Building Information Modelling (BIM) Guide for Facilities Upkeep

(Version 1.2)

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. 9/2019 or the latest version.

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FIRST EDITION - CURRENT REVISION

Revision No. -	1	Issue Date -	23.01.2019

Part	Page No.	Revision Details
Cover	Cover	- General update of the version of DevB Technical Circular.
1	1	- General update of Clause 1.1.
2	3	- General update of Clause 2.1.
Appendix 1	15	- Addition of Items 43 to 46 to PSB Standard Parameters.
Appendix 3	24	- Revision of Item 21.1.

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Part	Page No.	Revision Details
Revision history		- Revision history is added.
1	1	- Revision of Clauses 1.1 and 1.2.
2	4	- Revision of Clause 2.1.
2	5	- Revision of Clause 2.3.1.
2	7	- Revision of Clauses 2.3.4 and 2.3.5
2	8	- Revision of Clause 2.4.
Appendix 1	12	- Revision of Item 2.
Appendix 2	18	- Revision of Examples of PSB Standard Parameters in Objects.
Appendix 3	20	- General Update of the Title of Appendix 3.
Appendix 5	32	- Addition of Examples of As-built Modelling.

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. 9/2019 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 issued by Hong Kong Construction Industry Council.
(b) CIC Building Information Modelling Standards for Underground Utilities issued by Hong Kong Construction Industry Council.
(c) CIC BIM Standards for Mechanical, Electrical and Plumbing issued by Hong Kong Construction Industry Council.
(d) CIC Production of BIM Object Guide - General Requirements issued by Hong Kong Construction Industry Council.
(e) Computer-Aided-Drafting Standard for Works Projects (CSWP) issued by Development Bureau of the HKSAR Government.
(f) American Institute of Architects (AIA)'s G202-2013 Building Information Modeling Protocol Form.
(g) BS 8536-1:2015 Briefing for Design and Construction. Code of Practice for Facilities Management (Buildings Infrastructure).
(h) 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.
(i) 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.
(j) PAS 1192-3:2014 Specification for Information Management for the Operational Phase of Assets Using Building Information Modelling.
(k) BS 1192-4:2014 Collaborative Production of Information Part 4: Fulfilling Employers Information Exchange Requirements Using COBie – Code of Practice.
(l) PAS 1192-5:2015: Specification for Security-minded Building Information Modelling, Digital Built Environments and Smart Asset Management.

(m) Building Information Modelling for Asset Management (BIM-AM) Standards and Guidelines issued by Electrical & Mechanical Services Department.
(n) Level of Development Specification Part I by BIMFORUM.
(o) Building Information Modelling for General Building Plan Submission (Phase One) Consultancy Report, Feb 2017 issued by Hong Kong Construction Industry Council.
(p) Building Information Modelling (BIM) Guide for Architectural Design issued by Architectural Branch of Architectural Services Department.
(q) Building Information Modelling (BIM) Guide for Building Services Installation issued by Building Services Branch of Architectural Services Department.
(r) Building Information Modelling (BIM) Guide for Structural Engineering issued by Structural Engineering Branch of Architectural Services Department.
(s) Drawing Practice Manual – For Outsourcing Projects issued by Architectural Services Department

1.3 Terminology and Abbreviation

1.3.1 Terminology

The common terminologies for BIM process are listed below:

Terminology	Description
3D	Three-dimensional geometry
CAD	Computer-Aided Design
Common Data Environment (CDE)	Common Data Environment (CDE), an electronic information management system platform to manage the collection, creating, sharing and publishing of project information. This is the single source of all information relating to the project and should be set up to facilitate the spatial coordination and information exchange processes described in PAS 1192.
COBie	Construction Operations Building Information Exchange (COBie), an international standard to manage asset data information rather than geometric information such as equipment list and product data. COBie may take several approved formats include spreadsheet and IFC file format.
Federated Model	Compilation of Models from one or more programs that can define a complete or partial data set for a design.

Industry Foundation Class (IFC)	A platform neutral, open and object-based file format with specification developed by buildingSMART to facilitate interoperability in the architectural, engineering and construction industry, and is commonly used collaboration format in BIM based projects. The IFC model specification is registered by ISO as ISO 16739:2013.
LOD	Level of Development (LOD) described in CIC Building Information Modelling Standards
Object	An occurrence of a building component in BIM software at a particular location and orientation within a model (e.g. Room.). Elements are also often called objects.
Object file	A data file that contains building elements. It often contains the geometry and parameters representing the elements. It can be created or loaded into the BIM authoring software to assist design.

1.3.2 Abbreviation

The abbreviations adopted in this Guide are listed below.

