

Building Information Modelling (BIM) Guide for Facilities Upkeep

(Version 3.1)



Property Services Branch
Architectural Services Department

Objective

The primary purpose of this Guide is to provide a common reference on the adoption of BIM in As-built Modelling for Facilities Upkeep in building projects including capital works projects, entrustment works, subvented capital works projects and works that are undertaken by private parties with project estimates more than \$30 million and will be handed back to ArchSD for maintenance according to Development Bureau Technical Circular (Works) No. 02/2021 or the latest version.

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Building Information Modelling (BIM) Guide for Facilities Upkeep

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BIM Guide for Facilities Upkeep

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2	8	- Revision of Clause 2.4.		
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BIM Guide for Facilities Upkeep

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Appendix 2	20	- Addition of Examples of Asset Information Spreadsheet				
Appendix 4	23-31	- General Update of the LOD-G				
Appendix 5	32-34	- General Update of the Identifier of Appendix 5.				
Appendix 6	40-41	- Addition of Examples of Special Modelling Requirements				
Appendix 6	44	- Addition of Examples of Separation between each floor.				
Appendix 7	45-47	- Addition of As-built Model Colour Coding				

BIM Guide for Facilities Upkeep

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2	5 - 8	- Revision of Clauses 2.3.1, 2.3.4 and 2.3.6			
2	9 - 10	- Revision of Clause 2.4			
Appendix 1	12 – 18	- Revision of PSB Standard Parameters.			
Appendix 2	19	- Revision of Examples of Asset Information Spreadsheets			
Appendix 3	20 - 21	- Revision of examples of PSB Standard Parameters in Objects			
Appendix 4	22 - 31	- General Update of Requirements for Non-Graphical Information and Documentation			
Appendix 5	32 - 34	- General Update of Requirements for Creating Sheet Records			
Appendix 6	42	- Revision of Example (B): Separation between Tap and Basin			
Appendix 7	46 - 47	- Revision of As-built Model Colour Coding			

BIM Guide for Facilities Upkeep

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2	9	- Revision of Clause 2.4			
Appendix 3	20 - 21	- Revision of examples of PSB Standard Parameters in Objects			
Appendix 6	40 - 42	- Revision of Example (B): Separation between Tap and Basin			
Appendix 7	44 - 46	- Revision of As-built Model Colour Coding			

Table of Contents

1. Introduction	1
1.1 Overview.....	1
1.2 Reference BIM Standards and Guidelines.....	1
1.3 Terminology and Abbreviation.....	2
1.3.1 Terminology.....	2
1.3.2 Abbreviation.....	2
2. As-built Model for Facilities Upkeep	3
2.1 Coverage of the As-built Model.....	3
2.2 Definition of LOIN for As-built Model.....	4
2.3 Scope of As-built Modelling.....	5
2.3.1 General Requirements.....	5
2.3.2 Integration with ArchSD PSB's System.....	5
2.3.3 3D Animation.....	7
2.3.4 Modelling Requirements for Graphical & Non-graphical Information.....	7
2.3.5 Drawing Production.....	8
2.3.6 Photographic Record.....	8
2.3.7 3D Digital Point Cloud Scanning.....	8
2.4 File Folder Structure.....	9
Appendix 1 - PSB Standard Parameters in As-built Model.....	12
Appendix 2 – Examples of Asset Information Spreadsheets.....	19
Appendix 3 – Examples of PSB Standard Parameters in Objects.....	21
Appendix 4 – Modelling Requirements for As-built Models.....	23
Appendix 5 – Creating Sheet Record.....	33
Appendix 6 – Examples of As-built Modelling.....	36
Appendix 7 – As-built Model Colour Coding.....	45

1. Introduction

1.1 Overview

This Building Information Modelling (BIM) Guide for Facilities Upkeep (FU) by Property Services Branch (PSB) of the Architectural Services Department (ArchSD) (hereinafter as the “Guide”) documented the general requirements and practices in producing BIM as-built models for ArchSD managed Capital Works Projects, entrustment works, subvented capital works projects and works that are undertaken by private parties with project estimates more than \$30 Million and will be handed back to ArchSD for maintenance according to the Development Bureau Technical Circular (Works) No. 02/2021 or the latest version. The aim of this Guide is to provide the general requirements and practice for the processing of BIM model and related deliverables at handover and subsequent operation and maintenance stage as reference. The Guide is formulated base on internationally and locally recognized BIM standards, guidelines and industry practices. The Guide would be subject to regular review and update to suit the latest development on BIM.

1.2 Reference BIM Standards and Guidelines

This Guide has made reference to the following standards and guidelines:

- (a) CIC Building Information Modelling Standards General (Version 2.1 – December 2021) issued by Hong Kong Construction Industry Council;
- (b) CIC Building Information Modelling Standards for Architecture and Structural Engineering (Version 2.1 – 2021) issued by Hong Kong Construction Industry Council;
- (c) CIC Building Information Modelling Standards for Underground Utilities (Version 2 -2021) issued by Hong Kong Construction Industry Council;
- (d) CIC BIM Standards for Mechanical, Electrical and Plumbing (Version 2 -2021) issued by Hong Kong Construction Industry Council;
- (e) CIC Production of BIM Object Guide - General Requirements (Version 2 – 2021) issued by Hong Kong Construction Industry Council;
- (f) CIC Building Information Modelling Dictionary (2021) issued by Hong Kong Construction Industry Council;
- (g) Development Bureau Technical Circular (Works) No. 02/2021 – Adoption of Building Information Modelling for Capital Works Projects in Hong Kong;
- (h) Computer-Aided-Drafting Standard for Works Projects (CSWP) issued by Development Bureau of the HKSAR Government;
- (i) American Institute of Architects (AIA)'s G202-2013 Building Information Modeling Protocol Form.
- (j) BS 8536-1:2015 Briefing for Design and Construction. Code of Practice for Facilities Management (Buildings Infrastructure);
- (k) BS EN ISO 19650-1:2018 Organization and Digitization of Information about Buildings and Civil Engineering Works, including Building Information Modelling (BIM) – Information Management using Building Information Modelling, Part 1: Concepts and Principles;
- (l) BS EN ISO 19650-2:2018 Organization and Digitization of Information about Buildings and Civil Engineering Works, including Building Information Modelling (BIM) – Information Management using Building Information Modelling, Part 2: Delivery Phase of the Assets;

- (m) BS EN ISO 19650-3:2020 Organization and Digitization of Information about Buildings and Civil Engineering Works, including Building Information Modelling (BIM) – Information Management using Building Information Modelling, Part 3: Operational Phase of the Assets;
- (n) BS EN ISO 19650-5:2020 Organization and Digitization of Information about Buildings and Civil Engineering Works, including Building Information Modelling (BIM) – Information Management using Building Information Modelling, Part 5: Security-minded approach to information management;
- (o) BS 1192-4:2014 Collaborative Production of Information Part 4: Fulfilling Employers Information Exchange Requirements Using COBie – Code of Practice;
- (p) Building Information Modelling for Asset Management (BIM-AM) Standards and Guidelines issued by Electrical & Mechanical Services Department;
- (q) Building Information Modelling (BIM) Guide for Architectural Design (Version 3.1) issued by Architectural Branch of Architectural Services Department;
- (r) Building Information Modelling (BIM) Guide for Building Services Installation (Version 3.1) issued by Building Services Branch of Architectural Services Department;
- (s) Building Information Modelling (BIM) Guide for Structural Engineering (Version 3.1) issued by Structural Engineering Branch of Architectural Services Department;
- (t) Building Information Modelling (BIM) Guide for Cost Estimation (Version 3.1) issued by Quantity Surveying Branch of the Architectural Services Department;and
- (u) CAD Manual for ArchSD projects – For Outsourcing Projects issued by Architectural Services Department.

1.3 Terminology and Abbreviation

1.3.1 Terminology

The abbreviations and terminology/ glossary shall refer the CIC BIM Dictionary (2021).

1.3.2 Abbreviation

The other abbreviations adopted in this Guide are listed below.

Abbreviation	Full Name
ACTION System	Automated Communication, Technical Information and Operations Network System
ArchSD	Architectural Services Department
BIM AM System	Building Information Modelling Centric Asset Management System
FU	Facilities Upkeep
InForM	ArchSD InForM System
O&M	Operation and Maintenance

Abbreviation	Full Name
PSB	Property Services Branch

2. As-built Model for Facilities Upkeep

2.1 Coverage of the As-built Model

The BIM applications in public works projects shall be in accordance with the BIM Uses defined by the relevant Technical Circular (Works) No. 02/2021 or the latest version issued by the Development Bureau (DEVB). The following sections describe the requirements and acceptable deliverables in as-built model using BIM for facilities upkeep by PSB.

The as-built model should cover the entire project and it includes well-coordinated architectural, structural and building services models.

The as-built model shall fulfill the following criteria:

- (a) Give to-scale visualization and ability to walkabout within the model;
- (b) Be prepared in the specified formats for data exchange with ArchSD systems including BIM-AM System and ACTION System;
- (c) Provide as-constructed information relating to architectural, structural and building services information with links to operation, maintenance, asset data and other essential information;
- (d) Show construction assemblies, actual and accurate in terms of size, shape, location, brand and particulars of products, quantity and orientation in the LOIN as specified;
- (e) Extract and produce meaningful coordinated drawings (including but not limited to BIM output drawing) including locations and dimensions of all reserved maintenance access (i.e. floor and reflected ceiling plans, sectional & elevation drawings, details drawings, and etc.);
- (f) Produce drawings in other formats (e.g. CAD, pdf, dwg, dwf, etc.) and printing;
- (g) Provide data and documentation for planning the maintenance of structure, building fabric, building installations and fixtures during the operational life of a facility;
- (h) Include, unless otherwise specified, non-structural building components not embedded into concrete or building structure;
- (i) Systematically prepare and incorporate the information required in Appendix 4 and Appendix 5 into the as-built model; and
- (j) Fulfill the contract requirements on Particular Specification for Approved Shop Drawings, As-built Drawings, Operation and Maintenance Manual and Records.

2.2 Definition of LOIN for As-built Model

The LOIN requirements are referred to the CIC Building Information Modelling Standards. Apart from the CIC requirements, supplementary definition and interpretation of the LOIN requirements, if applicable, are listed below. The LOIN refers to the following three components of Information Model: the Level of Graphics (LOD-G), Level of Information (LOD-I) and Level of Documentation (DOC). The as-built model shall follow the definition and interpretation as shown in this Guide in order to achieve the required purpose of the as-built model in facilities upkeep. For specific requirements of LOD-G of the Architectural, Structural and Underground Utilities model elements, please refer to respective CIC BIM standards and the latest version of the Building Information Modelling (BIM) Guides for Architectural Design, Structural Engineering and Building Services Installation.

DOC

CIC Building Information Modelling Standard's Definition

DOC is the description of documentation to be associated with the users to meet the identified requirements.

Interpretations in this Guide

The BIM object documentation requirements as specified in Appendix 1 and Appendix 4, should be embedded in the model element / object for facilities upkeep use.

LOD-G 300

CIC Building Information Modelling Standard's Definition

The model element is graphically represented within the model as a specific system, object, or assembly in terms of quantity, size, shape, location and orientation. The model shall include details of the spaces required for handling installation, operation and maintenance, and the interface details for checking and coordination with other models/objects.

Interpretations in this Guide

Element/object is modeled at sufficient detail and accuracy in terms of quantity, size, shape, location, and orientation for construction coordination.

LOD-G 400

CIC Building Information Modelling Standard's Definition

The model element is graphically represented within the model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing for fabrication, assembly, and installation.

Interpretations in this Guide

Element/object is modeled at sufficient detail and accuracy in terms of quantity, size, shape, location, and orientation for fabrication

LOD-I

CIC Building Information Modelling Standard's Definition

It is the description of non-graphical information in a model element. Please refer to the Standards indicating with examples of minimum LOD-I associated with typical elements / objects at five levels from LOD-I 100 to LOD-I 500.

