



Module 5

Data Protection

Digitalisation in Construction



24
partners

12
countries

Date of Event

*Author/ **Institute***

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To equip the learner with the basic knowledge required to understand how to use and store digital data to ensure data protection and security, when communicating with others



1. Outline the **importance** of digital data protection, security and storage of information.(GDPR)
2. Outline the importance of **effective data management** during the BIM process.
3. List the **types of data** associated with BIM models (Graphical, non-graphical, documents) and give examples.
4. Outline the importance of establishing **who is responsible** for BIM model data
5. Outline the **requirements of a CDE system** in terms of data protection (licenses for access, secure login system, security requirements, recording, model viewer, audit trail, approval workflow).
6. Outline the process of **workflow approval** (Work in Progress, Shared, Published, Archive stages).





Topic 1 – Cyber Security

Topic 2 – Digital Data Management and Storage



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1. Cyber Security



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On 25 May 2018, the EU General Data Protection Regulation (GDPR) came into force and the risks of non-compliance are substantially increased from previous data protection legislation with the possibility of a company being fined 4% of its global annual turnover.

The GDPR applies to all organisations within the EU processing personal data, that is data relating to a living individual.



- Under the GDPR, businesses must ensure that personal data is:
 - processed lawfully, fairly and transparently
 - collected for specific, explicit and legitimate purposes (and not used for anything else)
 - adequate, relevant and limited to what is necessary
 - accurate and kept up to date where necessary
 - retained for no longer than necessary, and
 - kept secure.
- Construction companies will need to ensure that they **deal with the personal data** relating to their employees and workers **in the correct way** and any such data about their suppliers and clients, including **keeping documents for accountability purposes**.

Data controllers, that is the person or party that determines the purposes and means of the processing of personal data, must keep certain documents to demonstrate their compliance with the requirements.



- BIM, by its nature, relies on the exchange of electronic documents and data. The new role of **BIM Information Manager** or Coordinator is envisaged to manage this information exchange process
- The BIM objective is to have a fully integrated, collaborative process with models shared between the project team- a “single-source of information for any given project, used to collect, manage and disseminate all relevant approved project documents”
- Online platforms will increasingly play a critical role in successful BIM collaboration as they allow data from many different programmes to be shared across different organisations.



- The construction industry is becoming alive to the risk of cyber attacks on such an online platform and **the importance of a robust security system to protect data integrity and the project as a whole.**
- ISO 19650 provides for a BIM Information Manager. This role may form part of a wider set of duties under an existing appointment and is likely to be performed either by the design lead or the project lead, which could be a consultant or contractor at different stages of the project.

The ISO 19650 standard
is an international
standard for managing
information over the
whole life cycle of a built
asset using building
information modelling
(BIM)



The Construction Industry Council (CIC), supported by the BIM Task Group, has prepared guidance notes on the scope of services required of an Information Manager, and their responsibilities, on broad terms, can be summarised as follows:

- **Managing** the processes and procedures for information exchange on projects;
- **Initiating** and implementing the project information plan and asset information plan (to be agreed by the parties involved in the BIM project);
- **Assisting** in the preparation of project outputs, such as data drops (the BIM definition for submission of information and exchange);
- **Implementation** of the BIM protocol, including the updating of the model production and delivery plan.

The initial responsibility for the appointment of the Information Manager lies with the employer, who must ensure that there is an Information Manager appointed (whether by the employer or another party) at all times until completion of the project, save to the extent the responsibility is that of another project team member appointed by the employer.



- It is the responsibility of the Information Manager to agree and issue Information Requirements (IR) before agreements between the employer and the project team are concluded. The IR define:
 - How the model for the project must be developed (including which software versions will be used, and how the model will be coded);
 - The common data environment;
 - How files and layers will be organised;
 - The coordination system that will be used;
 - The spatial coordination and data drop requirements;
 - Archiving procedures, security requirements and access rights procedures.
- The above is not an exhaustive list.
- The Information Manager will have responsibility related to how the project information will be hosted, stored, operated and accessed – all of which are functions that are susceptible to a data breach.



- So the Information Manager's role involves establishing a Common Data Environment (CDE), setting up the software required for the information model, maintaining its integrity and, most critically, security standards.
- The responsibilities of an Information Manager must be clearly set out in their appointment to avoid any confusion in the event of a breach.



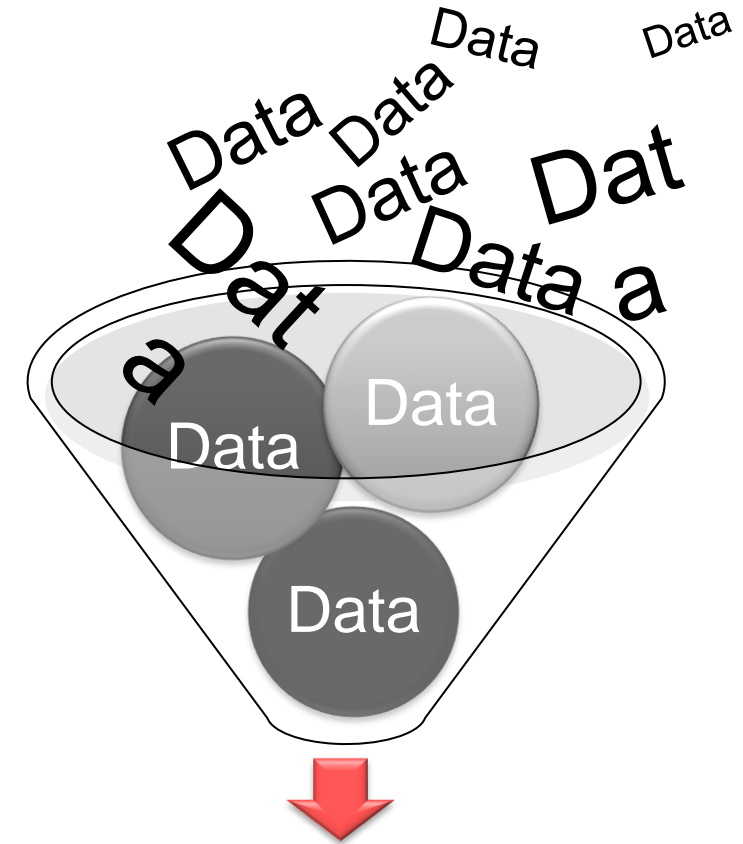


2. Digital Data Management and Storage



Information comes from data.

When data is processed, interpreted,
organized, structured and contextualized it
provides information.



Information



Information is used throughout the entire **LIFECYCLE** of a building or infrastructure project

DESIGN



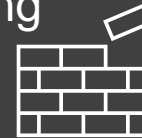
- Space programming
- Design coordination
- Design specification



CONSTRUCTION



- Planning
- Construction
- Commissioning



OPERATION



- Facility management /maintenance
- Reconstruction/Renovation
- Decommissioning
- Major re-programming



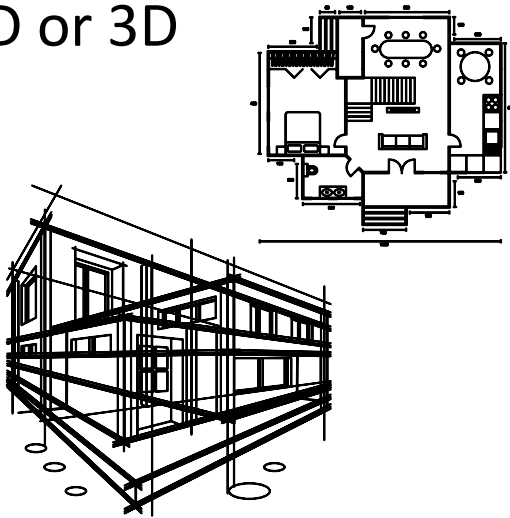
Types of Information



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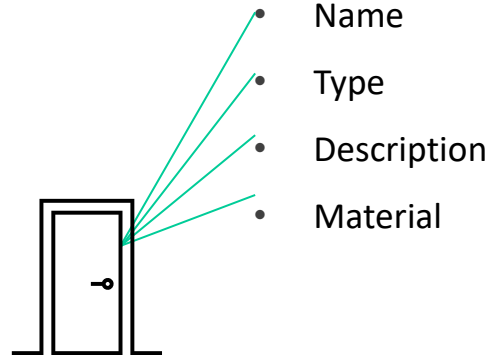
Graphical

2D or 3D



Non-Graphical

Digital attributes to the 2D or 3D objects



Documents

Examples:

- Specifications
- Schedules
- Bills of quantities
- Product manuals
- Certificates
- Warranties
- Contracts
- BIM Execution Plan (BEP)
- Employer's Information Requirements (EIR)



