
BIM4WATER



Water Industry Guidance Document Number - 4D/001

Supporting 4D in Project Delivery using Exchange Information Requirements (EIR)

BIM4Water Beyond 4D Task Group

2024

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Version	Date	Details of Amendments
P01_S0	07/09/2020	First Issue
P02_S0	31/05/2024	Addition of 4D LOIN matrix and generic industry updates



Please Join

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1.0 Executive summary

The document purpose is principally as a template to provide EIR authors support in the production of 4D supportive requirements in water projects, although its content has wider scope to be applied across contract documents and disciplines.

The following guidance document should be used to support the compilation of a water industry Exchange Information Requirements (EIR) as described within BS EN ISO 19650 – 1:2018 and used throughout its entirety to recommend industry stakeholders about best practice for the inclusion of 4D project delivery.

This document provides clear definition on the level, and programme detail at each project delivery stage; including model data exchange formats; training; collaborative workshop and resultant competencies.

2.0 Contributors

If you have feedback regarding the document, please contact BIM4Water at bim@britishwater.co.uk

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3.0 Introduction

This Document is intended for use by construction stakeholders implementing 4D and inclusion in the Appointing Party's Exchange Information Requirements, i.e. forming part of the Appointing Party's Tender Pack design. The document aims to help provide clarity in scope with reference to 4D strategic objectives, methods and procedures, collaborative planning, and data exchange formats.

This guidance aims to support organisations to adopt 4D principles which in turn aims to increase adoption of 4D within the water industry from the Appointing Party's side. The document intends to support the numerous benefits from early engagement and stronger communication, getting it right first time and preventing rework, having clear expectations from the offset, build in the virtual environment and construct once. The tabular approach aims to provide flexibility to the Appointing Party in including sections relevant to the project.

The following items are highlighted for inclusion where to define 4D project delivery within the contract and intended for use throughout the project delivery process.

4.0 Usage

Each subsection is detailed further in section 5.0 and can be applied or omitted as appropriate to the project. Appendix A 4D LOIN Application Matrix should be referred to help identify the most appropriate approach dependent on project stage.

1. Technical	2. Management	3. Commercial
1.1 Software Platforms 1.2 Data Exchange Format 1.3 Level of Information Need 1.4 Training	2.1 Standards 2.2 Roles and Responsibilities 2.3 Planning the Work and Data Segregation 2.4 Coordination and Clash Detection Process 2.5 Collaboration Process 2.6 Health and Safety and Construction Design Management 2.7 System Performance Constraints 2.8 Compliance Plan 2.9 Delivery Strategy for Asset Information	3.1 Data Drops 3.2 Appointing Party's Strategic Purpose 3.3 BIM-specific Competence Assessment

5.0 EIR Guidance

Detailed explanation of guidance:

Key:

<Statement of Requirement>

<Contractor to agree and complete>

<Guidance Notes>

5.1 Technical

This section covers data, software and skills considerations.

Ref	Item	Description	Requirement
1.1	Software Platforms	<p><i>Define the platform for the Building Information Model as well as other software platforms to be used</i></p> <p>The Appointing Party stipulates what systems they have internally, and what file formats they can accept. The Contractor should aim to ensure clear programme data exchange, ensuring the utilisation of a 4D software tool that ensures compatibility with the widest range of other software.</p>	<p>The following software has been demonstrated to the BIM team to be suitable for use on:</p> <ul style="list-style-type: none"> • Planning software • 4D construction scheduling software • Field tools <p><Contractor to list the planning/visualisation tools to be used by completing Section 6.1 of the Project BIM Execution Plan></p>
1.2	Data Exchange Format	<p><i>The purpose of this section is to define the formats used to deliver data at data drop.</i></p> <p>In general all revisions of all programmes, 4D models and visualisations will be delivered in a format that is viewable, readable and accessible.</p>	<p>For each of the data drops, information will be required in the following formats:</p> <ul style="list-style-type: none"> • Planning – XML, xls, • 4D Model – 4D model native files..... • Visualisations (video) – MP4, AVI..... • Visualisation (image) – JPEG, PNG,... <p>The software drop must aid and not hinder interoperability.</p> <p>Please state the frequency of the information exchange for 4D.</p> <p>Please refer to 4D LOIN Application Matrix for 4D (Appendix A) outputs at various project lifecycle stages.</p> <p><Contractor to provide response on requirement></p>
1.3	Level of Information Need (LOIN)	<p><i>The purpose of this section is to define requirements for information submissions/data drops at project stages.</i></p>	<p>The LOIN shall be such to maximise the benefit realisation and aim to best align the three critical components of programme, model and 4D in accordance with the recommended table in Appendix A.</p> <p><Contractor to complete Table 4.5 in Section 4.3 of the Project BIM Execution Plan></p>



