DIRECTORATE OF ESTATES & FACILITIES

EMPLOYERS INFORMATION REQUIREMENTS (where BIM has been agreed)

EPM PM25

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1	First issue		
2	Updated to include reference to new ISO 19650, refer to section 2		

Document Purpose

This procedure is only applicable to those projects (new build, extension, refurbishment) where BIM outputs are required. The decision to produce BIM outputs will be taken jointly by the Estate & Space Management Unit and the relevant internal Unit Head - currently the Head of Capital Projects or the Design Services Unit Manager. This decision must be made at an early stage, and before the appointment of the project team. If BIM outputs are not required, please refer to EPM GM5.

This document and its appendices confirm the Employer's Information Requirements (EIR) as a sub-set of the Employer's Requirements or equivalent contract documentation. It specifies the University of Manchester's (UoM) organisational and asset information requirements, reasons and purpose to the project team, along with technical standards and commercial procedures to support Level 2 Building Information Modelling (BIM) and Information Management. The Document is technical in nature and although a glossary is provided, it assumes sound knowledge of BIM, relevant standards and information management concepts.

Contents

Appendices

1. Vision and Objectives

1.1. Document Relevance and Structure

- This document together with its completed project specific Appendices A and B fulfills PAS1192-2:2013 section 5.2 and 5.3 as UoM's Employer's Information Requirements.
- Appendices A and B are to be completed by UoM's Client Representative/ Project Manager (CR) with support from UoM's BIM Manager.
- The EIR shall be incorporated into pre-contract appointments and wider tender documentation alongside traditional Employers Requirements and contracts. The Consultant Project Manager (CPM) shall ensure that the EIR is included in project contracts in such a way as to avoid duplication of responsibilities and effort.

This document is structured as follows:-

Why – Sections 1-3 outline the University's position regarding strategic vision, referenced standards and security.

How - Sections 4 and 5 specify the information management, roles, technical and commercial standards, methods and procedures to be used.

What and When - Section 6 defines the actual information and data deliverables.

Appendices A, B define individual project specifics and outline any agreed derogations from this EIR.

1.2. UoM Level 2 BIM Vision and Journey

The University of Manchester is the largest single campus in the UK with 245 buildings, containing over 50,000 rooms and has an internal floor area of almost 900,000 square metres.

UoM is committed to implementing a collaborative, Level 2 BIM process in the delivery of all new and major refurbishment capital projects.

UoM recognises Level 2 BIM as defined in the "BIM Level 2 Explained" Infographic at the bsi website. (www.bim-level2.org)

UoM commenced its journey towards Level 2 BIM ahead of the UK Governments BIM Task Group April 2016 deadline for central government departments with several early adoption projects utilising available standards and best practice from 2013. This journey continues as UoM implements the Level 2 standards and enabling tools and continues to develop its own information management processes and procedures for Operations. Systems such as its Space Management tool (Archibus), Asset Management tool (Oracle) and Document Management System (Sharepoint) are being enabled for the receipt of data, with current test projects underway.

For clarity; information models could include three-dimensional models, drawings, equipment schedules, technical specifications, photographs, test certificates and warranty arrangements as well as structured product data required during the asset life cycle.

1.3. Strategic Purpose

UoM, as stated above, is, like many organisations, on a BIM and Information Management journey. It recognises that at present far from reducing cost and risk some BIM processes

and deliverables can drive up cost and waste if ill conceived. It also recognises that in the past some employers have specified too strictly the BIM and information management processes that designers, main contractors and sub-contractors should adopt. Main Contractor BIM uses should be aligned to specific project challenges, procurement route and project stage.
UoM is therefore (at present) focused on requesting the minimum amount of data and information needed that can be subsequently protected and maintained and processes specified to achieve UoM's strategic BIM and Information Management purposes listed below:

- Assurance and quality
- Excellence of information management
- Spatial co-ordination of the design
- Stakeholder engagement and communication
- Main and sub-contractor productivity, efficiency, safety and risk mitigation
- Efficient transfer of consistent, complete O&M documents and data and H&S file.
- Operations and maintenance
    - Management of capacity and utilisation
    - Statutory compliance and regulatory responsibilities
    - Maintenance, repair and replacement
    - Support for repurposing and future projects
    - Support for decommissioning and disposal

1.4. PIM to AIM – consistency and lean approach.

Moving information from the project setting – Project Information Model (PIM) to the business as usual operational setting (BAU) – Asset Information Model (AIM) is challenging when each project is delivered using different teams. In addition, not all project information is useful during the day to day operation and maintenance of a built asset. However, it may be of use in the future for repurposing and ultimately disposal.
Critical to fulfilling UoM's strategic purpose are; 3D Models, structured data and documents which should be protected and maintained through the life of the building after handover, in addition to the Health and Safety file, and the one-off population of BAU (Business As Usual) enterprise systems. Therefore (at present) a lean approach is required concentrating on these critical deliverables not the wider dataset that may be possible.
The use of standards such as BS1192:2007 and UoM's EPM policies and procedures enables a consistent approach at handover, from different teams.
At present, it is UoM's intention at a high level to take the following approach:

Transfer from PIM to AIM using the CONJECT platform

- Population of Archibus– direct from Revit Models containing spaces and relevant attributes
- Population of Oracle Asset Management from BIM derived Asset data in Excel format
- Population of O&M and H&S file repository (Sharepoint) from relative path folder structures and consistent file naming and CI/SfB classification.

2. Referenced and applicable standards

The standards outlined below are to be used as appropriate by all project team members and their subcontractors. UoM recognise that many organisations are on a journey towards best practice use of the standards listed below and therefore they are marked Compulsory, Guidance or Reasonable Efforts to ensure a sensible approach at this time.

UoM acknowledges that new standard ISO 19650 is in development and that Parts 1 and 2 including a UK annex have been released. The principles of these standards are based on PAS1192-2 and BS1192:2007 and differences mainly reflect nomenclature. Therefore, at present UoM will continue to use the established standards and suppliers should use those referenced below.

UoM also note that the term MPDT has been generally superseded, however as UoM do not reference or use the CIC BIM protocol this term remains in use in its documentation, suffixed by the new term Responsibility Matrix in the EIR.

Compulsory, below, does not indicate a requirement for an organisation to hold certification of compliance, however organisations should demonstrate compliance through their capability assessments and BIM execution plan (BEP) see section 6.

UK/ International Standard	**Description**	**Requirement**
PAS1192-5:2015	Specification for security-minded building information modelling, digital built environments and smart asset management.	Compulsory
BS 8536:1	Briefing for design and construction. Code of practice for asset management	Reasonable Efforts – see also EPM PM15
RIBA Plan of Work 2013		Compulsory
BS1192:2007 +A2:2016	Collaborative production of architectural, engineering and construction information. Code of practice	Compulsory
PAS1192-2:2013	Specification for information management for the capital/delivery phase of construction projects using building information modelling	Compulsory
PAS1192-3:2014	Specification for information management for the operational phase of assets using building information modelling (BIM)	Reasonable Efforts
BS8541 Suite	Library objects for architecture, engineering and construction	Reasonable Efforts
UK Cyber Essentials Scheme (or other such as ISO27001)	A government-backed, industry supported scheme to help organisations protect themselves against common cyber attacks.	Reasonable Efforts
BS1192:4	Collaborative production of information. Fulfilling employer's information exchange requirements using COBie. Code of practice	Project specific – see section 5.2.2
ISO 8000–150:2011	Data Quality Management	Guidance
CI/SfB (UoM Implementation)	UoM implementation of CI/SfB Classification system – see CONJECT Protocol V9 Appendix 1	Compulsory for document numbering

The following University of Manchester polices and procedures shall also be followed and are referenced in various sections of this document to avoid duplication and ambiguity. They are available from the Directorate of Estates and Facilities website at:
http://www.estates.manchester.ac.uk/services/psu/policies/
From time to time updated versions of EPM documents and Policies are made available to address current best practice and changes to legislation and statutory compliance obligations and must be reviewed and should be incorporated at key project milestones.

