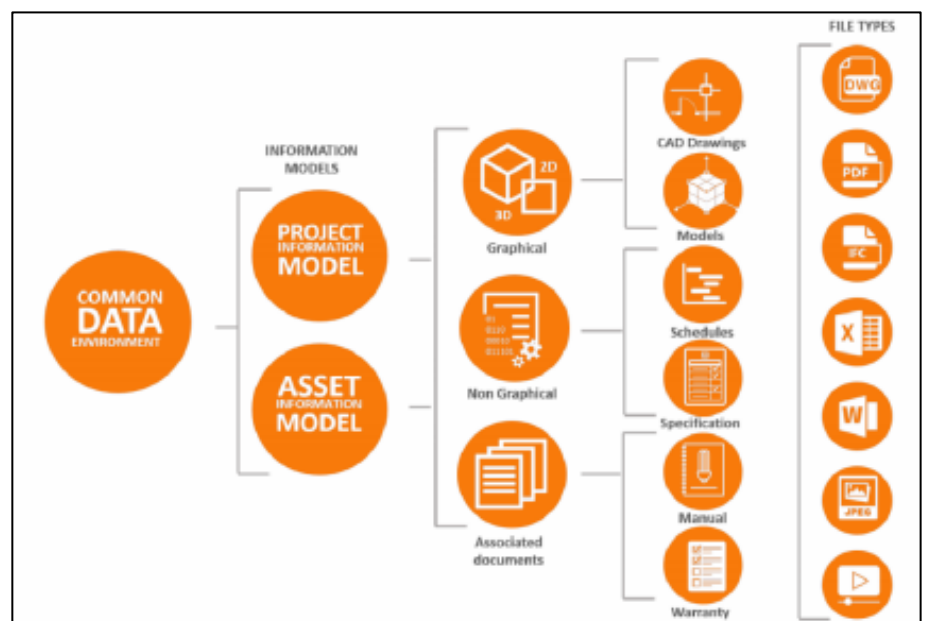
The establishment and effective management of the CDE is key to this standard. The standard advocates a standard folder structure to define 'WIP', 'SHARED', 'CLIENT SHARED AREA' and 'PUBLISHED' as illustrated in the diagram from the BS to the below.

The CDE facilitates the exchange of information by creating a standard process for:

- File sharing
- File Management Procedure
- Recording Input / Output

3.03 Collaboration Process

Required in response to the (yet to be submitted) EIR by PAS1192-2 Clause 5.3 a) 5).



The form of sharing that will be for the Information in the CDE, for data transfer will be a secure Project Extranet in the form of 'Viewpoint for Projects' (4P) and 'OneMind' (as a backup drive). These will be the project Teams CDE before information issue to the Employers portal. The frequency of full collaboration will be bi-weekly and set out in the Design Programme and through prearranged meetings and workshops.

4.0 Standards, Methods, and Procedures

4.01 BIM Level 2 Standards,

- BS 1192:2007 + A2:2016, (Collaborative Production)
- PAS1192-2:2013 , (Information Management)
- PAS 1192-5:2015 , (Cyber Security)
- BS8541-1 BIM Object Naming & Classification, (Including COBie & .IFC Requirements) e.g. <Source>_<Type>_Subtype> (NBL_LightFixture_CeilingPendant)
- BS1192 CAD Layer Naming , (Refer AEC (UK) Protocol for Layer Naming)
E.g.<Role><Classification><Presentation><Description*> (A-Uniclass Code-M_Door*)
- PD 19650-0:2019 – Transition guidance to BS EN ISO 19650.
- BS EN ISO 19650-1:2018
- Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM). Information management using building information modelling. Concepts and principles
- BS EN ISO 19650-2:2018 Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) -Information management using building information modelling. Part 2: Delivery phase of the assets.
- BS EN ISO 19650-3:2020 – Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM). Information management using building information modelling. Operational phase of the assets.
- BS EN ISO 19650-5:2020 – Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM). Information management using building information modelling. Security-minded approach to information management.
- BS 1192-4:2014 – Collaborative production of information. Fulfilling employer's information exchange requirements using COBie. Code of practice.
- PAS 1192-6:2018 – Specification for collaborative sharing and use of structured Health and Safety information using BIM.
- 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).

