National Association Construction Frameworks

*By the public sector,
For the public sector*

National Association of Construction Frameworks

Digital Construction Strategy

BiM

www.nacframework.org.uk/

This guide has been prepared to help those responsible for developing a Digital Construction Strategy (BiM). It can also serve as a useful guide for those who may be taking over assets to assess what is required using these processes. This guide focuses on both construction projects and the wider aspects of the Digital Construction process for it to be used as a tool for managing live asset portfolios, where individual construction projects / programmes are simply parts. This is a developing document, please contact us for the latest version.

Current version as of **May 2019** is **v2**

Contents

About us

The National Association of Construction Frameworks (NACF) is playing a unique role in leading the ongoing adoption of best practice in local government. Building on our past successes, the NACF is working together with the Local Government Association (LGA) to help shape the future of Local Government construction.

Between us, the NACF delivers over £1.5bn of construction work a year. We share key objectives to build quality assets to cost and time whilst ensuring we deliver social value through support to the local economy, employment and skills. Our partnerships with the private sector give us a unique insight into the construction market and enable us to better inform Local and Central Government through our market intelligence and understanding of the supply chain. Our combined data demonstrates we out perform traditional construction procurement.

The NACF has been at the vanguard of research and development creating and embedding BiM in construction, participating in the Central Government BiM Working Group since its inception and working alongside organisations like the Centre for Digital Built Britain and UK BiM Alliance. Our aim is to support our users - clients, consultants and contractors across the BiM regions – in signposting them to a common, single source, suite of templates and documents that we can all use with confidence to better enable those embarking on their delivery of a Digital Built Britain.
http://www.nacframework.org.uk/

The Centre for Digital Built Britain

The Government announced the launch of this Centre of excellence in Cambridge in order to champion the digital revolution in the built environment. The Centre is part of a landmark government-led investment in growing the UK's construction sector. The Centre has replaced the early development work achieved by the BiM Task Group.
The Centre for Digital Built Britain (CDBB) is a partnership between the Department of Business, Energy & Industrial Strategy and the University of Cambridge to deliver a smart digital economy for infrastructure and construction for the future and transform the UK construction industry's approach to the way we plan, build, maintain and use our social and economic infrastructure.
https://www.cdbb.cam.ac.uk/BIM

UK BiM Alliance

The UK BIM Alliance represents and works with and for the built industry, facilitating the drive to digitally transform the industry through education, leadership and focus.
In an industry of over 4M people, where 95% work in SMEs, or micro-SMEs, their mission is to ensure that we all understand the value of a digital enabled industry. The UK BIM Alliance aims to ensure BiM becomes business as usual whilst at the same time, transforming and future proofing the way the industry works.
https://www.ukbimalliance.org/

A Digital Built Britain – What is BiM ?

The Government Construction Strategy (GCS), 2011-15, first set out its requirement for fully collaborative 3D BiM on centrally procured government construction projects, identifying a 'level 2' standard to be achieved. The key objective being to modernise the construction sector, reduce capital cost and the carbon burden from the construction and operation of the built environment by as much as 20%. The current GCS, 2016-20, continues to require Government Departments deliver BiM.

BiM is a collaborative way of working that facilitates early contractor involvement, underpinned by digital technologies which unlock more efficient methods of designing, communicating and maintaining our assets.

BIM provides a digital representation of the physical and functional characteristics of an asset to support reliable decision making and management of information during its life-cycle. At its core BIM uses 3D models and a common data environment to access and share information efficiently across the supply chain and so boost the efficiency of activities around asset delivery and operation. By helping the entire supply chain to work from a single source of information, BIM reduces the risk of error and maximises the team ability to innovate.

Throughout the design stage, designers, clients and end users can work together to develop the most suited design, facilitate well informed decision making and test it on the computer before it is built. During construction BiM enables the supply chain to efficiently share precise information about components, resolve clashes and reduce the risk of errors and waste.

At its heart Digital Construction (BiM) is the management of information. Huge amounts of information and data are generated throughout the life of a project. This is then added to throughout the operational life of the asset(s). To make best use of this information it needs to be managed effectively.

To maximise the benefits of collaborative working a single source of information is vital, with all information generated being managed and, when verified and validated, made available for use. In cases where clients have a portfolio of assets, a 'Common Data Environment' (CDE) covering all the assets is generally the most effective way of managing information and data. The CDE enables multiple exchange of information across a variety of hardware and software platforms, taking advantage of a structured common standard of referencing information, available in an 'open protocol' language.

This environment should be a repository for all information generated, covering all aspects of the asset's history and operation. During design it acts as an interface between the client and the design team, capturing documents and data related to the design intent (including client requirements, scheme design reports) and the final design solution in the form of 3D digital models and specifications. In the construction phase, the CDE is used by the contractor as the route for information exchange, in conjunction with information exchange points – these are set out / agreed in the Employer's Information Requirements (EiR).

The full power of all this information is revealed when the building is occupied, because the greatest cost of the asset(s) is incurred during its in use operation and maintenance.

By drawing together key stakeholders, including facilities managers, a comprehensive build scope and specification can be compiled for a project, leading to more accurately predicted performance throughout the lifecycle of the building.

BiM better enables the required information deliverables (models, documents and data) to be received at the appropriate time, and in the right format, to achieve the following :

- Enable engagement with the appropriate stakeholders
- Drive project and operational delivery
- Inform management decisions
- Make the right project gateway decisions
- Enable efficiencies
- Supply appropriate information at handover and through the whole asset lifecycle, in order to operate, maintain and assess the ongoing performance of the delivered asset
- Integrate delivered assets, and their information, into the asset estate
- Improve asset knowledge, capability and estate planning

    The following are the key documents used in the BiM process :
- Organisational Information Requirements (OiR)
- Asset Information Requirements (AiR)
- Employers Information Requirements (EiR)
- BiM Execution Plan (BEP)
- Task Information Delivery Plan (TiDP)
- Master Information Delivery Plan (MiDP)

BiM applied to Frameworks

At Framework level we have concentrated on our clients need to define their Employers Information Requirements (EiR), as this formulates the subsequent response / actions required by the main contractor and supply chain. By concentrating on the EiR responses can be included, and evaluated, in both parts of the Two Stage procurement process.

To learn about Two Stage procurement, please contact the NACF and/or one of its regional partners that cover your area.
http://www.nacframework.org.uk/

BiM Level 2 / ISO

The UK Government defined Level 2 as consisting of a suite of PAS 1192 documents. Over time these will be withdrawn in favor of the internationally recognised ISO 19650 references as the need increases to communicate globally in a common language.

- PAS 1192-3
  Specification for information management for the operational phase of assets.
  It is recommended to read this ahead of part 2.

- PAS 1192-2
  Specification for information management for the capital / delivery phase of construction projects.

- PAS 1192-4
  Collaborative production of information. Fulfilling employer's information exchange requirements using COBie.

- PAS 1192-5
  Specification for security, digital built environments and smart asset management.

- PAS 1192-6
  Specification for sharing structured health and safety information.

- PAS 1192-7
  Construction product information - Specification for defining, sharing and maintaining structured digital construction product information.

The ISO 19650 standard is an international standard for managing information over the whole life cycle of a built asset using BiM. It contains all the same principles and high-level requirements as BiM Level 2 and is closely aligned with the current UK PAS 1192 standards.

In Q1 2019 the first two international standards of the ISO 19650 series were published, these are founded on BS 1192:2007 + A2:2016 and PAS 1192-2:2013.

- ISO 19650-1
  Organization and digitization of information about buildings and civil engineering works, including building information modelling -- Information management using building information modelling: Concepts and principles.