Ref	Item	Description	Requirement
1.4	Training	<p><i>The purpose of this section is to provide bidders with details of training that will be provided in connection with project systems, or training requirements which the bidder will be required to deliver as part of their appointment/contract.</i></p> <p>The supported approach shall be to deliver the right training to the right people at the right time. Recommended approach is to focus specific training on processes and tools at a project level against agreed Learning and Development (L&D) Plan.</p>	<p>A 4D training package should be developed if identified as part of competency and capacity assessments; develop a full competency matrix and clear definition on levels of training required for role (i.e awareness, fundamentals. etc.)</p> <p>Appointing Party to ensure they have hardware capabilities to view digital information.</p> <p><No response required></p>

5.2 Management

This section describes the standards to be used for the definition and delivery of the project, along with how the co-ordination and review processes will be set out.

Ref	Item	Description	Requirement
2.1	Standards	<p><i>The purpose of this section is to define the BIM Standards that are incorporated into the Information Plan as appendix 2 of the BIM Protocol.</i></p>	<p>Asset coding system shall be aligned across model structure, work breakdown structure and commercial breakdown structure to better facilitate alignment across the board.</p> <p>Refer to the Uniclass WBS and naming convention. Water Specific Uniclass release of February 2023 to be considered.</p> <p><No response required></p>
2.2	Roles and Responsibilities	<p><i>The purpose of this section is to bring to the attention of the project team the allocation of roles associated with the management of the model and project information.</i></p> <p><i>The roles themselves are addressed in specific appointments and ERs.</i></p> <p><i>ISO19650 pt 1/2 provides a useful cross-tabulated summary of the roles as they apply across Project Team members</i></p>	<p><The Contractor is to clearly define the Roles and Responsibilities by completing Table 3.1 in Section 3.1 of the Project BIM Execution Plan></p> <p>Early information to be obtained through pre con BEP</p>



Ref	Item	Description	Requirement
2.3	Planning the Work and Data Segregation	<p><i>The purpose of this section is to set out requirements for the bidder's proposals for the management of the modelling process</i></p> <p>Information will be managed in accordance with the processes described in ISO19650, BS 1192:2007 and their associated requirements.</p>	<p>Asset coding system shall be aligned across model structure, work breakdown structure and commercial breakdown structure to better facilitate alignment.</p> <p><The Contractor is review and document in the BIM Execution Plan: <ul style="list-style-type: none"> •Model management (Sections 3 & 4) •Zones, Areas & Volumes (Section 5.1) •Naming Conventions (Section 5.3) •Publishing processes (Section 5.4 & Section 3.6)></p>
2.4	Co-ordination and Clash Detection	<p><i>The purpose of this section is to define the required co-ordination process, together with requirements for quality control?</i></p>	<p>Utilise dynamic clash detection (i.e. temporary works, material movements, logistics and construction methodology), focus on mitigating H&S risks by any practicable means</p>
2.5	Collaboration Process	<p><i>The purpose of this section is to define how, where and when project information will be shared</i></p>	<p>A collaborative culture and behaviour shall be adopted throughout the project lifecycle, with a drive to have a minimum of 2 mandated face to face 4D review workshops including all key stakeholders in the room,</p> <p>Where practical the use of digital tools and visualisation should be adopted for lookaheads, site inductions on a project-by-project basis to ensure delivery assurance, safer working environment for all.</p> <p><The Contractor shall confirm details of collaborative workshops (both mandated and proposed) and documented in an Appendix to the Project BIM Execution Plan></p>
2.6	Health and Safety/ Construction Design Management	<p><i>The purpose of this section is to enable the employer to define how BIM-based working will support H&S/CDM monitoring aligned with the work stages. Data and records capture processes also need to be documented.</i></p>	<p>Use of all applicable sections to framework from ISO19650, guidance from BIM 4 Health and Safety Working Group and relevant sections from CDM Regulations 2015.</p> <p>Please refer to PAS Standard for Health & Safety PAS1192-6:2018 or ISO19650-6 as appropriate.</p> <p>Where practical the use of digital tools and visualisation should be adopted for lookaheads, site inductions on a project-by-project basis to ensure delivery assurance, safer working environment for all.</p>

