Standard for Project BIM Requirements

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1 Scope

This standard defines the elements of project BIM requirements that the owner (also known as the Appointing Party in ISO 19650-2 (2018)) would include in the Owner Project Requirements (OPR). It is intended for an owner to use to define Project BIM Requirements for delivery team members (also known as the Appointed Party in ISO 19650-2 (2018)). This standard is intended to define the minimum requirements for a viable BIM project. An owner may extend requirements beyond the scope of this standard to include other BIM uses or BIM implementation.

2 Terms and Definitions

Appointed Party
The entity that is contracted for and provides information concerning works, goods, or services.

Appointing Party
The entity that holds the contract and receives information concerning works, goods, or services.

Attribute
A single unit of data that in a certain context is considered indivisible.

BIM Deliverable
Data and/or model information to be provided to a party in connection with a BIM Use.

BIM Execution Plan (BEP)
A plan that explains how the information management aspects of a project will be carried out by the project team.

BIM Use
The purpose for applying BIM.

Building Information Management (BIM)
Functions of controlling the acquisition, analysis, retention, retrieval, and distribution of built asset information all within an information processing system

Building Information Model
A shared digital representation of physical and functional characteristics of a facility and built asset.
Building Information Modeling
Generating and using a shared digital representation of a built asset to facilitate design, construction and operation processes to form a reliable basis for decisions.

Common Data Environment (CDE)
An agreed source of information for any given project or asset, for collecting, managing and disseminating each information container through a managed process.

Component
The individual instances of the products and equipment defined in the Type data table.

Delivery Phase
Part of the lifecycle, during which an asset is designed, constructed, and commissioned.

Delivery Team
The collection of entities who are contracted for works, goods, or services.

Delivery team member
The entity that is contracted for and provides information concerning works, goods, or services.

Federated Model
A system of models consisting of linked but distinct components derived from multiple data sources that do not lose their identity or integrity.

Information Accuracy
A specification or method to define how close the geometric asset and spatial information is to an actual or planned requirement.

Information Exchange
Act of satisfying a requirement or part thereof through storing, accessing, transferring, and archiving information.
Metadata

Data that defines and describes other data.

Model Element

A portion of the model(s) representing a component, assembly, or construction entity (part) which, in itself or in combination with other parts, fulfills a predominating function of a construction entity.

Owner

The entity that holds the contract and receives information concerning works, goods, or services.

Owner Project Requirements (OPR)

Written document that details the ideas, concepts and criteria required by the owner, and the requirements upon which works, goods, and services are based.

Process

A sequence or flow of Activities in an organization with the objective of carrying out work.

Project BIM Execution Plan (PBEP or BEP)

A plan developed by an owner that explains the minimum requirements for the information management aspects of a scope of work for a project.

Project Milestone

A discrete point in time associated with a project outcome.

Project Team

Owner and all delivery teams.

Quality Management

A set of processes that involve Quality Planning, Quality Assurance, and Quality Control as applied to the management of information.

3 Reference Documents

The following documents are referenced throughout this standard:


4 Project BIM Requirements Development Process

On a typical building or infrastructure construction project, the owner (also known as the Appointing Party in ISO 19650-2 (2018)) develops Project BIM Requirements as part of the contract with the delivery
5 Project BIM Requirements

Each section of this Standard for Project BIM Requirements contains: 1) Title of the requirement, and 2) Definition of the requirement. The Standard is divided into three sections: Executive, Management, and Working/Technical.

5.1 Executive

5.1.1 Deliverables

5.1.1.1 Required Deliverables

The Owner Project Requirements (OPR) shall identify all deliverables required by the Standard for Project BIM Requirements.

5.1.1.2 Quality Plan

A BIM Quality Plan should be included in a Project Quality Plan. The OPR shall define when the BIM Quality Plan should be delivered and by which delivery team member(s). See: Quality Plan

5.1.1.3 Security Plan Deliverable

If a Security Plan is not being provided to the delivery team member, then the OPR shall define when the Security Plan should be delivered and by which delivery team member(s) it should be delivered. See: Security

5.1.1.4 BIM Execution Plan (BEP) Deliverables

The OPR shall define when a Project BEP should be delivered and which delivery team member(s) should be involved in the development and delivery of the BEP (see BIM Execution Plan Module for details).

5.1.1.5 Model Deliverable(s)

The OPR shall specify the deliverable format for each BIM Use. For each Model Deliverable, the owner shall provide a Model Requirement (See: Model Requirements) expectation.

5.1.1.6 Data Deliverable(s)

The OPR shall specify the delivery format for any required data deliverable. Each data deliverable shall be delivered using either an industry standard format (e.g., COBie) or a format defined by the owner. (See: Data Requirements)
5.1.2 Quality Management Strategy

5.1.2.1 BIM Quality Plan

The OPR shall direct the delivery team member(s) to follow the BIM Quality Plan provided by the owner. If no plan is provided the delivery team member(s) will provide a BIM Quality Plan. In both cases the delivery team member(s) shall document compliance with the BIM Quality Plan in the BEP.

5.1.2.2 Deliverable Quality

The OPR shall indicate all quality procedures that deliverables shall conform with.