- ISO 19650-2
  Organization and digitization of information about buildings and civil engineering works, including building information modelling -- Information management using building information modelling: Delivery phase of the assets.
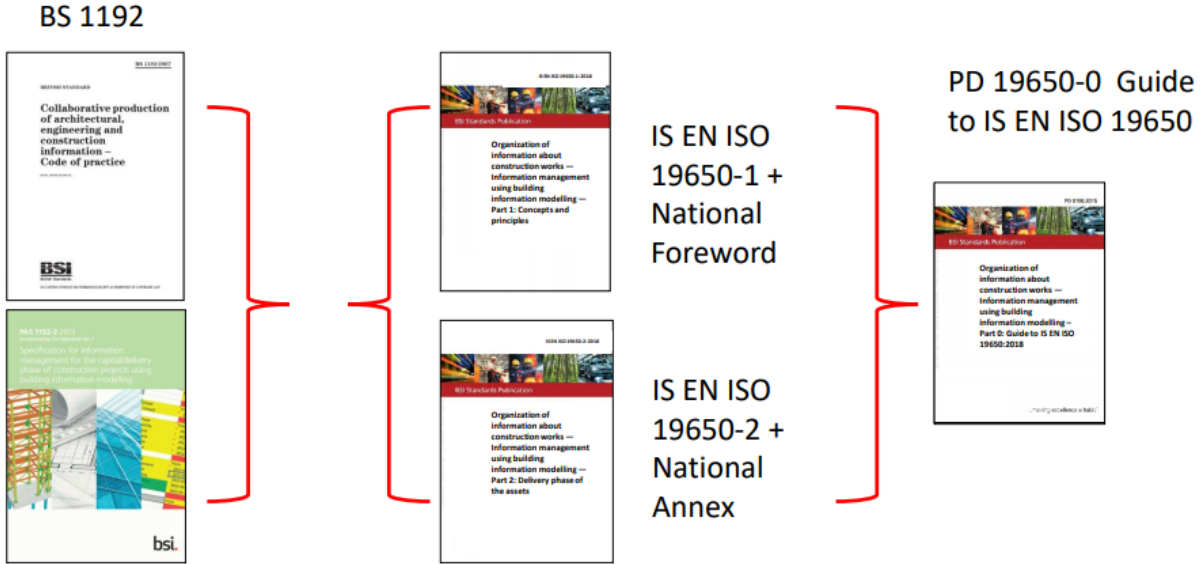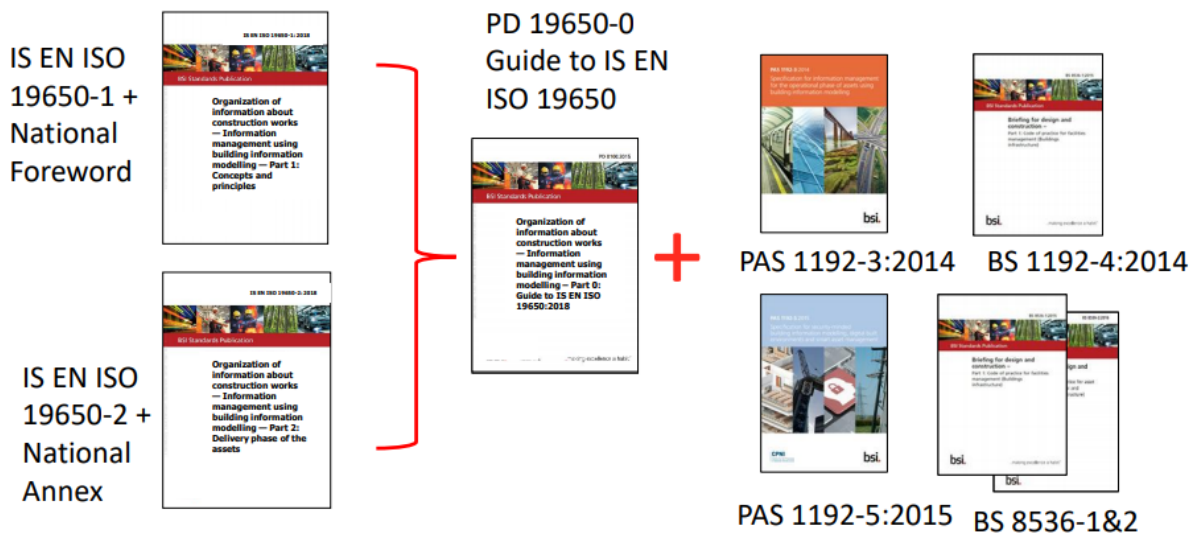
- ISO 19650-3 and ISO 19650-5 are currently being drafted, we expect their publication in early 2020. At which point PAS 1192-3 and PAS 1192-5 will be withdrawn.

Related References

- Government Soft Landings (GSL) Cabinet Office Section 1 – Introduction
  www.cdbb.cam.ac.uk/Resources/Bimtaskgroupmaterial/GovernmentSoftLandingsSection1Introduction.pdf

- RIBA Digital Plan of Work
  https://ribaplanofwork.com/

- Classification
  http://www.cpic.org.uk/uniclass/

- CIC BIM Protocol
  http://cic.org.uk/publications/

Additional Information

NBS have produced an online 'toolkit' to enable client teams to prepare a plan of work for a project, which can then be exported for use in other documents.
https://toolkit.thenbs.com/

The Building Services Research and Information Association (BSRIA) have also produced a Digital Construction (BiM) Roadmap. It provides a method for an organisation to chart, or map, their corporate strategy via a number of clear stages or 'layers'. The Roadmap expands on the approach that is already in use by HM Government departments involved in the BiM and Government Soft Landing (GSL) mandate by explaining the stages in detail and putting them into context. The Roadmap demonstrates the relationships the documents above have, where they are, how they relate to each other and to wider industry practice.
bsria.co.uk/information-membership/bookshop/publication/the-bim-roadmap/

Starting your project

Start your project with the end in mind. Consider what 'success' looks like, what are the users early operational requirements and what are the practical applications of 'running' the building. This will focus the detail on what digital information is required to design and produce / construct the building and what information is then required for occupation, importantly how much / little information is required.

One of the initial tasks is to look at the project objectives and subsequent soft landings approach. Instigating the soft landings process at a leading stage also enables lessons to be learnt from previous projects, performance targets to be established and considerations included as part of the strategic brief.

Requirements for collaborative and lean working practices should also be established, with a clear strategy on information management and what the CDE functional requirements and implementation should be. Standards and processes that are to be utilised for information management and data delivery should also be decided and prescribed.

Information Requirements

- The OiR identifies what data and information is needed to answer the operational decisions that an organisation will have to make. It establishes, and categories, the information requirements which meet the needs of an Asset Management System.

- The AiR details the pieces of data and information about an asset that, placed in context, can answer the questions raised in the OiR.

- The EiR is essentially a pre-tender document that sets out, in general terms, the format of the information to be delivered (models, documents and data - including traditional project documents, surveys, reports and appraisals) and the standards and processes the supplier should adopt during the project delivery process.

- The EiR enables users to identify the different outputs required at each stage of the project process and to assign the delivery of those outputs to the members of the project team. The EiR should be created as early as possible, as it subsequently enables suppliers to produce their BiM Execution Plan.

Project Technologies and Systems Integration

This is about ensuring appropriate technologies and infrastructure is in place for a collaborative BiM that will enable data to flow across the asset lifecycle. The employer's strategy for BiM should be formulated at Organisational level. In most cases the technology required for a BiM offering, 3D model simulation, coordination of information and its analysis will be undertaken directly by the suppliers.

The Employer will need to view, review and comment on what is produced and manage the projects' information during the construction of the building and subsequent operational delivery. In most cases this will be undertaken / controlled through the CDE.

During the tender process it is important for the Employer to confirm they are content with the suppliers BiM capability and capacity, maturity tools are available for this. Likewise, Employers should take legal advice to ensure contract clauses are adequate and proportionate.

Supply Chain Response

The Supplier / supply chain responds to the EiR by submitting a BiM Execution Plan (BEP), this is submitted in two phases – pre, then post contract – the BEP is therefore an indicator whether the EiR is achievable.

The initial pre-contract BEP demonstrates the supplier's initial approach, their capability and capacity to meet the EiR. Secondly, the post contract BEP is resubmitted, by the supplier, to show all relevant parties that they have agreed and committed to the EiR. The BEP facilitates the management of delivering the project. The post contract BEP will develop in detail overtime as more members of the supply chain are appointed.