Interpretations in this Guide

Essential information, such as data of fittings, manufacturer, model number, etc. and other as specified in

Appendix 1 and Appendix 4, should be embedded in the model element/object for facilities upkeep use.

2.3 Scope of As-built Modelling

2.3.1 General Requirements

An accurate record of the physical conditions and assets of a project shall be provided with reference to the requirements stated in this Guide. The as-built model using BIM shall be based on final and verified information of the project actually built on site. Information on location such as room number and building name, staircase number, washroom number, lift lobby number is required to be incorporated into the as-built model. It is necessary to include the operation data, product catalogues, O&M manuals, maintenance history of installation and building component, etc. and other information as required below into the as-built model.

The as-built model shall contain External Area Label (Site Level), Building Name Label (Site & Block Levels), Room Label (Floor Level) in 3D text object under Architectural BIM model for labelling of all building blocks/structures/facilities in Site, Block & Floor Levels as required by PSB for easy identification in facilities upkeep and model viewing. To facilitate identification and drawing generation (e.g. display of Room label), room should be modelled as far as practicable for spaces bounded by architectural and structural elements. It may also be modelled by either manually assigning the centre point or drawing an enclosed boundary. Room number or Room name should be included as an attribute under "Room" (LOD-I requirement). An example of 3D Room Label is shown in Appendix 6.

The naming convention (Model File Naming, View Naming, Object File Naming & Type Naming) should be referred to the latest version of Building Information Modelling (BIM) Guides for Architectural Design, Structural Engineering and Building Services Installation.

2.3.2 Integration with ArchSD PSB's System

BIM Centric Asset Management System (BIM-AM System)

The as-built model and 2D as-built record drawings including pdf shall comprise customized building attributes and file structure for data submission in the format approved by PSB. The as-built model and building attributes will be used for future development on retrieval of asset and works records mapping in BIM-AM System, which is based on a software named "ArcGIS¹" by Esri.

Apart from the as-built model required in this Guide, an additional as-built model in *modified IFC version* for viewing and integration with BIM-AM System should be provided. The BIM data shall be in HK1980 Grid Coordinates System² and refer to Hong Kong Principal Datum. The data format shall be compatible with the IFC standard (IFC4 or alternative advance format as requested by PSB). Relevant schedules and contract documentations stored in pre-defined folder structure shall also be arranged to suit the file display/downloading functions in BIM-AM System.

¹ ArcGIS is a software by Esri. The version of the ArcGIS shall be Esri ArcGIS Enterprise Standard Edition 10.9.1 or later edition.

² HK1980 Grid Coordinates System is a local system by Lands Department of the Government of HKSAR used in cadastral, engineering surveying and large scale mapping in Hong Kong.

BIM Guide for Facilities Upkeep

The Naive BIM files and IFC files produced for BIM-AM System integration shall be able to filter, screen, split or combine to produce models for viewing with information of Site, Block and Floor Levels. The information contained in these levels is required to be filtered suitably for viewing and working in BIM-AM System.

Level	Description
Site	One file for all building blocks, landscape, facilities, roads and paths, etc. within the site boundary. (Only external façade is required for the Site level model and the structural and plumbing & drainage aspects are not required)
Block	Separate file(s) for each individual building block, facilities and structure, etc. (For architectural aspect, only the external façade is required for the Block level model; For plumbing and drainage aspect, single file is required for each individual building block; Structural model for Block level is not required)
Floor	Separate file(s) for each individual floor, such as basement, mezzanine floor, cockloft, typical floors and roof, etc. (Separate files for architectural, structural and plumbing and drainage system)

It shall be agreed with PSB if lower detailing level is preferred and accepted for display in BIM-AM System . For projects with less complex scale and subject to PSB's agreement, the Site/Block/Floor levels may be provided with same IFC file(s). The original as-built model files shall also be submitted to PSB for necessary examination and data conversion purpose.

All contractual documentation submission shall be submitted as attachment files, i.e. dwg, doc, docx, pdf, jpeg, jpg, xls, xlsx, mp4, etc. and other format(s) as specified/commonly use and the documentation shall be stored according to the folder structure shown in Clause 2.4. The hyperlink for documentation of individual BIM object shall be recorded in the PSB Standard Parameters listed in Appendix 1 for easy retrieval in BIM AM System.

Automated Communication Technical Information and Operations Network System (ACTION System)

In addition, the information of the as-built model shall be modified for integration with ACTION System, which is a property maintenance services management system of ArchSD. The objects of the as-built model shall contain the properties as required in Appendix 1 and one example is shown in Appendix 3. Subject to the complexity of the project, the required properties shall be fine-tuned on request by PSB. The properties of the objects shall be mapped with and input with the codes from the Elemental Code Relation Table provided by the PSB in Microsoft Excel format. The table consists of approx. 5 x 4500 numbers of parameter for elements, sub-elements, components, attributes and remarks. As the Elemental Code Relation Table is restricted solely for data input to the as-built model purpose, PSB shall be approached separately for obtaining the latest version. Also, distribution of this table to third party is not allowed without prior consent of PSB. The table may also be subject to change or amendment without prior notification.

BIM Guide for Facilities Upkeep

It is required to work with and provide at least 50 hours of technical communication session with PSB, the BIM-AM System and ACTION System maintenance teams and/or their information system vendor(s) to ensure the as-built model smoothly integrated with these two systems.

Apart from the LOD-I requirements listed in Appendix 1, the asset information spreadsheets (separated by architectural, structural engineering & plumbing and drainage system) should be provided as it is essential to map the BIM objects to the objects in the BIM-AM System and ACTION systems. Samples of the asset information spreadsheets are included in Appendix 2.

2.3.3 3D Animation

The as-built model shall be provided with video clip files with 3D animation showing the assembly, disassembly, repair and replacement method for special component or special building system such as curtain wall system, etc. as specified in the contract and Appendix 3 for viewing in the BIM-AM System. The objective of the 3D animation is to illustrate how the special component or special building system can be maintained. In general, the 3D animation shall be generated with LOD ranged from LOD-G 300 to LOD-G 400 according to Appendix 4. The 3D animation converted from the as-built model shall be in mp4 format with resolution not lower than 1080p HD 30 fps or alternative format requested by PSB. As the extent of the 3D animation required is depended on the actual design of the building, proposal of the 3D animation shall be subject to PSB's approval.

2.3.4 Modelling Requirements for Graphical & Non-graphical Information

The following modelling requirements should be followed:

- (a) The as-built models of the architectural design, structural engineering, plumbing and drainage system shall follow the modelling requirements (e.g. unit of measurement, color code, presentation style and naming conventions, etc.) as stated in the latest BIM Guides for Architectural Design, Structural Engineering and Building Services Installation respectively and the requirements as shown in Appendix 4 of this Guide. In case another requirement in the same contract requests for a higher LOIN, a higher LOIN of the concerned as-built model shall be provided;
- (b) For underground utilities associated with plumbing and drainage system, the requirements as stipulated in CIC BIM Standards for Underground Utilities should be referred and adopted;
- (c) Special modelling requirements for (A) tap and basin fixtures and (B) wall/slab/column/beam and finishes are shown in Appendix 6. A typical example of BIM modelling requirements at toilet area is also illustrated for reference;
- (d) "Generic Models" should not be used for BIM category unless otherwise approved;
- (e) The BIM software version shall be proposed in BIM Execution Plan (BEP) and approved before the production of as-built models;
- (f) The names of BIM elements and all the information fields must be in English, unless specifically required by the BEP;

- (g) All as-built model files should be checked and purged. The maximum file size for each divided as-built models should not exceed 500Mb unless otherwise approved;
- (h) Clash detection and analysis should include the comparison of as-built models of different disciplines so as to identify and eliminate clashes between BIM elements; and
- (i) 3D co-ordination should include the checking of headroom requirements, working spaces for building services operation and maintenance activities.

2.3.5 Drawing Production

It is a process of producing drawing sheets from the BIM model source. By setting various drawing views (layout or section) in the BIM software tools, drawing sheets could be automatically generated based on the as-built models. As far as it is practicable to generate 2D drawings from the BIM authoring software, non-BIM authoring software should not be used to generate drawings. On the other hand, it is acceptable that certain architectural components, the building services schematic/control logic diagrams/drawings, reinforcement details are not generated directly from the BIM model.

The as-built models shall also be arranged to create sheet records and contain information & schedules to meet the requirements indicated in Appendix 5 and ArchSD's Particular Specification for Approved Shop Drawings, As-built Drawings, Operation and Maintenance Manual and Records. Samples of drawing schedules (e.g. door, ironmongery, window and access panel, etc.) are included in Appendix 6.

2.3.6 Photographic Record

Photographic record showing the site as-built condition shall be provided including both internal and external areas. Proposed locations for taking photographic record shall be submitted to PSB for comment and approval. The image shall be in good quality with good sharpness, contrast and without blur.

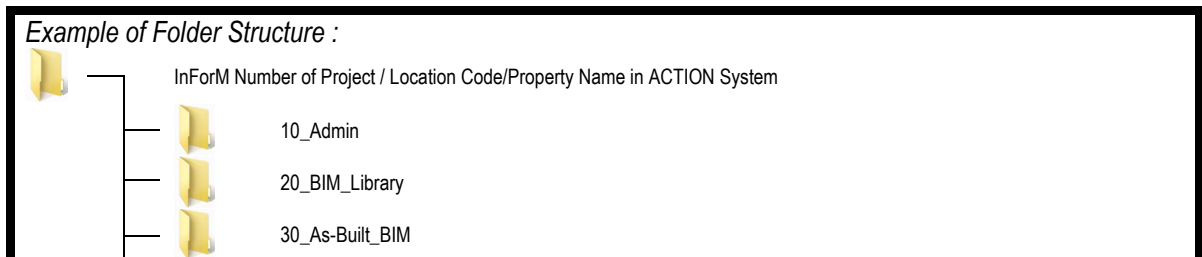
2.3.7 3D Digital Point Cloud Scanning

3D digital point cloud scanning shall be arranged for special feature and building structure with historical value as indicated in Appendix 4. A 3D Model shall be created from the point cloud laser scanning (with accuracy $\leq 5\text{mm}$) with subsequent 3D rendering showing the realistic colour and texture. The 3D Model integrated with As-built Model shall accurately reflect the appearance and shape. The as-built condition of the special feature and building structure at the completion of the project shall be shown for facilitating future repair or renovation projects.

