cdbb
Centre for Digital Built Britain

Exchange Information Requirements (EIR)

Guidance

UNIVERSITY OF CAMBRIDGE

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Executive summary

The international information management standards ISO 19650–1:2018 and ISO 19650–2:2018 define the recommended concepts and principles for information management using building information modelling (BIM), as well as specifying the activities to be undertaken to support information management during the delivery phase of an asset.

The ISO 19650 series outlines that the appointing party shall communicate their information requirements for the delivery phase of an asset, to the project delivery team, through the creation of several tender documents, including the exchange information requirements (EIR) and project information standards, the information production methods and procedures.

To assist with the adoption of the ISO 19650 series principles for construction and infrastructure projects, both the template and this guidance document have been structured to include the information requirements (Section 2) and the project information standards, production methods and procedures (Section 3). For more complex/non-traditional projects with multiple delivery teams, or for a project delivery team with wide-ranging building information modelling (BIM) experience, the project information standards, production methods and processes should be separated into their own contractual document.

This guidance document has been developed to assist users in the completion of the exchange information requirements (EIR) template.

1 Introduction

Provide a high-level explanation of the purpose of the exchange information requirements (EIR), how they will be used during the appointment and the organisational objectives behind adopting the ISO 19650 series principles.	The appointing party, **{client name},** has developed these exchange information requirements (EIR) for **{project name}**. It is structured to provide an understanding of its intended use, the information requirements and the relevant information standards, production methods and procedures to be adopted on the project.

<This section is intended to help readers understand how the exchange information requirements (EIR) should be used. This may be particularly useful for members of the prospective delivery team who may not have experience with the ISO 19650 series principles. If any subsection content, especially Sections 1.3.2, is contained within another contractual document, it is recommended that it be omitted to prevent confusion.>

1.1 Exchange information requirements (EIR) purpose

Explain the purpose of the exchange information requirements (EIR) and how they should be used during this appointment.	The exchange information requirements (EIR) provide a specification of the information requirements that are to be met throughout the delivery phase of an asset. This includes the acceptance criteria of the information standards, information production methods and procedures.

<The following example demonstrates the document's purpose, providing a summary for the reader(s). When completing the template, use this section to explain the function of the exchange information requirements (EIR), keeping in mind that this may be some task teams' first experience of building information modelling (BIM) processes and associated documentation.>

This exchange information requirements (EIR) document and its annexes form part of the invitation to tender suite of documents. It outlines the information requirements that the delivery team must comply with.

All existing project information will be supplied within the invitation to tender documentation suite, via the common data environment (CDE).

1.2 Information management goals and objectives

Provide a brief description of your organisation's commitment to building information modelling (BIM); the subsections below will allow you to expand on this.	**{Client name}** are committed to the use of building information modelling (BIM) for delivery of this project, enhancing existing processes, to realise both cost and programme benefits, through promoting a collaborative approach to project delivery.

<The example below demonstrates an appointing party's goals and objectives for implementing the ISO 19650 series principles on a project. The aim is to provide the prospective delivery team with a greater understanding of the intention of the requirements. These may be copied directly from the project information requirements (PIR) if applicable. If the intention is for this document to be a technical specification, for more experienced delivery teams, this section should be omitted.>

1.2.1 Goals

Identify high-level organisational goals, which will help the delivery team to understand why implementing building information modelling (BIM) on the project is important. Goals are usually wide overarching targets that define the general intentions and ambitions of an organisation.	The following information management goals support **{client name}'s** continuous improvement aims for delivery of their projects.

<The example below demonstrates possible goals that the appointing party might want to achieve, which should align with the project information requirements (PIR):>

- Promote continuous collaboration and coordination across the whole delivery team.
- Have access to the right project information at the right time, to make informed decisions.
- Utilise available, accurate project information for various uses, to the benefit of the project stakeholders.
- Use information to drive transparent sign-off of deliverables.
- Achieve measurable cost savings through implementing information management processes and coordination.
- Embed BIM information management processes as business as usual.
- Handover usable information at completion of the construction works.

Learn lessons collectively on the use of building information modelling (BIM) and record these for future use.

1.2.2 Objectives

Objectives are more specific; they are precise actions or measurable steps that the delivery team can undertake to achieve the goals.

To ensure a consistent approach to the production, management and modification of information, the building information modelling (BIM) goals should be read in conjunction with the following objectives that **{client name}** wish to achieve during the project.

<The example below demonstrates possible objectives to be adopted to achieve the overall goals. Provide objectives that align with your specific goals:>

- Outline the requirements for producing project information in a single common data environment (CDE) to be shared across all project work packages.
- Exchange agreed project information at established intervals during the project.
- Establish project-specific key performance indicators (KPIs) to measure progress and establish project benchmarking.
- Collaborate using information models and data to ease review and decision-making.
- Have a fully coordinated design before commencement on-site.
- Ensure that appropriate asset metadata is embedded in the project information model (PIM) and is suitable to meet the asset information requirements (AIR).

1.3 Information requirements hierarchy and documentation progression

Outline how the information requirements are structured and relayed to the delivery team. Include an explanation of what is expected in response to these exchange information requirements (EIR).

The subsections below outline the wider information requirements' structure and provide an understanding of how the information deliverables are defined and the subsequent information delivery plan developed.

1.3.1 Information requirements hierarchy

Provide an understanding of how the exchange information requirements (EIR) are defined and their influence on the information deliverables for handover.	Information requirements for the delivery phase of an asset are defined by wider organisational strategic and project-specific requirements. These are relayed to the delivery team through the exchange information requirements (EIR).

<The example below demonstrates the ISO 19650 series hierarchy of information principles, as illustrated in Figure 1 (Hierarchy of information requirements, source ISO 19650–1:2018). This section provides the delivery team with a better understanding of how these information requirements have been developed, including which information deliverables they directly specify and produce.

Depending on the experience of the delivery team, this section may be omitted. If this section is to be retained within the exchange information requirements (EIR), ensure that it accurately reflects the appointment information requirements and subsequent information deliverables.>

Figure 1 (below) illustrates how the scope of this document is influenced by the hierarchy of information requirements, as stated in ISO 19650–1:2018, and its subsequent provision of the specification for the project information model (PIM).