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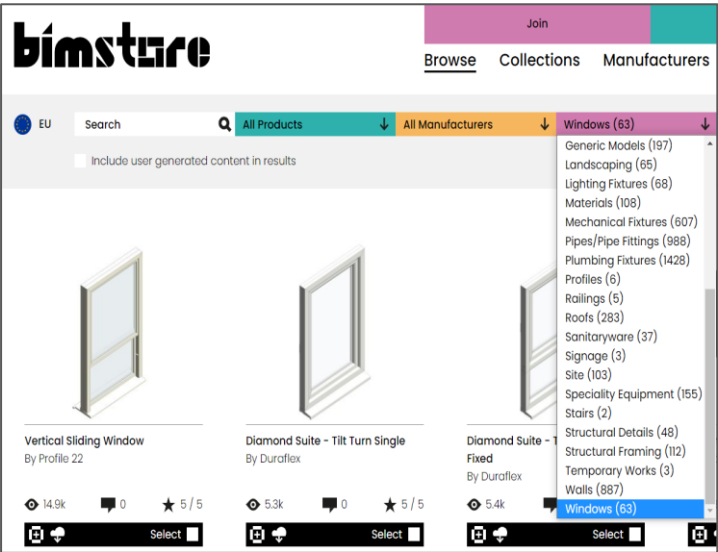
Information is often connected to the Building Information Model (BIM model) of the project.



- ✓ Checking dimensions and positioning is accurate and fast;
- ✓ Objects are parametric – modifications to the design are simplified;
- ✓ Visualising spaces and details is fast and easy;
- ✓ 3D printing based directly from the model;
- ✓ Ordering components directly from the model;
- ✓ Access to specifications of elements;



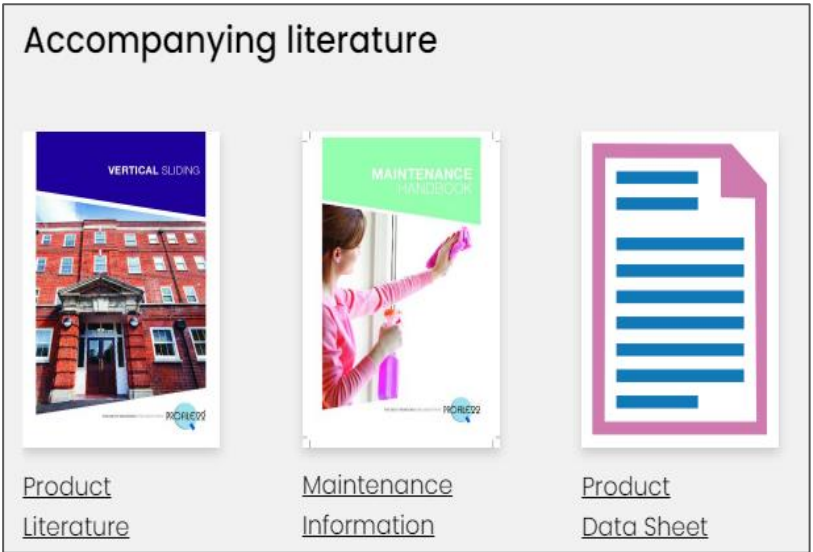
Example: A Window



Graphical

Default	Window_Windows-Profil_22-Vert
_BIMspec_GUID	0
_created by	Connor Laing
_current revision	1
_distributed by	www.bimstore.co.uk
Analytic Construction	Double glazing - domestic
Assembly Code	B2020100
Asset Type	Fixed
Base Frame Offset	85 mm
Classification Name	Uniclass 1.4
Created On	Feb 2015
Name	Vertical Sliding Window
Operation	Vertical Sliding
Product Brochure	www.profile22.co.uk/wp-content/uploads/2013/09/Vertical-Sliding-Window-System.pdf
Product Page URL	www.profile22.co.uk/commercial/products/window-systems/tully-reversible-windows/
Rough Height	0 mm
Rough Width	0 mm
Solar Heat Gain Coefficient	0.74
Thermal Resistance (R)	0.7100 (m²K)/W
Type Comments	Vertical Sliding Window
Type Name	Vertical Sliding Window
URL	www.profile22.co.uk/commercial
Visual Light Transmittance	0.81
Wall Closure	Both
Warranty Duration Unit	Years
Width	0 mm
Window Material	Windows_Glass_Clear

Non-Graphical



Images source Bimstore.co

Documents



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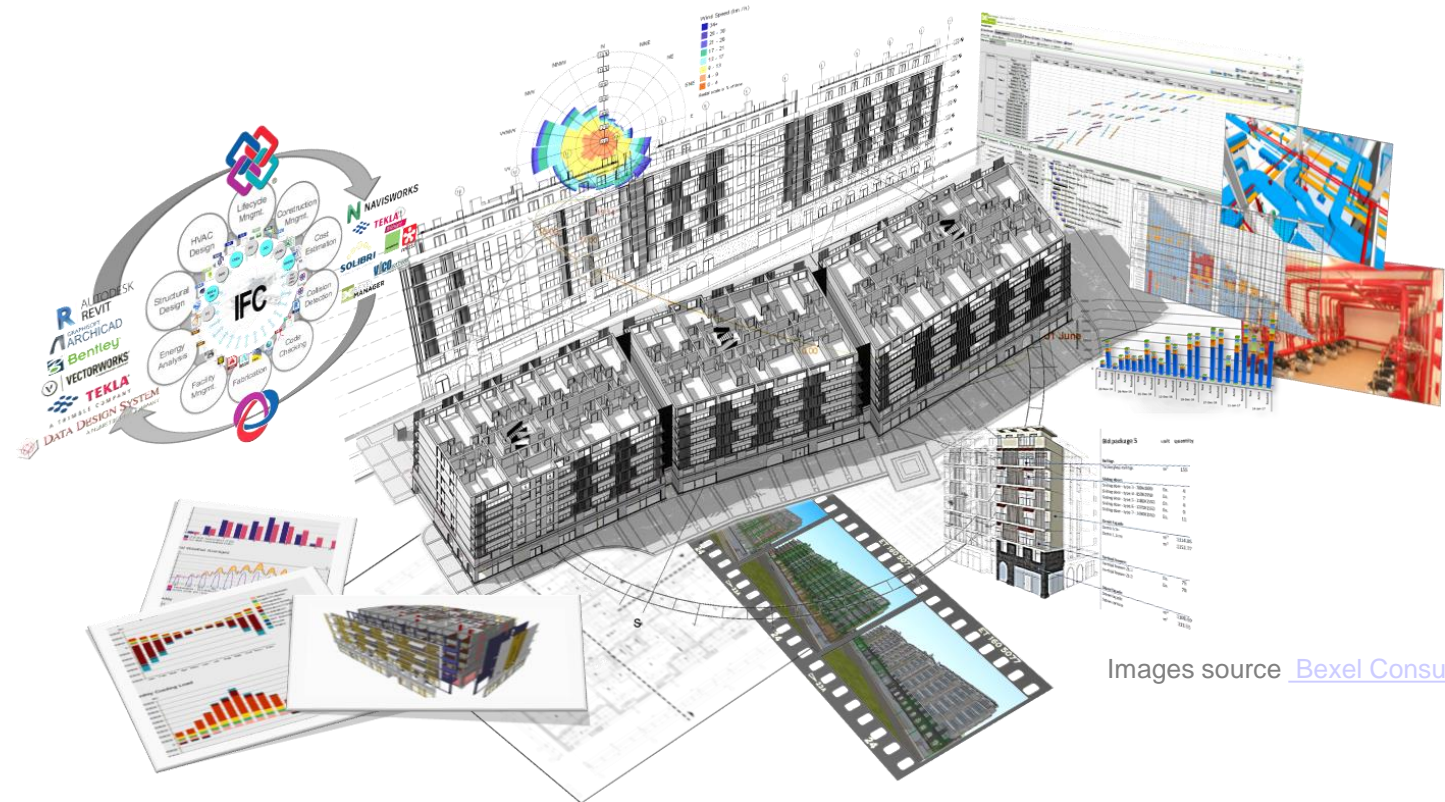
Exchange of Information



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Information is created by project participants using BIM software tools and specialized software tools for:

- Documents;
- Modelling;
- Parametric design;
- Data management;
- Communication;
- BIM on the construction site;
- Simulations;
- Issue management;
- Clash detection



Images source [Bexel Consulting](#)