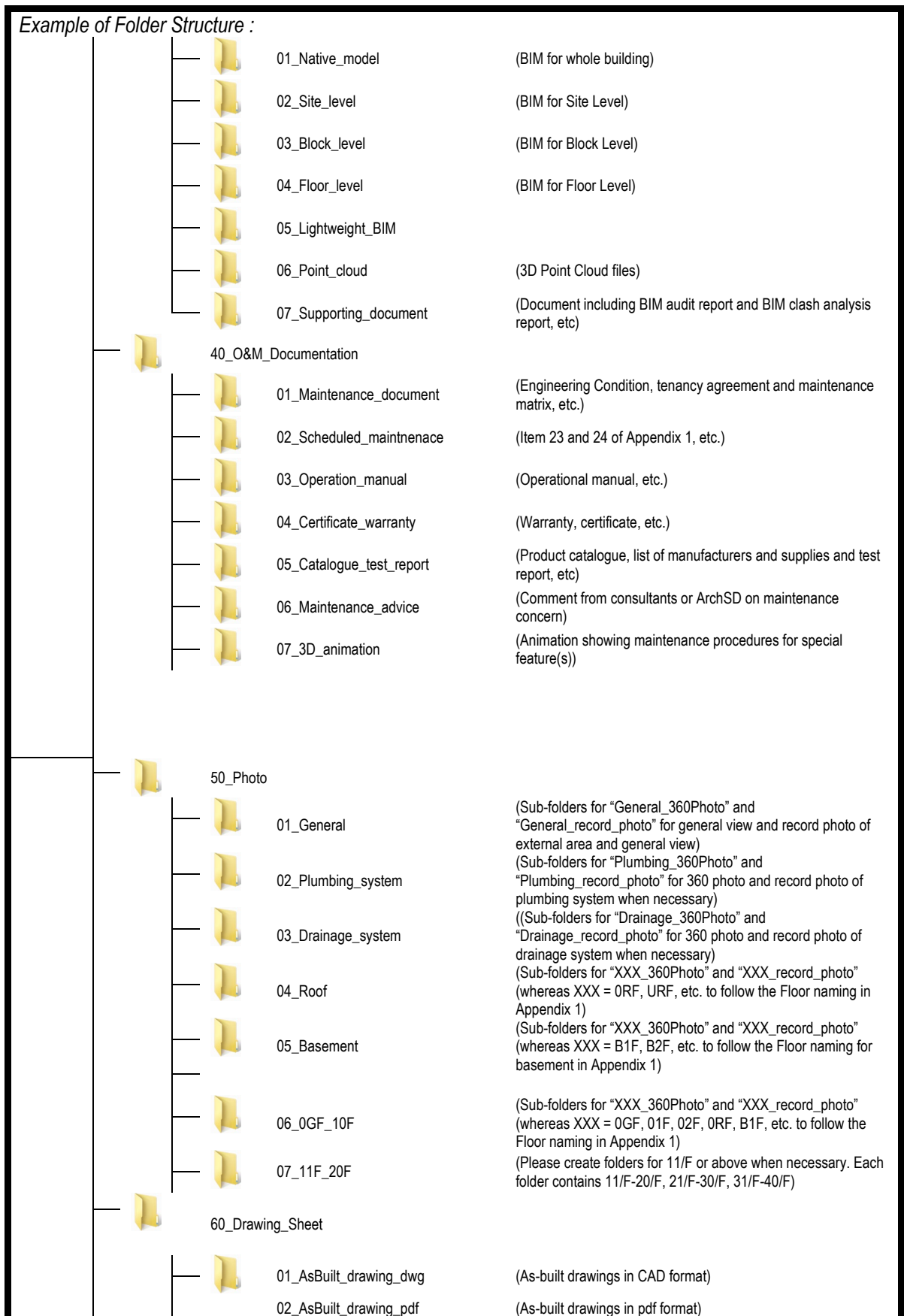
2.4 File Folder Structure

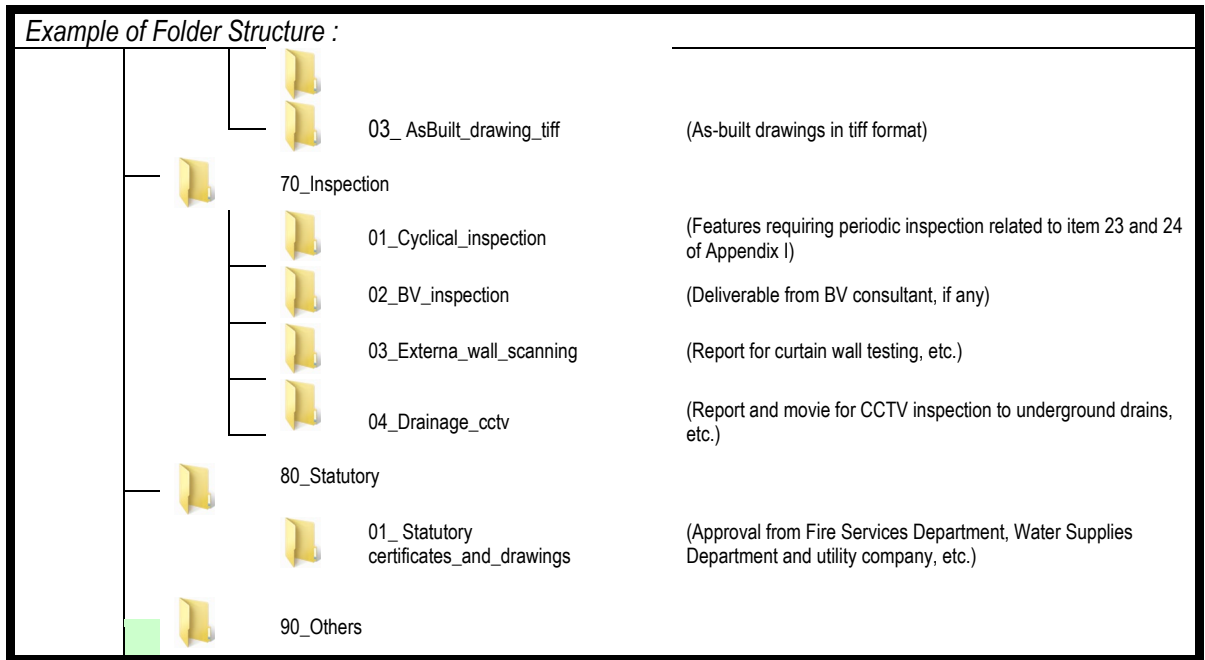
The required data and relevant documentations as specified in Appendices of this Guide should be stored in a well-organized file folder structure and the as-built model related materials should be filed in the respective folders. The proposed file folder structure should follow the below standard or in other folder structure in an effective manner to be accepted by PSB.

Tier	Folder Name	Stored Materials
1 st	InForM Number ³ of Project / Location Code /Property Name in ACTION System	
2 nd	10_Admin	Stores all document for project management, including contract, BIM execution plans, etc.
2 nd	20_BIM_Library	Stores resources files such as Templates, Title Blocks, Line Styles, Fonts, Objects, Material Images and Specific Families
2 nd	30_As-Built_BIM	Stores as-built BIM models from all disciplines. Models should be in native format (e.g. .rvt). The structure of BIM to follow AIS BIM specification.
2 nd	40_O&M_Documentation	Stores all documents related to operation and maintenance, e.g. testing & commissioning reports, catalogues, literatures, drawings, certificates, warranties, maintenance access proposals for both external and internal elements and O&M manuals, etc. Different system shall be stored in pre-defined structured folder.
2 nd	50_Photo	Stores all photographic record including the 360-view photos.
2 nd	60_Drawing_Sheet	Stores all drawing sheet record.
2 nd	70_Inspection	Stores all manuals containing the requirements on cyclical maintenance inspection.
2 nd	80_Statutory	Stores all documents related to statutory and contract compliance, e.g. certificate of compliance, maintenance certificate, etc.
2 nd	90_Others	Stores all other miscellaneous documents.



³ InForM Number is a unique project number for a project generated by ArchSD InForM System.





Appendix 1 - PSB Standard Parameters in As-built Model

BIM Guide for Facilities Upkeep

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
1	PSB_LocCode	13 characters	Yes	Data format refer to ArchSD's ACTION System's Property Register.	This field is for PSB officer to assign location code(s) to represent whole property/individual building/structure/ floor(s) or individual room(s). Such as QA00200152000

BIM Guide for Facilities Upkeep

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note																										
2	PSB_Floor	3 characters	Yes	Typical data format refer to examples of floor codes under Explanatory Note'.	<p>The floor level shall be customized project parameters and typical examples are shown in the following table:</p> <table border="1"> <thead> <tr> <th>Floor level</th> <th>Example</th> </tr> </thead> <tbody> <tr> <td>5th basement level</td> <td>B5F</td> </tr> <tr> <td>lower ground floor level</td> <td>LGF</td> </tr> <tr> <td>upper ground floor level</td> <td>UGF</td> </tr> <tr> <td>ground floor</td> <td>0GF</td> </tr> <tr> <td>1st floor</td> <td>01F</td> </tr> <tr> <td>2nd floor</td> <td>02F</td> </tr> <tr> <td>99th floor</td> <td>99F</td> </tr> <tr> <td>1/F mezzanine floor</td> <td>M1F</td> </tr> <tr> <td>2/F mezzanine floor</td> <td>M2F</td> </tr> <tr> <td>lower roof level</td> <td>LRF</td> </tr> <tr> <td>upper roof level</td> <td>URF</td> </tr> <tr> <td>flat roof</td> <td>0RF</td> </tr> </tbody> </table>	Floor level	Example	5th basement level	B5F	lower ground floor level	LGF	upper ground floor level	UGF	ground floor	0GF	1st floor	01F	2nd floor	02F	99 th floor	99F	1/F mezzanine floor	M1F	2/F mezzanine floor	M2F	lower roof level	LRF	upper roof level	URF	flat roof	0RF
Floor level	Example																														
5th basement level	B5F																														
lower ground floor level	LGF																														
upper ground floor level	UGF																														
ground floor	0GF																														
1st floor	01F																														
2nd floor	02F																														
99 th floor	99F																														
1/F mezzanine floor	M1F																														
2/F mezzanine floor	M2F																														
lower roof level	LRF																														
upper roof level	URF																														
flat roof	0RF																														
3	PSB_ElementNo	textual	Yes	from 00001 to 99999	Each PSB_ElementNo of BIM object should be unique for BIM model.																										
4	PSB_Element1	textual	Yes	The value shall refer to Elemental Code Relation table.	Element 1 shall only be used to input information of major object, such as door, window, wall, etc. Parts or components belong to door and windows, waterproofing system, shall be input to Element 2 to Element 5 with manufacturer/ catalogue information.																										
5	PSB_Sub-element1	textual	Yes	The value shall refer to Elemental Code Relation table and its code table.																											
6	PSB_Component1	textual	Yes	The value shall refer to Elemental Code Relation table and its code table.																											
7	PSB_Attribute1	textual	Yes	The value shall refer to Elemental Code Relation table and its code table.																											
8	PSB_Remarks1	textual																													

BIM Guide for Facilities Upkeep

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
9	PSB_Manufacturer1	textual		If the element has associated contractual submission from contractor/manufacturer/supplier, relevant information of such contractor/manufacturer/supplier shall be provided to PSB	Name, contact number of contractor, manufacturer, supplier shall be provided when the element has associated contractual submission requirement stipulated under contract, quotation or schedule of rates.
10	PSB_Brand1	textual		If the element has associated contractual submission from contractor/manufacturer/supplier, relevant information of such contractor/manufacturer/supplier shall be provided to PSB	Brand name/ Model number shall be provided when the element has associated contractual submission requirement stipulated under contract, quotation or schedule of rates.
11	PSB_element_doc1	textual		Relative path of the zipped files (contractual submission) to retrieve documents. Insert separator ',' to divide path in case of multi-directory. If the element has associated contractual submission from contractor/manufacturer/supplier, relevant documents of such contractor/manufacturer/supplier shall be provided to PSB	File path storing the contractual submission shall be provided. PSB will convert these zipped file with its system to convert into server's URL for updating the file path in BIM raw file. Documentation other than Item 12, 13 & 14 from manufacturer and suppliers shall have individual file to be categorized and stored in specific file folder/sub-folder structure so that the project officer could upload the documents to a user interface of designated ArchSD system accordingly. Manufacturer or supplier's web site shall be converted to pdf format for submission.