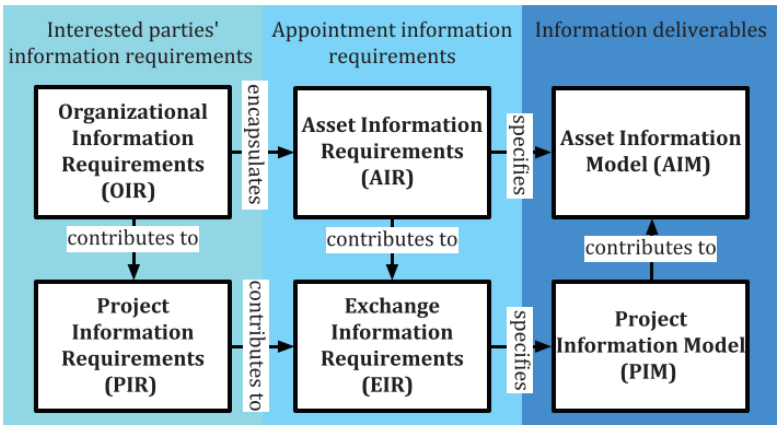

Figure 1: Hierarchy of information requirements, source ISO 19650–1:2018

1.3.2 Exchange information requirements (EIR) response requirements

Outline the response criteria for the exchange information requirements (EIR), which should align with the recommendation of ISO 19650–2:2018.	All parties will have until the **{insert date}** to raise any queries regarding the exchange information requirements (EIR), including appendices or referenced documentation. All parties participating in the project bid will produce a pre-appointment BEP (pre-BEP) in response to the exchange information requirements (EIR), which should be submitted via **{insert method for tendering}** to the appointing party no later than **{insert date}**. All submissions will be reviewed. The successful party will be informed by **{insert date}**. A workshop should then be held between the appointing party and lead appointed party to review any comments and confirm acceptance.

<If these response requirements are included within another document, this subsection should be omitted in order to avoid confusion.

Describe the response criteria and timeframes that need to be adhered to as part of this invitation to tender. When a delivery team first adopts the ISO 19650 series principles, it may be useful to describe the documents and their purpose.>

1.3.2.1 Pre-appointment BIM execution plan (pre-BEP)

The pre-appointment BIM execution (pre-BEP) is produced at the tender stage in response to the invitation to tender. It outlines how the delivery team propose to meet the information requirements for this project. Describe the expected content.	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). In addition to information requested as part of the appointment process, a comprehensive pre-appointment BIM execution plan (pre-BEP) will include the following content.

<The example below demonstrates the expected pre-appointment BIM execution plan (pre-BEP) content. Ensure that all the information you wish to receive as part of the tender submission in response to the exchange information requirements (EIR) is outlined, including any supplementary documentation or appendices.>

- Information delivery strategy:
  - Approach to meeting the exchange information requirements (EIR)
  - Objectives for information collaboration
  - Delivery team's organisational structure and composition
- Federation strategy
- Delivery team's high-level responsibility matrix
- Proposed platform system schedule
- Information standards; proposed amendments and additions
- Information production methods or procedures; proposed amendments and additions

1.3.2.2 Supplementary documents

Outline any supplementary documents that you would expect to be submitted as part of the pre-appointment BIM execution plan (BEP). This is especially important if you are supplying templates to be completed to assist with the evaluation process.	The documents below should be submitted alongside the pre-appointment BIM execution plan (BEP).

<Provide an explanation of any supplementary documents expected as part of the tender submission, including any references to templates that should be used.>

1.3.2.3 Supplier capability and capacity assessment

Describe any expectations of any pre-qualification questions specifically related to building information modelling (BIM) that the delivery team are to answer. These could be included/combined with a wider project pre-qualification questionnaire.	All task teams in the prospective project delivery team should be able to demonstrate that they either possess, or have the opportunity and commitment to attain, the relevant required skills and experience to be eligible for pre-qualification. As part of the tender return, the prospective lead appointing party should complete the capability and capacity assessment. Each question should be answered and evidence supplied where appropriate.

<If the capability and capacity assessment questions/criteria form part of a separate supplier's assessment/pre-qualification questionnaire, this could be referenced here, or this section could be omitted to avoid confusion.

The prospective delivery team or task team(s) should answer an assessment, which provides evidence of their capability (experience, training, etc.) and capacity (resource and information technologies) to meet the information requirements.>

1.3.2.4 Mobilisation plan

A mobilisation plan helps to ensure that everything is in place and working correctly before a project begins, which limits any potential delay to the project start date. The delivery team should identify all training, tests and checks that will be performed before any project work begins.	The lead appointed party should provide an explanation of the mobilisation plan that will be performed prior to the project commencement.

<If the mobilisation criteria are included within another tender return or contractual document, this subsection should be omitted to avoid confusion.>

1.3.2.5 Information delivery risk assessment

The delivery team should identify and report anything that could potentially prevent them from meeting the delivery milestones, providing a description of how they intend to reduce or remove the risk.	The delivery team should identify any potential risks that may prevent them from delivering information in line with the information delivery milestones and provide a description of the measures they intend to implement to mitigate these risks. This should include any assumptions made regarding the information requirements. All items should be graded in terms of the severity of the impact on the project.

<The example below, Table 1.1: Information delivery risk assessment), demonstrates that a schedule could be included in the pre-appointment BIM execution plan or as a supplementary document, to define any potential risks to meeting the information delivery milestones.

If the risk register is combined/included within other tender return or contractual documentation for risk management, this subsection should be omitted in order to avoid confusion.>

Table 1.1: Information delivery risk assessment

Work stage	Information delivery risk	Consequence	Severity	Potential resolution	Resolution date
2	CDE isn't accessible	Collaboration is delayed	Med	Ensure that the CDE is accessible before project commencement	19.06.20

1.3.2.6 Delivery team's BIM execution plan (BEP)

The delivery team's BIM execution plan (BEP) will be compiled by the lead appointing party upon appointment. This involves updating their pre-appointment BEP (pre-BEP) to include any feedback from the appointing party and ideally further collaboration with the wider delivery team.

The delivery team's BIM execution plan (BEP) should demonstrate the delivery methodology. This section should outline the minimum content requirements.

In accordance with ISO 19650 series, upon appointment, the lead appointed party will confirm the delivery team's BIM execution plan (BEP).

The first iteration should be a collaboration with the wider delivery team and include any comments from the appointing party.

A workshop with the appointing party and whole delivery team should be held to provide a clear understanding of how the delivery team's BIM execution plan (BEP) ensures delivery of the exchange information requirements (EIR). Any necessary clarifications or feedback from this meeting should be confirmed by the appointing party prior to acceptance of the BIM execution plan (BEP).

The delivery team's BIM execution plan (BEP) must be submitted by the lead appointed party via **{insert method for submission}** on the **{insert date}**.