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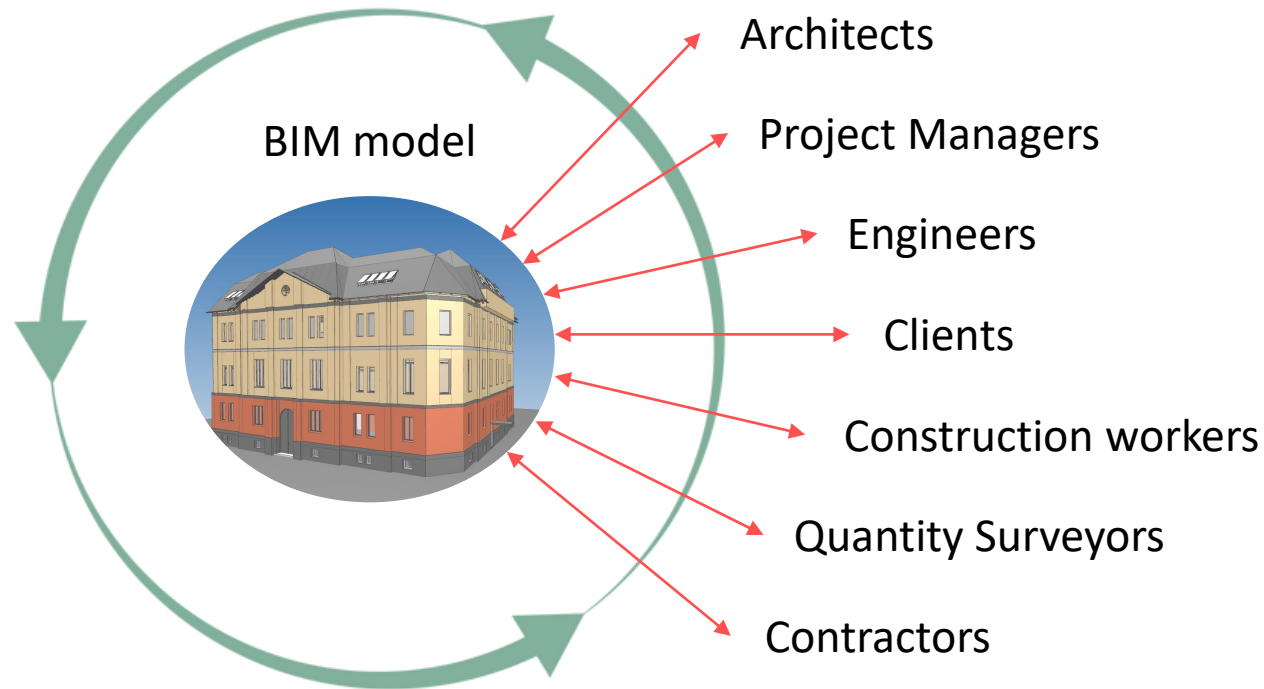


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Exchange of information

One of the main advantages of BIM is the communication between participants and the organization of all project information.

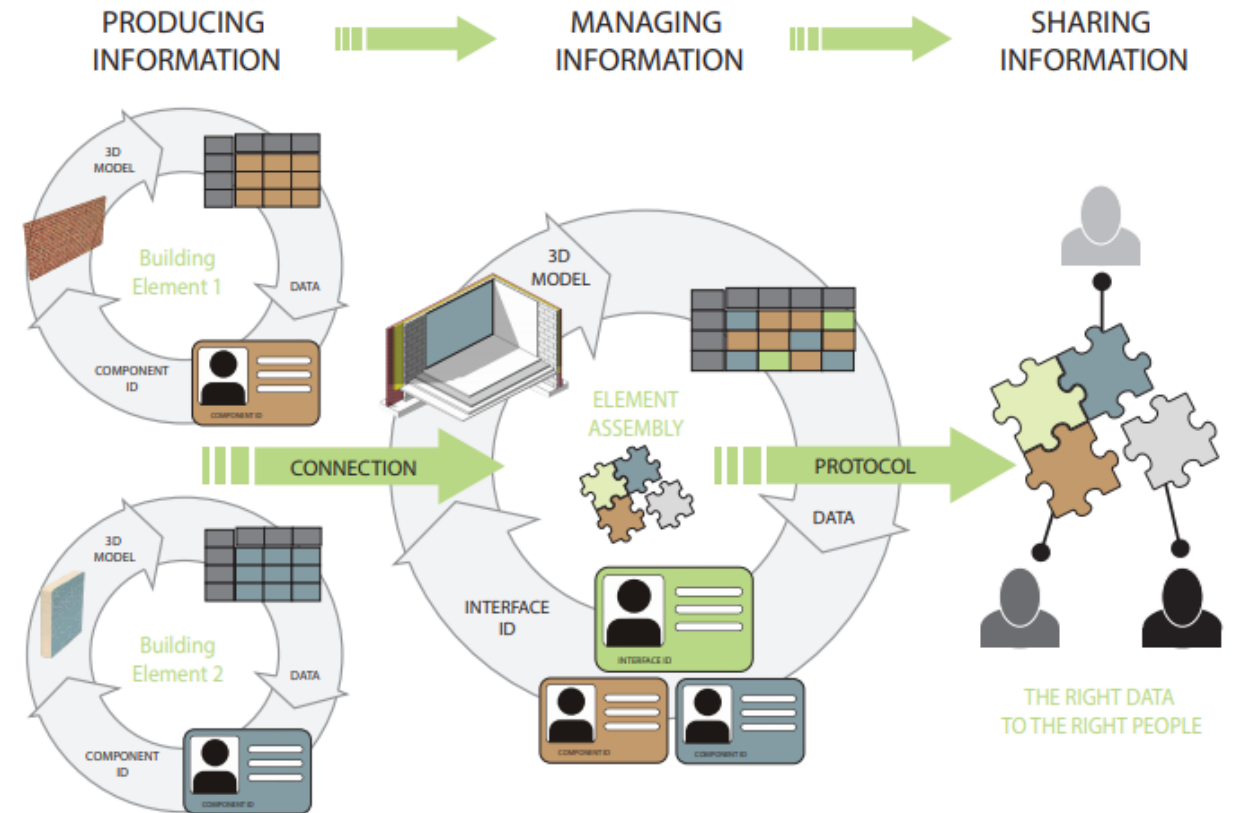


The BIM workflow is structured, and decisions, responsibilities and processes are transparent in terms of authorship and time.

It is important to mention that the access to the information can be limited (participants access the project in specific phases and/or only the parts where they are involved).

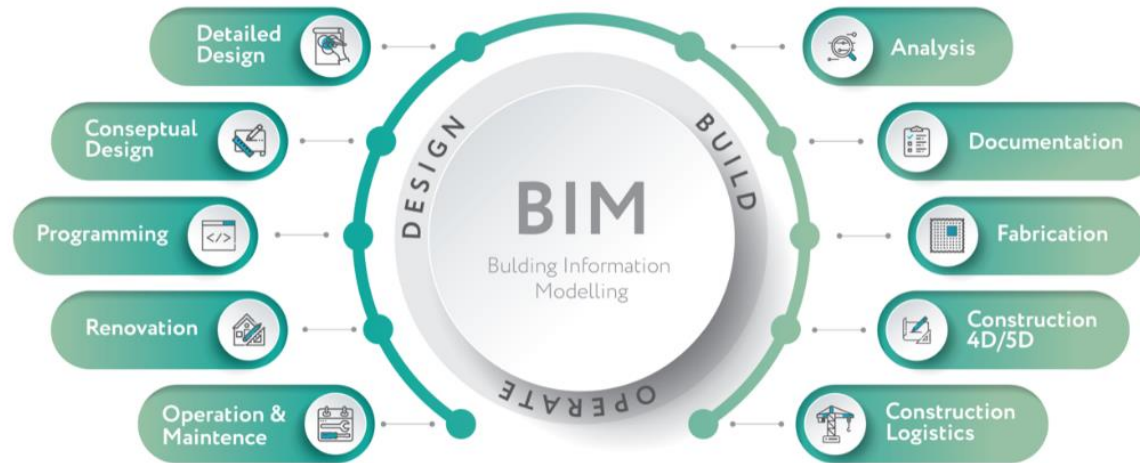


- As the core of BIM is not the geometry itself but rather more the information attached to it, **the key of a successful BIM process resides in the way we deal with information.**



Working in the cloud: CDE functions

- Protect ownership and authorship of models and shared information.
- Define the roles of the participants to establish permissions, responsibilities, obligations and rights for each team member.
- Guarantee the security and consistency of the data to ensure its traceability throughout the life of the construction.
- Enable visualisation and control of the federated model in standard formats.
- Serve to justify the delivery, validate and give conformity to the documentation delivered and previously required.
- Enable the distribution and coordination of project information.
- Favour better control over the versions, revisions and modifications made in the project.