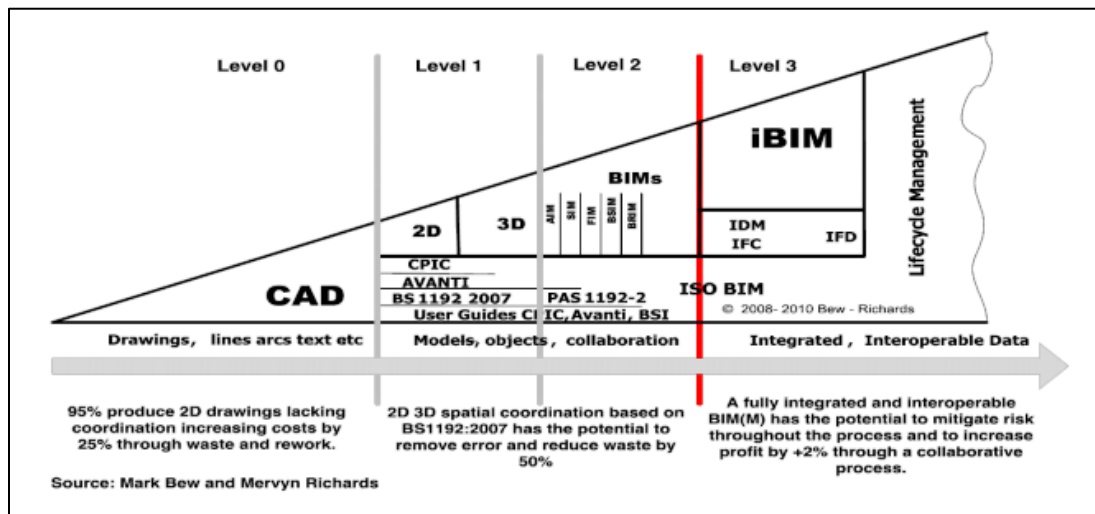
Additional international standards referenced in BSI BIM certification schemes.

- BS ISO 44001:2017 – Collaborative business relationship management systems. Requirements and framework.
- BS EN ISO 9001:2015 – Quality management systems. Requirements.
- BS EN ISO 55001:2014 – Asset management. Management systems. Requirements.

- BS EN ISO/IEC 27001:2017 – Information technology. Security techniques. Information security management systems. Requirements.
- BS ISO 10004:2018 – Quality management. Customer satisfaction. Guidelines for monitoring and measuring.

4.02 BIM MATURITY LEVEL

Below is an image of the 'Bew and Richards BIM Maturity diagram'. This shall be used as an indicator to prescribe the Level of BIM Maturity the design Team shall design to. The Design Team shall produce individual Building Information Models to Level 2 unless prescribed otherwise.



4.03 PROJECT MAJOR BIM GOALS / OBJECTIVES

The project is to be completed using a BIM implementation / processes and technologies to enable model-based approaches to support the following:

- Disciplined coordination of information / models /data and drawing sheets.
- Identification of conflict detection/review and provide a process to support coordinated resolution across multi-disciplines.
- Reduce construction delivery programme risk (both time and safety related).
- Incorporate COBie as required.
- Provide improved project management.

The table below details the core project wide BIM processes objectives along with an associated description and a list of the primary contributors.

BIM GOAL	DESCRIPTION	Objective:	COMPLETION RIBA STAGE (STATUS)
Design Development	Development of information rich 3D Models using parametric tools	Support reliable decision making, better quality design and improved understanding of design intent	End of Stage 4 (D3 & A4) Stage 5 (CR)
Automated Schedules	Development of automated production of all schedules.	To promote accuracy for other processes relating to cost, measurement, procurement and tracking	End of Stage 4 (D3 & A4) Stage 5 (CR)
Coordination/ Review/Conflict Detection	Use of conflict detection software during coordination process to determine and resolve conflicts by cross-checking multi-discipline 3D models	Informed decision making, improved understanding of design intent, enhanced team communication, reduce RFI's, Elimination of Site conflicts, Increase site productivity, reduce material waste and increased site safety	End of Stage 4 (D3 & A4) Stage 5 (CR)
As-Constructed Federated BIM Model & Uniclass 2015	Development of accurate As-Constructed BIM model to be handed over to client	Ensure accurate As-Constructed information (2D & 3D) upon Handover	End of Stage 5 (CR)

4.04 LEVEL OF DEFINITION

The PAS1192 defines the LOMD (Level of Model Detail) within degree to which the element's geometry and attached information has been thought through – the degree to which project team members may rely on the information when using the model.