A comprehensive delivery team's BIM execution plan (BEP) will include the content listed below. The purpose is to demonstrate an information delivery strategy that complies with the exchange information requirements (EIR) in a standardised method.

<The example below demonstrates the expected delivery team's BIM execution plan (BEP) content, which could either be adopted directly or modified to best suit the project requirements.>

- Information delivery strategy:
  - Information management matrix
  - Delivery team's organisational structure and composition, including information management matrix
  - Approach to meeting the exchange information requirements (EIR)
- Federation strategy
- Delivery team's high-level responsibility matrix
- Platform system schedule

Supplementary documents:

- Delivery team's detailed responsibility matrix
- Master information delivery plan (MIDP) and task information delivery plan(s) (TIDP)

2 Information requirements

Specify the information requirements, which should detail the information deliverables required to meet/answer the project information requirements (PIR), where applicable.

Each requirement should align with the information exchanges/delivery milestones and be suitable for the relevant delivery team's appointment.

This section captures the specification of each information requirement, which are to be adhered to in order to ensure the successful delivery of each delivery milestone.

The delivery team shall detail their approach and programme in order to comply with these requirements.

2.1 Information purpose

Describe the intended use of information generated throughout the delivery phase of an asset, which could include the relevant project stages, providing an understanding of each requirement's purpose.

The information purposes of the list below are to achieve the organisation's information management goals.

<The information purposes could be identified either in this section or appended to the exchange information requirements (EIR). They should align with, or be equivalent to, the project information requirements (PIR), where applicable:>

- Complete feasibility study
- Planning permission
- Stage completion

2.2 Plan of work

Define the project work stages, which are typically associated with a national standard and reflected in the 'contract stages'. These are provided to help with understanding the information delivery milestones (below).

The project's plan of work is the staged approach to the design and construction processes of the project.

<Provide an explanation of the staged approach of the project, which could be a reference to a national standard.>

2.3 Information delivery milestones

Information delivery milestones are predefined points where specified information deliverables are exchanged, at various stages of a project.

Specify these milestones for the project and relevant appointments.

Information should be exchanged throughout the life of a project, to enable decision-making at crucial milestones. The following milestones are to be adhered to on the project/appointment.

<The delivery milestones should reflect the project information requirements (PIR), where applicable. Table 2.1) uses the above plan of works project work stages mapped against the milestones and their relevant deliverables. These should be a high-level overview description/title, with the detailed specifications being identified in the following (corresponding) information requirements in the subsections below.

Ensure that the information milestones allow the appointing party, and its stakeholders, an agreed period to evaluate and validate the information deliverables.>

Table 2.1: Information delivery milestones

Project work stage	Milestone	Work package/activity	Deliverables	Date
2	1	Feasibility study	Programme area schedule	26.08.20
	2	Planning application		

2.4 Information security requirements

Identify any security requirements that are to be adhered to on this project. This could be based on the appointing party's security requirements for sharing information, or it could be project-specific, for instance, an asset that is sensitive in nature, such as a prison.	All information generated for this project shall comply with the following information security requirements. As a minimum, the baseline security measures defined below shall apply to all project stages: 1. Protection of any commercially sensitive and/or personal data/information, as required, in compliance with ISO 19650–5:2020. 2. Information should be shared with members of the delivery team only, unless approved by the appointing party. 3. All project communication and information exchanges are conducted via the common data exchange (CDE).

<The ISO 19650–5:2020 security triage (Section 4.7) should be used to help to identify whether a security management plan is required. If this is the case, a reference should be provided. If it isn't required, an organisation's default information security requirement could be identified or referenced.>

2.5 Spatial coordination requirements

Outline the information required to assess the accuracy of the design's spatial coordination.	Throughout the project, the delivery team are expected to coordinate the information models in order to mitigate the potential of site rework. To ensure successful coordination, the following information requirements are to be delivered at the defined work stages/milestones.

<The example below demonstrates possible clash detection and avoidance strategy requirements that are to be included as part of the tender submission.>

Table 2.2: Spatial coordination information requirements

Milestone	Description	Supporting information	Information requirements	Information container	Exceptions	Acceptance criteria
1	Feasibility study	• **{Client's name}** project brief	• GA plans and elevations @ 1:200 or 1:500 • Visuals • GIA schedule m² • Notional occupancy rates	• All design information in PDF format • A spreadsheet including the units shown (.xlsx)	N/A	Information delivered to project specification and adhering to project information standards
4	Spatial coordination progression/ monitoring	N/A	Clash resolution report, including a summary of all clashes and then detailed information of each clash rendition	A single report (.pdf)	Only tests identified within the project production methodology	A report on the last working day of the month
<Milestone number>	<Description>	<Insert supporting information>	<Insert information requirements>	<Insert information container>	<Exceptions>	<Acceptance criteria>

2.6 Project information model (PIM)

Define the information deliverables required to fulfil the handover of the project information model (PIM).	At project handover, **{insert work stage},** the project information model (PIM) should consist of all the approved milestone information for each work stage.

<This section provides an explanation of the information requirements for the project information model (PIM) information delivery milestone. As this typically signifies part of the end of the delivery phase of an asset, it is important to describe the expected information deliverables. The information standards, information production methods and procedures for the deliverables are identified in Section 3.>

2.7 Asset information model (AIM)

Define or reference the asset information requirements (AIR) to fulfil the handover of the asset information model (AIM).	At project handover, **{insert work stage},** the asset information model (AIM) should be collated from the project information model (PIM) to meet the asset information requirements (AIR).

<This section provides an explanation of the information deliverables for the asset information model (AIM) information delivery milestone. The asset information requirements (AIR) should be referenced, where applicable, or included in this section. The information standards, information production methods and procedures for the deliverables are identified in Section 3.>

2.8 Information management key performance indicators (KPIs)

Provide project-specific key performance indicators (KPIs) that support the commercial drivers. These should be quantifiable data that provides the appointing party with an overview of whether they are achieving the relevant commercial aspirations.

The lead appointed party is required to calculate and report the key performance indicators (KPIs) to the appointing party at agreed intervals.

This enables the appointing party to determine the success of their commercial building information modelling (BIM) aspirations; the following key performance indicators (KPIs) have been identified.