Included within the post contract BEP is the responsibilities matrix (RAPID – Responsibility, Accountability, Perform, Inform and Decide), Task Information Delivery Plan (TiDP) and also the creation of a Master Information Delivery Plan (MiDP).

The BEP consolidates all the task information to detail how, and when, project information is to be prepared, by whom and the protocol and procedures that should be used. The complexity of these documents should be proportionate to the project in question and the information requirements requested from the Employer.

The RAPID sets out the relationship between disciplines and the production of information.

The TiDP needs to schedule all tasks / deliverables, including the level of information that will be supplied at programme milestones.

The MiDP should also contain a BiM protocol and information production delivery table. The BiM protocol is a supplementary legal agreement that is incorporated into professional service appointments and construction contracts by means of a simple amendment. The protocol creates additional obligations and rights for the Employer and the contractor's party, the protocol is based on the direct contractual relationship between the Employer and the supplier.

Pre-Construction

The project information progressively develops through a series of detailed information exchanges and employers' decision points in accordance with the MiDP. The project information model consists of both graphical and non-graphical data. Information delivery typically includes documents in their own native file format, taken from the model – i.e. COBie data and 2D PDFs. Data exchanges require validation and verification.

The benefits of adopting BiM in pre-construction to resolve clash detection, construction scheduling, work package management, cost management, quality and Health & Safety planning all link to efficiencies during on site construction. The suppliers should be encouraged to adopt lean and collaborative working practices. It is especially important during the construction stage that information flows downwards in to the supply chain and the supply of information flow upwards.

Construction

The information model continues to develop during the build and commission stage of a project. Most of the information exchanges are now between members of the supply chain, this is particularly relevant where design work has been undertaken by subcontractors and / or their suppliers where generic objects can now be replaced with detailed information from the manufacturer. The key objective is to ensure that the digitally constructed models, design information, data and supporting documentation is delivered as intended, especially where capturing operation and maintenance data from manufacturers.

Handover

On completion commissioning data and accurate construction information can be transferred to the Facilities Management operation and be handed over to the client for their AiR and asset lifecycle schedule to be updated. Post occupation evaluations against performance information can then be progressed.

Operation

BiM produced information can then improve informed decision making and in use strategic planning. Better decisions can be made from operation and maintenance expenditure, based on asset performance or status.

Gateways

It is common to apply a stage decision Gateway process to formally close each stage and commence the next. Some Gateways (indicated by red diamonds) may be more significant in terms of project progression.
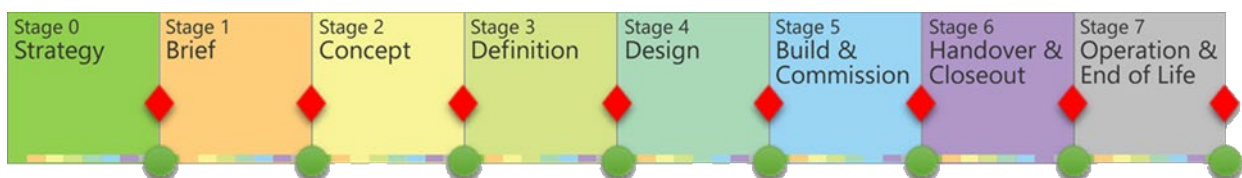
Whilst information can be shared at any time during a stage, formal information exchanges (indicated by green circles) should publish the required deliverables prior to the end of each stage to advise the decisions made at Gateways.

Plain Language Questions

The use of Plain Language Questions (PLQs) helps an organisation to identify their business process and information requirements.

The responses to a sequence of high-level questions, in clear non-technical language, collates information and data that the client can use to inform their business decisions, including whether, or not, to proceed to the next stage.

The NACF has reviewed the BiM Level 2 documents to produce a condensed specimen of PLQs to get you going. These should enable clients to get the most from both running their Mini Competition and from their initial conversations with the awarded contractor and supply chain.

We recognise that each client is likely to engage at a different stage of understanding / applying BiM processes. There are no right or wrong answers, the responses are designed to provide the basis of further discussion / agreement and to help produce the EiR.

The questions are targeted to be answered as early as possible in the project process. We recommend initial focus should define :

- Appointment of a client side Information Manager
- Information the client needs to provide – files and formats required
- Information the contractor needs to provide – initial Execution Plan
- Establish a Common Data Environment

For the avoidance of doubt, the NACF / Framework is not responsible for the production of project information, our recommendation is that clients employ professional services to advise / direct them where required.

Specimen Templates, further Documents and supporting Process

As the journey developing BiM continues, experience, testing, and in use performance on Central and Local Government projects has strengthened the collective desire for a single source of specimen templates, documents and supporting process.

During this journey the Scottish Futures Trust (SFT) has also developed their response to implementing / delivering BiM. The structure of the SFT BiM website is becoming more widely complimented as a rounded solution that contains the synergies the NACF and other departments, and organisations, have been developing.

Several Central Government departments are already signposting to this source as their comprehensive solution. Having input to the Central Government Working Group, the NACF is now working with the University of Cambridge Centre for Digital Built Britain to achieve a duplication of the SFT website for the formal benefit of England and Wales.

At the time of publishing, other Central Government departments are also formulating credible processes. We will continue to evolve our BiM implementation, with the aim of achieving significant time, cost and quality improvements in the way that construction projects and asset information is delivered to, by and within the NACF.

The Scottish Futures Trust

The SFT website provides explanatory videos, checklists and specimen templates for each of the RIBA Stages, users can adapt their information / requirement needs to where they first engage in the process. Task lists, activities and outputs are included for each Stage, along with references to supporting information and other bodies.

The website introduces you to a guidance dashboard. The dashboard provides an easy to use interface to locate the information required for the implementation of your project. The dashboard also aligns the project data lifecycle with various plans of work and those key BiM delivery tasks for each stage.

In addition, there are stage specific plain language questions.

bimportal.scottishfuturestrust.org.uk/level2

SFT Guidance Dashboard

Data Lifecycle

						DOCUMENTATION
					HANDOVER	NON-GRAPHICAL
						GRAPHICAL

BIM Level 2

01	02	03	04	05	06	07
Brief	Concept	Definition	Design	Build and Commission	Handover and Close out	Operation In Use

Quick Links

Video	Video	Video	Video	Video	Video	Video
Checklist	Checklist	Checklist	Checklist	Checklist	Checklist	Checklist
Templates	Templates	Templates	Templates	Templates	Templates	Templates

Tasks

01 Brief	02 Concept	03 Definition	04 Design	05 Build and Commission	06 Handover and Close out	07 Operation In Use
BIM Grading & ROI Review	Create Client Information Model	Supply Chain Response:- BIM Execution Plan	Supply Chain Response:- BIM Execution Plan	Model Review Meetings	Data Transfer to Asset Information Model	Update Assets Information Model
Determine Info Management & CDE Strategy	Create Employers Information Requirements	Prepare MIDP / RACI / TIDP	Prepare MIDP / RACI / TIDP	PIM Data Exchanges and Validation	Determine Soft Landings Approach	Post Occupancy Evaluation
Determine BIM / AIM / GIS Strategy	Project Technology & Integration	BIM Protocol & MPDT	BIM Protocol & MPDT			
Strategy to Determine Built Asset Security	BIM Contract Requirements	PIM Data Exchanges and Validation	PIM Data Exchanges and Validation			
Determine Soft Landings Approach	Test Supply Chain Capability & Capacity					
Create Project Lifecycle Process Map						

Plans of Work

Appendix 1 - Plain Language Questions

The pictorial below shows the relationship the EiR has in specifying individual project requirements. The responses provided to the below PLQs will help the client team define and align the scope, cost and programme of their project.