UoM Standards	Description	Version / Issue No.
EPM GM11	Room and Level Numbering Procedure	4 – July 2016
Information Security Policy	Policy to ensure UoM is protected from threats which may result in financial loss, reputational damage or exposure to liability.	Version 2
Information Security Procedures	Describes the governance framework and responsibilities for information security.	Version 1.2 – November 2014
Information Security Classification, Ownership and Secure Information Handling - SOP	Procedure for allocating information security classifications and appropriate information handling	Version 1.1 October 2016
EPM GM5	CAD and Modelling Standards	Version 3 – 2019.
EPM HS14B	H&S & O&M File Handover Procedure	Version 2 April 2016
EPM PM7	Code of Practice for Design Teams	Issue 7 – October 2018
EPM FM1	Maintenance Strategy - Appendix A, B & C (Asset Grouping Types, Asset Labelling)	Issue 4 – October 2018
EPM GM 10	Building Name Procedure	Issue 4 – December 2012
EMP HS25 (section 6)	Asbestos Management Plan	Issue 4 – October 2018
EPM PM3 - Projects Flowchart	Lists typical high level Information Deliverables at information exchange points aligned to employer decision gateways.	Current issue (as of this document date)
CONJECT Protocol & Quick-start user-guide	Collaboration Tool protocol, standards and processes.	Version 9
EPM PM24 UoM OEAM Data Requirements	Oracle Enterprise Asset Management Asset Group data requirements	Version 1 – January 2019

For clarity the following hierarchy of standards shall apply in the event of any ambiguity or conflict.
1. Project Standards, 2. University of Manchester Standards, 3. British and International Standards.

3. Security

3.1. PAS1192-5 Figure 5 Triage

The University has undertaken an assessment as to the extent of security minded approach required for its existing estate and proposed candidate projects as part of the 2012-2022 masterplan.
At present the triage has ascertained that none of UoM's planned and inflight capital projects are sensitive as defined by the Triage and therefore do not require a full implementation of the controls specified in PAS1192-5. Only Baseline security measures are required.

However, a further triage will be carried out by the CR and the Estate & Space Management Unit (ESMU) as part of each project and its result noted in Appendix A. If a proposed asset or any adjacent buildings are deemed to be sensitive, the CR and CPM in liaison with the Project Sponsor and UoM's Security Manager shall seek security advice, perform a security risk assessment and implement a security minded approach with further appropriate controls and responsibilities in line with PAS1192-5:2015. These will be outlined in Appendix A and detailed in a Project Built Asset Security Management Plan (BASMP).

3.2. Required Baseline Security Measures

- Protection of any commercially sensitive and/or personal data/information as required in compliance with PAS1192-5:2015 section 5.6.

- Comply with the controls and responsibilities as detailed in UoM's Information Security Policy and Information Security Procedures – see section 2.
- Please refer to section 5.1.1 of this document and Appendix A for specific further requirements.

4. Project Information Management Roles and Collaboration

4.1. Collaboration

The UoM adopts a collaborative approach to the procurement of new and refurbished built assets. It normally adopts a collaborative form of contract (such as NEC) which it believes encourages collaboration more effectively than some other more traditional contracts which can be seen as adversarial.

In the context of BIM and Information Management, organisational working practices are key to the successful collaborative approach, such as:

- Clear roles and responsibilities
- Clear lines of communication and authority.
- Protocols for the preparation and dissemination of information.
- Regular workshops and team meetings
- Procedures to ensure continuous improvement. This may require continual benchmarking, target setting, assessment, feeding back and adaptation.
- Early warning procedures.
- At the earliest opportunity both initially and ahead of key milestones throughout the project 'BIM Workshops' involving University Stakeholders should be held to agree approach and any specific requirements.

Project BEPs should in the context of BIM and Information Management outline project team approaches to these concepts.