<The example below, Table 2.3 (Key performance indicators (KPIs)), demonstrates possible key performance indicators (KPIs) relating to the commercial drivers.>

Table 2.3: Key performance indicators (KPIs)

KPIs	Requirement and deliverable	Responsibility	Frequency	Work stage/ milestone
Reduction design packages approval	Use the common data environment (CDE) to monitor the approval process for each information delivery milestone. This should be compared to previous approval timeframes and reported back to the whole delivery team via the 'KPI progress report' (PDF).	Lead appointed party	Quarterly	Project stage 02 to project stage 05
Reduction in embodied carbon	<Description>	<Insert responsible party>	<Frequency>	<Stage>
<Examples>	<Description>		<Frequency>	<Stage>

2.9 Health and safety and design construction risk management

Identify the specific health and safety requirements for the project. Expand on the specific health and safety deliverables that the delivery team will have to incorporate into the information model.	The information models should be utilised to meet both the health and safety and design and construction risk management construction obligations of the project. This should be delivered in accordance with **{name of standard}**. The delivery team is required to inform the appointing party of the potential hazards and risks. This shall be communicated within the information model via the common data environment (CDE).

<The example below, Table 2.4 (Health and safety information requirements), demonstrates the possible health and safety requirements that could be adopted. Alternatively, references to relevant standards and/or protocols could be provided. Timeframes should be defined.

References to either internal or external standards should be referenced.>

The appointing party has provided the following guidance for the key health and safety deliverables against each milestone.

Table 2.4: Health and safety information requirements

Milestone	Description	Supporting information	Information requirements	Information container	Exceptions	Acceptance criteria
6	Health and safety risk management	• **{Client's name}** construction design risk management • PAS 1192–6:2018	The progression of design coordination is to be reported to the appointing party. Risks should have the following information attributed to them: - Risk Name - Risk Category - Risk Description - Associated Product - Associated Activity - Associated Location - Risk Assessment Methodology - Agreed Mitigation - Risk Likelihood - Risk Consequence - Level Of Risk - Proposed Mitigation - Date Updated - Date Reviewed - Owner Discipline • Risk Documentation	• Federated health and safety/risk information schedule, in .xls format	N/A	Schedule must be federated; all information should be generated from the information model(s). Schedule format must comply with Section 8 of PAS 1192–6:2018 and submitted bi-monthly. Work stages 02–05 (inclusive).
<Milestone number>	<Description>	<Insert supporting information>	<Insert information requirements>	<Insert information container>	<Exceptions>	<Acceptance criteria>

3 Information standards, information production methods and procedures

This section is divided into two parts: the first half should be used to determine the standards that information containers should comply with; and the second half should define their required production methodology and procedures.

This section provides the information standards, as well as the information production methods and procedures, that should be implemented to meet the appointing party's information requirements. This is to ensure consistent quality and cohesive information deliverables throughout the delivery phase of the asset.

<Outline the purpose of the information standards, information methods and procedures for the exchange information requirements (EIR) for the project.

This section has been included in the exchange information requirements (EIR) to assist with the adoption of the ISO 19650 standard series, particularly in traditional projects where the delivery teams work consecutively. However, this section could be separated to form its own contractual project document, which would benefit projects where multiple delivery teams are working simultaneously, reducing the potential for error by providing a single version of these information standards, information production methods and procedures.

Amend this section to ensure that the information supplied to the appointing party meets the exchange information requirements (EIR), which should include project information requirements (PIR) and asset information requirements (AIR).>

3.1 Information standards

Define the standards that information containers should comply with.

These standards are to be adhered to on this project.

3.1.1 Project-specific standards

Throughout this document, various standards will be referenced; provide a list/directory of standards that will assist the delivery team to understand the information requirements.	The standards specified below are referenced through this section and should be adhered to as specified.

<The example below demonstrates project-specific standards that could be adopted. Any standards (both internal and external) that are to be used on the project should be listed, including their revision/version. These should be reflected within the main body of the document.>

- ISO 19650–1:2018 – Organisation and digitisation of information buildings and engineering works, including building information modelling (BIM) – information management using building information modelling.
- ISO 19650–2:2018 – Organisation and digitisation of information about buildings and civil engineering works, including building information modelling (BIM) – information management using building information modelling.
- BS 1192–3:2014 – Specification for information management for the operational phase of assets using building information modelling.
- BS 1192–4:2014 – Collaborative production of information Part 4: Fulfilling an employer's information exchange requirements using COBie.
- Uniclass 2015.
- PAS 1192–6:2018 – Specification for collaborative sharing and use of structured health and safety information using BIM.

<Other standards and specification to be added here.>

If any of the standards detailed above or throughout this document are superseded during the project, the lead appointed party shall provide the appointing party with a report detailing the change in standard and any implications that the adoption of these changes will have for the project.

The revised standard can only be implemented following an explicit agreement from the appointing party.

3.1.2 Information identification conventions

Information identification conventions (naming conventions) are an essential part of the production of information. They allow easy identification of the data, such as information type, the originator and the area of the project that information relates to, without opening the information container.

Provide references to all relevant naming conventions, either internal or external standards.

To realise true project efficiencies, it is essential that information containers be easy to locate and identify, without being reliant on the structure of the common data environment (CDE). The use of a consistent information container identification convention (naming conventions) is key to achieving this.

This section contains specific references to identification conventions for files, spaces and objects.

3.1.2.1 Information container identification

<The example below, Table 3.1 (Information container naming convention), demonstrates possible information container identification naming conventions (only); it is based on the United Kingdom's National Annex (NA). The applicable National Annex could be adopted.

Provide either a detailed explanation of the identification for information containers, spaces and objects/elements within your project or references to identification standards that should be adhered to.>

Information container identification conventions should follow the definitions outlined in ISO 19650–1:2018.

Each data field represents a specific property with an associated code, including the permitted number of characters for each.

Table 3.1: Information container naming convention

Field 1	Field 2	Field 3	Field 4	Field 5	Field 6	Field 7
Project	Originator	Volume or system	Level	Type	Discipline	File number
XXXX	XXX	XX	XX	XX	X	XXXX
Example:	*LT09-MML-00-XX-M3-C-0001*					

3.1.2.2 Common data environment (CDE) metadata requirements

Metadata is a fundamental part of the common data environment (CDE) management. Metadata helps to manage the information workflow. Identify metadata requirements, which will depend on the complexity of the project.

This section should specify the metadata that is to be assigned to all information containers within the common data environment (CDE).

Information containers should include a metadata field; this could be achieved via the common data environment (CDE) for metadata associated with file containers. The delivery team should describe how they will implement the following metadata requirements.

All files shall be populated with appropriate metadata in accordance with the requirements below.

<The example below demonstrates potential subsections that provide further information about metadata requirements, aligned with ISO 19650–2:2018, using the codification identified from the United Kingdom's National Annex (NA). An applicable National Annex could be adopted.>

Status and revision metadata

Information containers within the common data environment (CDE) shall be assigned the following, see Table 3.2: Metadata, status and revision metadata).