BIM Guide for Facilities Upkeep

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
12	PSB_Catalogue_Test_Report	textual		<p>Relative path of the combine file (contractual submission) to retrieve documents.</p> <p>If the element has associated contractual submission from contractor/manufacture/supplier, relevant documents of such contractor/manufacture/supplier shall be provided to PSB</p>	<p>File path storing the contractual submission shall be provided. \\40_O&M_Documentation\05_Catalogue\[FILE NAME]</p> <p>Catalogue & approval letter, test certificate/ report and test report upon completion of Works from manufacturer and suppliers shall have combined file and stored in specific file folder/sub-folder structure so that the project officer could upload the documents to a user interface of designated ArchSD system accordingly.</p> <p>Manufacturer or supplier's web site shall be converted to pdf format for submission.</p>
13	PSB_O&M_Manual_Shop_Drawing	textual		<p>Relative path of the combine file (contractual submission) to retrieve documents.</p> <p>If the element has associated contractual submission from contractor/manufacture/supplier, relevant documents of such contractor/manufacture/supplier shall be provided to PSB</p>	<p>File path storing the contractual submission shall be provided. \\40_O&M_Documentation\03_Operation_manual\[FILE NAME]</p> <p>Shop drawing and O&M manual from manufacturer and suppliers shall have combined file and stored in specific file folder/sub-folder structure so that the project officer could upload the documents to a user interface of designated ArchSD system accordingly.</p> <p>Manufacturer or supplier's web site shall be converted to pdf format for submission.</p>
14	PSB_Warranty	textual		<p>Relative path of the combine file (contractual submission) to retrieve documents.</p> <p>If the element has associated contractual submission from contractor/manufacture/supplier, relevant documents of such contractor/manufacture/supplier shall be provided to PSB</p>	<p>File path storing the contractual submission shall be provided. \\40_O&M_Documentation\04_Certificate_warranty\[FILE NAME]</p> <p>Warranty from manufacturer and suppliers shall have combined file and stored in specific file folder/sub-folder structure so that the project officer could upload the documents to a user interface of designated ArchSD system accordingly.</p> <p>Manufacturer or supplier's web site shall be converted to pdf format for submission.</p>
15	PSB_Expiry_of_Warranty	textual		Only applicable if warranty of the object is required under contract submission requirement	MMM YYYY (e.g. Nov 2014)

BIM Guide for Facilities Upkeep

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
16	PSB_Additional_Element	textual		<p>If an object contains more than 1 element under the Elemental Code Relation table. The additional element information shall be provided referring to the Elemental Code Relation table.</p> <p>Project team could either input the information in a single Project Parameter container "PSB_Additional_Element" or duplicate the items from 4 to 13 in a numerical order, i.e. PSB_Element2 / PSB_Sub-element2.....following the data type mentioned above.</p> <p>In case the "PSB_Additional_Element" is used, Insert separator "/" & ";" to divide the elemental code relation and components respectively.</p> <p>Using the Door components as an illustration, Door lock (Element 2), Door glass (Element 3), Door closer (Element 4), Door hinge (Element 5) could be inputted in the following format:- FF/DR/IRON/LOC ; FF/DR/GZ/GZS ; FF/DR/IRON/CLOSE ; FF/DR/IRON/HIN</p>	<p>Element 1 shall only be used to input information of major component, such as door, window, wall, etc. Parts or components belong to door shall be input to Additional Element with manufacturer/ catalogue information (if necessary), i.e. Door lock (Element 2), Door glass (Element 3), Door closer (Element 4), Door hinge (Element 5). The corresponding Element, Sub-element, Component, Attribute shall refer to Elemental Code Relation Table and its code table.</p> <p>Details should be referred to the Appendix 3 as the examples of PSB Standard Parameters in Objects.</p>

BIM Guide for Facilities Upkeep

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
17	PSB_ContractNo	textual		If the element has associated contractual submission from contractor/manufacturer/supplier, relevant information of such contractor/manufacturer/supplier shall be provided to PSB	Contact number of contractor shall be provided when the element has associated contractual submission requirement stipulated under contract, quotation or schedule of rates.
18	PSB_MWORRF_link	textual			This textual value will be replaced by URL(s) by PSB's system to read Repair Request Form generated in Repair Call Centre's Desktop Application in a customized pop-up windows.
19	PSB_MWO_link	textual			This textual value will be replaced by URL(s) by PSB's system to read minor works order generated in ACTION System in a customized pop-up window.
20	PSB_WO_link	textual			This textual value will be replaced by URL(s) by PSB's system to read works order generated in ACTION System in a customized pop-up window.
21	PSB_Cert_Comp_Date	textual			MMM YYYY (e.g. Nov 2014)
22	PSB_Handover_Date	textual		Only applicable for new project handed over to PSB for maintenance	MMM YYYY (e.g. Nov 2014)
23	PSB_Ins_Sch_Des	textual			If this building element is subject to periodic inspection/testing, detailed and accurate description of inspection or testing activities shall be provided.
24	PSB_Ins_Interval	textual		If PSB_Ins_Sch_Des is not null, this field is Mandatory.	The data type shall indicate the number of month for periodic inspection/ testing required.
25	PSB_feature	textual			If this feature has specific elements, say "HERITAGE" for heritage character defining elements or "ASBESTOS" for asbestos containing material. NULL is applied if no specific feature is connected.

BIM Guide for Facilities Upkeep

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
26	PSB_CDELevel	textual		If this feature is connected with heritage value, i.e. "HERITAGE" under item 45, the level of significance shall be mandatory.	Level of significance shall be "EXCEPTIONAL", "HIGH", "MODERATE" or "LOW".

Remark: For the non-applicable project parameters, the Contractor shall input "NULL" to the corresponding BIM element(s) of as-built model.

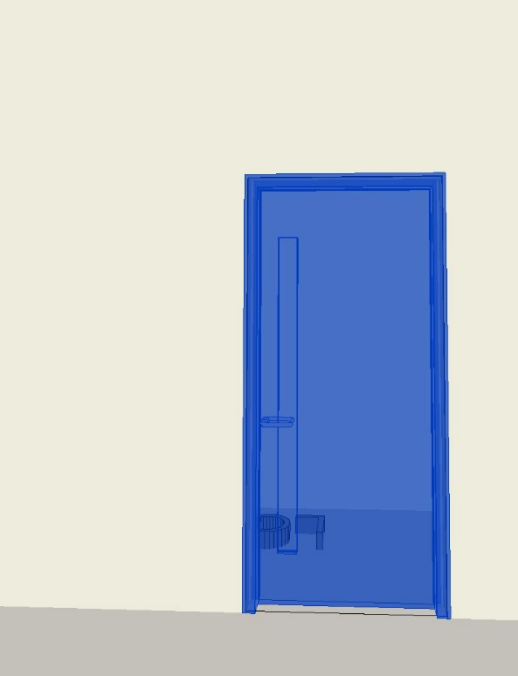
Appendix 2 – Examples of Asset Information Spreadsheets

Please refer to sample templates of Asset Information Spreadsheet (Architectural, Plumbing & Drainage and Structural Elements) required for ArchSD’s facilities upkeep.

Appendix 3 – Examples of PSB Standard Parameters in Objects

Example 1: Door and associated ironmongeries

Properties	
DOR-SGL-ADA-w. glass panel 900 x 2100mm_Timber	
Doors (1) Edit Type	
Constraints	
Construction	
Text	
PSB_LocCode	QA00200012000
PSB_Floor	07F
PSB_ElementNo	00550
PSB_Element1	FF
PSB_Sub-element1	DR
PSB_Component1	STRU
PSB_Attribute1	TIM
PSB_Remarks1	NULL
PSB_Manufacturer1	NULL
PSB_Brand1	NULL
PSB_ContractNo	NULL
PSB_Element_doc1	NULL
PSB_Catalogue_Test_Report	NULL
PSB_O&M_Manual_Shop_Drawing	NULL
PSB_Warranty	NULL
PSB_Expiry_of_Warranty	NULL
PSB_Additional_Element	FF/DR/IRON/LOC;FF/DR/GZ/GZS;FF/DR/IRON/CLOSE;FF/DR/IRON/HIN
PSB_MWORRF_Link	NULL
PSB_MWO_Link	NULL
PSB_WO_Link	NULL
PSB_Cert_Comp_Date	NULL
PSB_Handover_Date	NULL
PSB_Ins_Sch_Des	NULL
PSB_Ins_Interval	NULL
PSB_CDELevel	NULL
PSB_Feature	NULL



Example 2: Window and associated ironmongeries

The screenshot displays a BIM software interface. On the left is a 'Properties' panel for a window element. The top of the panel shows a window icon and the text 'WDW-FXD-ADA-Type2 W4'. Below this is a 'Windows (1)' section with an 'Edit Type' button. The main part of the panel is a 'Constraints' table with a 'Text' column and a 'Value' column. The table contains various properties and their values, with some values highlighted in blue. On the right is a 3D model of a bathroom stall. A window is shown above the stall, with a yellow line indicating a horizontal reference line. A blue line indicates a vertical reference line. The window is highlighted in blue, and the ironmongery (hardware) is highlighted in a darker blue. The stall has a sink and a mirror on the wall.

Text	Value
PSB_LocCode	QA00200012000
PSB_Floor	07F
PSB_ElementNo	00566
PSB_Element1	FF
PSB_Sub-element1	WIN
PSB_Component1	STRU Aluminum window
PSB_Attribute1	AL
PSB_Remarks1	NULL
PSB_Manufacturer1	NULL
PSB_Brand1	NULL
PSB_ContractNo	NULL
PSB_Element_doc1	NULL
PSB_Catalogue_Test_Report	Aluminum window frame
PSB_O&M_Manual_Shop_Drawing	NULL
PSB_Warranty	NULL
PSB_Expiry_of_Warranty	NULL
PSB_Additional_Element	FF/WIN/GZ/NULL;FF/WINFR/STRU/AL;FF/WIN/IRON/NULL;
PSB_MWORRF_link	NULL
PSB_MWO_link	NULL
PSB_WO_link	Glazing Ironmongery of window
PSB_Cert_Comp_Date	NULL
PSB_Handover_Date	NULL
PSB_Ins_Sch_Des	NULL
PSB_Ins_Interval	NULL
PSB_CDELevel	NULL
PSB_Feature	NULL

Appendix 4 – Modelling Requirements for As-built Models

- Remarks :
- (i) The elements shown in the table are under the relevant trades with reference to ArchSD General Specification and Schedule of Rates. Reference should also be made to the CIC Building Information Modelling Standards.
 - (ii) This list is not exhaustive, additional element(s) or feature(s) may be required to include for individual project.

- Legends :
- ✓ - Required
 - ✗ - Not required

Item	Element	Graphical Model Element	Non-graphical information	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Non-graphical Information and Documentation
		LOD-G	LOD-I					
1.0	Excavation							
1.1	Elements under this trade	300	500	✗	✓ (if available)	✗		
2.0	Concrete Work							
2.1	Elements under this trade	300	500	✗	✓ (if available)	✗		
3.0	Brickwork and Blockwork							
3.1	Elements under this trade	300	500	✗	✓ (if available)	✗		
4.0	Masonry							
4.1	Elements under this trade	300	500	✗	✓ (if available)	✓		

BIM Guide for Facilities Upkeep

Item	Element	Graphical Model Element	Non-graphical information	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Non-graphical Information and Documentation
		LOD-G	LOD-I					
5.0	Roofing and Waterproofing							
5.1	Elements under this trade (unless otherwise specified below)	300	500	✗	✓ (if available)	✓	1) Showing Maintenance access	1) Contractor / Specialist Contractor information. 2) Brand name and model information. 3) Manufacturer/ Supplier information 4) Expiry date of warranty 5) Catalogue/ Technical literature. 6) Warranty. 7) Shop drawings 8) O&M manual. 9) Cyclical maintenance requirement (if applicable).
5.2	Waterproofing	300	500	✗	✓ (if available)	✓	1) Ditto (to Item 5.1). 2) Showing fixing details including movement/ expansion joints, tiling and insulation, etc.	1) Ditto (to Item 5.1). 2) Infra-red thermograph testing report.
5.3	Corrugated or Profiled Sheet Roofing	300	500	✓ (in LOD 300 or above ; Step-by-step process showing the assemble & disassemble of fixtures)	✓ (if available)	✓	1) Ditto (to Item 5.1). 2) Showing fixing details including joints, provision of subgrid & purlin, fall arrest, etc.	1) Ditto (to Item 5.1).
5.4	Green Roofing System	300	500	✗	✓ (if available)	✓	1) Ditto (to Item 5.1). 2) Showing different layers of the system (e.g. roof barrier, moisture retention layer, drainage layers and inspection chamber, irrigation system, etc.)	1) Ditto (to Item 5.1). 2) Structural assessment record by Registered Structural Engineer.