4.2. Roles

UoM acknowledge that there are a plethora of 'BIM' related role names in use, including 'Information Manager', BIM Manager, BIM Leader and BIM Coordinator, even when PAS1192-2 which defines some roles is being followed. This can create ambiguity, uncertainty and therefore risks. In line with section 4.1 above UoM define below, BIM related roles and responsibilities only for those appointed directly by UoM.

- Project Information Coordinator (PIC)
  This role is defined in the CONJECT Protocol document and covers the technical administration of the CDE and document control functions. PICs are also devolved to Tier 1 organisations where relevant. (PICs should not be devolved to Tier 2 Subcontractors)
- Spatial Co-ordination / Interface Manager (pre-contract)
  Pre-contract the role of Lead Designer will be responsible for spatial co-ordination which includes 3d model federation, visual analysis and automated rules based clash analysis as appropriate to project stage and key milestones.
- BIM Strategic Consultant
  Particularly for major schemes UoM may appoint a Strategic BIM Consultant to provide advice and support to the CR and CPM. This organisation will be retained 'client side' throughout the project and may be employed to provide further auditing duties. This will be recorded in Appendix A if required.

- BASM – Built Asset Security Manager
  As outlined in section 3.1 UoM has defined its inflight and candidate major projects as not requiring a security minded approach. Following triage, if a project requires further controls and responsibilities UoM will appoint a BASM who will be retained 'client side' throughout the project. This will be recorded in Appendix A if required.

The BEP should carefully and comprehensively specify, in the form of a RACI matrix or similar, together with commentary, each Building Information Modelling and Information Management related responsibility / activity as specified by PAS1192-2, the CIC Scope of Services for the Information Manager and other best practice roles such as Document Controller, against a defined project role. Those roles should then be allocated to an organisation or individual by project stage to give surety to UoM that the roles will be delivered in a robust manner.

5. UoM Standards, Methods and Procedures (Management)

5.1. Information Management

5.1.1. Security

- Elements to be modelled separately
  As part of best practice baseline security measures the following systems should be provided in separate volumes (models and data):
  - Access Controls
  - Surveillance cameras and their fields of view
- Room and space naming (see 5.1.3)
  The 'names' of rooms and spaces of a sensitive nature should not be routinely marked on general arrangement drawings unless needed for the express purpose of the drawing.
- Protective marking
  Protective marking is not generally required unless specified in Appendix A. If security marking is required then the Standard Operating Procedure as described in "Information Security Classification, Ownership and Secure Information Handling Version 1.1 October 2016 and its Appendix A" will be followed.

Commercial good practice, with an emphasis on all project team members to respect the confidentiality of all relevant information is however required. Individuals are expected to think about the nature and context of the information they work with and to exercise good judgement to ensure that information is handled and safeguarded appropriately.

The BEP should outline project member's detailed approach to the above sections 3.2 and 5.1.1.

5.1.2. Common Data Environment (CDE)

A CDE managed in accordance with BS1192:2007 is a key component of Level 2 BIM standards and processes. UoM has invested in CONJECT platform for use as a document management, contract administration, communication, process control tool and tendering system.

- Pre-contract
  Unless specified differently in Appendix A, the CDE to be utilised by all project stakeholders pre-contract is UoMs CONJECT platform – provided free of cost to all users.
  All information sharing between project stakeholders including consultants, project managers and employer should utilise this system – see CONJECT Protocol for detailed guidance.

- Post-contract
  UoMs preferred approach is the use of its CONJECT system, including the NEC contract management module where appropriate. Framework partners have agreed to this approach. CONJECT as a minimum should be used for all end of stage and milestone information exchanges. If contractors or consultants utilise their own CDE for internal document control and sharing this approach and clarification of overlap with the CONJECT system should be explained in the BEP and agreed by UoM's PIC and CR.
- A UoM CONJECT protocol document is provided which should be followed. Any derogation to this protocol should be explained in the BEP.