Once the project is completed the information links back into managing the clients longer term building portfolio / asset(s).
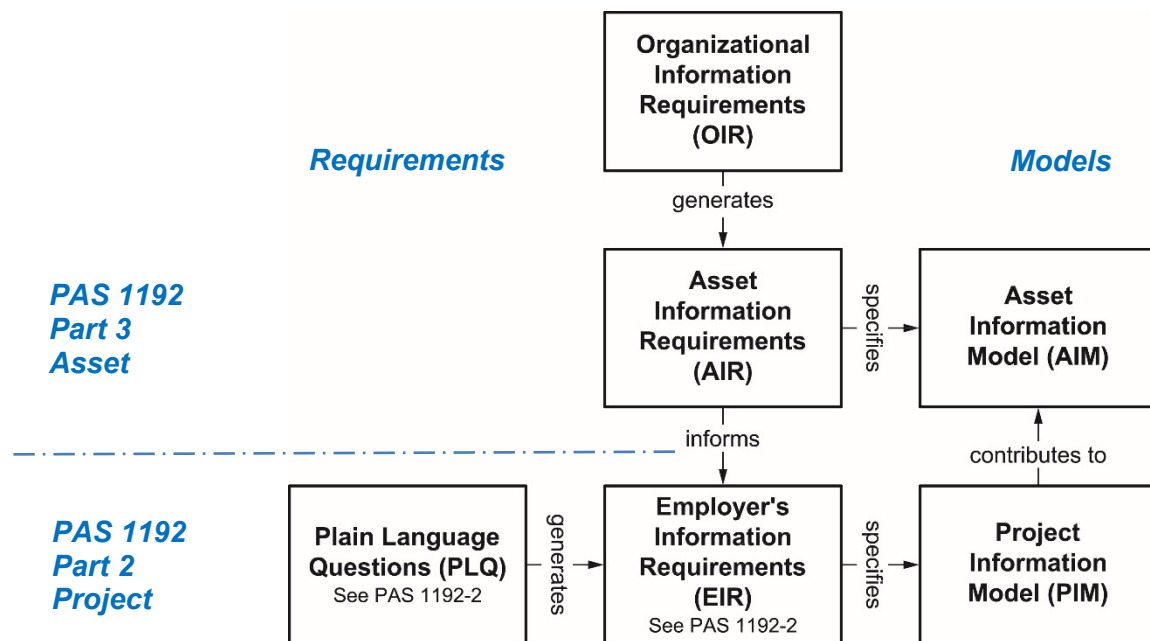
Framework Mini Competition

The purpose of these PLQs is to provide an initial assessment of your understanding of the Digital Construction BiM process. The responses also assist input into the Mini Competition and should be included in the EiRs. The responses are used to inform the project teams due diligence review and start up process at the project inception stage. We therefore suggest this exercise is done as early as possible.

To assist, some example answers have been provided to guide those completing it, these are highlighted in *red.*

Stage specific exemplar plain language questions are also included in each of the template sections on the Scottish Futures Trust BiM website to assist you.

1.0 Client Organisation – Strategy Questions			
Ref	**Question**	**Guidance Note**	**Client Response**
1.1	Have you had experience of a project that has used a BiM process?	*Use this question to inform the level of BiM awareness of the client organisation.*	*No*
1.2	Do you have a defined working process for the use of BiM across your projects / building(s) / estate?	*client to provide (as appendices to this document) any strategy / process documents which the client organisation may have already produced to manage their projects / portfolio.*	*No*
1.3	Who is responsible for operating and maintaining your building(s) / estates?	*Use this to identify who the client uses to operate and maintain the building(s) under their control.*	*Named in house personnel, technically skilled* *How are you considering costs in-use as well as construction costs?*
1.4	How is your facilities management budget set? Is it linked to the project's capital budget e.g. lifecycle costs, energy targets.	*This is to identify how the FM budget is linked to the capital cost plan for your project, to inform the likely considerations needed in a BiM environment.*	*Included within the capital (capex) budget proposal. Averaged across local estate and not specific to this new project. Revenue (opex) budgets managed separately, no link to project cost plan.*

1.5	Are there any facilities management system(s) / provider(s) already in place? If so, provide a short explanation of the system(s) you / your providers have and a high-level overview of how these are used.	*This identifies any current FM system(s) (e.g. Maximo) being used by the current FM provider(s).*	*No specific internal system. Building will be designed to be 'standalone'.*
1.6	Does your organisation have a policy on the use of 'standardisation' and, if so, do you have a list of components / specialist suppliers / design guides which must be used in your building(s) / estates?	*This is to identify if the client has a set of standards which need to be adopted in the BiM process. How is this used?*	*Yes* *Specialist manual available*

2.0 Project Specific – Informative Questions			
Ref	**Question**	**Guidance Note**	**Client Response**
2.1	Have you defined what end user outputs you require from the BiM process?	*Use this to determine if the client has defined outputs in mind for an individual project.*	*No*
2.2	Have you prepared an EiR that includes defining the project outputs	*Use this to define if an EiR document exists or needs to be prepared.*	*In part. Included in project information / brief*
2.3	Have you identified who you expect to participate in the project decision making process and how this will be managed on the project?	*Use this to identify required stakeholders.*	*Yes* *Internal team structure identified, organogram attached*
2.4	Have you defined who will be	*Are they employed*	*Not at the time (but soon yes)*

	responsible for BiM operation in delivering this project and for the lifecycle of the asset?	*directly by the client, or are on-going professional services required,have skill levels been assest, including training.*	
2.5	How do you want to capture / use the data outputs ?	*During the project and at the end to run the building*	*COBie outputs?*
2.6	Have you defined what operational information your facilities management team require? Are they able to use the BiM data to maintain your buildings/ estates?	*Use this to define what actual FM outputs will be required, in particular across a range of projects / asset portfolio to ensure a consistent and measured approach to the actual provision of useful FM information.*	*As installed model* *Asset list* *Maintenance requirements* *Replacement schedule* *What's connected to what?*
2.7	Have you defined how you want the information / models / data delivered to you?	*Use this to inform the production of a project specific BiM Execution Plan - Model information compliant with the client's technical standards including those defined in BSI PAS 1192-3.*	*Yes, see attached client standards*
2.8	Will the project follow the soft landings approach?	*Use this to define how the "soft landings approach" is required and how this is to be integrated into a*	*Currently No. Looking forward Yes* *Further information can be read at :* *BSRIA Procurement Document :* *https://www.bsria.co.uk/services/design/soft-landings/faqs/*

Ref	Question	Guidance Note	Client Response
		BIM enabled project. Confirm if ability to monitor operation and use of building is required in first 3 years of use. Might inform fine tuning of use of the building.	
2.9	How, who by and when will your new facility operate (e.g. opening hours, on site maintenance teams)?	*Use this to define level of BiM competence / compliance to work in a BiM enabled environment when the building is in use.*	*06:00 – 23:00*
2.10	Have you defined an aftercare process for your building(s) / estates and how do you see it being used on this project?	*Use to define if aftercare process through the defects period has been defined as part of the brief, including consideration for service during defects period.*	*12 months maintenance and call out via the contractor during defects period*
2.11	Is your aftercare process aligned to the use of common data outputs and models and, if so, what FM systems will the BIM process be required to interface with?	*Use this to define the overall strategic aims for major preventive and planned maintenance and how the models and data will be linked to any BMS or Cafm system*	*Nothing currently exists at project start*
3.0 Project Specific – Process Questions			
Ref	**Question**	**Guidance Note**	**Client Response**
3.1	Have all parties working on the project been engaged with a clear understanding	*Use this to define if client has already employed anyone on the*	*No (some projects come to procurement with the designs already produced by professional teams)*

	of the BiM objectives for the project?	*project and, if so, were they employed to work in a BiM enabled environment.*	
3.2	Have the parties to the project been employed in line with the RIBA Plan of Work Toolkit?	*This is to define if the client has reviewed and understood the overall steps in the process.*	*No* *Further information can be read at :* *http://www.ribaplanofwork.com/Toolbox.aspx*
3.3	Who will be the point of responsibility for setting/ agreeing your information and modelling strategy?	*Use this to define the way in which the client will use the BiM process to communicate with their internal team and what specific / additional information the client will need to enable them to make decisions. Do you require BiM in 2D or 3D? Can you identify who needs to see what information, what format it is in and when you want to access / use it?*	*Internal document controller to be appointed.* *Possibly additional activity required*
3.4	How do you intend to use the BiM process to inform / validate your budgets - both Capital (Capex) and Revenue (Opex) - and who will be responsible for carrying this out?	*Use this to identify / establish a process for internal/external cost controls using the information and modelling process*	*Yes we do in the future and will be carried out by externally appointed QS, who can operate and understand the technology*
3.5	Has a BiM Execution Plan	*A contractual BiM execution*	*No*

	been prepared for the project and, if so, what is its current level of development / status?	*plan and protocol for the project defining different levels of design maturity for each project phase, who will develop the content, to what standards, who will be authorised to use it, for what purpose, how it will be coordinated, who will own what and how information incompatibilities shall be resolved. This is to include the means and protocols for the communication of information between parties.*	

Appendix 2 – Specimen EiR

See attached

Employer's Information Requirements

Core Content and Guidance Notes

This document is a guidance template for an Employer's Information Requirements (EIR) and should be used to draft a particular Employer, Framework or Project EIR. The final document is the responsibility of the Employer to produce and own.