4.05 CLASH DETECTION

EDMDC will provide a multi-discipline clash detection model to federate, audit and assist with the design coordination, providing both interactive and documented clash detection reports for issue back to the design team, using the processes stated within Section '9.4 Spatial co-ordination' of the PAS1192:2.

Utilising revtizo as the main collaboration tool but supported by Navisworks to setup and maintain the Clash-Detection Environment before uploading identified issues to Revizto to then be discussed and resolution actions captured. It will consist of all BIM models within the project and clash detection results and Digital Red Pen Markups.

4.06 LEVELS & LOCATION CODE

All BIM models are to contain only the levels stated and agreed within the full BEP document (which will be issues on pre-approval of the outline BEP document), and all BIM objects offset from those levels, this is to ensure a usable and understandable reference point.

NOTE: Any extra created BIM Levels contained within the BIM models will not be accepted and therefore will need amending to the required project stated levels

4.07 MODEL LIBRARY, FAMILY, SYSTEM AND ELEMENT NAMING GUIDANCE

Library objects are the Families or Parts which are applied to the Assembly and Component models. All BIM objects must follow a consistent naming convention, refer to BIM Level 2 requirements 'BS 8541-1' to logically "group" sets of similar objects in a hierarchical manner. These will include rooms, walls, columns and finishes etc.

Please see the table below showing how the naming conventions for each document should be set out.

Project	-	Originator	-	Volume	-	Level	-	Type	-	Role	-	Number
XXXX	-	XXX(XXX)	-	XX	-	XX	-	XX	-	X	-	XXXX(XX)

4.08 MATERIALS & FINISHES

All Materials and finishes will be applied within all BIM objects, refer NBS toolkit link:
<https://www.thenbs.com/knowledge/exploring-the-nbs-bim-object-standard-metadata-requirements>

4.09 DRAWING COMPILATION DRAWING COMPILATION

Drawing compilation and preparation for publication must be provided via a fully assembled compilation of views and sheets within the BIM environment. In the instance that it is deemed necessary by the consultant to deviate from this preferred method of working by for example, exporting views in the form of 2D output files for assembly and graphical enhancement using 2D detailing tools within a CAD environment, this must be first discussed and approved by the EDMDC Project BIM Coordinator.

4.10 VOLUME STRATEGY

Due to the project scale and current RIBA Stage, no volume strategy has been defined, as deliverables shall be denoted with the volume code 'ZZ' as defined within the file naming convention.

4.11 TASK INFORMATION DELIVERY PLAN

The purpose of this section is to confirm the production of the Task Information Delivery Plans.

For ease of readability the Task Information Delivery Plans (TIDP) have not been included within this document. TIDPs are available on request.

4.12 PROJECT TEAM BIM REPRESENTATIVES AND ROLES

This section of the BEP covers the requirements of PAS1192-2 Clause 7.2.1 a)

ROLE	Responsibility & Authority
EDMDC Project Delivery Manager	Assure Delivery of all Design information exchanges
EDMDC Construction Manager	Assure Delivery of construction
EDMDC Design Manager	Manage all the processes in relation to technical content on project information
EDMDC BIM Manager*	Assure Client BIM requirements are agreed and delivered
EDMDC BIM Coordinator**	Coordinate BIM use on project
Project Information Manager:	Enforce the project BIM standard and ensure delivery of the information requirements in the EIR (Employers Information Requirements) (Which are yet to be submitted for this project).
Lead Designer:	Coordinated delivery of all design information, enforce spatial coordination
Task Team Manager:	Production of design outputs related to discipline-specific, package-based or time-based take, enforce documentation standards
Task Team Interface Manager:	Manage and negotiate spatial coordination on behalf of a task team
Task Team BIM Coordinator***	Enforce project BIM & CAD standards
Task Team Information Managers:	Reject non-compliant models, drawings and documents
Task Team BIM Authors	Develop constituent parts of the BIM in connection with specific tasks/requirements. Model Owner

BIM Manager*:

Role corresponds specifically with the understanding and definition of the Clients BIM requirements within the outline EDMDC Project BIM Execution Plan (BEP), ensuring all required protocols, standards and associated BIM documentation are specified.