Abbreviation	Full Name
ACTION System	Automated Communication Technical Information and Operations Network System
AIS	Asset Information System
ArchSD	Architectural Services Department
BIM	Building Information Modelling
CIC	Construction Industry Council
FU	Facilities Upkeep
GIS	Geographic Information System
InForM	ArchSD InForM System
O&M	Operation and Maintenance
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. 9/2019 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 AIS 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 LOD 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 3 and Appendix 4 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 LOD for As-built Model

The LOD requirements are referred to the CIC Building Information Modelling Standard. Apart from the CIC requirements, supplementary definition and interpretation of the LOD requirements, if applicable, are listed below. 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.

LOD 350
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, orientation, and interfaces with other building systems.

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 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, fabrication, assembly, and installation information.* 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 500
CIC Building Information Modelling Standard's Definition *The model element is a field verified representation in terms of size, shape, location, quantity, and orientation.* Interpretations in this Guide *The existence, exact quantity, exact physical dimension, exact shape, approximate orientation, approximate spatial location of the element / object in the model was verified on site. Accuracy of the element / object's setting-out location and its spatial location should be within ± 50mm between the model and the actual verified site installation. The 3D geometry details of the element / object is not less than LOD400 and the shape should be modelled for easy identification. Essential information, such as data of fittings, manufacturer, model number, etc. and other as specified in Appendix 1 and Appendix 3, 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. An example of 3D Room Label is shown in Appendix 5.

2.3.2 Integration with ArchSD PSB's System

Asset Information System (AIS)

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 AIS, which is based on a software named "ArcGIS[1]" 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 AIS should be provided. The BIM data shall be in HK1980 Grid Coordinates System[2] 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). Coordination with PSB's representatives and their information technology vendor is required to further proceed data conversion process to the submitted native BIM and IFC file for data conversion and AIS web application by using FME[3] and GIS[4] using ArcGIS. Relevant schedules and contract documentations stored in pre-defined folder structure shall also be arranged to suit the file display/ downloading functions in AIS.

The IFC files produced for AIS 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 AIS.

Level	Description
Site	One file for all building blocks, landscape, facilities, roads and paths, etc. within the site boundary.
Block	Separate file(s) for each individual building block, facilities and structure, etc.
Floor	Separate file(s) for each individual floor, such as basement, mezzanine floor, cockloft, typical floors and roof, etc.

It shall be agreed with PSB if lower detailing level is preferred and accepted for display in AIS. 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. The submission of hyperlink for documentation retrieval from web page is not allowed and it shall be converted to above format for storage and retrieval in AIS.

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

[1] ArcGIS is a software by Esri. The version of the ArcGIS shall be Esri ArcGIS Enterprise Standard Edition 10.4.1 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.

[3] FME is a software by Esri for transforming and exchanging data between ArcGIS and other applications. The version of the FME shall be 2017 or later edition.

[4] Geographic Information System is a system designed to capture, store, manipulate, analyze, manage and present spatial or geographic data.

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 2. 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.

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

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 AIS. 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 LOD350 to LOD500 following Appendix 3. 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 Graphic & Non-graphic 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 3 of this Guide. In case another requirement in the same contract requests for a higher LOD, a higher LOD 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 5. 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.
(e) The BIM software version shall be proposed in BIM Project Execution Plan and approved before the production of as-built models.
(f) The names of BIM elements and all the information fields must be in English.
(g) All as-built model files should be checked and purged. The maximum file size for each divided as-built models should not exceeded 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.
(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 4 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 5.

2.3.6 Photographic Record

Photo record showing the site as-built condition (before the move-in of loose furniture) shall be provided in every room including both internal and external. Each photo shall cover not more than 10m x 10m area for each room. At least one photo should be taken for every room and subject to PSB's approval on demand of more photo records to show the details of such area. As the purpose of the photo record is to see through and cover the whole room, additional photo(s) shall be required for any obstruction, recessed area, etc. A spreadsheet with floor plan (in dwg or pdf format) marking the photo taken locations, field of visibility and to list the items (i) the photo filename, (ii) room name, (iii) floor level and (iv) block level shall be in a presentable and agreed format. For building with repetitive floor plan and design (e.g. government quarters, etc.), only one of the typical floor should be selected for taking photo record. Proposed locations for taking photo record shall be submitted to PSB for comment and approval.

The photo shall be stitched into a seamless 360-degree spherical panoramic image (i.e. 360 degree field of view horizontally and 180 degree vertically) with at least 7776x3888 pixels in JPEG format. The file size of each stitched 360-degree panoramic photo shall be less than 7 MB. 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 3. A 3D Model shall be created from the point cloud laser scanning (with accuracy ≤5mm) with subsequent 3D rendering showing the realistic colour and texture. The 3D Model integrated with As-build 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.

