

FEDERATION OF PILING SPECIALISTS

FPS Digital Progression Group Guidance Note 2

BIM Introduction and Workflows

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BIM is a process for creating and managing information on a construction project from early design all the way through to operational delivery / handover. This process will include a combination of structured data and intelligent 3D models supported by a suite of digital construction technology.

The aim is to streamline construction projects by using this smarter way of working, digital construction technology supports unlocking many aspects of your project by using structured data to drive this technology.

**For more information around some of the key outputs Please refer to GN document 1*

BIM Requirement

Structured data is key to unlocking all the benefits of BIM / digital construction and the base to all your Geotechnical projects.

To help and support the BIM tools and technologies we have created the FPS E-Pile schedule to hold your project's structured data as a good starting point to enable you to develop your BIM projects in the most efficient way.

Working with structured data and connecting this to your smart technologies will unlock efficiencies in how you create, review and manage your projects, also making it possible to connect your project data to a larger selection of digital solutions for analysis, tracking, setting out and so on.

Digital Automation can also be supported through structured data, by adding visual programming code to your BIM / digital construction tools this can automate and carry out your developed workflows / processes.

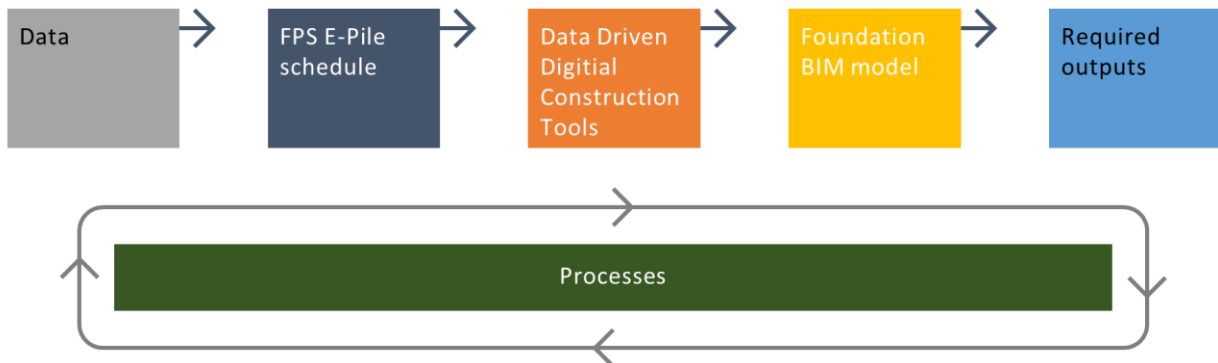
Fast reliable smart ways of working delivering benefits and give you your required outputs at a press of a button.

Designing and building digital processes to support the delivery of BIM projects.

To understand how BIM could look like on a project, we have produced a simple BIM workflow diagram.

The diagram below helps outline what is needed to support a BIM project, the requirements for structured data, and how the tools can be used to support your project from initial design all the way through to handover.

Structure processes driving digital tools, delivering required outputs



Remember!! when developing your BIM processes:

- Your process needs to be scalable as not all of your projects will require the same outputs.
- Review and understand the current BIM standards referenced with the issued BIM documentation for each project (e.g. ISO 19650, Construction Playbook)

Data:

Client Issued data plus any design created data that can be used within your project.

- Clients issued data.
- Design data.

FPS E-Pile Schedule:

Project data created within a structured format that can be used to support your project.

AGS Ground Data:

Ground investigation data, AGSi ground model data. Clients/Main contractors should use the AGS validator tool (freely available on the AGS website) to check the data has no errors before sending it on.

Data Driven Construction Tools:

Smart technologies that are driven by data connecting to the FPS E-Pile schedule to locate and place the foundation elements holding all its information with each object to the correct dimensions creating the digital twin of your project.

Foundation BIM Model:

Digital Twin of project that can support the internal company requirements and the external client deliverables.

Required outputs:

The outputs required to support your project review, coordination, delivery, and handover.

Processes:

Digital workflows / connections that can be created to support the requirements for your company / project. (Connection of data to digital tools / systems to support the digital requirements / outputs captured for each of your projects)

Your created processes can be scaled to support each project's requirements.

The information shared above highlights how data is used throughout a project's lifecycle.