BEP Overview

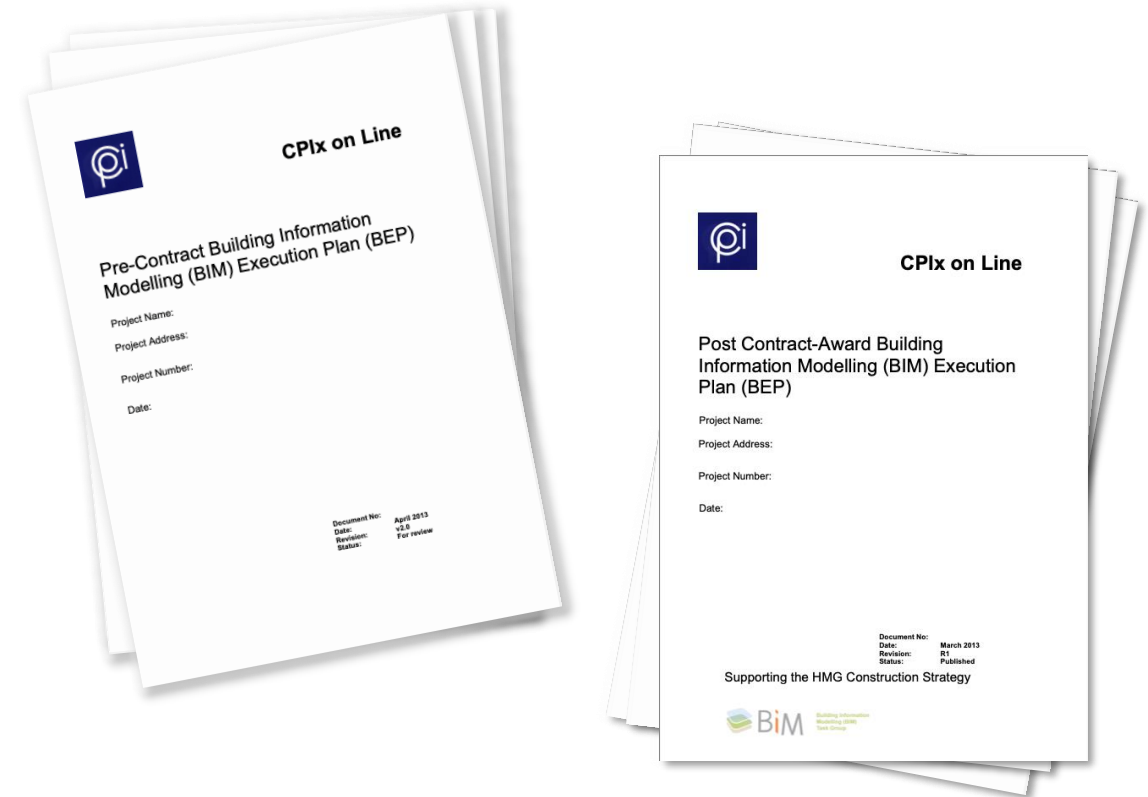


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BIM Execution Plan (BEP) is a guideline document which forms the basis for BIM collaboration

BEP is:

- A definition of organisational structures and responsibilities
- The framework for BIM performance
- A definition of processes and requirements for collaboration
- A description of unified approach for structures and elements



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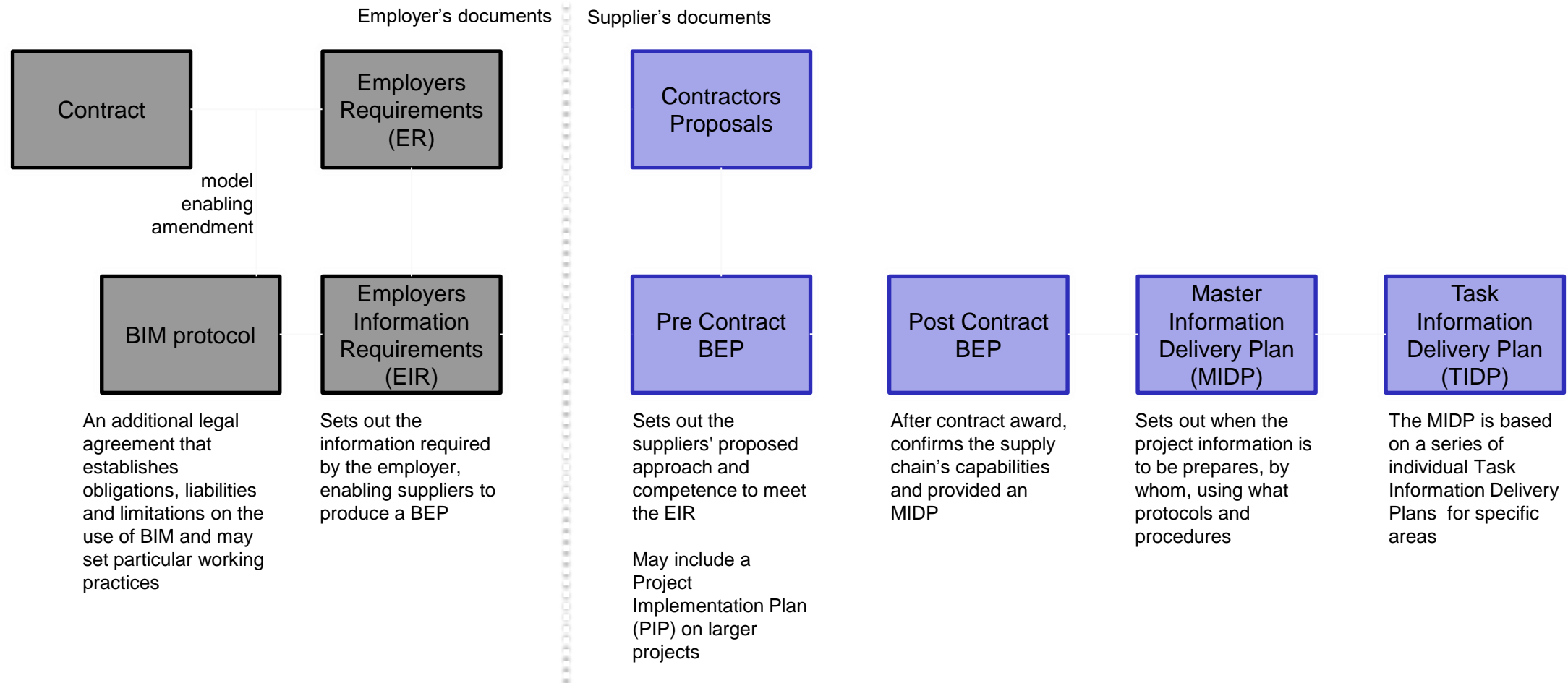
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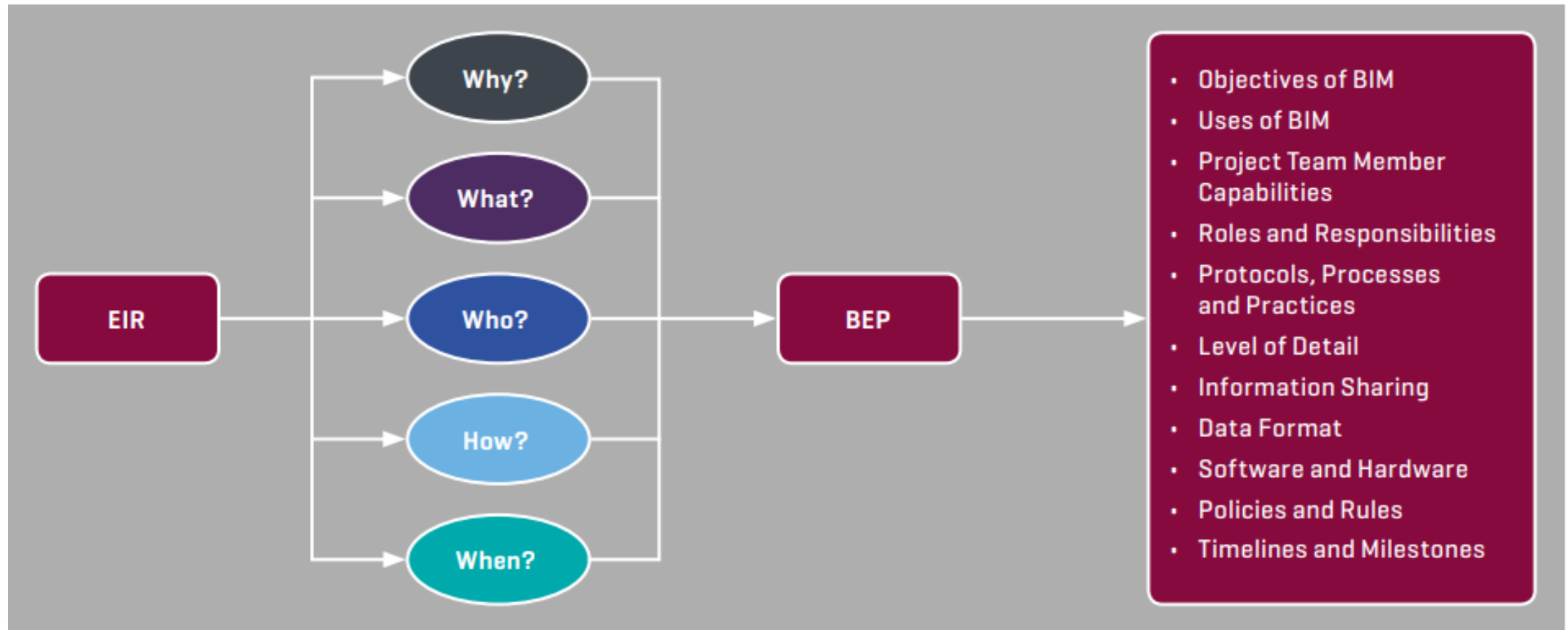
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BEP Development



