NBS and the BIM Toolkit

Stefan Mordue, Architect & NBS Business Solutions Consultant

RIBA Enterprises
Overview

NBS and RIBA Enterprises
UK Government BIM and construction strategy
NBS portfolio
Summary
NBS and RIBA Enterprises
NBS and RIBA Enterprises
NBS and RIBA Enterprises
NBS and RIBA Enterprises
NBS and RIBA Enterprises

ribaprodutselector

National BIM Library

Information and Expertise
NBS and RIBA Enterprises

- Specification and process
- Product information
- Standards and technical

Logos for RIBA, National BIM Library, and Information and Expertise.
BIM to FM - on

20 May 2014 | By Peter Trebilcock

BIM can help facilities managers, what information is required

The time is now to address BIM in FM. Otherwise, things will get worse.

My recent discussions with the various private and public sector client groups have been in order to leverage the full and life need to better engage with the BIM process and define a clear vision and expectations. In BIM speak – it’s defining the Employers Information Requirements (EIRs).

NBS and RIBA Enterprises

In theory, greater collaboration should mean a better integrated project and less clash issues, but it depends on how clear protocols are

“It’s lovely to think we can drive out defects and premiums,” Ponds adds, “Are we there yet?”

The picture lies with industry

2 July 2014 | By Pete Baxter

collaboration

BIM and the frontier

12 May 14
<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960s</td>
<td>Industry need to improve building quality</td>
</tr>
<tr>
<td>1960s (late)</td>
<td>Research project identifies need for an industry standard specification system</td>
</tr>
<tr>
<td>1970</td>
<td>RIBA agrees to fund the project</td>
</tr>
<tr>
<td>1973</td>
<td>NBS published as a series of books</td>
</tr>
<tr>
<td>1975</td>
<td>NBS moves to Newcastle to reduce costs</td>
</tr>
<tr>
<td>1988</td>
<td>NBS re-written onto CPI format (includes SMM7 and Common Arrangement of Work Sections)</td>
</tr>
<tr>
<td>1992</td>
<td>First database version of NBS (Specman 3)</td>
</tr>
<tr>
<td>2008</td>
<td>NBS starts re-write onto BIM platform</td>
</tr>
<tr>
<td>2013</td>
<td>NBS Create launched with Revit plug-in</td>
</tr>
<tr>
<td>2013</td>
<td>NBS National BIM Library launched</td>
</tr>
<tr>
<td>2015</td>
<td>NBS BIM Toolkit launched</td>
</tr>
</tbody>
</table>
NBS history
NBS history
"This Government’s four year strategy for BIM implementation will change the dynamics and behaviours of the construction supply chain, unlocking new, more efficient and collaborative ways of working. This whole sector adoption of BIM will put us at the vanguard of a new digital construction era and position the UK to become the world leaders in BIM."

Francis Maude
Minister for the Cabinet Office
UK Government strategy
UK Government strategy - objectives

Simple objectives and requirements:

- 3D collaborative environment by 2016
- COBie output at key stages including handover
- 20% capital cost reduction for construction phase
UK Government strategy - implementation

The Bew: Richards wedge

- Level 0: CAD
  - Drawings, lines, arcs, text, etc.

- Level 1: 2D
  - 95% produce 2D drawings lacking coordination increasing costs by 25% through waste and rework.

- Level 2: 3D
  - 2D 3D spatial coordination based on BS1192:2007 has the potential to remove error and reduce waste by 50%.

- Level 3: iBIM
  - Integrated, Interoperable Data
  - A fully integrated and interoperable BIM(M) has the potential to mitigate risk throughout the process and to increase profit by +2% through a collaborative process.

Source: Mark Bew and Mervyn Richards
### UK Government strategy - standards

- **PAS 1192:2:2013**  Production of co-ordinated design and construction (CAPEX) information,
- **PAS 1192:3:2014**  Development of operational strategies and the effective transfer of data into operations (OPEX)
- **BS 1192:4:2014**  COBie - Data definition for information deliveries
- **BS 1192:5:2015**  Data security
- **BIM Protocol**  A suite of BIM commercial and contractual advice documents and standard forms
- **Gov Soft Landings**  Policy and processes to ensure effective handover and Post Occupation Effectiveness
- **Classification**  A structured and standardised information classification system
- **DPoW**  An industry standard method of describing geometric, requirements and data deliveries at key stages of the project cycle
UK Government strategy - implementation

BIM : BAM : BOOM

Savings have always been targeted at design and construction costs
UK Government strategy – DPoW