Table 3.2: Metadata

Status code	Description	Suitability	Revision
Work in progress (WIP)			
S0	Work in progress	N/A	P01.01, P0*n* etc.
Shared (non-contractual)			
S1	Suitable for coordination	For coordination	P01, P0*n* etc
S2	Suitable for information	For information	P01, P0*n* etc
S3	Suitable for review and comment	For comment	P01, P0*n* etc.
S4	Suitable for stage approval	For acceptance	P01, P0*n* etc.
S6	Suitable for PIM authorisation	Preliminary revision	P01, P0*n* etc.
S7	Suitable for AIM authorisation	Preliminary revision	P01, P0*n* etc.
Published documentation (contractual/completed)			
A1, A*n*	Authorised and accepted	For construction	C01, C0*n* etc.
CR	**As constructed record document**	**As built**	**C01, C0*n* etc.**

Security classification

Security classification codes help to manage information containers that require restricted access.	All project information shall be treated with confidence. The project security requirements have been identified in the information requirements. The specified security classification should be assigned to the relevant information container. These metadata codes are to determine the information's visibility within the common data environment (CDE) and throughout the project; the delivery team are to outline their approach to complying with the security requirements of this project.

<The example below, Table 3.3: Security metadata), demonstrates possible security classification; it is important that this section be modified to suit both project and/or national requirements.>

Table 3.3: Security metadata

Code	Title	Description
PA	Publicly Available	Information approved for publication outside the appointed party information system.
IO	Internal Use Only	Information for appointing party {client name} only and authorised appointed party.
CI	Confidential	Information that is commercially or operationally sensitive, and disclosure or loss could have an impact on the appointed party businesses, not limited to financial or reputational damage.
LP	Legally Privileged	Legal professional privilege protects confidential communications between lawyers and clients.
SC	Strictly Confidential	This refers to information that is commercially or operationally sensitive, and disclosure would have a significant impact on the appointing party's business, its assets or individuals.
PS	Price Sensitive	'Inside information' in the UK and 'material non-public information' in the US.
CNI	Critical National Infrastructure	Information that relates to critical national infrastructure systems and processes utilised for the safe, secure and reliable transmission of electricity and gas.

Information classification

Provide references to the information classification standards to be adopted for information containers and model elements.	To assist with the identification of information containers and model elements, it is important that the relevant information classification requirement that complies with the information requirements be adhered to. Provide a methodology for incorporating these classifications in line with information requirements.

3.1.3 Method of assignment for level of information need

It is important that every delivery team member understands exactly what information they are responsible for producing, which includes how much data and graphical detail are required at each project stage.

This section specifies the level of information need (LOIN) standard that is required for specific information deliverables.

3.1.3.1 Level of detail (LOD) and level of information (LOI)

<Example of possible level of detail (LOD) and level of information (LOI) requirements, which could be replaced with a reference to an applicable standard.>

To articulate the specified level of information need, the following properties have been assigned to information within the responsibility matrix:

- Level of detail (LOD) refers to the amount of detail shown in the graphical digital representation, at a particular stage of the project.
- Level of information (LOI) refers to the amount of information (data) contained/associated with the model at a particular stage of the project.

Both the level of detail (LOD) and level of information (LOI) will increase through the life cycle of a project, potentially at different rates, and they are therefore specified separately. These shall be defined using the NBS definitions library available at https://toolkit.thenbs.com/definitions

3.1.4 Data authoring

Consider which native file formats will be required in order for the appointing party to utilise the information model.

The delivery team should state their planned authoring software and version for all information containers in order to mitigate any potential interoperability issues, impact and disruption.

It is fundamentally important that all task teams that plan to use different software from those listed in the table below clarify their procedure to enable complete collaboration and interoperability for all relevant information containers.

The lead appointed party is responsible for procuring, testing and implementing any required IT infrastructure, hardware and software required for activities within their scope.

<The example below, Table 3.4 (Preferred software authoring tools), demonstrates possible data authoring requirements in a table format that provides a list of desirable software for model and drawing authoring.>

Table 3.4: Preferred software authoring tools

Discipline	Software	Year	Version	Format
Architecture	Software X	2019	X.1	XYZ
Civil	-	-	-	-
Structural	-	-	-	-
M&E	-	-	-	-
Drainage	-	-	-	-

To support the use of, and access to, information for all project stakeholders, the following guidelines shall be met:

- Individual information containers shall not exceed 250Mb.
- Information containers shall not contain any geometry or information greater than the level of information need (LOIN) requirement defined in the responsibility matrix.

3.1.4.1 Data exchange formats

Specify the file formats required for the information containers that the delivery team is required to comply with.

It is important to understand how you intend to use the information. For instance, reports may only need to be issued in PDF format for review and comment, whereas schedules may need to be in both PDF format for version control and XLS format for analysis of the data.

Information is required to be exchanged in the specified formats at agreed stages in the programme. The formats of each file type are defined below.

Where there is a requirement to exchange information in a format other than those prescribed, the delivery team shall provide details of how they will address interoperability issues.

<The example below, Table 3.5 (Required exchange formats), demonstrates possible data exchange formats.>

Table 3.5: Required exchange formats

Type	Native file required formats	Version	Rendition required formats
Project schedule, Gantt charts	XLS(X) / PPT(X) / XML / MMP etc.	2018	PDF
3D CAD models	XYZ	2019.1	PDF, IFC
CAD drawings	XYZ	2019.1	PDF
GIS models	XYZ	2020	PDF
Cost plans	XLS(X)/CSV, etc.	2018	PDF
Programmes	XLS(X)/PPT(X)/XML/MMP, etc.	2018	PDF
Photos, videos, animations	.JPG/AVI/MP4, etc.	-	-

3.1.5 Information software platforms

To ensure that the information containers will be functional on your organisation's internal systems, it is important to provide a list of the software platforms that you intend to use.

The software platforms identified below will be used by the appointing party throughout the project life cycle and into operation. The delivery team is required to take them into account when responding to the information requirements.

The appointing party will be using the following platforms and versions across their projects.

<The example below, Table 3.6 (Information software platforms), demonstrates proposed information software platforms. Outline what systems are to be utilised by your organisation, including version requirements, where applicable.>

Table 3.6: Information software platforms

Purpose	Software/platform	Version
Data management system (e.g. common data environment (CDE))	Y Software	Y.2
Drawing and model viewers	<Software name>	<Software version>

If the delivery team do not wish to use these specific software solutions for the delivery or production of project information, they should recognise the above listed platforms and identify how they will exchange information with these platforms.