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Source : <https://www.rics.org/globalassets/rics-website/media/knowledge/research/insights/bim-for-project-managers-rics.pdf>



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Creating a BEP



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How do you create a BEP?

Click on the image to watch the video



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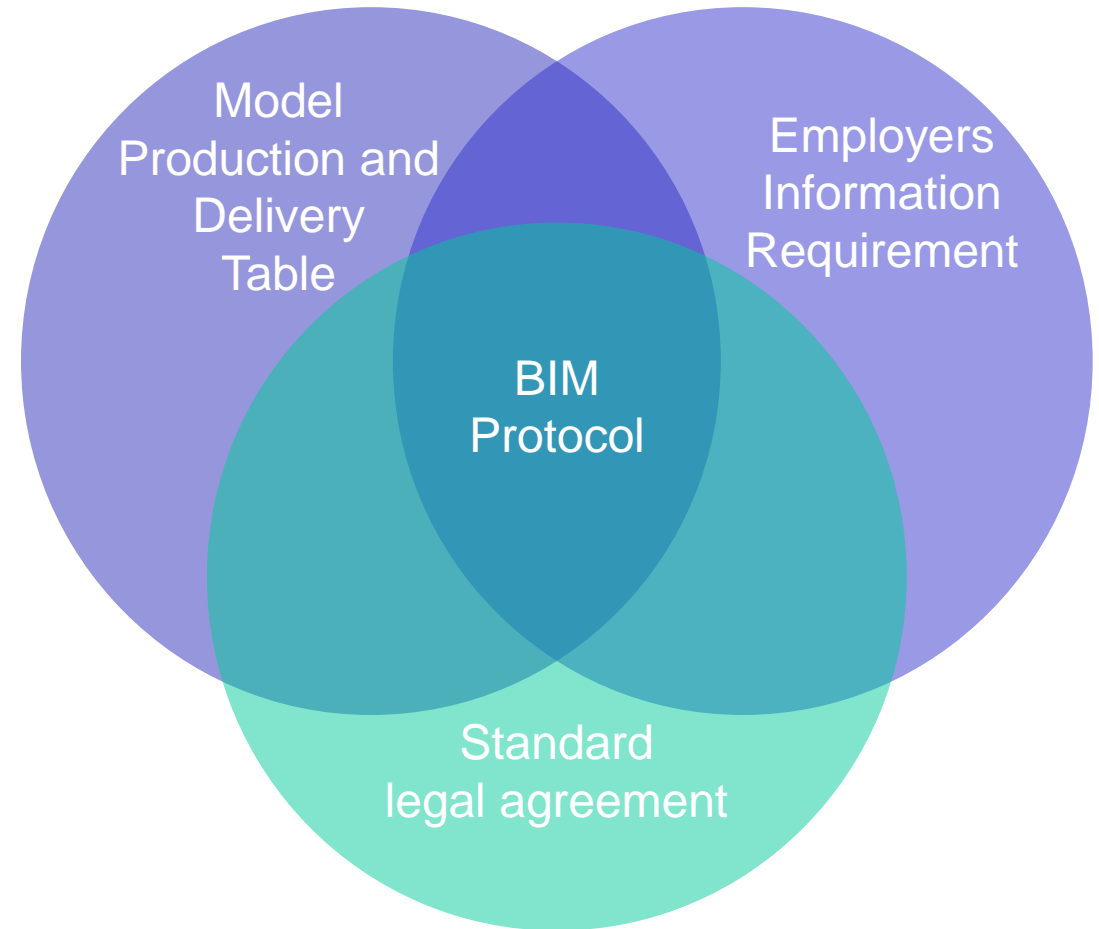


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BIM Protocol identifies building information models that are required to be produced by the project team and puts in place specific obligations, liabilities and associated limitations on the use of those models.

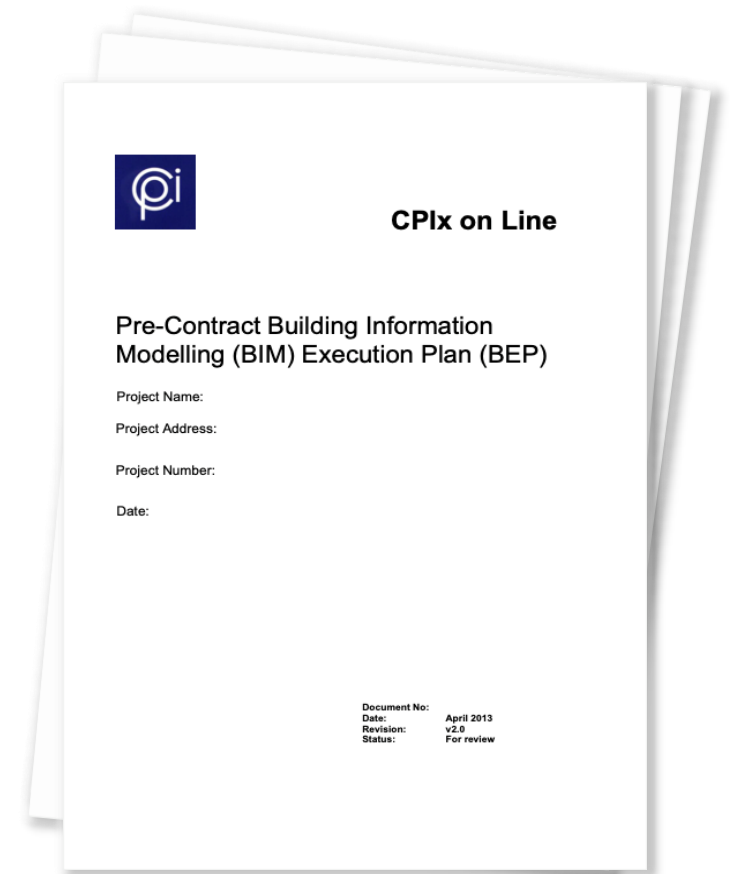
It is just part of a suite of standards, protocols and tools that underpin delivery to BIM Level 2 and is designed to be easy to apply. It may take the form of a supplementary legal agreement



The Pre-contract BEP demonstrates the supplier's proposed approach, capability and capacity to meet the EIRs.