5.1.3. Naming, Numbering and Guidance

Unified model, document naming and numbering standards are critical to UoMs efficient running of the Estate. Building Numbers, Levels and Room numbering are consistent across UoM and must be adhered to and used by all project stakeholders. This section should be read in conjunction with UoM's CONJECT Protocol and quick-start user-guide document.

- **Facilities and Buildings** (includes phasing and blocks)
  EPM GM10 gives a clear workflow as to the naming and numbering of buildings and blocks. The ESMU will allocate numbers which will be recorded in Appendix A by the CPM.
- **Levels**
  EPM GM11 gives guidance on level naming. Levels should be agreed with the ESMU and recorded in the BEP.
- **3D Model Volumes**
  A volume strategy should be defined on a project by project basis, based on the principles of the CONJECT Protocol document section 4.8 and its appendix 1 and outlined in the BEP following agreement with ESMU. The following principles should also be followed:-
  Primary split of volumes should be by originating discipline, sub-contractor or sub discipline in the case of MEP. If further volume splits are needed due to model complexity then splits should be by building 'block'. Splitting by floor is discouraged unless deemed unavoidable. Please also note any volume constraints advised due to security – see section 5.11
- **Systems**
  As outlined in the CONJECT Protocol the CI/SfB classification is used to notate systems in drawing numbering. Also in use are Oracle Asset Management 'Type' codes which are employed at a system level as well as individual asset. See UoM OEAM Data requirements document for mapping between CI/SfB and OEAM System Codes.
- **Rooms and Spaces**
  EPM GM11 gives clear guidelines on room and space naming and numbering. Project room and space naming must be agreed with the ESMU.
  A Revit architectural template and shared parameter file is available from the ESMU which should be utilised. It includes mandatory fields and optional fields. Its use is documented in EPM GM5.
- **CAD / BIM Components**
  AutoCAD 'blocks' and Revit 'Families' should be named in accordance with EPM GM5, following the principles of the BS8541 suite of standards.
- **Layers**
  (where applicable) please see EPM GM5

- **Drawings & Documents**
  UoM's CONJECT Protocol and quick start user guide includes specific instructions on the numbering of Drawings and Documents. See Section 4.8 – note: BS1192-2007 Note: 'Role' codes are not utilised. The Protocol also specifies the use of a UoM implementation of the CI/SfB classification system. – Note the exception to this standard is the UoM Master General Arrangement Drawings which use a legacy convention (a restriction of Archibus) see EPM GM5.
- **Photography**
  Photographs are recognised as the most universal record of a building. UoM recommend the use of a smart phone / tablet application which names or tags photographs at source using the CONJECT Protocol photograph naming convention example (following the principles of ISO8000-150) using appropriate project picklists.
- **Assets**
  See UoM's EPM PM24 which details the naming and labelling of Assets. The list also contains a list of UoM's defined assets which should be tagged and for which specific data is required.

5.1.4. Classification

At present UoM uses a number of classification systems as laid out in the table below.

Project stages	RIBA plan or work 2015	RIBA Enterprises
Document Naming and No.	CI/SfB	CONJECT Protocol V9 App 1
Systems	CI/SfB	CONJECT Protocol V9 App 1
Systems	UoM OEAM Asset Types	EPM PM24
Assets	UoM OEAM Asset Types	EPM PM24
Spaces	UoM Archibus Space Types	EPM GM11 & EPM GM5

UoM's CPM or main contractor may implement additional classification systems such as NRM 1 or 2 to assist with costing or supply chain management, however at present UoM does not require these and the CPM or Information Manager should show the value of these requirements before implementation to ensure an efficient and lean approach.

5.1.5. Training

- CONJECT
  Training on use of the CDE is set out in the CONJECT Protocol and Quick-start document – Section 2
- If the CPM or University Project Manager or any of its stakeholders is required to utilise any system or software platform to contribute to the design and build process (eg snagging, collaborative commissioning or design / spatial co-ordination issue management) training must be provided by the project design or construction team.

5.2. Technical Management

5.2.1. Information Exchanges

- **Handover of models, documents and data.**
  See information requirements and deliverables section below for timing of

information exchanges. All documents, data and models must be submitted via the University's CDE – CONJECT.