Data & Geometry Maturity

Point of Geometric and Data Maturity required to answer "target cost" type operational decisions

Data Needed to populate AI/MIS System
UK Government strategy – the results

Progress and savings made

- £9.6bn ($15.4bn USD) government work completed
- £4bn ($6.4bn USD) private sector work from just 3 clients

Audited savings delivered on government projects were:

- 2011 / 2012  £72m saving on £476m spend (13.1%)
- 2012 / 2013  £447m saving on £2.4bn spend (15.6%)
- 2013 / 2014  £840m saving on £3.5bn spend (19.6%)
UK Government strategy - comments

‘The UK programme based on the BIS BIM Strategy is currently the most ambitious and advanced centrally driven programme in the world. The UK has a window of opportunity to capitalise on the success of its domestic programme and to take on a global leadership role in BIM exploitation, BIM service provision and BIM standards development.’

Patrick MacLeamy
Chief Executive Officer of HOK
‘The understanding and endorsement of building information modelling in the United Kingdom construction industry is as rapid as it is impressive. Due in large part to the inspired leadership of the Government's BIM Task Group, BIM is now key to the Construction Strategy and has catapulted UK construction to the forefront in BIM standards and adoption worldwide…’

Phillip G. Bernstein FAIA RIBA
Vice President, Autodesk Strategic Industry Relations
UK Government Strategy 2025
UK Government strategy 2025 – BIM level 3

Maturity

Level 0
Level 1
Level 2
Level 3

Data

Life cycle Management

Processes

2D
3D

CAD

BIMs

CPIC
AVANTI
BS 1192 2007
User Guides CPIC, Avanti, BSI

IDM – Common Dictionary
IFC – Common Data
IFD – Common Processes
ISO BIM

Integrated, Interoperable Data

Drawings, lines, arcs, text etc

Models, objects, collaboration

Integrated Web Services BIM Hub

Tools

Paper

File Based Collaboration

File Based Collaboration & Library Management

© 2008 Bew - Richards
UK Government strategy 2025 – objectives

**Lower costs**

33%

*reduction in the initial cost of construction and the whole life cost of built assets*

**Faster delivery**

50%

*reduction in the overall time, from inception to completion, for newbuild and refurbished assets*

**Lower emissions**

50%

*reduction in greenhouse gas emissions in the built environment*

**Improvement in exports**

50%

*reduction in the trade gap between total exports and total imports for construction products and materials*
International activity – EU Public Estate

European Public Estate Owners

Building Information Modelling (BIM) Conference

22nd October 2013, Brussels
International activity – EU Public Estate
International activity – global requirements

Who is asking for BIM? – Published BIM Mandates

As BIM adoption continues to grow around the world, governments are promoting its ability to eliminate waste on public projects and even mandating its use as part of construction sector reform, cost-saving efforts and climate change mitigation.


AMER
- U.S. Army Corps of Engineers (USACE)
- U.S. General Services Administration
- U.S. National Institute of Building Sciences
- U.S. Veterans Affairs
- New York City Department of Design and Construction
- State of Ohio General Service Division State Architect’s Office
- State of Tennessee Office of the State Architect
- State of Maryland and Washington D.C. Public Schools
- NY School Construction Authority
- State of Wisconsin

EMEA
- Statsbygg – Norway
- Transport Agency – Finland
- Rijksooberwiygisten Ministry of the Interior and Kingdom Relations – Netherlands
- Cabinet Office – UK
- Department of Housing & Equal Territories – France
- Public Procurement Rules – Austria
- EU Public Procurement Directive – Brussels
- Bygnings (National Property Agency) – Denmark
- BIM for tall buildings and Green Building Directive - Dubai
- BIM requirements for rail schemes - Qatar

APAC
- Hong Kong Housing Authority
- Building and Construction Authority - Singapore
- Chinese Ministry of Housing and Urban-Rural Development (MCHURD)
- Japanese Ministry of Land Infrastructure and Transportation (MLIT)
- Korean Ministry of Land Infrastructure and Transportation (MLIT)
- Australia National BIM Specification

Sample of Government BIM Policy Initiatives or standards as of August 2014 with public-facing websites for more information.
International activity – ICIS members

Locations of national master specification organisations
Bringing it all together
Linking the tools – the product map

- Process management
- Classification
- Geometry model
- BIM objects library
- Standards/technical
- Specification and Guidance
- Building Code
Linking the tools – process management
Linking the tools – spec / knowledge
Linking the tools – construction products