Revision	Date	Amendment
v0.9	May 2019	Reproduced for NACF

Table of Contents

1. Introduction

Guidance generally: Throughout this document, guidance has been included as blue panels like this and will need to be deleted prior to issue.

BIM Execution Plan Requirements: *Supplier BEP response to specific EIR sections are shown in dashed highlighted boxes.*

1.1.Document Purpose

Guidance 1: This document should be used as a template to generate the particular Employer's Information Requirements generically for a particular Employer and/or a particular Project or Framework. This document and its contents is guidance only and drafters must take full responsibility for any use.

This document confirms the Employer's Information Requirements (EIR) as a sub-set of the Employer's Requirements or equivalent contract documentation and introduces information requirements, reasons and purpose to the Project Team or Supplier, along with technical and commercial particulars that need to be addressed.

Required information and other standards are referenced in this document. Detailed extracts are not included. The document does confirm the Employer's bespoke requirements where necessary.

EIRs are an important element of Project BIM Implementation as they are used to set out clearly to the bidder what models are required and what the purposes of the models will be; these requirements can be written into the BIM Protocol / BIM Protocol for Security-minded Projects and implemented through the BIM Execution Plan (BEP).

The EIR is used to set out clearly to the Project Team or Supplier what information (models, documents and data) is required generally and also at each project stage, possibly via a stage based Information Delivery Plan (IDP).

Areas where adjustments are likely to be required include:

- Type of Asset

  This document was prepared on the assumption that the asset is a building – this will not be the case for all employers.

- Security-minded approach

  This document includes the content which should be incorporated into a project-specific EIR if a security-minded approach is to be implemented.

- Project Stages

  Information exchanges and associated information requirements are to be mapped against the project stages of a particular employer.

- Information Requirements

  Information exchanges are to be aligned against the needs of the project, e.g. new-build versus on-going asset management.

- Procurement Strategy

Information exchanges are to be aligned with the procurement strategy adopted by the employer (e.g. Cost-led, Integrated Insurance, two stage open book).

- IT Requirements

  Collaboration tools and other employer-specific requirements are to be specified. For example, any collaboration site provided by the employer.

- Detailed Technical Information Requirements

  Space object properties are likely to vary by employer and asset type.

- Detailed Alignment of Documents

  Terminology for information, stages, documents and roles described in the EIRs should match that used in specific appointment documents.

Where PAS 1192 references are made, overtime these will be withdrawn in favour of the internationally recognised ISO 19650 references as the need increases to communicate globally in a common language.

The ISO 19650 standard is an international standard for managing information over the whole life cycle of a built asset using BiM. It contains all the same principles and high-level requirements as BiM Level 2 and is closely aligned with the current UK PAS 1192 standards.

In Q1 2019 the first two international standards of the ISO 19650 series were published, these are founded on BS 1192:2007 + A2:2016 and PAS 1192-2:2013.

ISO 19650-3 and ISO 19650-5 are currently being drafted, we expect their publication in early 2020. At which point PAS 1192-3 and PAS 1192-5 will be withdrawn.

For the avoidance of doubt, please be clear which of the standards you have referenced / require and amend as required where you see this option *<<ISO 19650-1+2>>*.

> *Guidance 2: For Framework or term contract relationships, the EIR may form two parts; a framework level document modified from time to time through a controlled process, and the Information Delivery Plan forming the project or supply specific component.*
>
> *Guidance 3: If the plan is using the RIBA Enterprises/NBS BIM Toolkit to generate the IDP this should be clearly stated and referenced in the EIR. The BIM Toolkit IDP will have been drafted by the Employer, to be used by the Project Team or Supplier to then cascade the plan down through the supply chain as the Master Information Delivery Plan and Task Information Delivery Plan. The BIM Toolkit is available from NBS.com.*

1.2. Responding to this document

In accordance with PAS 1192-2:2013 *<<ISO 19650-1+2>>* the Supplier is to include an outline BIM Execution Plan (BEP) in their proposal. Throughout this document specific responses are sought from the Supplier through their BIM Execution Plan.

> **BIM Execution Plan Requirements**
>
> *Text confirming what the Employer requires confirmed by the Supplier in their BIM Execution Plan.*

The Pre Contract BEP should include the following content:

- Specific response to this EIR with a cross referenced index;

- Specific response to the Information Delivery Plan commenting where deliverables are over or under specified, or impractical to deliver with alternative delivery proposals;

- A Project Implementation Plan – see PAS 1192-2:2013; *<<ISO 19650-1+2>>*

- Project goals for collaboration and information modelling;

- Major project milestones consistent with the project programme where in variance to the IDP;

- Project Information Model deliverable strategy where in variance to the IDP.

A compliant Post Contract BEP in support of this project tender will demonstrate how the requirements of this EIR and IDP will be met. The BEP and its response to the EIR will form part of tender scoring and hence selection.

2. BIM Vision and Objectives

It is the vision that the use of BIM on this project will enable the Employer to receive the required information deliverables (models, documents & data) at the appropriate time in the right formats in order to:

- engage with the appropriate stakeholders;

- drive project delivery and efficiency;

- make the right project gateway decisions;

- supply appropriate information at handover to operate, maintain and assess the performance of the delivered asset;

- Integrate the delivered asset and its information into the Employer's asset estate.

- The objectives for the implementation of BIM are:

Guidance 1: Provide an overview of the vision you wish to deliver through the use of BIM. This could be either based on a project requirement to deliver structured data to support strategic, operational or asset management decision making or to deliver improvements in project performance by implementing a Level 2 BIM approach. The vision should be clearly stated and specific to the project/programme.

Guidance 2: Provide an overview of the objectives you wish to deliver. The objectives should be SMART specific, measurable, actionable realistic and time bound.

Examples could include:

- *Deliver validated and verified structured information and data to support project gateway decisions, engage with project stakeholders, build the project into the Employer's Asset Information Model, and to populate operational and line of business systems that will support strategic, operational and asset management decision-making and streamlining following the practical completion of the construction works and installations*

- *Authorise Main Contractor's Technical Design using BIM tools*

- *Understand and confirm full programme, sequence and logistics implications using BIM tools*

- *Form the basis for post operational performance evaluation and learning*

- *Assess and address safety and security issues using BIM tools*

- *Check the proposed scope compared to briefing requirements using BIM tools*

3. Client's Strategic Application

Guidance 1: The purpose of this section is to describe the expected purposes of the information provided as models, documents and data and to support the CIC BIM Protocol/BIM Protocol for Security-minded Projects which do not specifically state the purposes for which models and data will be used.

Setting out proposed purposes in the EIRs informs the scope of the licences defined in the Protocol.

The table below is an example set.

Guidance 2: In circumstances where the employer intends to use elements of the model for a wider set of purposes e.g. use of elements of design on more than one project or to build a model library, the additional use should be stated, together with the wording of the proposed licence.