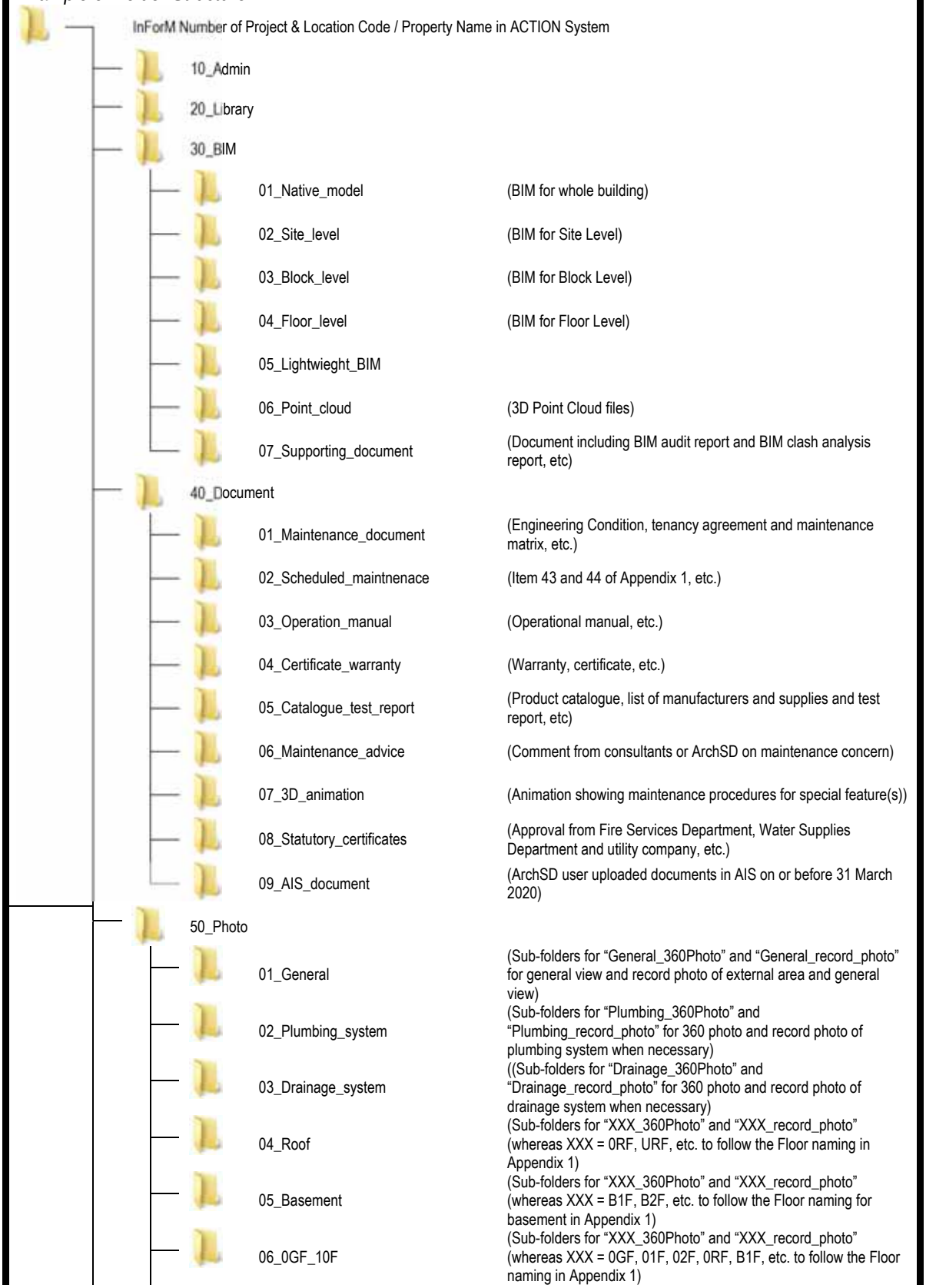
2.4 File Folder Structure

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.