Ref	Item	Description	Requirement
2.7	Systems Performance	<i>The purpose of this section is to communicate to bidders any constraints in the employer's systems or specific IT requirements which may need additional resources or non-standard solutions.</i>	<p>Access to model viewing software</p> <ul style="list-style-type: none"> The Appointing Party will have access to cloud-based and/or application based 4D model viewer The Appointing Party should confirm what their current IT infrastructure is, and that it can receive 4D files, and any limitations. <p><State minimum hardware requirements for adopted 4D software></p> <p><No response required></p>
2.8	Compliance Plan	<i>The purpose of this section is to enable the supplier to communicate how the integrity of the model and other data sources will be maintained</i>	The Appointing Party expects that by checking, auditing and validating the 4D model before they are published to the CDE will lead to better quality assurance. Note the linked model shall be published not work in progress at time of issue)
2.9	Delivery Strategy for Asset Information	<i>This section defines the information exchange standard for asset information and enables the employer to obtain proposals with regards to asset information delivery into the employer's FM environment</i>	Appointing party to define requirements, e.g. All Maintainable and Commissionable Assets shall have 4D animation and programme attached for decommissioning purposes.

5.3 Commercial

This section defines information requirements, purposes for data and the content of key deliverables.

Key to table below:

<Statement of Requirement>

<Contractor to agree and complete>

<Guidance Notes>

Ref	Item	Description	Requirement
3.1	Data Drops	<i>The purpose of this section is to communicate the content of data drops and how data drops are aligned to work stages. Section 1.3.1 will also explain how data drops relate to the selected procurement process, as well as the purpose and key contents. This part of the EIR must be complete when issued to bidders for design or constructor tenders</i>	<p>The 4D model LOIN shall align with the table in Appendix A – 4D LOIN Application Matrix + H&S.</p> <p><No response required></p>