BIM Guide for Facilities Upkeep

Item	Element	Graphical Model Element	Non-graphical information	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Non-graphical Information and Documentation
		LOD-G	LOD-I					
6.0	Carpentry and Joinery							
6.1	Elements under this trade (unless otherwise specified below)	300	500	✗	✓ (if available)	✗		1) Brand name and model information. 2) Catalogue/ Technical literature.
6.2	Fire resisting door set, windows, partition and enclosure	300	500	✗	✓ (if available)	✓	1) Showing fixing details including all accessories, ironmongeries, joints, supporting frames, etc.	1) Ditto (to Item 6.1). 2) Manufacturer/ Supplier information 3) Expiry date of warranty 4) Warranty. 5) Fire Certificate/ Report
6.3	Acoustic door, panel, fixtures	300	500	✗	✓ (if available)	✓	1) Showing fixing details including all accessories, ironmongeries, etc.	1) Ditto (to Item 6.1). 2) Manufacturer/ Supplier information 3) Expiry date of warranty 4) Warranty and certificate. 5) Specification of the acoustic properties.
7.0	Ironmongery							
7.1	Elements under this trade	300	500	✗	✓ (if available)	✗		1) Brand name and model information. 2) Manufacturer/ Supplier information 3) Catalogue/ Technical literature. 4) O&M manual.
8.0	Steel and Metal Work							
8.1	Elements under this trade (unless otherwise specified below)	300	500	✗	✓ (if available)	✗		1) Brand name and model information. 2) Catalogue/ Technical literature.
8.2	Fall arrest system	300	500	✗	✓ (if available)	✗		1) Ditto (to Item 8.1). 2) Contractor / Specialist Contractor information. 3) O&M manual. 4) Particular specification for examination, testing and operation training.
8.3	Steel sheet / composite aluminium cladding	300	500	✗	✓ (if available)	✓	1) Showing fixing details including joints, supporting frames, insulation layer, etc.	1) Ditto (to Item 8.1). 2) Contractor / Specialist Contractor information. 3) Guarantee and warranty. 4) O&M manual.

BIM Guide for Facilities Upkeep

Item	Element	Graphical Model Element	Non-graphical information	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Non-graphical Information and Documentation
		LOD-G	LOD-I					
8.4	Proprietary shutter, swing and sliding door	300	500	✗	✓ (if available)	✓	1) Showing fixing details including joints, supporting frames, rail / track, etc.	1) Ditto (to Item 8.1). 2) Contractor / Specialist Contractor information. 3) Guarantee and warranty. 4) O&M manual.
8.5	Aluminium windows and doors	300	500	✗	✓ (if available)	✗		1) Ditto (to Item 8.1).
9.0	Plastering and Finishes							
9.1	Elements under this trade (unless otherwise specified below)	300	500	✗	✓ (if available)	✗		1) Brand name and model information. 2) Catalogue/ Technical literature.
9.2	Suspended ceiling system	300	500	✗	✓ (if available)	✓	1) Showing fixing details including frames, etc. 2) Showing maintenance access to ceiling void above	1) Ditto (to Item 9.1). 2) Manufacturer/ Supplier information 3) Shop drawings 4) Test certificates and manufacturer's guarantee.
9.3	Acoustic plaster / fire resisting fireproofing plaster	300	500	✗	✓ (if available)	✗		1) Ditto (to Item 9.1). 2) Manufacturer/ Supplier information 3) Manufacturer's recommendation on application. 4) Manufacturer's guarantee.
9.4	Floor tiles, slabs, paving blocks	300	500	✗	✓ (if available)	✓	1) Showing fixing details including tiles adhesive, sand filling/bedding, pointing and grouting joint, etc.	1) Ditto (to Item 9.1). 2) Laying or fixing patterns. 3) Configuration and dimension. 4) Slip resistance classification and test certificate.
9.5	Flexible tiles and sheet finishes	300	500	✗	✓ (if available)	✗	1) Showing fixing details including weld-joints, etc.	1) Ditto (to Item 9.1). 2) Laying or fixing patterns. 3) Configuration and dimension. 4) Slip resistance classification and test certificate.

BIM Guide for Facilities Upkeep

Item	Element	Graphical Model Element	Non-graphical information	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Non-graphical Information and Documentation
		LOD-G	LOD-I					
9.6	Stone or marble slabs / tiles	300	500	✓ (in LOD 300; for marble tiles at external wall/area; Step-by-step process showing the assemble & disassemble of fixtures)	✓ (if available)	✓	1) Showing fixing details including supporting frame/bedding, pointing and grouting joint, edges, etc.	1) Ditto (to Item 9.1). 2) Laying or fixing patterns. 3) Configuration and dimension. 4) Anti-stain treatment details. 5) Calculation endorsed by Registered Structural Engineer for fixing of stone or marble slabs to vertical or sloping surfaces.
9.7	Raised Accessed Flooring	300	500	✗	✓ (if available)	✗	1) Showing fixing details including supporting frame, grids, etc.	1) Ditto (to Item 9.1). 2) Laying or fixing patterns. 3) Configuration and dimension. 4) Test certificate and manufacturer's guarantee.
10.0 Roadwork and Cable Duct								
10.1	Elements under this trade	300	500	✗	✓ (if available)	✗		
11.0 Plumbing and Drainage								
11.1	Elements under this trade (unless otherwise specified below)	300	500	✗	✓ (if available)	✗	1) Showing exposed, underground and concealed pipeworks, valves, cisterns, tanks, brackets, hangers, flexible joints, fittings, manholes, petrol interceptor, traps, gullies, sub-soil drain, etc. 2) Showing maintenance access for tanks, duct well, pipe-duct, concealed installations, etc.	1) Brand name and model information. 2) Manufacturer/ Supplier information 3) Type of joints & jointing method. 4) Size, volume, capacity, physical dimension, etc. 5) Catalogue/ Technical literature. 6) Test Certificate/ Report 7) O&M Manual. 8) Cyclical maintenance requirement (if applicable).
11.2	Glass-fibre reinforced plastic water tank	300	500	✗	✓ (if available)	✗	1) Ditto (to Item 11.1). 2) Showing the fixing of the panels, fittings, ladders, overflow, warning pipe, etc.	1) Ditto (to Item 11.1). 2) Structural calculation endorsed by Registered Structural Engineer. 3) Test certificates.

BIM Guide for Facilities Upkeep

Item	Element	Graphical Model Element	Non-graphical information	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Non-graphical Information and Documentation
		LOD-G	LOD-I					
11.3	Pressure Reducing Valve	300	500	✗	✓ (if available)	✗	1) Ditto (to Item 11.1).	1) Ditto (to Item 11.1). 2) Cleaning and maintenance requirements.
11.4	Sub-soil drain pipes and drain layer	300	500	✗	✓ (if available)	✓	1) Ditto (to Item 11.1). 2) Showing the layers of the sub-soil drain, e.g. filter, pipe, etc. should be shown.	1) Ditto (to Item 11.1).
12.0 Glazing								
12.1	Elements under this trade (unless otherwise specified below)	300	500	✗	✓ (if available)	✗	1) Showing fixing details.	1) Brand name and model information 2) Manufacturer/ Supplier information 3) Catalogue/ Technical literature for proprietary product.
12.2	Glazing	300	500	✗	✓ (if available)	✗	1) Ditto (to Item 12.1).	1) Type, size, colour, coating, thickness, u-value, fire rated properties, etc. 2) Test certificate and manufacturer's guarantee.
12.3	Louvre	300	500	✗	✓ (if available)	✓	1) Ditto (to Item 12.1).	1) Ditto (to Item 12.1).
13.0 Painting								
13.1	Elements under this trade	300	500	✗	✓ (if available)	✗		1) Brand name and model information 2) Manufacturer/ Supplier information 3) Expiry date of warranty 4) Catalogue/ Technical literature. 5) Test certificates and warranty (if applicable).

BIM Guide for Facilities Upkeep

Item	Element	Graphical Model Element	Non-graphical information	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Non-graphical Information and Documentation
		LOD-G	LOD-I					
14.0	Recreational / Sports Surfacing and Protective Padding							
14.1	Elements under this trade (unless otherwise specified below)	300	500	✗	✓ (if available)	✗		1) Brand name and model information 2) Manufacturer/ Supplier information 3) Expiry date of warranty 4) Catalogue/ Technical literature. 5) Shop drawings
14.2	Proprietary sport flooring system	300	500	✗	✓ (if available)	✓	1) Showing fixing details including all accessories, components, finishes, sub-base, joint, etc.	1) Ditto (to Item 14.1). 2) Certificate of origins. 3) Test certificates, warranty and certificate. 4) O&M Manual.
14.3	Protective padding	300	500	✗	✓ (if available)	✗	1) Showing fixing details including all components, finishes, etc.	1) Ditto (to Item 14.1). 2) Certificate of origins. 3) Test certificates, warranty and certificate.
14.4	Impact absorbing surfacing material	300	500	✗	✓ (if available)	✗	1) Showing fixing details including all accessories, components, finishes, sub-base, joint, etc.	1) Ditto (to Item 14.1). 2) Certificate of origins 3) Test certificates, warranty and certificate. 4) O&M Manual.
15.0	Fixtures and Fittings							
15.1	Elements under this trade (unless otherwise specified below)	300	500	✗	✓ (if available)	✗		1) Brand name and model information 2) Manufacturer/ Supplier information 3) Catalogue/ Technical literature.
15.2	Cabinets, cupboards, wardrobes, sink cabinets, shelves, rack unit, locker, counter, blinds, curtains, awing, canvas, seating benches / chairs, chess tables, drying rack, etc.	300	500	✗	✓ (if available)	✓	1) Showing fixing details including all accessories, ironmongeries, etc.	1) Ditto (to Item 15.1).
15.3	Proprietary fume cupboards	300	500	✗	✓ (if available)	✓	1) Showing fixing details including all accessories, connection to plumbing / drainage / building services installations, etc.	1) Ditto (to Item 15.1). 2) Specification on suitable chemical resistant laboratory-grade material 3) Warranty and certificate. 4) O&M manual.

BIM Guide for Facilities Upkeep

Item	Element	Graphical Model Element	Non-graphical information	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Non-graphical Information and Documentation
		LOD-G	LOD-I					
15.4	Flag pole	300	500	✗	✓ (if available)	✓	1) Showing fixing details including all accessories, foundation, etc.	1) Ditto (to Item 15.1). 2) Warranty and certificate. 3) O&M manual.
15.5	Sanitary fittings	300	500	✗	✓ (if available)	✗		1) Ditto (to Item 15.1). 2) Specification of the accessories and flush valves. 3) O&M manual.
15.6	Taps and mixers	300	500	✗	✓ (if available)	✗		1) Ditto (to Item 15.1). 2) WELS information.
15.7	Braille and tactile map	300	500	✗		✓		1) Certificate issued by recognized certifying body.
16.0	Partitions and Cubicle System							
16.1	Elements under this trade (unless otherwise specified below)	300	500	✗	✓ (if available)	✗	1) Showing fixing details including all accessories, ironmongeries, insulation, supporting frame, track, rail, finishes, etc.	1) Brand name and model information 2) Manufacturer/ Supplier information 3) Expiry date of warranty 4) Catalogue/ Technical literature. 5) Shop drawings
16.2	Demountable partition system	300	500	✗	✓ (if available)	✗	1) Ditto (to Item 16.1).	1) Ditto (to Item 16.1). 2) Warranty and certificate. 3) O&M manual.
16.3	Dry wall partition	300	500	✗	✓ (if available)	✗	1) Ditto (to Item 16.1).	1) Ditto (to Item 16.1). 2) Fire certificate for fire resisting partition.
16.4	Sliding / folding partition including acoustic partitions	300	500	✗	✓ (if available)	✓	1) Ditto (to Item 16.1).	1) Ditto (to Item 16.1). 2) Warranty and certificate. 3) O&M manual.
16.5	Toilet cubicle system/ compact laminate/ graphical surface material	300	500	✗	✓ (if available)	✗	1) Ditto (to Item 16.1).	1) Ditto (to Item 16.1). 2) Warranty and certificate. 3) O&M manual.
17.0	Landscape Work							
17.1	Elements under this trade	300	500	✗	✓ (if available)	✗		

