BS 8541-5:2015	Assemblies – Code of practice	N/A
BS7000-4:2013	Design management systems. Guide to managing design in construction	N/A
BSRIA BG 6/2014	A Design Framework for Buildnig Services	4
BS 8536-1:2015	Code of practice for facilities management (Buildings infrastructure)	N/A
BS 8536-2:2016	Code of practice for asset management (Linear and geographical infrastructure)	N/A

Table 6 - Standards

3.2. Security

3.2.1. The Consultant will assist the Employer in defining the correct security classification for the project in alignment with PAS1192-5.

3.2.2. If identified as required the Consultant will assist the Employer in the creation of a Built Asset Security Management Plan, a Built Asset Security Strategy, a Security Breach/Incident Management Plan and the Built Asset Security Information Requirements.

3.2.3. The Consultant shall assign the appropriate security classification in accordance with the Employer's Information Security Classification Standard, to all Production Information and Handover Information within the CDE.

3.2.4. The Consultant shall provide details within the BEP of how compliance with the Employer's Information Security Classification Standard will be monitored and managed.

3.3. Roles and Responsibilities

3.3.1. The role of Project Information Manager shall be appointed by the Consultant.

3.3.2. The responsibilities which fall under the role "Project Information Manager" may be fulfilled by more than one person.

3.3.3. The responsibilities of the Project Information Manager include:

a) ensuring the BEP has been completed and agreed with the Employer.

b) Ensure the BEP is briefed to the Contractor, Sub-contractors or supplier of the Consultant, the Project Manager, the Supervisor and Others (as

applicable) and is updated during the works through the project change control procedures

c) ensuring processes and collaborative behaviours are fully complied with across the project

d) providing the focal point for all Production Information and Handover Information management issues on the project

e) ensuring that all Production Information and Handover Information is compliant with the requirements of the contract and all applicable standards

f) ensuring that all Production Information and Handover Information is managed through the CDE including that all mandatory meta-data has been captured

g) ensuring the Consultant, Contractor, Sub-contractors or supplier of the Consultant, the Project Manager, the Supervisor and Others (as applicable) have continued and appropriate access to the Common Data Environment

h) providing clear instructions including on the following areas:

- what Production Information and Handover Information is required, by whom and for what purpose;
- who will generate the Production Information and Handover Information and maintain it;
- how it will be sorted and distributed;
- how frequently it is shared; and
- what actions should be taken on receipt of the Production Information and Handover Information.

3.3.4. The Consultant shall ensure responsibilities have been allocated and maintain a list of contact information of those assigned, providing their Curriculum Vitae (CV) as notified by the Employer.

3.4. Naming Conventions

3.4.1. A single Unique File Identification (File ID) convention shall be used for all graphical and non-graphical data uploaded onto the CDE. File ID details are found in the FNC Standards referenced in Table 6 - Standards.

3.5. Classification

3.5.1. The Consultant shall structure all Production Information and Handover Information; categorising the functional and physical characteristics of the assets such that they can be efficiently identified, grouped and utilised for different purposes. All Production Information and Handover Information

must be assigned with the appropriate classification(s), in accordance with Table 6 - Standards.

4. Information Management

4.1. System Performance and Constraints

4.1.1. The Consultant shall provide details of any limitations / restrictions of all parties IT systems; this should as a minimum determine limitations on files size and restrictions on use of versions of software.

4.1.2. The Consultant is responsible for procuring, testing and implementing any required IT infrastructure, hardware and software during the mobilisation period as instructed by the Project Manager.

4.2. Massing Strategy

4.2.1. The Consultant shall provide a massing strategy, within the BIM Execution Plan.

4.2.2. The Massing Strategy will as a minimum establish the extents of the proposed design, including:

a) shape

b) general size

c) location

d) orientation.

4.3. Modelling Strategy

4.3.1. The Consultant shall provide a modelling strategy within the BIM Execution Plan.

4.3.2. The Modelling Strategy will as a minimum establish the requirements for how Production Information and Handover Information will be developed to allow;

a) parallel working within discipline / task teams

b) coordination within (and across) discipline / task teams

c) efficient exchange through the CDE

d) delivery of graphical data in accordance with Table 4.

4.4. Volume Strategy

4.4.1. The Consultant shall provide a volume strategy within the BIM Execution Plan.

4.4.2. The Volume Strategy must establish as a minimum how the extents of the massing strategy are sub-divided into spaces for discipline / task teams to coordinate their designs within (i.e. rooms, horizontal and vertical circulation, structures, service routes).

4.4.3. The Consultant shall provide details of their processes for utilising the volume strategy, in accordance with PAS 1192-2:2013, to:

a) federate models

b) provide assurances and evidence of coordination of discipline / task teams design within each volume

c) provide assurances and evidence of the coordination and integration between the volumes.