Any restrictions when interfacing with the above systems should be raised with the appointing party prior to using systems other than those listed here. These limitations shall include:

- Access to systems and software, as well as licensing restrictions;
- Hardware restrictions;
- Security restrictions; and
- Network restrictions and integration issues.

3.1.6 Information model quality

Provide the minimum quality assurance requirements that each aspect of the information model should adhere to.	Task team members shall execute the following quality control (QC) procedures.

<The example below, Table 3.7: Quality requirements), demonstrates a possible quality assurance and quality control methodology that may be adopted in table format. Ensure that the minimum expectation of all information is outlined.>

Table 3.7: Quality requirements

Information container aspect	Quality requirements
Geometrical model files	Spatial integrity information models shall not be accepted if deemed unsuitable: • All items are to conform to their level of detail (LOD) requirements within the responsibility matrix. • All drawings shall be derived from geometrical models to maintain accuracy and coordination.
Model spatial integrity	The following rules shall apply to the model spatial integrity: • Space definition – bounding boxes used to represent spaces and zones shall match architectural requirements and data values. • All walls shall be properly joined to prevent spaces being incorrectly defined. Bounding boxes of spaces shall not conflict. • Spatial information shall be generated and associated with bounding elements (walls, doors, windows, floors, columns, ceilings).
Material integrity	<Specific quality requirements>

3.2 Information production methods and procedures

The different methods of generating data and information can potentially impact its functionality. Determine the information production methods and procedures. This could include responsibilities, workflows and approval processes.	The following information production methods and procedures are to be adhered to on this project.

<Define information production methods and procedures, as specified within ISO 19650–2:2018, 5.1.5, which should reflect the purpose and functionality required for the information deliverables.>

3.2.1 Information management functions

To prevent poor information management, it is important that everyone involved in the project understands their information management function responsibilities.	This section allocates the responsibility for each member involved in information management activities within the project. The following principles apply to all building information modelling (BIM) roles and responsibilities: • Information management is part of everyone's job; • These tasks can be performed by more than one individual; • An individual can perform more than one task; • Individuals must be competent to undertake these tasks; • Individuals must have the authority to undertake these tasks. These do not negate any design responsibilities.

<ISO 19650–1:2018 Annex A, Table 3.8 (Information management responsibility matrix), provides an RACI (responsible, accountable, consulted and informed) matrix for the information management functions. If adopted, this should be completed to identify the delivery teams' responsibilities. This table could be expanded or reduced to suit; ensure that it includes only the relevant activities for the project.>

Key

R	Responsible for undertaking activity
A	Accountable for activity completion
C	Consulted during activity
I	Informed following activity completion

Table 3.8: Information management responsibility matrix

Information management activity	Appointing party	Third party	Lead appointed party	Appointed party
Appoint individuals to undertake the information management function.				
Establish the project's information requirements.				
Establish the project's information delivery milestones.				
Establish the project's information standard.				
Establish the project's information production methods and procedures.				
Establish the project's reference information and shared resources.				
Establish the project's common data environment.				
Establish the project's information protocol.				
Establish the appointing party's exchange information requirements.				
Assemble reference information and shared resources.				
Establish tender response requirements and evaluation criteria.				
Compile invitation to tender information.				
Nominate individuals to undertake the information management function.				
Establish the delivery team's pre-appointment BIM execution plan (pre-BEP).				
Assess each task team's capability and capacity.				
Establish the delivery team's capability and capacity.				
Establish the delivery team's mobilisation plan.				
Compile the delivery team's tender response.				
Confirm the delivery team's BIM execution plan (BEP).				
Establish the delivery team's detailed responsibility matrix.				
Establish the lead appointed party's exchange information requirements.				
Establish the task information delivery plan(s).				
Establish the master information delivery plan.				
Complete the lead appointed party's appointment documents.				
Complete the appointed party's appointment documents.				
Mobilise resources.				
Mobilise information technology.				
Test the project's information production methods and procedures.				

Information management activity	Appointing party	Third party	Lead appointed party	Appointed party
Check availability of reference information and shared resources.				
Generate information.				
Undertake quality assurance check.				
Review information and approve for sharing.				
Information model review.				
Submit information model for lead appointed party authorisation.				
Review and authorise the information model.				
Submit information model for appointing party acceptance.				
Review and accept the information model.				
Archive the project information model.				
Capture lessons learned for future projects.				

3.2.2 Information collaboration process

Define the expectations for collaboration on this project and describe the relevant collaboration processes. This should include information exchanges and meetings for the whole delivery team.

Collaboration of all project information is key to effective project delivery. Collaboration is enabled by the project tools, for example, the common data environment (CDE), but it is made effective by the culture and tone set by the leadership team.

Improved processes for sharing information should not suppress traditional informal collaboration such as holding meetings but rather provide efficiencies by forming a ‘single source of the truth’.

The following subsections outline the project’s collaboration.

3.2.2.1 Common data environment (CDE) workflow

Outline the common data environment (CDE) procedures for the project. If the common data environment (CDE) is being hosted by the appointing party, a detailed description of the information exchange process should be provided. If it is to be hosted by others, provide an overview of the minimum workflow requirements that they are expected to meet.

The appointing party **{lead appointed party/appointed party}** will be managing the common data environment (CDE) and provide access to the delivery team, meeting any project security requirements. All information containers (i.e. reports, drawings, models, specification) will be shared via the common data environment (CDE) solution. Information exchanges are to be performed as per the prescribed workflows below.

<The example below demonstrates a high-level common data environment (CDE) workflow, which could be adopted or modified to suit your project needs. Ensure that each expected procedure is outlined, including responsibilities, where appropriate. It is expected that the lead appointed party may wish to expand this section following their appointment.>

Figure 3.1: Common data environment (CDE) workflow) below illustrates the process overview that the delivery team must use for the creation, collaboration and issue of project information. This is required for consistency, ensuring that information is managed and delivered in a timely manner.

This workflow is based on the ISO 19650–1:2018, Figure 10 (Common data environment (CDE)) concept.