BIM Guide for Facilities Upkeep

Item	Element	Graphical Model Element	Non-graphical information	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Non-graphical Information and Documentation
		LOD-G	LOD-I					
18.0	Geotechnical Works							
18.1	Elements under this trade	300	500	✗	✓ (if available)	✗		
19.0	Trees							
19.1	Elements under this trade	200	300	✗	✗	✓		For i) OVT and ii) trees on registered SIMAR slope only.
20.0	Curtain Wall/ Window Wall / External Cladding System / Skylight							
20.1	Elements under this trade	400	500	✓ (in LOD 300 or above; Step-by-step process showing the assemble & disassemble of fixtures)	✓ (if available)	✓	<ol style="list-style-type: none"> 1) Showing details including fixing, connection, anchorages, spandrels & supporting system, type of finishes, water bars, movement joints, etc. 2) Showing maintenance access. 	<ol style="list-style-type: none"> 1) Contractor / Specialist Contractor information. 2) Information & specification of the materials, e.g. glazing, ironmongeries, supporting framework, ironmongeries, fire insulation, fixing & connection, coated finishes, water bars, movement joint, sealant, etc. 3) Manufacturer/ Supplier information 4) Expiry date of warranty 5) Catalogue/ Technical literature. 6) Shop drawings 7) OTTV calculation (for curtain wall) 8) O&M manual. 9) Warranty. 10) Cyclical maintenance requirement (if applicable).
21.0	Others (not mentioned above)							
21.1	Elements under this trade	300	500	✗	✓ (if available)	✓		<ol style="list-style-type: none"> 1) Cyclical maintenance requirement (if applicable), e.g. building element is subject to periodic inspection / testing, heritage, asbestos containing materials, etc.

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Item	Element	Graphical Model Element	Non-graphical information	3D Animation	BIM Object from original manufacturer	Photo record (other than 360° photos)	Other Modelling Requirements	Non-graphical Information and Documentation
		LOD-G	LOD-I					
21.2	Special feature / Building structure with historical value (*exact feature / structure to be specified by the PSB)	300	500	✗ (unless otherwise specified)	✗	✓	1) Showing maintenance access	1) Ditto (to Item 21.1). 2) 3D digital point cloud scanning.
21.3	Modular Integrated Construction	400	500	✓ (in LOD 300 or above; Step-by-step process showing the assemble & disassemble of fixtures)	✓ (if available)	✓	1) Showing details including fixing, joints and gaps, connection, anchorages, supporting system, connection and route of services and fittings, etc. 2) Showing Maintenance access.	1) Ditto (to Item 21.1). 2) Contractor / Specialist Contractor information. 3) Information, specification and literature of the installations and materials. 4) O&M manual. 5) Warranty and Certificate.
21.4	Other items covered in i) Architectural Model & ii) Plumbing & Drainage Model but not listed above.	300	500	✗	✓ (if available)	✓		1) Ditto (to Item 21.1).
21.5	Furniture	300	300	✗	✗	✗	1) Showing the layout including the furniture.	

Appendix 5 – Creating Sheet Record

Identifier	Description
GP	Location Drawings
	(a) List of Drawings
	(b) Site / location / block plan showing the size and position of the building and of other buildings in the immediate vicinity, and neighbouring streets
	(c) GLA/Lot boundary, lease boundary, right of way, etc.
	(d) The existing nature of the site and the surrounds and particulars of structures, foundations, public utilities, drains and sewers and other services on and adjacent to the site
	(e) Existing layout / demolition plan (if existing works should be shown)
	(f) General plans of every floor and of the roof of the building, on which there shall be shown full dimensions, the thickness of walls, the position of all windows, soil fitments, waste fitments and water storage tanks, and the intended use of every part of the building
	(g) Drawings showing - -all elevations of the building; -the level of adjacent streets in relation to a known datum and to the levels of the site and the building; -the width of every street adjacent to the site; and -the position, depth and construction of any well;
	(h) Plans and sections of the proposed site formation works and associated surface water drainage works
	(i) A diagrammatic plan, with full dimensions and calculations, showing: -the height, site coverage, plot ratio and disposition of the building -any open space required -the usable floor area -the number and type of soil fitments and waste fitments to be provided in the building -provision made for persons with a disability -list of modifications and/or exemptions -details of the fire engineering approached adopted -means of escape -fire resisting construction including fire compartments & fire resistant of building elements -travel distance indicated on plan
	(j) Canopy, bridge or other projection over a street or unleased Government land, plans showing clearly the nature and dimension of such projection
PE	Principal Elements
	(a) Architectural features / wall sections
	(b) Roofing details
	(c) Staircases
	(d) Lift Shafts
	(e) Openings for skylights / escalators, etc.
CA	Component drawings / assembly drawings
	(a) Door schedules and details
	(b) Window schedules and details
	(c) Glass / metal louvres schedules
	(d) Roller shutter schedules
	(e) Sliding door / gate schedules
	(f) Finishing schedule and details
	(g) Ironmongery schedules
	(h) Sanitary fittings schedules
	(i) Glass block / grille wall schedules and details
	(j) Waterproofing and tanking system

BIM Guide for Facilities Upkeep

Identifier	Description
CF	Suspended ceiling system / special flooring system
	(a) Reflected ceiling plans and details
	(b) Raised floors and details
	(c) Sports flooring system
SP	Sanitary plumbing and drainage system
	(a) Drainage plan (including exposed, concealed & underground), showing the size and depth of drains or sewers; connections to a public sewer or drain or nullah, any other method for the disposal of drainage, the position of disconnecting traps, and the means of ventilation
	(b) Vertical diagrams
	(c) Manholes schedule
	(d) Drainage details (e.g. manholes, BITG, gully trap, surface/stepped channels, channel covers, grease trap, petrol interceptor, septic tanks, etc.)
WS	Water supply system
	(a) Layout plan (including exposed, concealed & underground), showing the size and location of the pipeworks including the associated installation (e.g. meter, valve, pump, tanks, etc.); connections to WSD main / well.
	(b) Vertical diagrams
DL	Detailed layouts (showing the detailed location and precise information of components and assembly details in the project, e.g. toilets, changing rooms, lift lobbies, services rooms, etc.)
	(a) Layout plans
	(b) Sections
	(c) Elevations
	(d) Details
EW	External works (showing the detailed location of components and assembly details at external areas, e.g. paving, steps, ramps, planters, benches, arbours, tree pit & grille, perimeter walls, fences, railings, gates, draw pit, earth pit, etc.)
	(a) Layout plans
	(b) Sections
	(c) Elevations
	(d) Details
	(e) Landscape plans and details
MS	Miscellaneous (showing precise information of components and assemblies for workshop manufacture or on site fabrication.)
	(a) Other unclassified elements (e.g. details of notice board, cat ladders, trap doors, flagpoles, signage system, cabinets, FS inlet / HR cabinets, etc.)
	(b) Hidden and exposed structural elements
	(c) Skylights
	(d) Projections
	(e) Railing and parapets
	(f) Expansion / Construction / Movement Joints
OT	Others
	(a) List of Proprietary Products, Warranty Period, Scope of Warranty and Details of Suppliers and Manufacturers
	(b) List, Details, Dimensions, Respective Locations and Quantity of Spare Materials, Finishes and Parts and their Storage Area;
	(c) Management and Maintenance Responsibilities

BIM Guide for Facilities Upkeep

Identifier	Description
	(d) Location and Details of Special Feature that need attention
	(e) Traffic Impact Assessment, Drainage Impact Assessment, Environmental Impact Assessment, etc.
	(f) Engineering Conditions, Assignment, Deed of Mutual Covenants, etc.

Appendix 6 – Examples of As-built Modelling

1. Sheet Production - Typical Drawing Schedules

(a) Door schedules

ELEVATION

DOOR SCHEDULE

DOOR MARK	01	02	03	04	05
CONSTRUCTION
LOCATION
QUANTITIES

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(b) Ironmongery schedules

IRONMONGERY SCHEDULE

DOOR/CLOCK	DESCRIPTION	LOCATION	QTY	UNIT
01
02
03

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(c) Window schedules

EXTERNAL ELEVATION (L50)	W1	W2	W3	W4
WINDOW MARK	W1	W2	W3	W4
FRAME	3mm T1 METAL INSULATED ALUMINUM FRAME	3mm T1 METAL INSULATED ALUMINUM FRAME	3mm T1 METAL INSULATED ALUMINUM FRAME	3mm T1 METAL INSULATED ALUMINUM FRAME
GLASS	6mm T1 CLEAR GLASS (S&I)	6mm T1 CLEAR GLASS (S&I)	6mm T1 CLEAR GLASS (S&I)	6mm T1 CLEAR GLASS (S&I)
LOCATION	WING TERRACE - LANE / WING TERRACE & WING (L50)	WING TERRACE - WING (L50) & T (L50)	WING TERRACE - WING (L50)	WING TERRACE - WING (L50)
NUMBER	2	2	1	2
REMARKS	ALL WINDOW PANELS BALANCE & TRIMMED WITH 10mm TO GLASS.	ALL WINDOW PANELS BALANCE & TRIMMED WITH 10mm TO GLASS.	ALL WINDOW PANELS BALANCE & TRIMMED WITH 10mm TO GLASS.	ALL WINDOW PANELS BALANCE & TRIMMED WITH 10mm TO GLASS.

EXTERNAL ELEVATION (L50)	W5	W6	W7
CLASS PANEL MARK	W5	W6	W7
FRAME	1300mm METAL INSULATED SLIDING GLASS	1300mm METAL INSULATED SLIDING GLASS	1300mm METAL INSULATED SLIDING GLASS
GLASS	6mm T1 METAL INSULATED SLIDING GLASS (S&I)	6mm T1 METAL INSULATED SLIDING GLASS (S&I)	6mm T1 METAL INSULATED SLIDING GLASS (S&I)
LOCATION	WING TERRACE (L50)	WING TERRACE (L50)	WING TERRACE (L50)
NUMBER	1	2	1
REMARKS	WING TERRACE (L50) & WING (L50)		

WINDOW HEAD DETAIL
1:2

WINDOW SILL DETAIL
1:2

GLASS PANEL DETAIL
1:1

NOTES

- ALL WINDOW PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.
- ALL WINDOW PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.
- ALL WINDOW PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.
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- ALL WINDOW PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.

NO.	DATE	REVISION	BY

FOR REFERENCE ONLY

WINDOW SCHEDULE
GLASS PANEL SCHEDULE
AND DETAILS

PROJECT NO. CA0086

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(d) Access panel schedules

ACCESS PANEL SCHEDULE				
EXTERNAL ELEVATION 1:20				
ACCESS PANEL MARK	(AP1)	(AP2)	(AP3)	(AP4)
CONSTRUCTION				
LOCATION	WING TERRACE & L1 CORRIDOR (L50) WITH W.C. (L50) & W.C. (L50)	WING TERRACE & L1 CORRIDOR (L50) WITH W.C. (L50) & W.C. (L50)	WING TERRACE & L1 CORRIDOR (L50) WITH W.C. (L50) & W.C. (L50)	WING TERRACE & L1 CORRIDOR (L50) WITH W.C. (L50) & W.C. (L50)
TOTAL NOS.	17 NOS.	2 NOS.	1 NO.	2 NOS.
REMARKS				

FRONT ELEVATION OF LEDGE WITH W.C. (L50)

SECTION OF LEDGE

FRONT ELEVATION OF LEDGE WITH WASH HAND BASIN

SECTION OF LEDGE

DETAIL A

DETAIL OF ACCESS PANEL

NOTES

- ALL ACCESS PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.
- ALL ACCESS PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.
- ALL ACCESS PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.
- ALL ACCESS PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.
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- ALL ACCESS PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.
- ALL ACCESS PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.
- ALL ACCESS PANELS ARE TO BE SUPPLIED WITH 10mm TO GLASS.