[Image of a webpage from National BIM Library with search results for insulation (93) and two examples of flat roof constructions with polymeric membrane and insulation.]
Linking the tools – construction products

Insulation (62)

- G410-ELF Adhered Roof System - Sarnavap 5000E SA

- G410-ELF Adhered Roof System - Sarnavap 500E
Bringing it all together
Linking and maintaining the data
Linking the tools and data
Linking the tools and data

25-50-20/120 - Doorset system

25-50-20/120 - Doorset system

25-10-55/123 - External multiple leaf wall above damp proof

25-50-20/120 - Doorset system

20-55-05/110 - Battened timber board floating floor system
Linking the tools and data
Linking the tools and data
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Linking the tools and data
Linking the tools and data
Bringing it all together - DPoW
Linking the tools – the product map

- Process management
- Classification
- Geometry model
- BIM objects library
- Standards/technical
- Specification and Guidance
- Building Code
Linking the tools – the product map

- Classification
- Process management
- Geometry model
- BIM objects library
- Specification and Guidance
- Standards/technical
- Building Code
Hi Stephen Hamil,
Here's a list of your existing projects:

- **017 Morning Sun Country Park**
  Last modified 23/03/2015
  Work to the visitor centre, drainage

- **005 Newtown High School**
  Last modified 21/03/2015
  New high school for the children of Newtown. Also community

- **023 Quayside Development**
  Last modified 21/03/2015
  Inspirational design for new museum by the river in the city centre

- **009 City Centre Office...**
  Last modified 21/03/2015
  Refurbishment of listed building in the centre of Newtown
017. MORNING SUN COUNTRY PARK

Newtown Old Pit, Newtown NE28 7RH

EDIT PROJECT DETAILS

Reference *
A unique identifier for your project consisting of numbers, letters and/or symbols.
017

Title *
Morning Sun Country Park

Address
Newtown Old Pit, Newtown NE28 7RH

Location
Enter the postcode of your project and use the map below to refine the location if required.
Enter a postcode... Find

Latitude: 55.01488116726285, Longitude: -1.5325110874023267
### ROLES AT STAGE 1

<table>
<thead>
<tr>
<th>Role</th>
<th>Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architect</td>
<td>Not decided</td>
</tr>
<tr>
<td>Building services engineer</td>
<td>Not decided</td>
</tr>
<tr>
<td>Civil engineer</td>
<td>Not decided</td>
</tr>
<tr>
<td>Client</td>
<td>Newtown CC</td>
</tr>
<tr>
<td>Construction lead</td>
<td>Not decided</td>
</tr>
</tbody>
</table>
## TASKS AT STAGE 1

<table>
<thead>
<tr>
<th>Ref</th>
<th>Task</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.010</td>
<td>Contribute to development of Initial Project Brief including Project Objectives, Quality Objectives, Project Outcomes, Sustainability Aspirations, Project Budget and other parameters or constraints.</td>
<td>Newtown CC (Client)</td>
</tr>
<tr>
<td>1.020</td>
<td>Provide information for and contribute to contents of Project Execution Plan as required.</td>
<td>Newtown CC (Client)</td>
</tr>
<tr>
<td>1.030</td>
<td>Develop Initial Project Brief with project team including Project Objectives, Quality Objectives, Project Outcomes, Sustainability Aspirations, Project Budget and other parameters or constraints.</td>
<td>Project lead</td>
</tr>
<tr>
<td>1.040</td>
<td>Collate comments and facilitate workshops as required to develop Initial Project Brief</td>
<td>Project lead</td>
</tr>
</tbody>
</table>

All members of the Project Team will have an input, but one member takes responsibility for organising the process and communicating the results.
017. MORNING SUN COUNTRY PARK

Newtown Old Pit, Newtown NE28 7RH

Stage 3. Definition

DELIVERABLES AT STAGE 3

<table>
<thead>
<tr>
<th>Classification</th>
<th>Deliverable</th>
<th>Type</th>
<th>Responsibility</th>
<th>LOD</th>
<th>LOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ss_15_10_30_25</td>
<td>Earthworks excavating systems</td>
<td>CCC Civils</td>
<td>Civil engineer</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Ss_15_10_32_10</td>
<td>Caged rock unit (gabion) retaining wall systems</td>
<td>CCC Civils</td>
<td>Civil engineer</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

The side of the old pit heap will need retained at both the south and the east entrances to the visitor centre.

As agreed at the end of the concept design stage, caged rock would be the solution here. CCC have advised that a design similar to that used in the Oldtown country park project would be suitable.