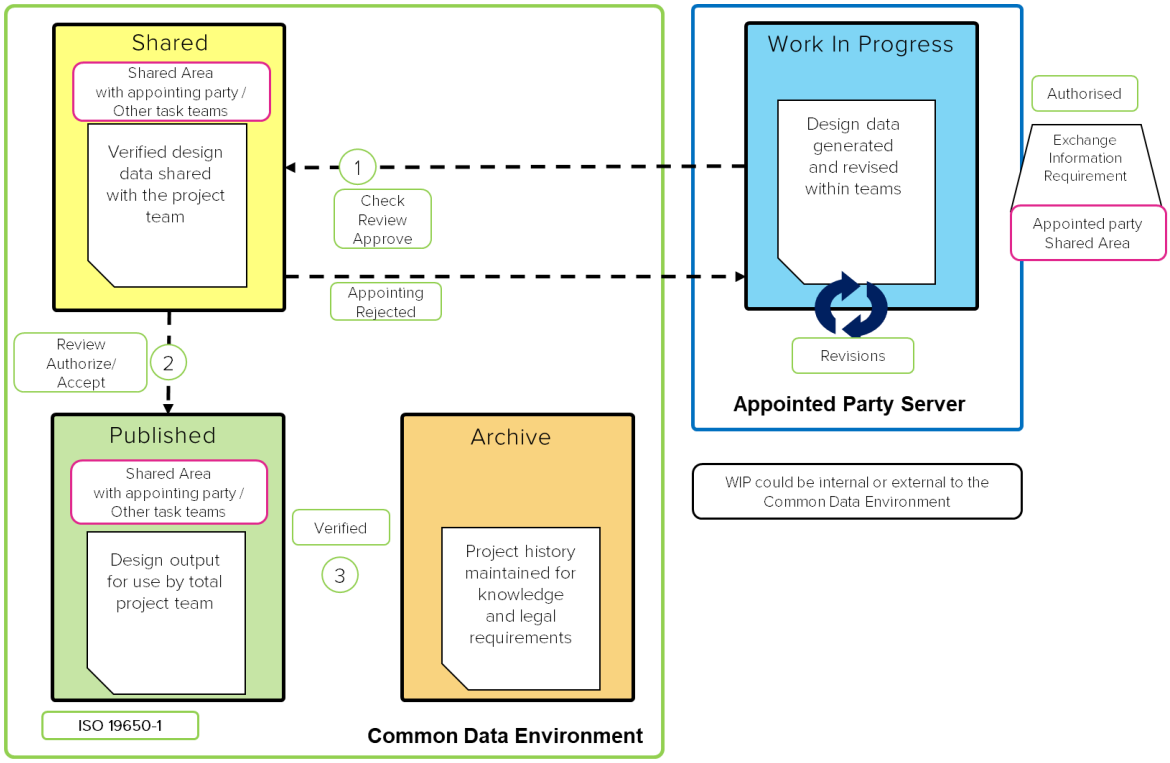

Figure 3.1: Common data environment (CDE) workflow

Diagram key:

1. The delivery team will produce their information either on a separate common data environment (CDE) solution or on their local server. When information is ready to be shared with the delivery team, the task team will perform their quality control procedures to ensure that information meets the information standard. If the information container is deemed suitable, it will be uploaded to the common data environment (CDE) as SHARED. SHARED information containers with an appropriate status may be used by the delivery team for collaboration purposes. These information containers are referenced by the relevant task teams to support the development of their own information. This process happens until a sufficient degree of information has met the requirements to fulfil an information delivery milestone.
2. When information is ready to be submitted for project stage completion at an information delivery milestone, it is uploaded to the common data environment (CDE) as SHARED with the appropriate status code (see Section 4.3.1), which informs the lead appointed party that the information container is ready to be authorised and accepted, if appropriate. Authorised/accepted information containers will be uploaded to the common data environment (CDE) as PUBLISHED; typically, PUBLISHED information containers will become the project information model (PIM).
3. ARCHIVE facilitates an audit trail of all the information containers shared and published throughout the project.

3.2.2.2 Information exchange frequency

Define the minimum frequency of information exchanges expected of the delivery team. This should include everything from coordination meetings to periodical graphical model sharing.	Collaboration requires regular, concise and effective communication. It relies on the delivery team being able to access the current version of all relevant information, which can only happen through consistent information exchanges.

3.2.2.3 Mobilisation

A mobilisation plan helps to ensure that everything is in place and working correctly before a project begins, which limits any potential delay to the project start date. The delivery team should identify all the training, tests and checks that will be performed before any project work begins.	Before project commencement, and when a new task team is appointed, the mobilisation activities below should be undertaken: - Software, hardware and network set-up procedure; - Software and platform training (common data environment (CDE) platforms and building information modelling (BIM) authoring and coordination software); - Software, platforms and hardware testing strategy.

3.2.2.4 Training

Every delivery team's combined building information modelling (BIM) experience will be unique, and each appointed party will be responsible for any training requirements that are identified in the delivery team's capacity assessment.

However, to promote consistency of project information standards, information production methodology and procedures, it is important that the lead appointed party provides training for the whole delivery team on these project-specific requirements.

In order to promote consistency of project information standards, information production methodology and procedures, training should be provided to the delivery team on the information requirements only, by the lead appointed party.

This will be provided through team inductions and/or the provision of appropriate training material. This will cover:

- Overall software platforms architecture;
- Common data environment (CDE) protocols (including structure and usage);
- File, space and element identification conventions;
- Levels of information need (LOIN);
- Coordination and collaboration process;
- Information production workflows;
- Graphical outputs;
- BIM responsibilities;
- Document change control procedures;

  Metadata and master information delivery plan (MIDP).

<The example below demonstrates possible elaboration of training prerequisites.>

Team inductions should occur when a new task team joins the project and/or after any subsequent changes to building information modelling (BIM) documentation.

Records of previous and ongoing training will be submitted to the appointing party upon request. This can include a register of completed training, as well as sample material used in the delivery of training.

3.2.3 Authorisation and acceptance process

The common data environment (CDE) workflow provides an overview of how information should be managed. This section should provide a detailed description of the authorisation and acceptance processes.

When the delivery team has completed an information container, they shall submit it for authorisation and acceptance.

The following outlines the authorisation and acceptance processes that the appointing party shall undertake on this project.

<Below is an example of possible authorisation and acceptance processes that align with the ISO 19650 standard series that may be adopted, if suitable for the project needs. Provide a step-by-step guide that instructs the prospective delivery team how to submit information and the various outcomes.>

Authorisation

1. The task team will upload the information as SHARED with the appropriate status code (in line with Section X.X.X), which identifies that the information container is suitable for lead appointed

party authorisation. If the common data environment (CDE) does not have the functionality to notify the lead appointed party of the information status and upload, it will be the responsibility of the originator to inform them of the intent to submit information for authorisation.