The primary use of the information (models, documents & data) will be for the following purposes:

Purpose of Data
Ref.

| Ref.	Purpose of Data
P01	**Registration** To allow accurate audit and reporting based on the assets registered.
P02	**Use and Utilisation** To support comparison of actual utilisation with records of the intended use, capacity and planned utilisation of the Facility and to support Government Soft Landings usage reviews.
P03	**Operations** To support the understanding of the anticipated cost of operations based on the normal operations of the Facility and to support Government Soft Landings operations reviews.
P04	**Maintenance and Repair** To support the understanding of the anticipated cost of maintenance and repair based on the recommended maintenance tasks.
P05	**Replacement** To support the understanding of the anticipated cost of asset replacement based on the expected service life of assets.
P06	**Assessment and Re-use** To support the assessment of the Facility at the end of its planned use.
P07	**Impacts** To support the management of the economic and environmental impacts of the Facility throughout its lifecycle.
P08	**Business Case** To support the on-going evaluation of the business case, which is dependent upon the continual development of P01 and P07 above.
P09	**Security and Surveillance** To support the assessment of security and surveillance.
P10	**Regulation and Compliance** To support the maintenance of the health and safety of the users of the Facility.

4. Information Requirements

4.1.Information Exchanges, Project Deliverables & Information

Guidance 1: Information Requirements for the project should be referenced here.

The purpose of this section is to communicate the timing and content of information exchanges between the Project Team / Supplier and the Employer and how information exchanges are aligned to work stages. Information may flow both ways.

To ensure that the industry as a whole adopts a common way of working the unified CIC/APM 8 stage plan is adopted even if the stage names need to be 'localised' as with the adoption by the RIBA. This is shown in the figure here:
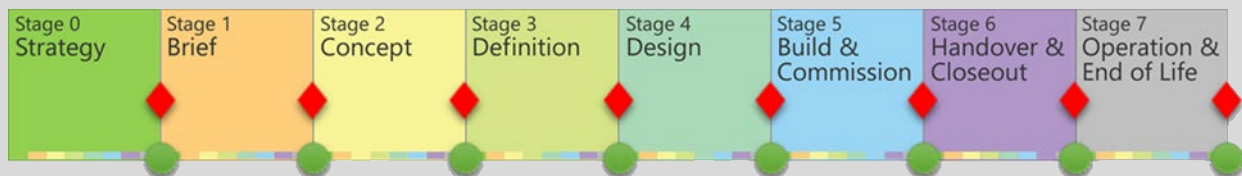
Each stage gateway should be advised by a developed set of Employer Plain Language Questions (PLQ). These gateway decision points are shown as red diamonds.

The data required to populate the information exchanges will vary at each stage in accordance with the 'Plain Language Questions' that need to be supported by the data drops. These address the performance requirements which a project is required to meet to comply with the brief and wider regulatory requirements. The project team is required to provide information in the model to demonstrate compliance with questions associated with the information exchanges.

Whilst information can be shared at any time during the course of a stage, formal published information deliverables should be exchanged prior to the end of a stage to advise the decision gateways. These published exchanges are referred to as Information Exchanges and are indicated by green circles or 'footballs'. Employers may not require information exchanges at every stage, but they are implied.

Deliverables required to inform the stage PLQ should be scheduled in the Information Delivery Plan (IDP). This can take a number of forms but should always include the requirements of the CIC BIM Protocol Master Production and Delivery Table.

The IDP should ideally include:

1. *A listing of information deliverables to answer Employers 'Plain Language Questions'*

2. *Format requirements, constraints or scope for each deliverable*

3. *Where discipline native models are required (addressing the BIM Protocol MPDT)*

4. *Where open standard formats are required in addition to a pdf format*

5. *Where federated model visualisations are required to support stakeholder engagement*

6. *The Level of Definition (Level of Detail and Level of Information) of each deliverable*

7. *The intended role or appointed supplier for the information deliverable*

Information to which specific security requirements will apply should be identified by the Employer in as Built Asset Security Information Requirements (BASIR) and also any specific security requirements related to individual information exchanges.

4.2. Information Delivery Plan

The IDP is appended to this EIR. The Design Team or Supplier should review this plan and confirm its ability to provide the information using appropriate resources, in the appropriate formats at the appropriate stage decision gates. Any proposed variation from or addition to the plan should be clearly noted and brought to the Employer's attention in the responding to the pre-tender BEP. It is intended that this Employer's IDP informs the preparation of the Suppliers Master Information Delivery Plan (MIDP) for preparation and submission of information to the Employer at the appropriate stages.

4.3. Level of Definition, Detail and Information

Information delivery requirements are indicated using Level of Model Detail (LOD) and Level of Information Maturity (LOI) aligned to the normal delivery stage eg LOD3 for stage 3 and LOI4 for stage 4 and all as defined in the RIBAE/NBS BIM Toolkit

4.4. Health & Safety and Construction Design Management

Information deliverables in respect of H&S/CDM are detailed in the Information Delivery Plan and will be used to manage the employer's and supplier's H&S/CDM obligations. The supplier should confirm how these will be used in the responding BIM Execution Plan.

Reference should be made to PAS1192-6:2017 'Specification for collaborative sharing and use of structured hazard and risk information for Health and Safety', once it is published

5. Management

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

5.1. Standards

The purpose of this section is to define the BIM Standards that are incorporated into the Information Requirements, Appendix 2 of the CIC BIM Protocol/BIM Protocol for Security-minded Projects.

The core documents and standards that are mandated to be used on the project are:

- PAS 1192-2:2013 *<<ISO 19650-1+2>>*

- PAS 1192-3:2014

- BS 1192-4:2014

- PAS1192-5: 2015

- Supported by BS 1192:2007 *<<ISO 19650-1+2>>*

> *Guidance 1: Use of these standards can be incorporated into the contract via the CIC BIM Protocol/BIM Protocol for Security-minded Projects. Adoption of other standards related to Building Information Modelling can be encouraged if specifically relevant (this list is not exhaustive):*
>
> - *BS 7000 series (Design Management Systems)*
>
> - *BS 8534:2011 (Construction Procurement policies)*
>
> - *BS 10012:2009 (Data Protection)*
>
> - *PAS 55-1:2008 (Asset Management)*

5.2 Roles and Responsibilities

The purpose of this section is to bring to the attention of the project team the allocation of roles associated with the management of the model and project information. The roles themselves may be addressed in specific appointments and ERs.

The following roles in connection with BIM will be taken on directly by the supplier:

- Client's Technical Adviser (TA)
- Project Delivery Manager (PDM)
- (Supplier) Information Manager (IM)
- Lead Designer (LD)
- Task Team Manager (TTM)

The following roles in connection with BIM will be taken on directly by the employer:

- Built Asset Security Manager (BASM) – when PAS1192-5:2015 applies
- Employer Information Manager (EIM)
- Employer Project Manager (EPM)

Guidance 1: PAS 1192-2:2013 provides a useful cross-tabulated summary of the roles as they apply across Project Team Members.

This section should include references to existing documentation which defines the responsibility and scope of appointments associated with the supplier roles. The roles themselves may be addressed in specific appointments and ERs.

Contact details should be given of those allocated employer roles for the project.

5.3   Collaboration Process

The purpose of this section is to define how, where and when project information will be shared.

The Project Team or Supplier is expected to manage the Project Common Data Environment (PIM) for each stage of the project and through the Supplier Information Manager. The management and system providing this service may change with the appointment of different Project Teams or Suppliers for different stages or phases. There will only be one Project CDE in operation at any one time managing one version of the truth.

Details of the collaboration process sufficient to demonstrate competence and capability must be provided in the Pre BIM Execution Plan. It is expected that full details of the process will be included within the completed Post BIM Execution Plan.