BIM Coordinator:**

Role corresponds specifically with the management of BIM processes, protocols and procedures. Main duty is to ensure the project Team members work within the domain as prescribed within Outline Project BIM Execution Plan (BEP) and associated referenced BIM Documentation.

Task Team BIM Coordinator*:**

Role corresponds specifically to ensure establishment and management of the BIM process & models produced by Task Team members assigned within scope of works. This Document has been agreed by the representatives of the project team as listed above with the authority of their parent companies to accept this document as the agreed BEP.

4.13 COLLABORATION PROCEDURES

The Collaboration strategy for collaboration is outlined fully within the full BEP to ensure an efficient methodology of exchanging information between all project team members, EDMDC, CDE and the Employer EDMS.

4.14 MODEL PREPARATION

Model preparation must be performed prior to exporting and/or issuing data. All models should be reviewed against the following checklist on a regular basis by the appointed individual on each design team:

1. Ensure the model file name conforms with the Project Naming Convention
2. Ensure the Model Issue Sheet (splash screen) is complete, updated with the correct information
3. Check the model contains the correct shared coordinate system
4. Review and fix all warning messages where possible
5. Check that all families comply with the consultants BIM Standard for Naming Conventions
6. Check model is correctly assembled through visual inspection
7. Retain, and unload, the valid linked Files. Remove non-transmittal links
8. Preserve the used and relevant Sheets, Views, schedules and Legends
9. All extraneous and unwanted information (e.g. temporary views) removed from the model
10. Purge model (repeat three times to remove materials of previously removed parent objects)

4.15 BIM ENABLED DESIGN TEAM MEETING REVIEW

The BIM model will be used for continuous coordination and interference detection and will be central to the design review process. One of the advantages of model-based design is the ability to check for interferences in the model prior to construction on site. This project will use the following coordination, auditing applications:

- Autodesk Revit for day-to-day coordination checks between models, Individual designers can check how their own model coordinates and ensure they are clash free before checking against models from other disciplines
- Autodesk Navisworks Manage & Revizto will be utilised for comments and clash detection tracking

The Design Review sessions will be utilised as a means for project team members to highlight any particular areas that may be of concern, as well as auditing the models for any undetected clashes by the design team. During the EDMDC Design review meetings the clash detection reports will chaired by EDMDC and reviewed by the project team.

5.0 IT Solutions

5.01 Project Resources & IT Requirements

It is essential that the Stakeholders BIM software skills and experience match the required BIM deliverables.

The proposed design team would have completed BIM IT Assessment forms and BIM Resource Assessment Forms and we consider them to have sufficient hardware and software to undertake the design works to the required standard.

5.02 Software Agreements

The following software packages will only be utilised for the scheme as they are pre-approved with Welsh Government / Swansea City and County Council. No alternative items of software will be utilised without agreement from the client. Please review and understand the list of pre-approved software packages below.

- Architecture Model – REVIT 2021/2022 (Arch)
- Structural Model – REVIT 2021/2022 (Structural)
- MF&E Model – REVIT 2021/2022 (MF&E)
- Collaboration; Please see the “COLLABORATION PROCEDURES” section of this BEP.
- Autodesk Navisworks Manage for clash detection.
- Revizto for Markups and issue Tracker (Licenses will be provided for Revizto, 1x per BIM originator Company)
- Naviworks (Collaboration and view checks)

6.0 Additional Information

6.01 Periodic Table of BIM

Please visit the URL below for information regarding the NBS periodic table of BIM.

<https://www.thenbs.com/periodic-table-of-bim>

References

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