It may include:

- ☐ A response to requirements of the EIR
- ☐ A Project Implementation Plan (PIP) setting out competence, capability and experience of potential suppliers to bidding for the project.
- ☐ Targets/ Goals for collaboration and information modelling
- ☐ Project milestones
- ☐ Project Implementation Plan (PIM) Strategy



A project implementation plan (PIP) is part of the tendering documentation, it sets out:

- ☐ The capability, competence and experience of potential suppliers bidding for a project,
- ☐ Quality documentation.
- ☐ Goals for collaboration and information modelling.
- ☐ Project milestones in line with the project programme.
- ☐ Delivery strategy



Project Implementation Plan (PIP)



Post-contract BEP

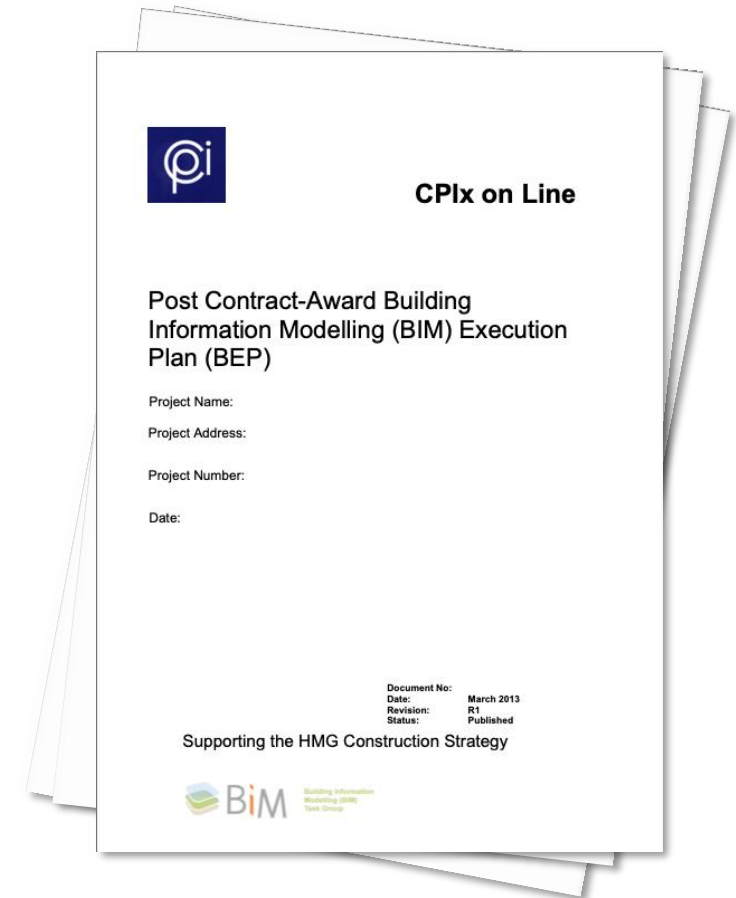


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The post-contract BEP will develop in detail over time as more members of the supply chain are appointed. It should include:

- ☐ A response to requirements of the EIR
- ☐ Revised PIP
- ☐ Responsibility Matrix
- ☐ Details of: Management Planning and documentation
- ☐ Methods and procedures
- ☐ A Task Information Delivery Plan (TIDP)
- ☐ A Master Information Delivery Plan (MIDP)

Adherence to the BEP should be monitored throughout the duration of the contract to ensure that the PIM is being developed in accordance with the MIDP and all relevant standards.



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Master Information Delivery Plan (MIDP)



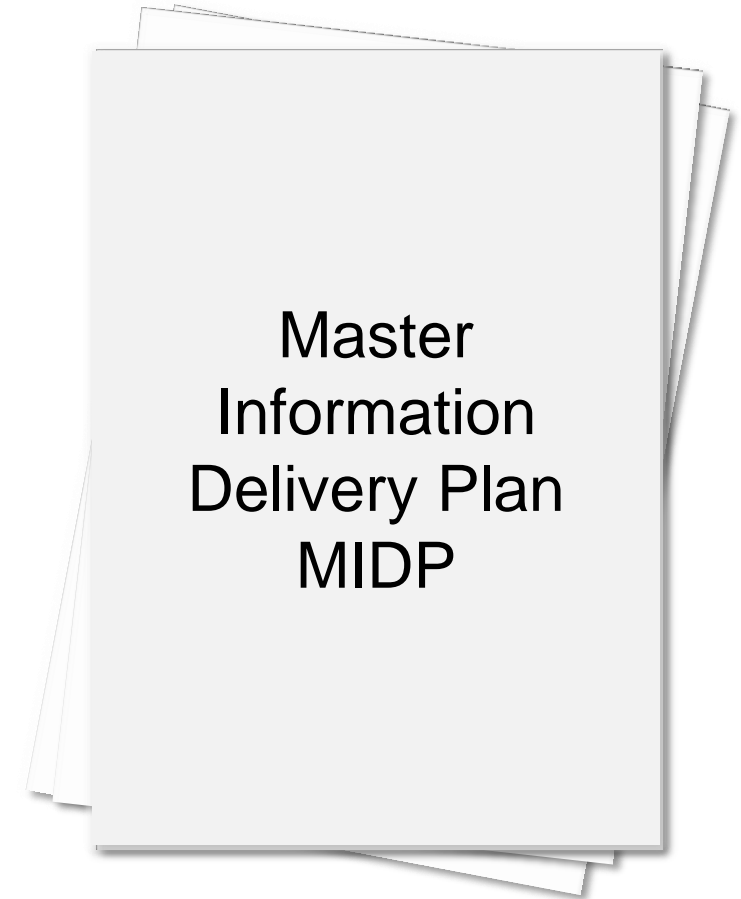
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WHAT

The master information delivery plan is the primary plan for the preparation of the project information (from the supplier's perspective) required by the employer's information requirements. It lists information deliverables, and sets out when project information is to be prepared, by whom, and using what protocols and procedures for each stage of the project.

WHO

Developed by the **project delivery manager**, working collaboratively with the **task team managers**. It is then used by the project delivery manager to manage the delivery of information during the project.



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Task Information Delivery Plan (TIDP)



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WHAT

Task information delivery plans set out the responsibilities for each individual information deliverable and are used to manage the delivery of that information

WHO

Individual **Task Managers** compile the relevant TIDPs and assist in the MIDP

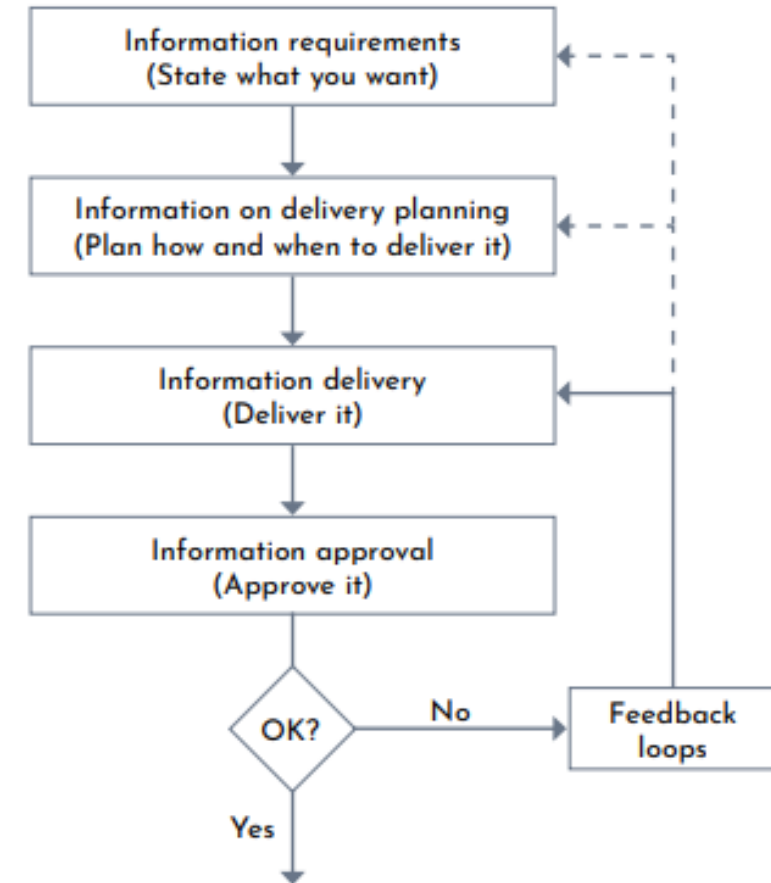


Figure 10: Information delivery process (ISO 19650-1 Figure 4)