> **BIM Execution Plan Requirements**
>
> *The Supplier shall confirm the parties and persons who will be responsible for information management for the project.*

Pre BEP details of the process received should include details of:

- Form and process of sharing information between Project Team members
- Proposals to manage restrictions around the sharing of data and information relating to sensitive assets and systems required in connection with the Employer's security requirements
- Form and process of publishing information to the Employer
- How the requirements of the Information Delivery Plan will be met and tracked
- Extent and form of model coordination and federation

- Frequency of collaboration and information exchange
- Details of model review workshops and other collaborative working practices eg use of model federation and coordination at design and/or site meetings

Guidance 1: Processes will be defined in detail in the Post BIM Execution Plan (BEP)

BIM Execution Plan Requirements

The Supplier shall confirm their proposed collaboration tool and how they intend it to operate in support of the Common Data Environment in accordance with PAS 1992-2:2013 and BS 1192:2007. Details shall be included to confirm how the Archive information will be transferred to the Employer upon the Practical Completion of the construction works and installations.

5.4   Planning the Work and Data Segregation

The purpose of this section is to set out requirements for the bidder's proposals for the management of the modelling process.

Information should be managed in accordance with the processes described in PAS 1192-2:2013, BS 1192:2007 *<<ISO 19650-1+2>>* and PAS 1192-5:2015

The Information Delivery Plan confirms the information delivery, information packaging and information exchange requirements for models, documents and data. All published transmittals will be accompanied by a COBie spreadsheet confirming the included exchange files.

Where the employer has specific requirements for work management, including security aspects, the requirement and request for proposals should be identified in the Information Delivery Plan.

The following are required and should be confirmed in the Ref BEP:

- Model Management
  - Detail of procedures co-ordinated by the Information Manager

- Volumes, Zones and Areas
  - Definitions of zones and the management of adjacency within the discipline models
  - Confirmation of the definition of the project volume structure
  - Requirements in connection with the use of separate project volumes for sensitive assets and system

- Naming Conventions
  There will be a single project file name convention based on the BS1172:2007 & PAS1192-2:20013 *<<ISO 19650-1+2>>* but extended to include reference to the IDP deliverable and LOD as follows:

  1. **Project Number**: the Employer project reference will be used in all cases

  2. **Originator**: as assigned by the Employer in the Information Delivery Plan

  3. **Volume**: Supplier assigned as PAS1192-2:2013 *<<ISO 19650-1+2>>* optional Volume/Zone or 00 for all volumes or if omitted

  4. **Location**: Supplier assigned as PAS1192-2:2013 *<<ISO 19650-1+2>>* optional Level/Region/Location or zz for multiple, or xx if omitted

5. **Type**: Supplier assigned as PAS1192-2:2013 *<<ISO 19650-1+2>>* document/model/information type

6. **Role**: Supplier assigned as PAS1192-2:2013 Role *<<ISO 19650-1+2>>*

7. **Document Number**: Supplier assigned unique & sequential file alphanumeric document number

8. **Status**: Supplier assigned as PAS1192-2 *<<ISO 19650-1+2>>* Status/Purpose of Issue but see below

9. **Rev**: File revision

10. *IDP Ref: IDP Delivery Ref*

11. *LOD: Level of Definition as LOD.LOI eg LOD2.3*

12. *Title: Supplier assigned and optional free text descriptive title or name*

Note: fields 8-13 are an extension to BS1192/PAS1192-2. *<<ISO 19650-1+2>>* Fields 1 & 2 are Employer assigned.

- Purpose of Issue (Field 8 of standard file name)
  - o For WIP & Shared issues use PAS1192-2:2013 *<<ISO 19650-1+2>>* Table 3 WIP & Shared status codes

  - o For Published use the following purpose codes for publishing of stage exchanges

A0	Published Stage 0 Strategy
A1	Published Stage 1 Brief
A2	Published Stage 2 Concept
A3	Published Stage 3 Definition
A4	Published Stage 4 Design
A5	Published Stage 5 Build
A6	Published Stage 6 Handover
A7	Published Stage 7 Operation

- Publishing processes
  - o The contents of stage Information Exchanges are defined in the Information Delivery Plan
  - o These will be published by the Supplier Information Manager from the Supplier CDE to complete the particular delivery stage.
  - o All published file packages will be accompanied by a COBie file which will be used to validate the delivery.
  - o The Supplier Information Manager will upload all information packages to the Employer CDE notifying the Employer Information Manager
  - o The Employer Information Manager will validate the package and produce a Red Amber Green (RAG) acceptance report to the Supplier Information Manager.
  - o Green packages will be published into the Employer CDE AIM Published file area and the COBie data and file linkages published into the Employer CDE AIM data area for onward use.
  - o Amber or Red package should be remedied in the Supplier CDE and resubmitted for retest.
  - o Acceptance failure and resubmission of deliverables in accordance with the Information Delivery Plan is unlikely cause a variation/compensation event.

Confirmation of use of these procedures should be confirmed in the Pre BIM Execution plan.

5.5   Security

The purpose of this section is to communicate client specific security measures required in order to secure the data.

> *Guidance 1: The bid submission should demonstrate how the supplier will comply with, and deliver, these security requirements. It should also set out how the requirements of the Built Asset Security Information Requirements (BASIR) will be achieved in respect of software platforms, their configuration, operation and maintenance.*

The EIR should include:

For all built assets, the measures required by the Employer to protect personal and commercial information. Details of the security standards that apply to information used on the project. For example:

BIM Execution Plan Requirements

The submission should demonstrate the supplier's compliance with mandated security systems and Built Asset Security Information Requirements (BASIR). The completed BIM Execution Plan will set out compliance processes and the means by which compliance is monitored and managed.

5.6   Coordination and Clash Detection Process

The purpose of this section is to ask the supplier to define their co-ordination process, in order to meet employer requirements for quality control?

The following should be detailed in the Pre BIM Execution Plan:

- Details of the clash detection process including:
    - Software
    - Process overview
    - Responsibilities
    - Outputs
- Technical query workflow

- Tolerance strategy

- Clash resolution process

- How this process will align with the Employers contractual and process requirements, such as ongoing / periodic technical review.

5.7 Compliance Plan (Quality Assurance)

The purpose of this section is to enable the supplier to communicate how the integrity, and hence quality, of the model and other data sources will be maintained.

All published information exchanges will be validated using the included COBie file against the Information Delivery Plan for the stage information exchange. Only compliant exchanges will be accepted.

The supplier should confirm his own internal model file and data standards and compliance procedures including references to standards and compliance software in the BIM Execution Plan.

This should refer to:

- Quality assurance/control procedure

- Associated software

- Level of assurance

- Security and information assurance requirements

- Period of aftercare (the number of years that the model should be managed for)

The Employer or Employer Project or Information Manager should be given reasonable access to the Supplier CDE to enable compliance monitoring and audits.

Guidance 1: The above should be populated with appropriate requirements, indicating where any specific detail is required in a contractor's interim BIM Execution plan as part of a bid submission. If aftercare is required, the period for which it is required should be stated.

5.8 Delivery Strategy for Asset Information

This section defines the information exchange standard for asset information and enables the employer to obtain proposals with regards to asset information delivery into the employer's FM environment.

The information exchange format for provision to the Asset Information Model (AIM) will be as defined in the Information Delivery Plan. It will transmitted and contained in the published information exchange COBie file, together with associated exchange information files.

> *Guidance 1: Define the details of systems/databases/information formats in use so that the contractor can demonstrate compliance with information management requirements.*
>
> *Text describing AIM delivery strategy should be populated with appropriate requirements and constraints, including, where appropriate, security requirements, indicating where any specific detail is required in a contractor's interim BIM Execution plan as part of a bid submission*
>
> *Guidance 2: If the BIM Toolkit is specified then add the following: Object Information detail is defined in the RIBAE/NBS BIM Toolkit Component Library and can be downloaded from thenbs.com.*

5.9 Provision of MIDP and Project Plan

The following templates should be used by the Supplier to ensure information coordination and consistency.

5.9.1 Master information Delivery Plan (MIDP)

The Master Information Delivery Plan should be prepared by the supplier in response to the Information delivery Pan and should follow a similar or related format.

5.9.2 Project Plan (PP)

A Project Plan will be provided to the Supplier to allow an appreciation of the strategic programme intent for the project and to enable the development of the Suppliers programme proposal.

In the absence of the Project Plan the Information Delivery Plan will be used by all team members to manage and monitor progress and information delivery for the duration of the project.