- **File Formats and Version**s
  As a key requirement of level 2 BIM all O&M and H&S documents and data must be delivered in a digital (not paper) format.

Type	Format	Alternative	Version
3D models	Revit	IFC (when Revit not available)	2017
2D models	DWG	none	2013 or above
Federated Models	Navisworks NWD	none	2015
Documents	PDF	Original authoring file eg Word, Excel	See notes
Drawings	PDF & DWG	DWF	DWG
Photographs	JPG	none	
Structured Data	Excel	CSV	XLSx

Notes:

- Revit 2017 is currently the default version required due to a UoM CAFM system (Archibus)
- PDF / A (Archiving) format documents are preferred for long term storage and archiving.
- Native Word and Excel files should be in docx/XMLx (2013)
- All PDFs where possible should be vectoral renditions of original native documents, not bitmap renders or scans of documents.
- All information exchanges must be digital. For example no hand written and scanned schedules, such as piling records should be submitted

- **Level of Definition**

  The Level of Definition (LOD) to be utilised on UoM projects is the RIBA Enterprises NBS Toolkit standard which outlines the principles of Geometric Level of Detail (LoD) and Level of Information (LoI) for various building systems and components. Project stakeholders are encouraged to share their interpretation of this standard through a simple mock up and example drawing if clarification is required.
  Please note there is no direct correlation between this standard and others such as AECUK or AIA BIM Forum LOD and as such these should not interchange.

- **Co-ordinates and Origins**
  EPM GM5 details co-ordinates, units and origin requirements which should be detailed in Appendix A.

- **Spatial Co-ordination**
  Spatial co-ordination is a key component of PAS1192:2. UoM recognises the benefits of the utilisation of 3D models, federated and analysed for spatial co-ordination, both through visual manual inspection and automated rules based

analysis to reduce risk and increase quality during construction.
Clash analysis 'tests' should target specific co-ordination risks over time to reflect programme requirements as part of a lean approach. The relevant degree of spatial co-ordination should be demonstrated by a report at each project milestone, submitted to the CPM.

The BEP should outline the teams approach to spatial co-ordination in line with PAS1192:2 section 9.4 including roles and responsibilities, issue management, model provenance, tolerance, frequency (aligned to programme) and any proposed management KPIs.

- **Constraints**
  - Individual model volumes: 200MB max for Revit and any other exchange formats.
  - Reports and documents containing images should be optimised using the Microsoft Word 'compress pictures' tool or similar PDF compression for 'print'- 300 DPI max
  - Photographs should be limited to 3MB per image – Main contractors should agree photograph resolution with UoM PIC and record in the BEP.
  - No 'new' Asset Type picklist values or similar should be used. If clarification or potential new codes are needed, contact the relevant UoM Estates & Facilities Unit named in the EPM document.
- **Tolerance & Model Provenance**
  Most building elements and systems are constructed to size tolerances, however 3D virtual models built in a CAD environment are exact. This can then cause issues when used with automated and visual clash detection as the model would not reflect exact actual site conditions. Models are also 'replaced' as the design progresses (e.g. Steel fabrication model and Structural Engineering model). Laser scanning and other types of traditional survey can be used to verify 'As Built' conditions to check for tolerance. It's important to ensure the appropriate models are used at each stage and that models are updated accordingly to reflect site conditions. (see PAS 1192:2 section 9.4.9)

The BEP should outline the project teams approach to this issue also taking into account 'As Built' model issues below both during construction and at handover.

- **'As Built' Models and Drawings**
  UoM recognises that the traditional approach to 'as built' drawings and models with designers issuing 'as designed' or 'construction issue' drawings which are often then marked up with changes as part of the O&M process has a detrimental effect on the reliance on these documents and models during the life of the asset.
  Appointments and scopes of services should clearly define responsibilities for updating models and documents in line with 'as built' conditions, accepting the limitations of building systems normal tolerance. (see Tolerance above)

The BEP should clearly state the project teams approach to ensuring as built models, drawings and documents reflect 'as built' conditions on site and proposed tolerance limits.