5.1.2.3 Verification / validation Requirements

The OPR shall reference any verification / validation procedures that the owner will perform for quality checking of the deliverables.

5.1.2.4 Collaboration and Data Sharing

The OPR shall specify procedures for sharing and using documents pending quality approval and all parties shall identify areas of collaboration in the BIM Execution Plan.

5.1.3 Intellectual Property (IP) Rights

5.1.3.1 Ownership

The OPR shall indicate the ownership of Intellectual Property. If IP is defined in a contract, the OPR shall reference the contract.

5.1.3.2 Grant of License

The OPR shall indicate any licenses granted.

5.1.3.3 License entitlements

The OPR shall indicate all entitlements granted by license to project team.

5.1.3.4 License Limitations

The OPR shall indicate any limitations of licenses granted to project team.

5.1.3.5 Collaboration and Data Sharing

The OPR shall specify procedures for sharing and using IP-protected information and all parties shall identify areas of collaboration or information exchange in the BIM Execution Plan.

5.1.4 Security

5.1.4.1 Data Separation

The OPR shall require all members of the delivery team to identify areas of collaboration or data separation in the BEP.

5.1.4.2 Security and Cybersecurity

The OPR shall direct the delivery team member(s) to follow the security plan provided by the owner. If no plan is provided the delivery team member(s) will provide a security plan. In both cases the delivery team member(s) shall document compliance with the security plan in the BEP.
5.1.4.3 Data Storage Requirements
The OPR shall include the physical location, governance, provenance, and lineage needs regarding the data for the project. If the owner is not providing these requirements the delivery team member(s) shall be required to include these items in their Security Plan.

5.1.4.4 Continuation of Operations and Disaster Recovery
The OPR shall require the Security Plan to include continuation of operations and disaster recovery plans.

5.1.4.5 Use of Security Standards
The OPR shall indicate if the owner has security standards and how they will be employed on the project.

5.1.4.6 Security Restrictions
The requirements shall indicate if any working restrictions will be employed on the project.

5.1.4.7 Confidential, Controlled Unclassified, or Sensitive Information
The OPR shall indicate if confidential, controlled unclassified, or sensitive information will be present on the project. If there is confidential, controlled unclassified, or sensitive information present on the project, the information and its classification status shall be identified by the requirements.

5.1.5 Legal Considerations
5.1.5.1 Contract Documents
The OPR shall indicate the order of precedence Model Deliverables hold in relationship to other contract documents.

5.1.5.2 BIM Standards
The OPR shall require the use of the owner’s BIM standards and requirements for the creation of all contract documents created using BIM workflows.

5.1.5.3 Waivers
The OPR shall specify how and under what conditions project teams can request waivers from use of the owner’s BIM Requirements or parts of the owner’s BIM Requirements. For a viable BIM-enabled project, the Deliverables defined in section 5.1.1 shall not be waived. Responsibility for Product

The OPR shall include the expectation that contributors are responsible for their contribution.

5.1.5.4 Indemnification Clause
The OPR shall include an indemnification clause regarding damages due to shared BIM data.

5.2 Management
5.2.1 BIM Execution Plan (BEP)
5.2.1.1 Purpose of Document
The OPR shall include a description of why the BEP is required for the project.
5.2.1.2 Requirement of Use and Participation
The OPR shall require the delivery team to participate in the creation of the BEP and execute the process defined within.

5.2.1.3 Required Inclusions
The OPR shall indicate, or make reference to, all information that is required for inclusion in the BEP. The BEP required information can be referenced to either an industry standard format (e.g., BEP Standard, NBIMS US v.4) or a standard defined by the owner.

5.2.1.4 BEP Accountability
The OPR shall include mechanisms to hold accountable delivery team member(s) that fail to adhere to BEP requirements or the Project BEP deliverable.

5.2.1.5 BEP Deliverable Approval Process
The OPR shall define an approval process for how the owner will review and approve the BEP deliverables.

5.2.2 Roles & Responsibilities
5.2.2.1 Required Documentation
The OPR shall require the delivery team to document roles and responsibilities of the team in the BEP. It shall also indicate which information about the Roles and Responsibilities should be included.

5.2.2.2 Defined Roles
The OPR shall include which BIM roles are required. For each BIM role required the OPR shall define the responsibilities.

5.2.3 Common Data Environment (CDE)
5.2.3.1 Requirement for Participation
The OPR shall require the use of a CDE for the project.

5.2.3.2 Restrictions / Limitations
The OPR shall indicate any restrictions or limitations to the CDE.

5.2.3.3 Capabilities
The OPR shall indicate what functions a CDE shall be capable of performing. In the case that the owner is not capable of defining the capabilities, the delivery team shall be responsible for defining the capabilities of the CDE in the BEP.

5.2.3.4 Document Metadata
The OPR shall indicate specific metadata that shall be attached to documents stored within the CDE. In the case that the owner is not capable of defining the metadata, the delivery team shall be responsible for defining the metadata of the CDE in the BEP.