To give some ideas around how this would work at each stage and help expand on some of the basic requirements you will need to implement BIM and the benefits this can offer we have split the next section into the following:

- Tender / Pre-Contract
- Pre-Construction
- Delivery / Construction
- As Built / Handover

Contract Stages

Potential BIM Documentation –

- BIM Assessments – BIM Capabilities.
- BEP – BIM Execution Plan – Document that clearly defines the actions required of each member of the project team to successfully deliver BIM on the project.
- EIR – Exchange Information requirements – Document that defines how information is transferred, in what format, what level of information on the project.

This table below highlights an example of how information is shared, managed and delivered at each stage of a project.

Received Information (Data)	Information Management / Data storage	Deliverables (Required Outputs)
Tender / Pre-Contract		
<ul style="list-style-type: none"> • Drawings • PDFs • SI/GI (AGS, AGSi) 	<ul style="list-style-type: none"> • FPS-E Pile Schedule • Storage of information within internal CDE 	<ul style="list-style-type: none"> • Project quantities. • Review and plan constructability. • Capture risk • Communicate approach.
Pre-Construction		
<ul style="list-style-type: none"> • BIM Models • Drawings • PDFs • Schedules • Construction issue info 	<ul style="list-style-type: none"> • FPS-E Pile Schedule • Storage of information within internal CDE • External CDE storage requirements 	<ul style="list-style-type: none"> • Outline internal requirements to support full review / validation of project. • Outline External requirements to support Client's documentation. • Logistics / clash detection
Delivery / Construction		
<ul style="list-style-type: none"> • BIM Models. • Drawings. • PDFs. • Schedules. 	<ul style="list-style-type: none"> • FPS-E Pile Schedule • Storage of information within internal CDE • External CDE storage requirements • Management of captured site Data. • Management of Rig data. 	<ul style="list-style-type: none"> • Construction BIM Foundation model • Construction drawings cut from model. • Digital Site data capture tools. • Setting out systems. <p>Continuation of internally captured areas:</p> <ul style="list-style-type: none"> • Review and plan constructability. • Capture risk • Communicate approach.
As Built		
<p>As-Built Construction Site Data captured through:</p> <ul style="list-style-type: none"> • Digital Site Data capture tools. • Site records books • Rig telematics • Setting out systems. 	<ul style="list-style-type: none"> • FPS-E Pile Schedule • Storage of information within internal CDE • External CDE storage requirements 	<ul style="list-style-type: none"> • As-Built Reports / Records. • As-Built Foundation Models / Drawings. • Structured Data Exports.

Notes:

- Within all stages of a project the levels of information received could vary, so it's important to plan and capture the digital approach for your project and outline the requirements needed to support and developed within each stage.
- Additional BIM documentation could be required to deliver against, so it's important to plan and capture the digital approach needed to support the internal and external requirements needed for your project.
- Timescales are always important to understand, optimized digital workflows within the tools and technology available can get the best outputs within the required timescales. Make sure all BIM documents have been reviewed and requirements have been captured and

incorporated into your digital plan.

- Try to leave the selection of tools and technology until you have a digital plan in place, as this will be driven by what you have captured and your internal and external required outputs.
- If your project has received a BEP review the deliverables as this may change your selection of tools and technology to support this project. Create / update your digital plan to support the internal and external deliverables.
- Structuring your data is key to driving data connectivity and unlocking the benefits of digital construction tools and technologies. To help support this look to use a centralised storage area or database structure where you can manage / store / develop and report all your project data, this will help drive efficiencies and give you a structured platform to connect your digital workflows to.

Conclusion

- With the examples shown all outputs can be managed through a digital plan which will review and capture internal and external requirements and make sure the technology, processes and data structure / storage is optimized to your project's deliverables.
- Always good to review the digital processes to support your requirements and make sure you have the correct data to deliver the captured outputs.
- When creating your digital plan, review the client's BEP, EIR or any other documents that outline the standards/requirements for digital delivery. This will identify any knowledge gaps.

Development of your digital processes and workflows

To drive efficiencies within your digital projects, below are a few ideas to help support your adoption of BIM / Digital Construction:

- Standardisation and usability are key in driving change.
- Standardise your data and incorporate the use of the FPS E-Pile Schedule.
- Review your storage / data management.
- Take time to understand how best BIM / Digital Construction Technology can support your company / project.
- Capture process and create automated workflows over time to improve efficiency.
- Review project / client requirements.
- Engage with all departments to share the benefits of change.
- Create a phased approach / Start small.