- **3D Model derived documents**
  EPM GM5 defines in detail UoM's CAD and BIM standards. UoM recognise that some drawings such as schematics and standard details are drawn in isolation from the 3D modelling approach at the heart of 'BIM'. However wherever possible drawings and schedules should be cut or extracted from 3D models and then annotated and enhanced in the native application to ensure the benefits of Building Information Modelling are realised with spatially coordinated drawings and accurate schedules.

- **CAD / BIM Quality Control and Checking**
  UoM's EPM GM5 includes specific technical requirements for checking and quality control.
- **Test Information Exchange**
  EPM GM5 requires test files to be submitted during stage 5 to ensure compatibility issues are resolved well ahead of practical completion.
- **Data Quality**
  UoM recognises the benefits of applying many of the principles of ISO8000-150 when collecting data. In order to ensure data quality is maintained project stakeholders are encouraged to utilise systems with defined picklists and restricted data fields (e.g. dates) where ever possible, rejecting non-compliant data at source rather than solely relying on auditing and retrospective corrective action.

The BEP should outline the method and approach to collecting asset data and naming and numbering of documents, assets, etc. to ensure quality and accuracy

5.2.2. Structured Data Requirements

At present UoM's structured data requirements are as follows:

- **Space Data**
  UoM's Archibus system will be populated directly from spaces defined and authored in the Revit Model or AutoCAD General Arrangement model as relevant.
  - Revit: A shared parameters file will be provided by UoM. All the required parameters are set out in the EPM GM5 and must be populated.
  - AutoCAD: Room data above should be populated in a spreadsheet format (COBie Level and Space sheets or Archibus import CSV)

  The ESMU would also benefit from: Floor surface finish, number of windows, key room dimensions and usable height – pick lists are not yet available for these items.
- **Asset Data**
  Asset data shall be provided in Excel format (COBie Level, Space, Component and Type sheets or OEAM import sheets) with compulsory fields only being those listed in UoM OEAM Asset Requirements document. The list of maintainable assets against which numbers should be allocated and data provided is to be found in EPM PM24 UoM OEAM Asset requirements document.
- **COBie (BS1192:4) vs Native OEAM import sheets**
  At present UoM cannot easily process COBie data and would prefer to receive Asset Data in native import format for Oracle Enterprise Asset Management (refer to EPM PM24 for requirements). UoM recognise that main contractors may be able to provide data in the COBie data format at a lower cost due to standard processes. Whichever data schema / format is used the picklists and required fields will be the same.

  If COBie is provided, extra space, component and type fields should be added to the right of individual sheets rather than deployed through the attribute sheet. (see BS1192:4 section 6.3.1 note 5)

The BEP should outline the main contractor's proposal for delivering structured data to UoM i.e. COBie or dedicated OEAM import files.

5.2.3. H&S and CDM

PAS1192:6 is currently under development and will bring more clarity to this area following its publication. At present UoM require the following as a minimum:-

- Objects / Blocks with appropriate attributes to record residual risks should be placed into models and a risk table inserted into relevant drawings. See EPM GM5 for more details.
- Visual inspection of 3D models and use of logistics modelling and sequencing should be used where relevant to enhance normal contractors and designers risk assessments and method statements and used to assist in communication of H&S issues to project stakeholders and risk mitigation.
- The Health and Safety file should be seen as an integral part of the handover documentation, not separate from it to avoid duplication and ambiguity. See EPM HS14.

The BEP should outline the main contractors approach to utilising BIM to assist with relevant H&S challenges.

5.3. Commercial Management

5.3.1. BIM related Legal, Contractual, Intellectual Property and Copywrite issues.

UoM Professional Appointments have been cross checked against the CIC BIM Protocol and updated to include definitions and clauses relating to Building Information Modelling, Models and their licensed use. UoM therefore do not append the CIC BIM Protocol to appointments or the main building contract. The appointments do reference this document and its appendices.