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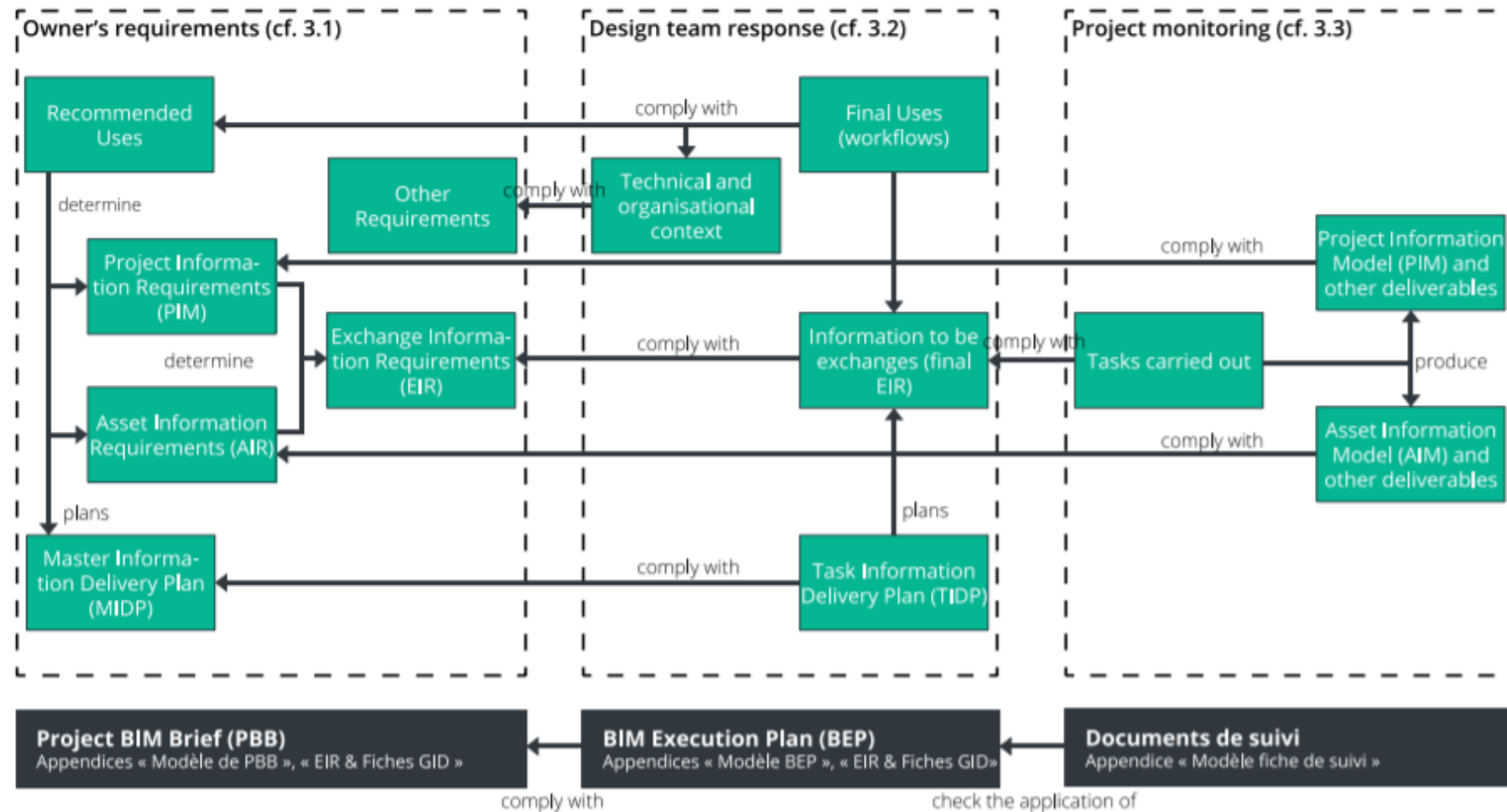
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Documentation summary



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Source : CRTI-B, BIM Application Guide Luxembourg: http://www.digitalbuilding.lu/content/1-guide-application-bim/Guide-BIM-Luxembourg_v1-0-EN.pdf



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Handover of the project

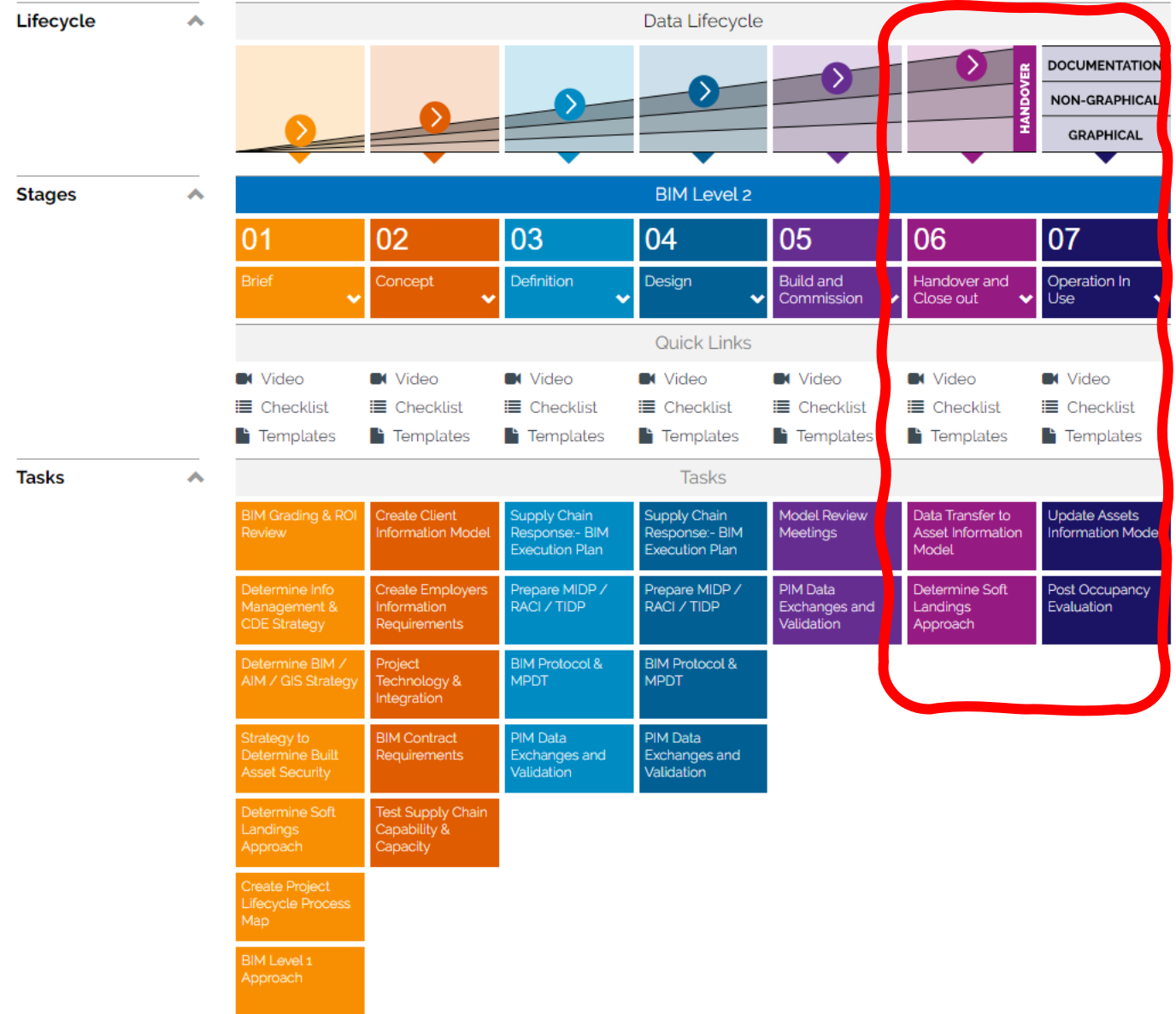


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Soft Landings refers to a strategy adopted to ensure the transition from construction to occupation is 'bump-free' and that operational performance is optimised.

Key areas for Soft landings:

- Roles and Responsibilities
- Focus on outcomes
- Aftercare and Post Occupancy Evaluation
- Performance Management
- Contracts and Procurement



Handover of the project



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Soft Landings checklist:

- ✓ Review of completed AIRs
- ✓ Environmental and energy logging review
- ✓ Building readiness programme established
- ✓ Commissioning records check
- ✓ Building management system interface completion and demonstration
- ✓ BIM enabled end user orientation
- ✓ Ensure a process is in place to maintain the Asset Information Model
- ✓ Transfer of data