2. The lead appointed party will verify the information/work package against the master information delivery plan (MIDP), appointing party exchange information requirements and lead appointed party exchange information requirements:
    a. If the information does not conform to the information requirements for that information exchange, this will be identified within the common data environment (CDE) feedback function, and this should notify the originator that the information requires amendments before resubmitting it to the lead appointed party for authorisation.
    b. If the information is authorised, the lead appointed party will ask the relevant task teams to submit the information, via the common data environment (CDE), for appointing party acceptance, if applicable.

Acceptance

3. The task team will upload the authorised information as SHARED with the appropriate status code (in line with Section X.X.X), which identifies that the information container is ready for appointing party authorisation. If the common data environment (CDE) does not have the functionality to notify the appointing party of the information status and upload, it will be the responsibility of the lead appointed party to inform them of the intent to submit information for authorisation.
4. The appointing party will verify the information/work package against the master information delivery plan (MIDP) and appointing party exchange information requirements:
    a. If the information does not comply with the information requirements for that information exchange, the relevant metadata will be applied to all information containers associated with this information exchange via the common data environment (CDE). This should notify the information originator that the information requires amendments before resubmitting it to the appointing party for authorisation.
    b. If the information is authorised, the party responsible for managing the common data environment (CDE) will apply the relevant metadata so that these information containers are considered PUBLISHED.

Failure to authorise or accept deliverables according to the master information delivery plan (MIDP) will not imply an additional variation/compensation to the contract.

3.2.4 Spatial coordination strategy

Outline the expectations for how the delivery team are to ensure a coordinated design through spatial coordination. Specify how the delivery team should illustrate the spatial coordination workflow and the methodology of reporting clash resolutions.	Throughout the project, the delivery team are expected to coordinate the information that they exchange in order to mitigate the potential of site rework. This will be a combination of information planning, including the federation strategy and clash renditions. The delivery team should define the procedures to ensure that spatial coordination is achieved, including timeframes, responsibilities and reporting.

3.2.5 Legacy information and shared resources requirements

Reference any legacy information or shared resources that are to be utilised on this project. Specify their intended use, permissions and location.	To assist with both the tender process and the collaboration of information production throughout the delivery phase of the asset, the following legacy information and shared resources have been provided.

<If any legacy information (past planning applications, etc.) or shared resources would assist with the development of the project, they should be made available to the delivery team. Use this section to provide the information reference and its intended usage.>

All legacy information and shared resources are located within the common data environment (CDE) and shown in Table 3.9 (Legacy information and shared resources).

Table 3.9: Legacy information and shared resources

Reference	Information name/ description	Format	Origin	Allowed usage
LT09-MML-00-XX-M3-C-0001	Existing infrastructure model	XYZ	MML	For reference only
<Insert information container identifier>	<Insert information name or description>	<Format>	<Information originator>	<Insert information container identifier>

3.2.6 Capture of existing asset information

Describe how the delivery team are to capture existing asset information throughout the project. This may be through the use of traditional survey techniques or more sophisticated techniques such as 3D scanning and photogrammetry.	Any existing project/asset information that is required should be captured using the following methods and procedures.

<Outline the method for capturing existing information relating to the project.>

3.2.7 Information container breakdown structure

The information container breakdown structure is an important model coordination management tool. The appointing party should outline how the information model should be organised and divided. The appointing party can also decide to delegate this part of the process to the lead appointed party.

The information container breakdown structure should be developed during the information planning activities. It should explain how the information model is intended to be divided into sets of information containers.

The information container breakdown structure explains the methodology to manage interfaces associated with the asset during its delivery phase.

<The example below demonstrates possible information container breakdown structure requirements. These could be modified to suit project needs.>

The information container breakdown structure should divide the project information model (PIM) into discipline-specific subsets such as:

- Civil engineering
- Landscape
- Architecture
- Structural
- Mechanical
- Electrical

If more breakdown/subsets are required because of the anticipated file size or project complexity, this should be identified in proposed amendments to the information standard as part of the tender response by the prospective lead appointed party.

The information container breakdown is considered the first step to spatial coordination within the project; it should explain the methodology to manage the interfaces associated with the different disciplines during the project, as well as any intended federations of information container breakdowns.

Figure 3.2 (Volume strategy; source: ISO 19650:2)**Error! Reference source not found.** provides a federation strategy example in case of a linear infrastructure project. The different discipline areas are depicted in different colours.

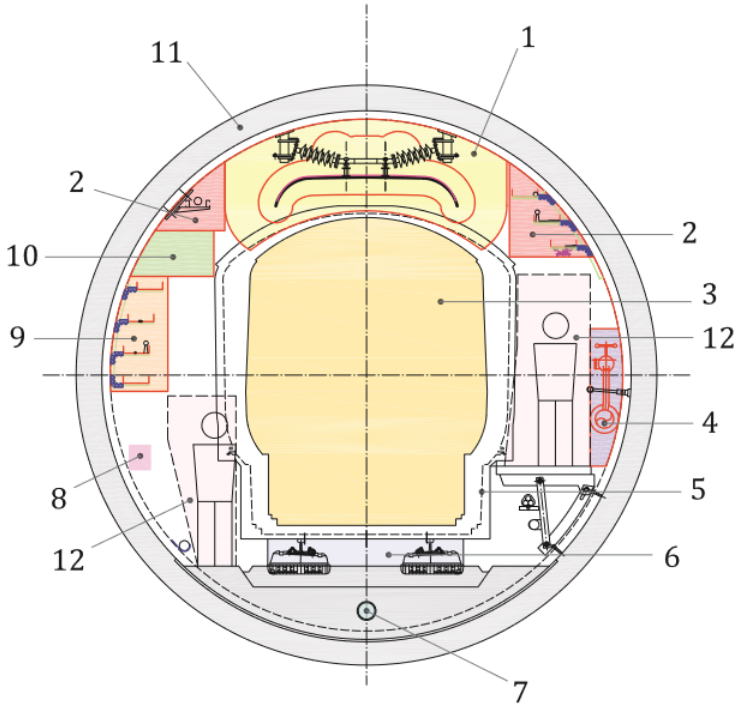

Figure 3.2: Volume strategy; source: ISO 19650:2

3.2.8 Lessons learnt

To maximise the success of projects, as well as mitigating their failures, it is important that feedback/lessons learnt be integrated into project activities.

Specify when lesson learnt reviews should occur and how the feedback should be adopted in the current project, if appropriate.

To maximise the success of projects, as well as mitigating their failures, it is important to obtain feedback and recommendations from the whole delivery team.

This will take place during lesson learnt reviews, which should be conducted at the end of the project by the appointing party. All feedback should be reported to the appointing party. Any suggested adjustments to the current information requirements, information standard or information production methods or procedures should be reported to the appointing party, detailing the implications of adopting these changes.