5.10 Training

The purpose of this section is to provide bidders with details of training that will be provided in connection with project systems, or training requirements which the bidder will be required to deliver as part of their appointment/contract.

The supplier will be responsible for maintaining and delivering appropriate information handling and access training to all interfacing parties including any Employer staff, for the operation and access to the Supplier CDE.

Training for access and operation to the Employer CDE will be provided by the Employer to interfacing Supplier staff.

Details of any general security awareness and induction requirements, as well as any role-based security requirements, as set out in the Employer's Built Asset Security Management Plan (BASMP).

If proprietary model viewing software is proposed in variance to that shown as held by the Employer in this document then reasonable access and training is to be provided by the Supplier at no cost. Information should be progressively shared and published from the Supplier CDE to the Employer CDE so that in normal circumstances the Employer will not need access to the Supplier CDE other than for compliance purposes.

Guidance 1: The EIRs should communicate clearly that the responsibility for training associated with other modelling and analysis tools rests with the consultant/constructor.

BIM Execution Plan Requirements

The Supplier shall confirm the training that they will provide for their tools and systems that the Employer and others will be expected to use which will include, but not be limited to:

- *The BIM Execution Plan*

- *The Supplier's collaboration tool*

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6. Technical

This section establishes technical information requirements, including the software, data drop contents and level of detail.

6.2 Software Platforms

The purpose of this section is to communicate software platforms and versions where these are known and where they might influence the preparation of a bid. For public bodies OJEU rules preclude specification and selection based on proprietary systems use.

Platforms and versions used by the employer across the programme of projects include the following:

- The Employers CDE is available at [URL] and provided by [ABC SAAS Solutions].

- [XYZ Professional MODEL Viewer] is currently used for model federation and visualisation

The ability of the bidder to work with these platforms should be made clear in the response.

Designers and Constructors should align their model attribute data to be consistent with the data exchange format COBie UK 2012. However the COBie data takes precedent.

The BEP should confirm the process of data compilation between models and COBie.

Guidance 1: In accordance with an open approach to software solutions, the EIRs should not dictate a software solution to the supply chain. However, depending on the stage of the project, the Employer will be able to state the versions and platforms used to prepare information exchanges that the supplier will receive. The employer will also be able to define the versions and platforms used for employer collaboration and facilities management.

6.3   System Performance

The purpose of this section is to communicate to bidders any constraints in the employer's systems or specific IT requirements which may need additional resources or non-standard solutions.

The following employer-side IT system restrictions and requirements need to be taken into account when developing the BIM Execution Plan:

- Model size   no physical size restriction but practically 100Mb max
- Software uses   IFC federated model visualisation can be viewed in the Employer CDE
- Access to free viewers   [XYZ] files can be viewed and federated by the Employer
- Security restrictions   As required in Built Asset Security Management Plan (BASMP) and Built Asset Security Information Requirements (BASIR)

Guidance 1: The above should be populated with appropriate requirements and constraints, indicating where any specific detail is required in a contractor's interim BIM Execution plan as part of a bid submission.

6.4   Data Exchange Format

The purpose of this section is to define the formats used to deliver the Information Exchanges

Information will be required in the following formats but as defined in the Information Delivery Plan:

- Native – 3D discipline (un-federated) model files for all design and analysis models
- COBie – COBie-UK-2012 version 2.4 complete with reference to the exchanges files
- PDF files – no older than version 7.0 as a default
- In addition other open standard files as defined in the Information Delivery Plan

On projects where PAS 1192-5:2015 is applied, information about sensitive assets and systems will be required in the format specified in the BASIR

> *Guidance 1: Government Employer Requirements mandate information in a COBie format (a relative of IFC) for all information exchanges. This is a standards based structured data container and used to provide an open standard for information exchange between parties irrespective of publishing or receiving system. The Construction-Operations Building Information Exchange (COBie) format facilitates the delivery of project and asset information (files and data) to support Employer and Stakeholder decisions and information transmittal during planning, design, construction, and commissioning for delivery to facility owners and operators.*
>
> *Guidance 2: Under the BIM Protocol/BIM Protocol for Security-minded Projects, a project member undertakes to generate data provided in all three formats from the same data set.*
>
> *Guidance 3: The COBie file will be used to validate the information (files & data) published to the Employer at each plan of work stage. See section 5.4 for details of the validation and acceptance process using COBie and the Information Delivery Plan.*

6.5   Co-ordinates

The purpose of this section is to encourage the adoption a common coordinate system for all BIM data with consistent adoption for all models. Defines requirements for the common coordinate system for all BIM data.

The minimum requirement is spatial coordination stated as follows:

- Intersection of grids XX and YY - xxxxxx.xxxE and xxxxxx.xxxN
- Intersection of grids AA and BB - xxxxxx.xxxE and xxxxxx.xxxN
- Ground floor FFL = xxx.xxx

Other coordination standards defined in the BIM Execution Plan should include:

- Origin rotation
- Offsets
- Datum information
- Units to be used

3D geo-location co-ordinates to be shown to no less accurate than 10mm (0.01m) in all directions.

7. Commercial

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

7.2   BIM Execution Plan

The Supplier shall prepare, deliver and maintain a BIM Execution Plan (BEP) for the project that responds to this Employer Information Requirements.

The Supplier shall review their BEP regularly and additionally when there is any change to their contract.

7.2.1   BIM Execution Plan Requirements

Pre and Post Building Information Execution Plans are to be provided in response to the Employer's Information Requirements identifying the Supplier proposals clause by clause. Where CPix templates are used the subsections of the EIR response section should be deleted and the clause by clause response included. The Pre BIM Execution Plan will be scored as part of the tender submission.

> **BIM Execution Plan Requirements**
>
> *The BEP Requirements are detailed throughout this document in highlighted panels like this one. The Supplier shall respond to the requirements and include any further information that they deem necessary within the BEP with the aim of the project.*

7.3   BIM Specific Competence Requirements

This section details the information that a bidder should be required to provide as part of a bid submission.

7.3.1   BIM Capacity and Experience

Responses will need to describe how mature an organisation is, and what capabilities are held specifically where this is in accordance with the standards sighted in this EIR.

Tenderers should include the following detail:

- BIM experience - organisational and personnel
- BIM capabilities
- Security understanding, capability, competence and experience
- Out-sourced roles

The information requested in this section is detailed further in the Project Implementation Plan described in PAS 1192-2:2013 *<<ISO 19650-1+2>>*.

7.3.2   Evidence of BIM Execution Planning

Responses will include examples of BIM execution planning specifically where this is in accordance with the standards sighted in this EIR.

Tenderers should include the following detail:

- BIM Execution Plans
- Lessons learnt

The information requested in this section is detailed further in PAS 1192-2:2013 *<<ISO 19650-1+2>>*

7.3.3   Confirmation of BIM Toolset

Responses will describe the processes and procedures that make up the bidder's BIM and information management toolkit specifically where this is in accordance with the standards sighted in this EIR

Tenderers should include the detail on procedures aligned with core project stages as follows:

- BS1192:2007 *<<ISO 19650-1+2>>*

- PAS1192-2:2013 *<<ISO 19650-1+2>>*

- BS1192-4:2014 & COBie UK 2012

- Other bespoke processes

The information requested in this section is detailed further in PAS 1192-2:2013 *<<ISO 19650-1+2>>*

7.3.4   Details of BIM Workload and Resourcing

Responses will describe the resources (and what levels) that are available to the project

Tenderers should include the following detail:

- Resource matrix with level, number, utilisation

- Outsourcing details or services etc.

The content of the assessment is described as the supplier BIM assessment form described in PAS 1192-2:2013. *<<ISO 19650-1+2>>*

7.3.5   Principal Supply Chain

Responses will describe the supply chain's ability to link into the process and how will this be assessed

Tenderers should / could include the following detail:

- Key supply chain partners

- Expected outputs

- Assessment process

The information requested in this section is detailed further in PAS 1192-2:2013 *<<ISO 19650-1+2>>*.