4.5. Compliance Plan

4.5.1. The Consultant shall provide a Compliance Plan

4.5.2. The Compliance Plan will detail how they will ensure and provide evidence that all Production Information and Handover Information, delivered through the CDE at each Pathway Stage and as notified by the Employer, is:

a) verified against Project Requirements (including the EIR)

b) compliant with the standards set out in Table 6 - Standards,

c) progressed to the agreed Level of Definition as set out in the MIDPs and BEP

d) spatially coordinated in relation to asset's physical space, operational space and maintenance space

e) useable by the software platforms identified in Table 7 - Software Platforms

f) in the formats identified in Table 8 - Employer's Data Exchange Formats; and

g) checked and approved for technical content (in accordance with the Design Management Plan).

4.6. Common Data Environment (CDE)

4.6.1. All Production Information and Handover Information is to be issued through the CDE.

4.6.2. Details relating to the CDE and associated processes are found in the CDE Standard listed in Table 6 - Standards.

4.7. Collaboration Process

4.7.1. All Production Information and Handover Information shall be checked, approved and verified as it passes through the CDE.

4.7.2. The level and types of checks and approvals shall be determined by the purpose for which the Production Information and Handover Information is being shared.

4.7.3. The Consultant shall provide the following details:

a) processes for checking, approving and verifying Production Information and Handover Information within the CDE

b) triggers for sharing / exchanging Production Information and Handover Information

c) purposes of sharing / exchanging Production Information and Handover Information

d) required exchange formats

e) frequency and purpose for each design review / coordination workshops.

5. Digital Engineering

5.1. Software Platforms

5.1.1. The Employer will utilise, for a number of activities, the software platforms identified in Table 7.

Use		Platform	Version
Data authoring	Non-Graphical Data	Excel	2007
	Graphical Data	**Surface**	
		AutoCAD	2013
		AutoCAD Civil 3D	2013
		Revit	2013
		Esri (GIS)	

		LU MicroStation AECOsim	 SS2 SS2
Data capture	Laser Surveys	Recap Pointools	2013 SS2
Data visualisation	Documentation Graphical Data	Adobe PDF **Surface** Navisworks **LU** Bentley Navigator	11 2013 SS2
Data coordination	Graphical Data	**Surface** Navisworks **LU** Bentley Navigator	 2013 SS2
Data simulation	Graphical Data Non-Graphical Data	**Surface** Navisworks **LU** Bentley Navigator	2013 SS2

Table 7 - Software Platforms

5.1.2. The Consultant shall provide details of software platforms they and their Sub-contractors will use and for what purpose.

5.2. Data Exchange Formats

5.2.1. Graphical Data, Non-Graphical Data and Documentation, to be provided by the Employer, will be exchanged (through the CDE) in the file format(s) as set out in Table 8.

Data / Information	Exchange Format	Version
NAMS, Confirm, SFM, BridgeStation, Ellipse, Maximo Asset data (Non-Graphical Data)	XLS	2007
Native models (Graphical Data)	Native Format	
Federated models (Graphical Data)	NWD	2013
4D Simulation (Graphical Data and Non-Graphical Data)	NWD	2013
Cost Data (Non-Graphical Data)	XLS	2007
Programmes	XER PLF PDF MMP	P6 P6 11 2010
Documentation	PDF	11

Table 8 - Employer's Data Exchange Formats

5.2.2. The Consultant shall deliver Production Information and Handover Information (through the CDE), with the Employer on the dates contained within the accepted MIDP, in the formats identified in Table 8.

5.2.3. The Consultant shall provide details of how they will address interoperability issues within the BEP.

5.3. Library of Objects

5.3.1. Consultant shall, if used, provide a Library of Objects through the CDE for approval for use and inclusion within TfL's Library of Objects.

5.3.2. Objects provided by Consultant shall be delivered through the CDE in their native format.

5.3.3. Consultant shall ensure (and provide evidence that) all objects provided by Consultant and their Sub-contractors and sub-consultants of any tier, are compliant with BS8541-1, BS8541-2, BS8541-3 and BS8541-4.

5.3.4. Consultant ensures that the minimum attribute data (non-graphical data), as set out in section 2.4, is attributed to the objects at each stage of the project.

5.4. Coordinates

5.4.1. The following must be exchanged, through the CDE, compliant with the OS Grid:

a) Survey information, including mapping; and

b) Production Information and Handover Information representing the fixed geographical location of an asset(s).

5.4.2. Details relating to the dimensional consistency / units of measure are found in the Computer Aided Design Data Standard from Table 6 - Standards.