Ref	Item	Description	Requirement
3.2	Appointing Party's Strategic Purposes	<p><i>The purpose of this section is to describe the expected purposes of the information provided.</i></p> <p><i>The BIM Protocol does not specifically state the purposes for which models will be used. Setting out proposed purposes in the EIRs informs the scope of the licences defined in the Protocol</i></p> <p>It is expected that the primary use of the data will be for the following purposes:</p> <ul style="list-style-type: none"> • Operations • Maintenance and repair • Replacement • Warranties 	<p>In addition to models, drawings and analysis reports, the data drops will potentially also include some or all of the following project outputs:</p> <ul style="list-style-type: none"> • Elemental Project Planning Model • Construction Sequencing Model • Phasing analysis • Approvals schedule • Site / Welfare Planning • Temporary/Enabling Works/Logistics <p>The data shall align with 4D model LOIN table stated above.</p>
<p>3.3 BIM-specific competence assessment</p> <p>A high level BIM Competency Assessment would normally be distributed to the supply chain by an Information Manager at the start of each project, to have suppliers confirm they are competent to deliver what the EIR & BEP require of them, and identify any further training needs.</p> <p>This will include 4D questions/criteria if applicable to that project, and if defined as a key deliverable in the Appointing Party's EIR within the assessment form.</p>			
A	BIM Capability and Experience	<i>Responses will describe how mature an organisation is, and what capabilities are held</i>	<Include 4D capability in BIM assessment; results shall be combined to produce the Supply Chain Capability Summary>
B	Confirmation of BIM Toolset	<i>Responses will describe the processes and procedures that make up the bidder's BIM and information management toolkit</i>	<Complete a 4D competency matrix>
C	Details of BIM Workload and Resourcing	<i>Responses will describe the resources (and what levels) that are available to the project</i>	<Complete a 4D competency matrix and resource assessment table, combine the information to produce a responsibilities matrix through the delivery stages>
D	Principal Supply Chain	<i>Responses will describe the supply chain's ability to link into the process and how will this be assessed</i>	<p><Complete 4D competency assessments on Principal Supply Chain, detail to be provided on:</p> <ul style="list-style-type: none"> -Model breakdown structure -Programme breakdown structure>

6.0 Glossary of terms

The following is a list of terms and acronyms used throughout the document sourced from the UK National Building Specification (NBS) and ISO19650.

Term/ Acronym	Term	Definition
IEP	Information Execution Plan	An Information Execution Plan (IEP) is a detailed plan that outlines how information will be managed and exchanged among project stakeholders. It specifies the processes, standards, and tools to be used to ensure efficient and accurate information delivery throughout the project lifecycle.
Appointing Party	Appointing Party	The appointing party is the entity or individual responsible for commissioning a construction project, e.g. the client. This party defines the project's requirements, including the scope of work, deliverables, and standards to be followed. They are responsible for providing the Employer's Information Requirements (EIR) and ensuring that all project participants comply with the specified information management protocols.
BEP	BIM Execution Plan	A BIM Execution Plan (BEP) is a comprehensive document that outlines the strategies, workflows, and procedures for implementing BIM on a project.
EIR	Employer Information Requirements	Employer Information Requirements (EIR) are a set of guidelines and specifications provided by the appointing party. The EIR outlines information that must be delivered at various stages of a project. It includes requirements for data formats, level of detail and standards. The EIR serves as a foundation for developing the BEP and information management documents.
LOIN	Level of Detail/ Development	Level of Detail (LOIN) or Level of Development refers to the degree of accuracy and completeness of a BIM model at different stages of the project, and is typically associated with PAS1192, which has now been superseded by ISO19650. The NBS Toolkit bandings were given single-digit numbers from 2–5, as reflected in the BIM Protocol and PAS 1192 suite of documents. The online versions of these definitions were retired in June 2022.
LOIN	Level of Information Need	Levels of Information Need (LOIN) for ISO 19650 provide a framework for specifying the necessary amount of information required at different stages of a project, superseding the LOIN definition of PAS1192.
4D BIM	4 th Dimension of BIM	4D BIM refers to the integration of time-related data into a BIM model, adding the fourth dimension of time to the 3D geometry. This allows for the visualisation and simulation of the construction schedule, enabling better planning, sequencing, and coordination.
CDM	Construction (Design and Management)	CDM refers to regulations and guidelines designed to ensure the health, safety, and welfare of all construction project stakeholders. CDM regulations require the appointment of duty holders e.g. clients, designers, contractors, with specific responsibilities to manage and mitigate risks.
WBS	Work Breakdown Structure	A Work Breakdown Structure (WBS) is a hierarchical decomposition of a project into smaller components or tasks. It provides a clear framework for organising and defining the total scope of the project, breaking it down into work packages that can be assigned, scheduled, and tracked.
CDE	Common Data Environment	Single agreed source of information for any given project or asset, used to collect, manage and disseminate all relevant project artefacts or information containers for multi-disciplinary teams in a managed process.



Appendix A: 4D LOIN Application Matrix with Health and Safety Guidance