NO.	DATE	REVISION	BY

FOR REFERENCE ONLY

ACCESS PANEL SCHEDULE & DETAIL FOR PIPE DUCT & LEDGE WALL DETAILS

PROJECT NO. AB/2988/MS07

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ARCHITECTURAL SERVICES DEPARTMENT

(e) Roller shutter schedules

ELEVATION			<p>NOTES:</p> <ol style="list-style-type: none"> ALL DIMENSIONS UNLESS OTHERWISE NOTED BY THE CONTRACTOR. ALL DIMENSIONS TO BE TAKEN AS SHOWN IN THIS SET OF DRAWINGS. ALL DIMENSIONS TO BE TAKEN AS SHOWN IN THIS SET OF DRAWINGS.
	PLAN		
MARK	(RS1)	(RS2)	
QUANTITY	1 No.	1 No.	
TYPE/MATERIAL	EXPOSED HOOD MOTOR-OPERATION (VERTICAL) TYPE	EXPOSED HOOD MOTOR-OPERATION (VERTICAL) TYPE	
LOCATION	VEHICLE SEARCH AREA ON G/F	VEHICLE SEARCH AREA ON G/F	
REMARK	1.6mm THK. S.S. K3 SLAT & ELECTRIC MOTOR CONTROL	1.6mm THK. S.S. K3 SLAT & ELECTRIC MOTOR CONTROL	
ELEVATION			<p>DETAIL OF ROLLER SHUTTER GUIDE 1:5</p>
PLAN			
MARK	(RS3)	(RS4)	
QUANTITY	1 No.	3 No.	
TYPE/MATERIAL	EXPOSED HOOD MOTOR-OPERATION (VERTICAL) TYPE	EXPOSED HOOD PUSH UP TYPE	
LOCATION	SHIP BLDG ON G/F	STORE ROOMS ON G/F	
REMARK	1.6mm THK. S.S. K2 SLAT & ELECTRIC MOTOR CONTROL	1.2mm THK. S.S. K2 SLAT MANUAL OPERATED	

(f) Cat ladder schedules

FRONT ELEVATION SCALE 1:20

SECTION SCALE 1:20

DETAIL C SCALE 1:15

DETAIL D SCALE 1:15

DETAIL E SCALE 1:5

DETAIL F SCALE 1:5

DETAIL G SCALE 1:5

DETAIL H SCALE 1:5

DETAIL I SCALE 1:2

CAT-LADDER SCHEDULE SCALE N.T.S.

ITEM NO.	QTY	UNIT
1	1	NO.
2	1	NO.
3	1	NO.
4	1	NO.
5	1	NO.

NOTES:

- ALL METAL WORKS SHALL BE HOT DIP GALVANIZED WITH SYNTHETIC PRIME FINISH.

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LDL


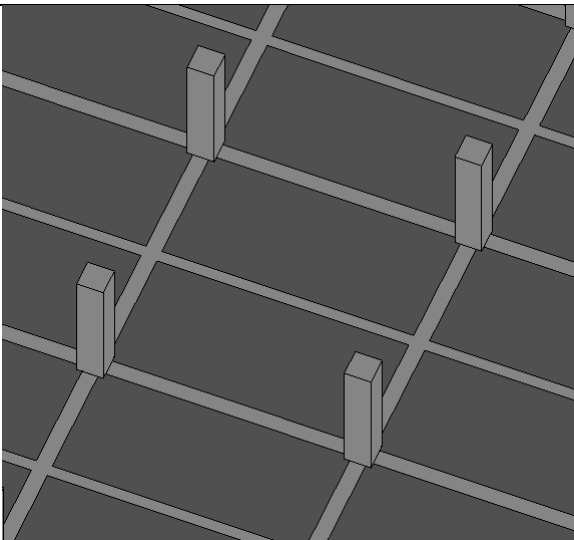
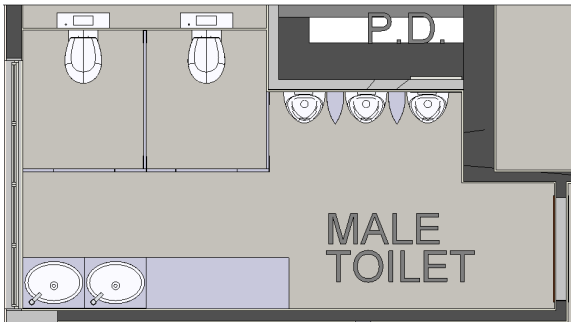
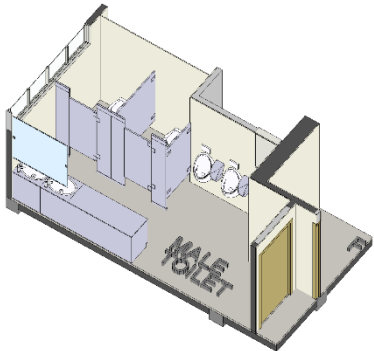
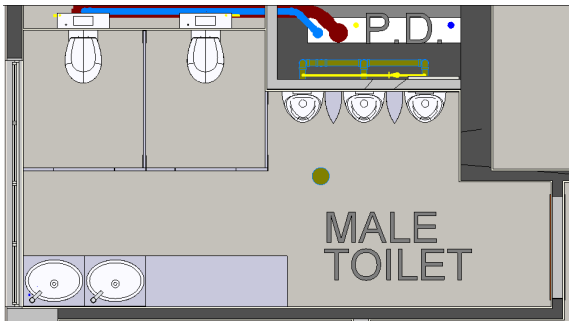
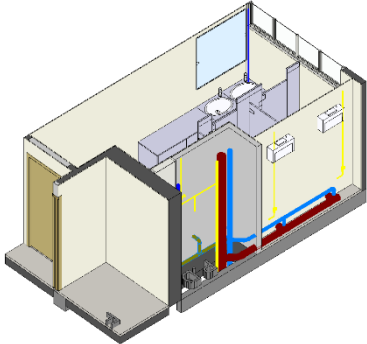
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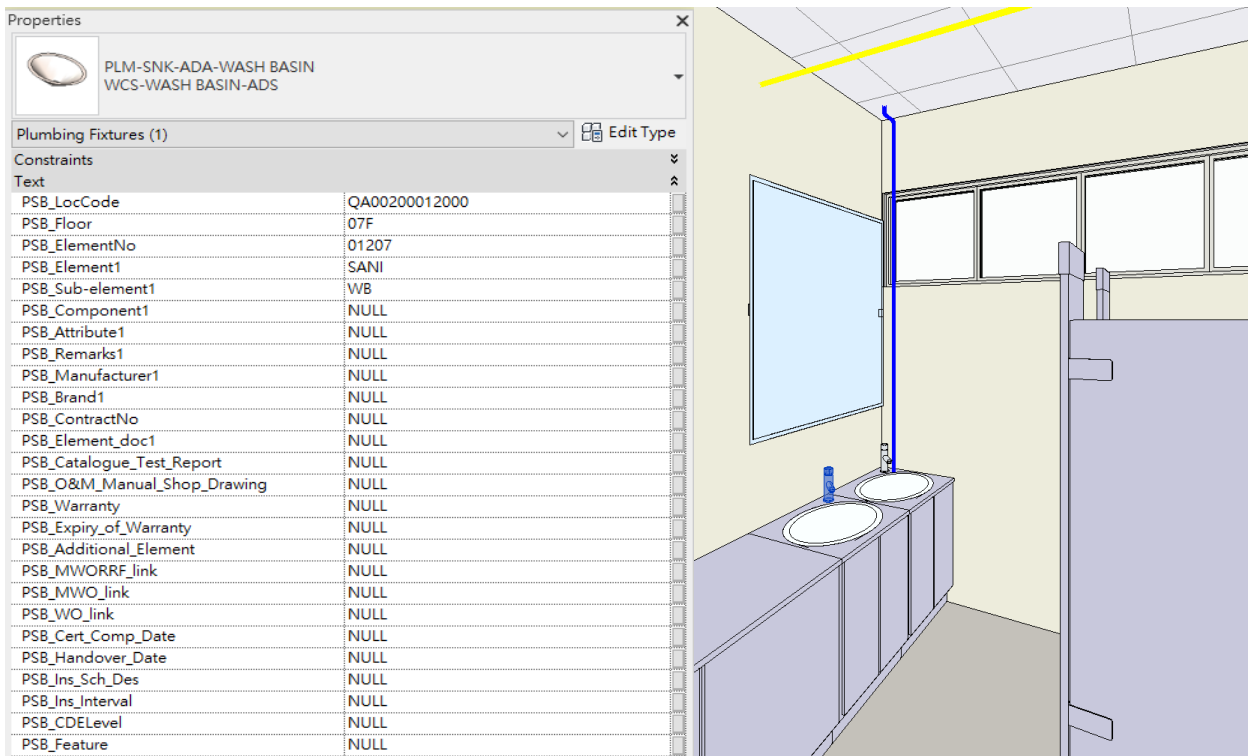
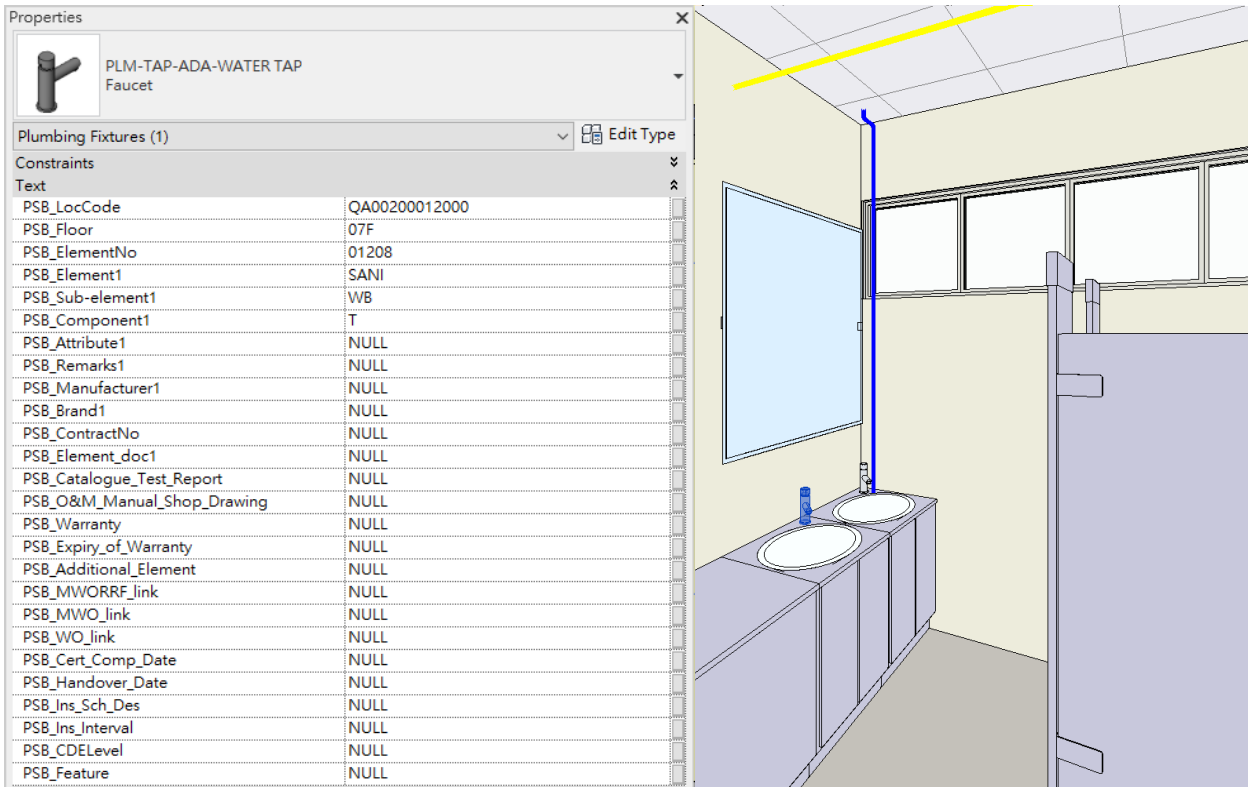
2. Special Modelling Requirements (Refer to Clause 2.3.4)

Example (a): Typical example of BIM element modelling at toilet area
 (Note: Different components are highlighted in different colors for illustration.)