5.2.3.5 CDE Framework Documentation
The OPR shall require the CDE framework to be documented in the BEP if not provided by the owner. The OPR shall also indicate which party is responsible for the management of the CDE during the project.
5.2.4 Collaboration Requirements

5.2.4.1 Specification of Collaboration Requirements
The OPR shall specify the owner’s collaboration requirements. Also, the OPR shall require the delivery team member(s) to specify any collaboration requirements.

5.2.4.2 Collaboration Procedures Documentation
The OPR shall require all collaboration procedures and meetings to be recorded in the BEP.

5.2.4.3 Information Exchange Procedures
The OPR shall specify procedures for sharing and using the following types of information:

5.2.4.4 Kick-Off Meeting
The OPR shall require delivery team member(s) to take part in a Kick-Off Meeting(s) for the purpose of gathering the information necessary to create the BEP.

5.2.4.5 Team Co-location
The OPR shall indicate if delivery team member(s) are required to co-locate on the project.

5.2.4.6 Coordination Meetings
The OPR shall require the delivery team to regularly meet to conduct BIM coordination and quality checks.

5.2.4.7 Quality Control Activities
The OPR shall require that the delivery team member(s) must define and perform focused, scheduled quality checks throughout the project delivery process.

5.2.4.8 Required Quality Control Documentation
The OPR shall require the delivery team to document quality control activities of the team in the BEP.

5.2.4.9 Quality Control Report
The OPR shall require the delivery team member(s) to deliver a Quality Control Report (QCR) in conjunction with the delivery of any deliverable required.

5.2.4.10 Constructability Checks
If within the scope of the project, the OPR shall require the delivery team to conduct constructability reviews of their contributions prior to their submission.

5.2.4.11 Coordinate Design and Construction Checks
The OPR shall require the delivery team to coordinate models prior to their submission.

5.2.4.12 Model Integrity Checks
The OPR shall require the delivery team member(s) to conduct model integrity checks to ensure the Model has no missing, undefined, incorrectly defined, or underdeveloped elements. The delivery team member(s) shall be required to document all elements in the QCR that are found to be noncompliant.

5.2.4.13 Metadata
The OPR shall require the delivery team to append metadata to all files stored in the CDE. The metadata shall be defined using either an industry standard format or a format defined by the owner or the Project Team.
5.2.4.14 Federated Model Checks
The OPR shall require that the delivery team is responsible for the review of the model(s) provided for
efederat. Federated model checks are used to ensure the model(s) have no misaligned or duplicated
elements. The responsible party for the review should be defined in the BEP.

5.2.4.15 Data Compliance Checks
The OPR shall require the delivery team to conduct reviews of the data standards and their application
to Model Deliverables and Data Deliverables. The delivery team member(s) shall be required to
document all compliant/noncompliant elements in the QCR.

5.3 Working/Technical

5.3.1 BIM Uses

5.3.1.1 List of Required and Additional BIM Uses
The OPR shall state which BIM uses are required and which are optional for the delivery team
member(s). [See BIM Use Definitions Standard, NBIMS-US v.4] The defined BIM Uses shall be required to
be documented in the BEP.

5.3.2 Model Requirements (Finished Product)

5.3.2.1 Model Element Breakdown (MEB)
The OPR shall include a list of all elements to be included in the scope of work. The MEB shall be
organized using either an industry standard format or a format defined by the owner. The MEB shall be
established by the owner as a template.

5.3.2.2 Model Progression Specification (MPS)
The OPR shall require the owner to specify model progression provide a Model Progression Specification
(MPS) to the delivery team that indicates the minimum desired Information accuracy and information
detail of model elements for each milestone deliverable. Information accuracy and information detail
can be defined using either an industry standard (eMVD or IDS) or a standard indicated by the owner.

5.3.3 Modeling Requirements (Creation Requirements)

5.3.3.1 Owner Specific Requirements
If the owner has specific modeling requirements, the OPR shall indicate the Delivery Teams requirement
to use them. These requirements shall include but are not limited to: Model Tolerances and
Dimensioning, Structure of the model, Naming conventions, Coordinate Systems, Linking and
Referencing Procedures, Model Views, Data Schema (e.g. Shared Parameters, Item Types, etc.).

5.3.4 Data Requirements

5.3.4.1 File Metadata
The OPR shall require all files and database sources stored in the Common Data Environment to include
metadata using either an industry standard or a standard supplied by the owner.
5.3.4.2 Data Attribution Requirement
The OPR shall require that all delivery team members add data attributes to model elements in compliance with the Information Detail requirements.

5.3.4.3 Data Standard Reference
The OPR shall require that model objects include specific data attributes using either an industry standard or a data standard supplied by the owner. The requirements or the referenced standard shall clearly indicate which objects should carry data attributes and what data attributes shall be required on each model object type.

5.3.4.4 Inclusion in BIM Execution Plan
The OPR shall indicate that any deviation from provided standards should be documented within the BEP.

5.3.4.5 Existing facilities dataset
The OPR shall indicate if an existing dataset will be included in the owner furnished material provided to the delivery team. The existing dataset shall represent all existing assets relevant to the project and will include their data attributes and indicate the format of the provided materials.