Hudson Metals are the preferred suppliers.

Big Beam Ltd

In situ concrete bored piling system

<table>
<thead>
<tr>
<th>Classification</th>
<th>Deliverable</th>
<th>Type</th>
<th>Responsibility</th>
<th>LOD</th>
<th>LOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ss_20_05_65_41</td>
<td>In situ concrete bored piling system</td>
<td>Big Beam Ltd</td>
<td>Structural engineer</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
Caged rock unit (gabion) retaining wall systems Ss_15_10_32_10

Who's responsible for this deliverable?

Civil engineer (CCC Civils)

Any notes to add?

The side of the old pit heap will need retained at both the south and the east entrances to the visitor centre.

As agreed at the end of the concept design stage, caged rock would be the solution here. CCC have advised that a design similar to that used in the Oldtown country park would be suitable.

Requirement

Visual information to provide developed principles of the design to a greater level of detail. Developed coordination between all professions. Visual development showing coordination for general size and primary relationships between different elements of the construction.

Can form a brief for a specialist sub-contractor or fabricator to progress with their technical design, fabrication and installation. This would be expected to include critical dimensional coordination, performance requirements and qualities of finish.

Purpose of information

Level of detail (LOD) 3
Level of information (LOI) 3
**Caged rock unit (gabion) retaining wall systems Ss_15_10_32_10**

**Who's responsible for this deliverable?**

Civil engineer (CCC Civils)

**Any notes to add?**

The side of the old pit heap will need retained at both the south and the east entrances to the visitor centre.

As agreed at the end of the concept design stage, caged rock would be the solution here. CCC have advised that a design similar to that used in the Oldtown country park would be suitable.

---

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design supervision and checking</td>
<td>Required level of design supervision and Design supervision personnel.</td>
</tr>
<tr>
<td>Loads applied to gravity retaining walls</td>
<td>Ground levels, Excavation in front of retention structure and Lateral loading.</td>
</tr>
<tr>
<td>Geotechnical design</td>
<td>Standards, Design category and Ground investigation report.</td>
</tr>
<tr>
<td>Design of gravity retaining wall systems</td>
<td>Limits on movements.</td>
</tr>
</tbody>
</table>
Add Deliverable to Stage 3

Step 1 - Search for the deliverable you want to add to your project

Search for 'boiler'

Definitions
- With definitions (12)
- Without definitions (4)

Table
- Product (13)
- Space (2)
- System (1)

Disciplines
- Services (12)

Deliverables
- Solid fuel steel shell boilers
- Solid fuel cast iron boilers
- Oil fired water tube boilers
- Oil fired steel shell boilers
- Oil fired cast iron boilers
- Gas fired water tube boilers
- Gas fired steel shell boilers
- Gas fired cast iron boilers
- Gas fired condensing boilers
- Gas fired boilers
- Dual fuel steel shell boilers

Table
- Pr_60_60_08_81
- Pr_60_60_08_80
- Pr_60_60_08_60
- Pr_60_60_08_59
- Pr_60_60_08_58
- Pr_60_60_08_37
- Pr_60_60_08_36
- Pr_60_60_08_35
- Pr_60_60_08_34
- Pr_60_60_08_33
- Pr_60_60_08_25

Next Step

Cancel
ADD DELIVERABLE TO STAGE 3

Step 2 - Define the level of information, level of detail and who’s responsible for this deliverable.

Gas fired condensing boilers
Pr.60 60 08 34

What level of detail and information is required?

<table>
<thead>
<tr>
<th>LOD</th>
<th>LOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Who’s responsible for this deliverable?

Building services engineer | Wires+Fires Ltd

Any notes to add?

Speak with the soft landings champion and determine space requirements.

929 characters remaining

Requirement

Visual information to provide general principles of the design. Showing arrangement of system with their relationship to internal and external context, and key project criteria to suit a clients brief.

General descriptions would be expected to communicate principles of materiality, scope, colour and context. Expect strategic coordination with other professions to show general principles of the design.

Purpose of information

To provide a visual representation of proposals at a Concept stage and
**ADD DELIVERABLE TO STAGE 3**

**Step 2 - Define the level of information, level of detail and who's responsible for this deliverable.**

**Gas fired condensing boilers**  
Pr_60_60_08_34

--- Change

Who's responsible for this deliverable?

Building services engineer (Wires+Fires Ltd)

Any notes to add?

Speak with the soft landings champion and determine space requirements.

929 characters remaining

What level of detail and information is required?