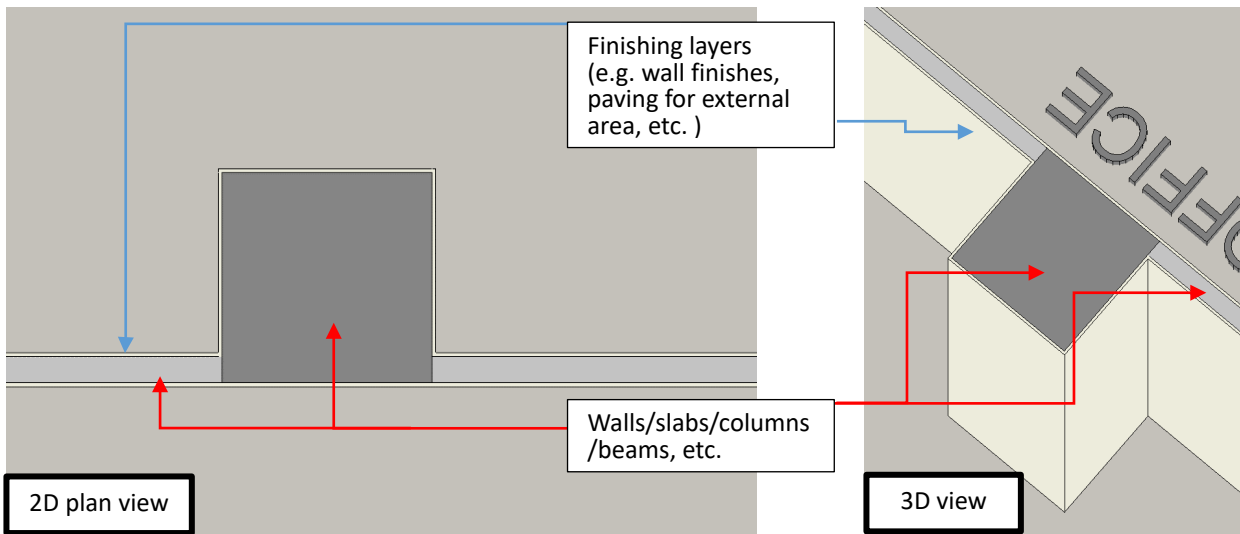
	Plan	3D
Presentation		
Example for Structural model		
Presentation		
Example for Architectural model		
Presentation		
Example for MEP model		

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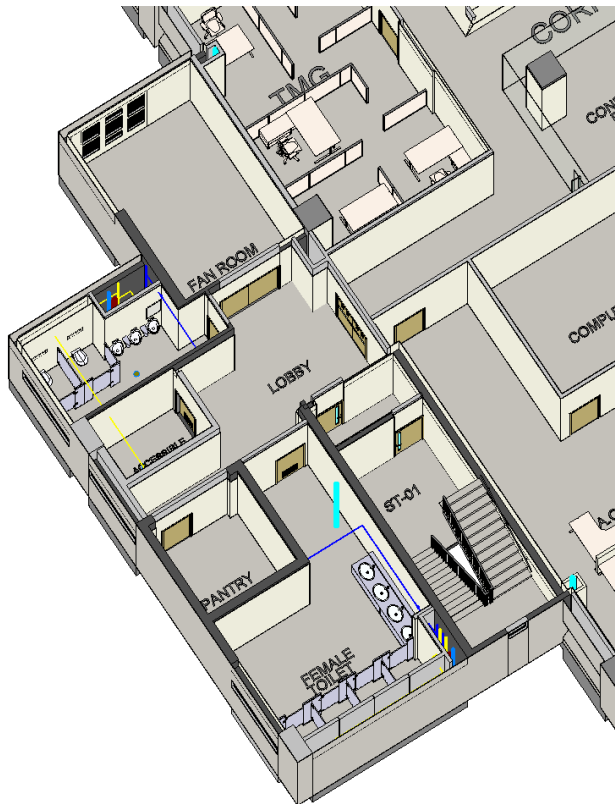
Example (B): Separation between Tap and Basin



Example (C): Separation between Walls/ Slabs/ Columns/ Beams and Finishes

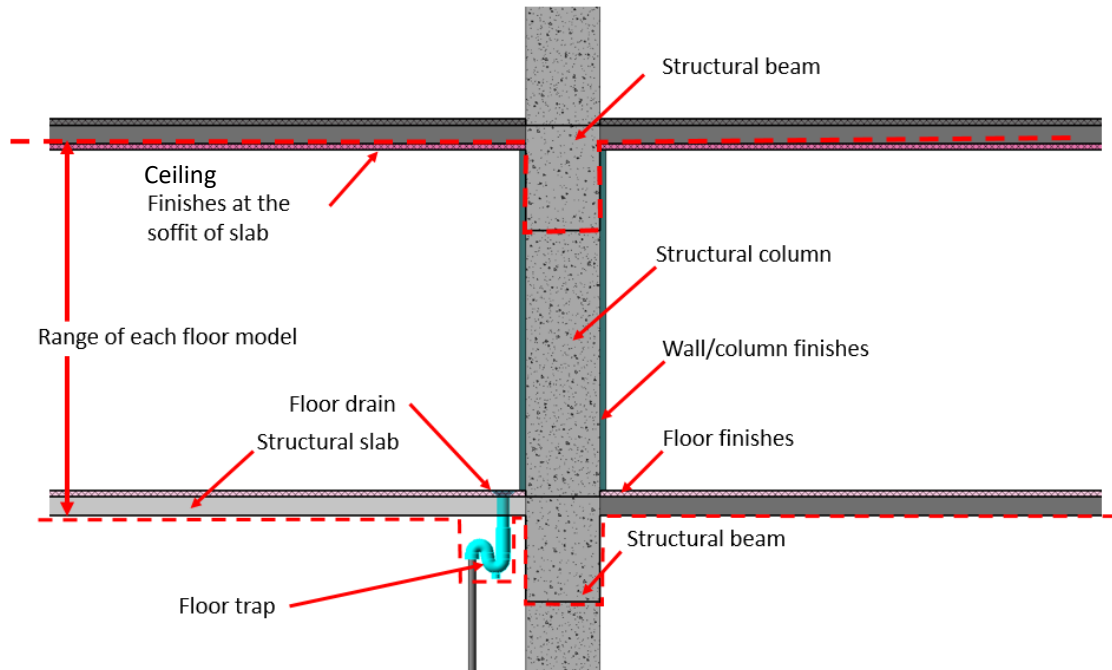


3. Typical Example of 3D Room Label (Refer to Clause 2.3.1)



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Example (D): Model Division in Floor Level



Appendix 7 – As-built Model Colour Coding

1 Site Model

	Material Naming (Optional)	Model Elements	RGB Colour
1	ADA-TOPO-143_081_063	Topography (Existing Site and Surrounding Land Use)	143-081-063
2	ADA-MASS-185_189_196	Massing Model of Adjacent Areas or Surrounding Buildings	185-189-196
3	ADA-ROAD-191_191_191	Pavement / Carriageway / Footpath / Cycle Track	191-191-191
4	ADA-TREE-000_255_000	Tree / Planter	000-255-000

2 Structural Model

	Material Naming (Optional)	Model Elements	RGB Colour
1	ADS-SLAB-080_080_080	Floors / Slabs	080-080-080
2	ADS-WALL-080_080_080	Walls	080-080-080
3	ADS-RAMP-080_080_080	Ramps	080-080-080
4	ADS-BEAM-133_133_133	Structural Framing / Beams	133-133-133
5	ADS-COL-133_133_133	Structural Columns	133-133-133
6	ADS-FILL-175_175_175	Mass (Concrete Fill)	175-175-175
7	ADS-SFD-175_175_175	Structural Foundations	175-175-175
8	ADS-STAIR-175_175_175	Stairs	175-175-175
9	ADS-SSC-225_225_225	Steel Structural Connections (UB,SHS I-Beam, etc.)	225-225-225
10	ADS-OTHER-225_225_225	Others	225-225-225

3 Architectural Model

	Material Naming (Optional)	Model Elements	RGB Colour
*1	ADA-WFIN-237_236_220	Wall Finishing / Painting / Waterproofing	237-236-220
*2	ADA-FFIN-196_193_186	Floor Finishing / Tiles / Waterproofing	196-193-186
*3	ADA-CEIL-235_235_240	Ceilings	235-235-240
4	ADA-NSWALL-195_195_195	Non-Structural Walls	195-195-195
5	ADA-GREEN-230_255_230	Green Roof System / Green Walls / Planters	230-255-230
6	ADA-WOOD-182_167_109	Wood Element / Timber Doors	182-167-109
7	ADA-GLASS-220_240_255	Mirror / #Glass Doors / #Glass Walls / #Glass of Window / #Curtain Wall	220-240-255
8	ADA-METAL-225_255_220	Cladding / Railing / Balustrades / Handrails / Ladder / Maintenance Platform / Metal Doors / Louvers / Mullion / Window Frame	225-225-220
9	ADA-FURN-250_240_230	Furniture	250-240-230
10	ADA-OTHER-255_255_255	Architectural Elements (Others) / Signage	255-255-255
11	ADA-SANFIT-250_250_255	Sanitary Fitments (Water closets / Urinals / Cistern / Sink / Washbasin / Bathtub)	250-250-255
12	ADA-TAP-220_225_230	Tap / Faucet / Shower Head	220-225-230
13	ADA-TOIFIX-200_200_220	Toilet Fixture (Toilet Cubicles / Urinal Divider / Basin Cabinet / Hand Dryer / Toilet Paper Holder / Grab Bar)	200-200-220

*Note: Application of actual colour pattern to finishing layer may be considered subject to further agreement of PSB Project Team.

#Note: 90% Transparency may be considered subject to further agreement of PSB Project Team.

4 Plumbing System

	Material Naming (Optional)	Model Elements	RGB Colour
1	ADB-CLP-000_000_255	Cleansing Water Pipe	000-000-255
2	ADB-CWP-000_000_255	Cold Water Pipe	000-000-255
3	ADB-FLP-255_255_000	Flushing Water Pipe	255-255-000
4	ADB-FWP-000_255_000	Fresh Water Pipe	000-255-000
5	ADB-GWP-000_128_255	Grey Water Pipe	000-128-255
6	ADB-HSP-255_000_000	Hot Water Supply Pipe	255-000-000
7	ADB-HWP-255_128_128	Hot Water Return Pipe	255-128-128
8	ADB-IWP-000_255_255	Irrigation Water Pipe	000-255-255

5 Drainage System

	Material Naming (Optional)	Model Elements	RGB Colour
1	ADB-RWP-000_255_255	Rainwater Pipe	000-255-255
2	ADB-PRWP-000_128_128	Pumped Rainwater Pipe	000-128-128
3	ADB-SWP-128_000_000	Soil and Waste Water Pipe	128-000-000
4	ADB-PSWP-064_000_000	Pumped Soil and Waste Water Pipe	064-000-000
5	ADB-VTP-000_128_255	Vent Pipe	000-128-255
6	ADB-WAP-128_128_000	Waste Water Pipe	128-128-000
7	ADB-PWAP-064_064_000	Pumped Waste Water Pipe	064-064-000