Lifecycle

Stages

Tasks



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Source: Si!BIM Project

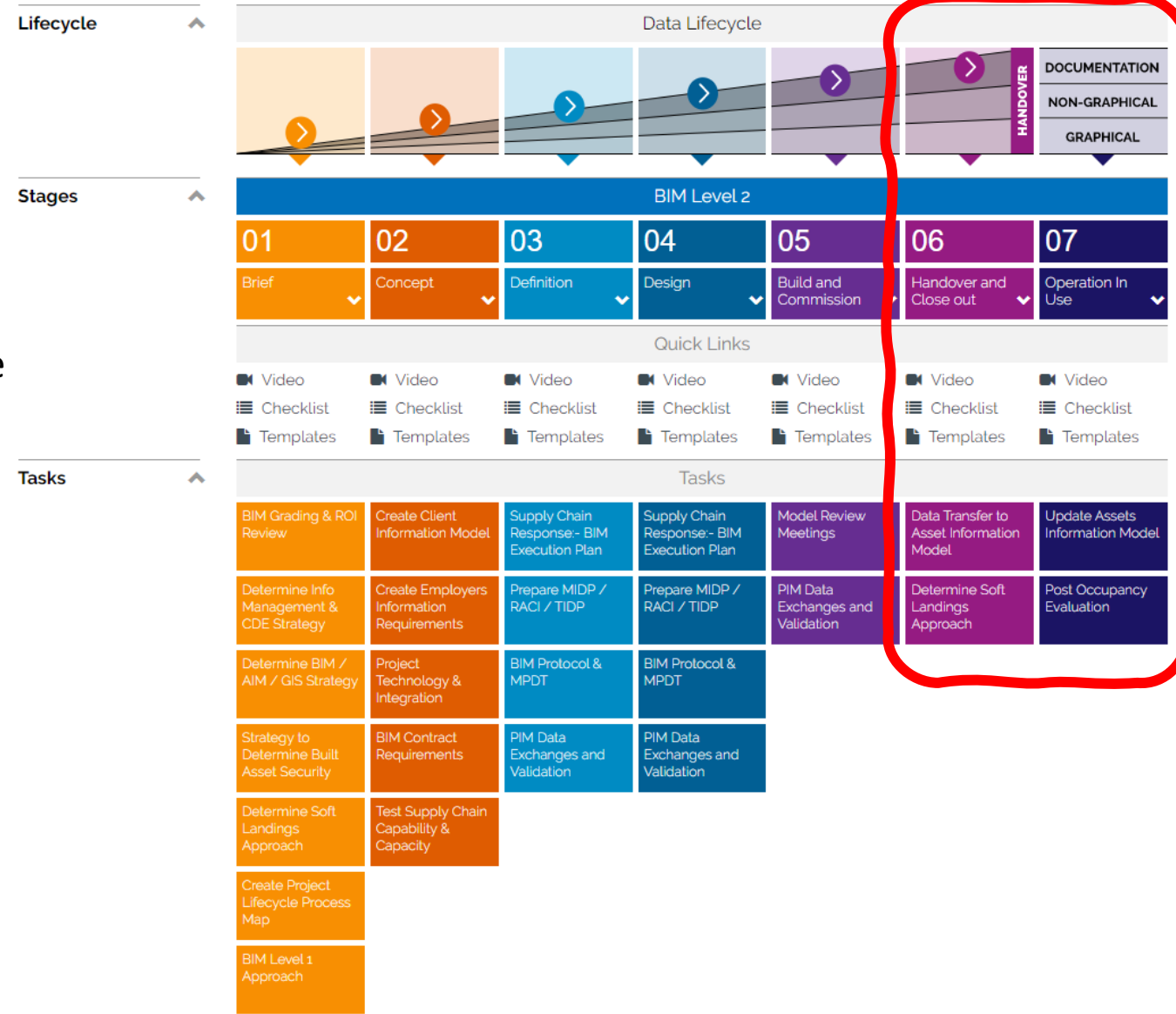
Handover of the project



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Post occupancy evaluation to assess performance for at least three years post completion to establish actual outcomes and lessons learnt incorporates **Handover** and **Operation and Use**



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Source: Si!BIM Project

For Clients

Clients should use a structured procurement process to communicate their BIM requirements and to assess the quality of their contractor's proposals.

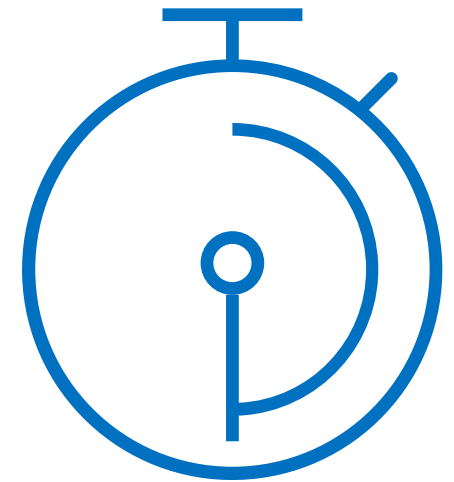
Outline BEP

- provided as part of a tender submission
- describe how a project team will deliver the required BIM uses
- the processes that will be used to deliver the project
- include a proposed schedule of models that should be used to populate the BIM Protocol



For Contractors

- Better understanding – contractors can get the project proposal underway much quicker under tight timescales and competitive tendering processes.
- Greater scope capture – increased visibility to the project scope reduces the risk of missing elements, decreasing the likelihood of problems surfacing as construction gets underway.
- Proposal communication – Contractors can effectively demonstrate their proposals to the various project members and to the client.
- Improved planning – the opportunity to plan the project within a 3D model helps contractors to implement plans in a manner in which risks are minimised.

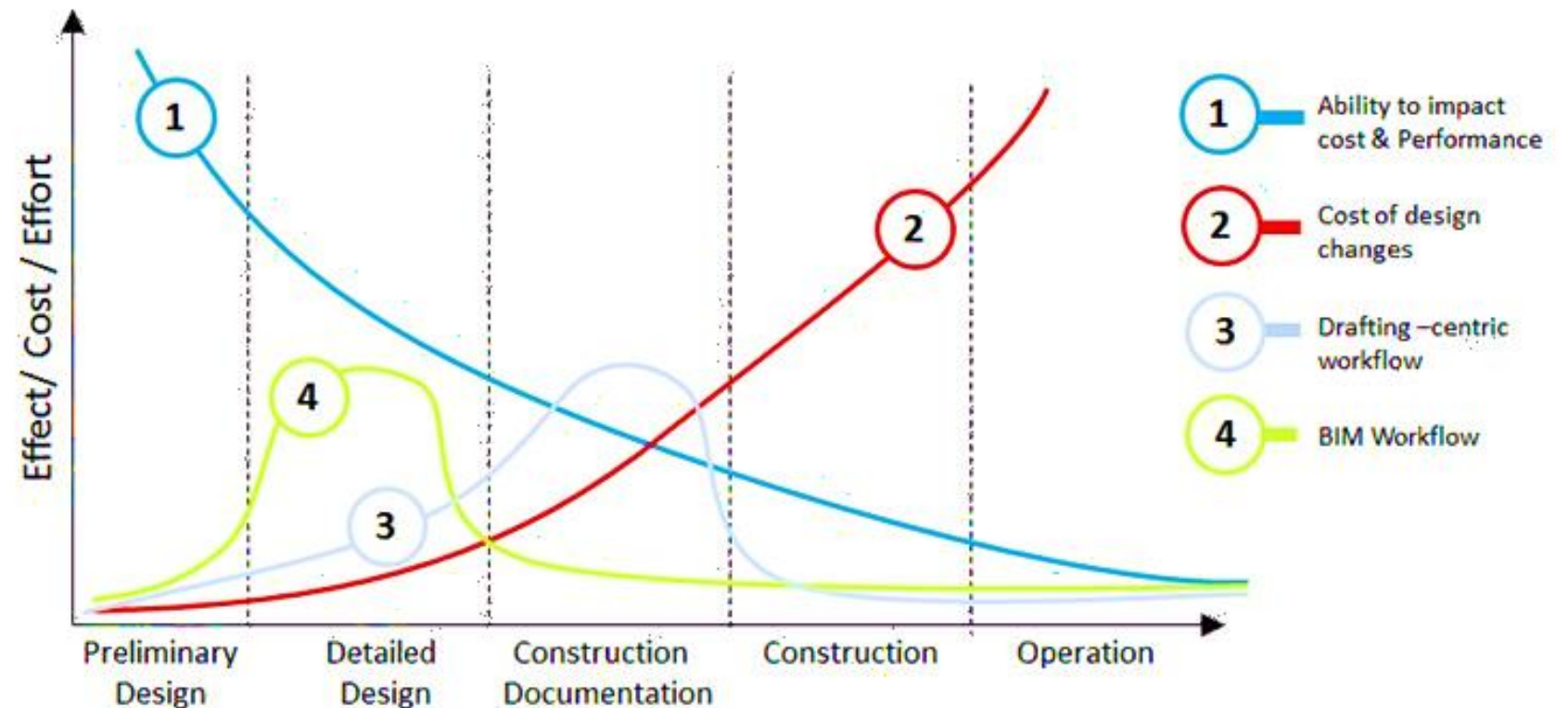


Benefits of procurement in BIM



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By implementing BIM,
the cost of design
changes is mitigated and
increases the ability to
impact on cost and
performance



Source : BIM workflow v traditional workflow (MacLeamy Curve" Patrick MacLeamy)



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European Federation
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