**Level of detail (LOD)**  
5

**Level of information (LOI)**  
3

**Requirement**

Visual information to provide full information to support construction / installation. Developed coordination between all professions.

Visual representations showing final coordination for size and relationships between different elements of the construction.

Graphical representation of system, dimensionally accurate indicating primary performance characteristics and sufficient information to support installation.

Typical / Installation details separately produced linked to model element

[Add Deliverable]  [Cancel]
JET BLAST DEFLECTION SYSTEMS

A jet blast deflection system typically comprises of items such as system performance, blast deflector and anchors.

Uniclass2015 - Ss_25_16_08_44 Jet blast deflection systems

Level of detail    Level of information

2

Requirement
Visual information to provide general principles of the design, dimensionally inaccurate. Expect strategic co-ordination with other professions regarding e.g. surfacing.

Purpose of information
To provide a visual representation of proposals at Concept Stage and to support general spatial co-ordination.

The above illustrations are for Jet blast deflection systems from the NBS section Jet blast screen systems. This is indicative of the LOD requirements for Jet blast deflection systems.
5 Requirement

Visual information to provide full information to support construction / installation. Developed coordination between all professions.

Visual representations showing final coordination for size and relationships between different elements of the construction.

Graphical representation of system, dimensionally accurate indicating primary performance characteristics and sufficient information to support installation.

Typical / Installation details separately produced linked to model element and adjacent constructions.

Purpose of information

To be updated during the construction process to reflect the final design, and to provide a future reference to sit alongside the O&M Manuals.

The above illustrations are for Jet blast deflection systems from the NBS section Jet blast screen systems. This is indicative of the LOD requirements for Jet blast deflection systems.
Rail turnouts are described by characteristics such as rail type, switch type and form.

Uniclass2015 - Pr_20_76_71_75 Rail turnouts

Requirement
Visual information to provide developed principles of the design to a greater level of detail. Developed coordination between all professions. Visual development showing coordination for general size and primary relationships between different elements of the construction.

Can form a brief for a specialist sub-contractor or fabricator to progress with their technical design, fabrication and installation. This will give the specialist some indication.

Plan

The above illustration is for Rail turnouts from the NBS section Rail fastener products. This is indicative of the LOD requirements for Rail turnouts.
5 Requirement

Visual information to provide full information to support construction / installation. Developed coordination between all professions.

Visual representations showing final coordination for size and relationships between different elements of the construction.

Graphical representation of system, dimensionally accurate indicating primary performance characteristics and sufficient information to support installation.

Typical / Installation details separately produced linked to model element and adjacent constructions.

Purpose of information

To be updated during the construction process to reflect the final design, and to provide a future reference to sit alongside the O&M Manuals.

The above illustrations are for Unit lined tunnel system from the NBS section Tunnel structure systems. This is indicative of the LOD requirements for Unit lined tunnel system.
WASTEWATER SCUM REMOVAL SYSTEMS

Uniclass2015 - Ss_50_75_75_96 Wastewater scum removal systems

3 Requirement

Visual information to provide developed principles of the design to a greater level of detail. Developed coordination between all professions. Visual development showing coordination for general size and primary relationships between different elements of the construction.

Can form a brief for a specialist sub-contractor or fabricator to progress with their technical design, fabrication and installation.

Plan

Model

2D Section
**SOLAR HEATING SYSTEMS**

A solar heating system typically comprises of items such as heat source, mounting of solar modules and expansion.

<table>
<thead>
<tr>
<th>Uniclass2015 - Ss_60_40_37_81 Solar heating systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reference</strong></td>
</tr>
<tr>
<td>NBS</td>
</tr>
<tr>
<td>NBS Code: 60-45-40/140 Solar heating system</td>
</tr>
<tr>
<td>RICS</td>
</tr>
<tr>
<td>NRM1: 5.5.1 Heat source (default)</td>
</tr>
<tr>
<td>Rules of measurement</td>
</tr>
<tr>
<td>Cost benchmarks</td>
</tr>
<tr>
<td>Rules of measurement guidance from RICS NRM1</td>
</tr>
</tbody>
</table>

**Level of detail**

2

**Requirement**

Visual information to provide general principles of the design. Showing arrangement of system with their relationship to internal and external context, and key project criteria to suit a clients brief.

General descriptions would be expected to communicate principles of...
And finally... Resources

www.thenbs.com

www.bimtaskgroup.org
Linking the tools and data - awards
In the pipeline
In the pipeline – cost and carbon
Links
And finally… Resources

www.thenBS.com

www.bimtaskgroup.org