5.3.2. MPDT (Responsibility Matrix)

UoM recognises the difference between a MPDT as referenced in the Professional Appointments and a traditional BIM model elements table often used to manage modeling in BEPs which will be presented at an elemental rather than volume level. The UoM MPDT can be used as is, or modified to suit the needs of the project and is attached as Appendix B to this document.

5.3.3. Compliance and Information Acceptance Requirements

Compliance with this EIR will be by combination of demonstration from the supply chain and spot auditing by UoM or UoM's representatives. In line with a lean approach UoM look to industry standard approaches where possible.

- **Demonstrating: (Supply Chain)**
  - **Supply Chain Capability and Capacity**
    Appropriate supply chain capability and capacity should be demonstrated to the CPM by responses to the following:

    Non-framework partners:
    PAS91 Questions (Table 8)
    Capability statements based on the CPIX BIM and IT assessment forms or similar

    Framework Partners:
    Current capability statements based on the CPIX BIM and IT assessment forms or similar.

Subcontractors and further sub-contractors.
Main contractors and Consultants must ensure their supply chain has the capability and capacity to deliver the requirements of this document where relevant. UoM recommends the use of standardised forms of assessment such as CPIX or similar to encourage a lean approach.

- **Regular reporting**
  As part of the project team's normal, regular reporting, a section summarising BIM and Information Management should be included to demonstrate ongoing compliance with this EIR. It should include but not be restricted to the following.

  Security
  Document Control
  Model and Data audit results
  Spatial Co-ordination Report
  KPIs
  Status of any BIM related entries on the Risk Register.

  The project team is encouraged to use the early warning (or similar) procedure for any perceived or actual difficulties in the delivery of this document's requirements.

- **Auditing: (Employer and CPM)**
  Depending on perceived performance, risk and programme the following may be audited from time to time against this document and its appendices. If non-compliance is found an Early Warning (or similar) should be issued.
  - CDE use and naming conventions
  - Model quality
  - Data collection
  - Drawings
  - Spatial co-ordination process
  - 'As Built' process

5.3.4. Evaluation and Assessment of BEP and Capability / Capacity Assessments

The CPM together with appropriate UoM representatives from the Directorate of Estates and Facilities (DoEF) will evaluate the pre contract BEP against this document and best practice and provide comment where necessary.
The CPM will evaluate BIM capability assessments which will form part of the wider assessment ahead of appointments. The CPM may ask for proposals for mitigation on particular points as a condition of appointment.

6. Information Requirements and Deliverables

This section should be read in conjunction with the sections above which specify the processes, formats and standards used to produce the deliverables listed below. The various UoM EPM documents also list deliverables at various project stages which should also be fulfilled, although many are summarised here.

- Capability and Capacity Assessments (before appointment)
- 'Feasibility' or 'Design' BIM Execution Plan (before main contractor involvement as part of stage 2 gateway – to be produced by Lead Designer or CPM)

- Discipline TIDPs rolled up into a Project MIDP at each project stage, shared with the whole project team – should cover as a minimum items listed in the MPDT, EPM PM3 and EPM HS14
- Pre-Contract BIM Execution Plan as a response to this document and its appendices
- Post-Contract BIM Execution Plan and associated documents such as MIDP etc.
- Regular reporting (addition of BIM and Information management to normal stage and monthly reports)
- Document and Data Requirements of Section 12 of EMP PM7 – code of practice for design teams.

  EPM PM7 also covers O&M and H&S file and Asset lists (note also requirement for proposed asset list at Stage 4 – section 6.10.9)
- Deliverable requirements of EPM PM3 – Projects flowchart (gateways)
- Document and Data requirements of EPM HS14b Health and Safety and O&M Handover Procedure.
- Native 3d Model files (or exchange formats where relevant) for all disciplines and volumes as defined in the MPDT
- Federated 3d model files
- Space data (5.22 of this document)
- Asset data (5.22 of this document)

Timing of deliverables should reflect the MPDT and EPM PM3 projects flowchart gateways.