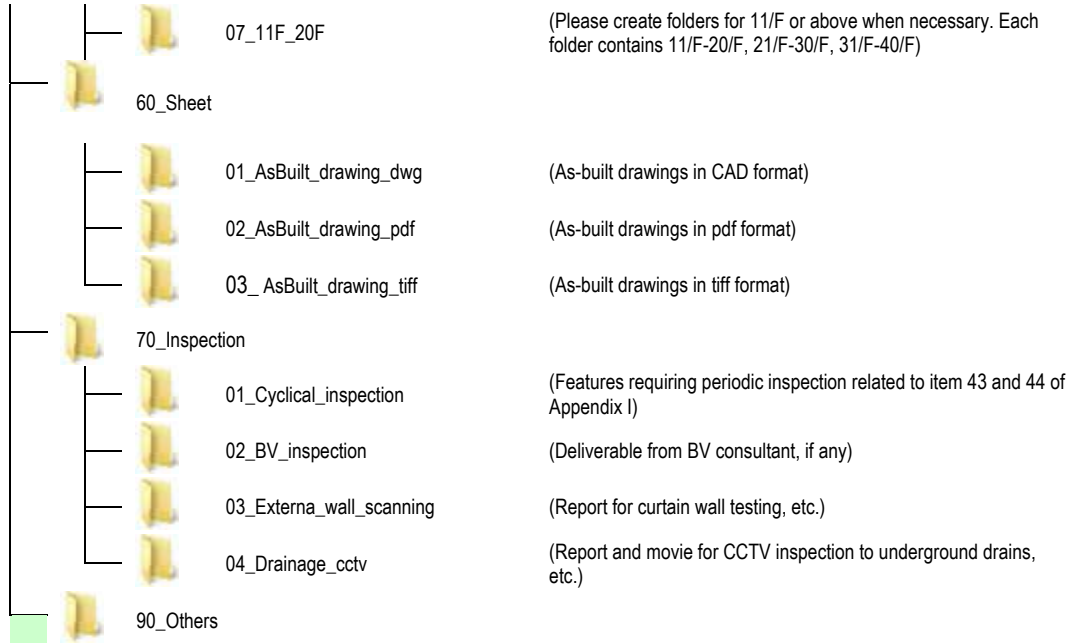
Tier	Folder Name	Stored Materials
1st	InForM Number[5] of Project & Location Code / Property Name in ACTION System	
2nd	10_Admin	Stores all document for project management, including contract, project execution plans, etc.
2nd	20_Library	Stores resources files such as Templates, Title Blocks, Line Styles, Fonts, Objects, Material Images and Specific Families
2nd	30_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.
2nd	40_O&M	Stores all documents related to operation and maintenance, e.g. testing & commissioning reports, catalogues, literatures, drawings, certificates, warranties and O&M manuals, etc. Different system shall be stored in pre-defined structured folder.
2nd	50_Photo	Stores all photographic record including the 360-view photos.
2nd	60_Sheet	Stores all drawing sheet record.
2nd	70_Inspection	Stores all manuals containing the requirements on cyclical maintenance inspection.
2nd	90_Others	Stores all other miscellaneous documents.

[5] InForM Number is an unique project number for a project generated by ArchSD InForM System.

Example of Folder Structure :



Example of Folder Structure :



Appendix 1 - PSB Standard Parameters in As-built Model

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

<table>
<tr><th>Item</th><th>Project Parameter</th><th>Data type</th><th>Mandatory</th><th>Remarks</th><th>Explanatory Note</th></tr>
<tr><td>2</td><td>PSB_Floor</td><td>3 characters</td><td>Yes</td><td>Typical data format refer to examples of floor codes under Explanatory Note'.</td><td>The floor level shall be customized project parameters and typical examples are shown in the following table:

<table><tr><th>Floor level</th><th>Example</th></tr><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 mezzaine floor</td><td>M1F</td></tr><tr><td>2/F mezzaine 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></table></td></tr>
<tr><td>3</td><td>PSB_Element No</td><td>5 digits</td><td>Yes</td><td>from 00001 to 99999</td><td>This element number shall be referring to LocCode-Floor-Element1-Subelement1 only.</td></tr>
<tr><td>4</td><td>PSB_Element1</td><td>Textual</td><td>Yes</td><td>The value shall refer to Elemental Code Relation table.</td><td>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.</td></tr>
<tr><td>5</td><td>PSB_Sub-element1</td><td>Textual</td><td>Yes</td><td>The value shall refer to Elemental Code Relation table and its code table.</td><td></td></tr>
<tr><td>6</td><td>PSB_Component1</td><td>Textual</td><td>Yes</td><td>The value shall refer to Elemental Code Relation table and its code table.</td><td></td></tr>
</table>

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
7	PSB_Attribute1	Textual	Yes	The value shall refer to Elemental Code Relation table and its code table.	
8	PSB_Remarks1	Textual			
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_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. Catalogue/warranty/test report/material origin, etc. 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.
11	PSB_Element2	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
12	PSB_Sub-element2	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
13	PSB_Component2	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
14	PSB_Attribute2	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
15	PSB_Remarks2	Textual			

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
16	PSB_manufacturer2	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.
17	PSB_element_doc2	Textual		If the element has associated contractual submission from contractor/manufacturer/supplier, relevant documents of such contractor/manufacturer/supplier shall be provided to PSB	Catalogue/warranty/test report/material origin, etc. 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.
18	PSB_Element3	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
19	PSB_Sub-element3	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
20	PSB_Component3	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
21	PSB_Attribute3	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
22	PSB_Remarks3	Textual			
23	PSB_manufacturer3	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.

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
24	PSB_element_doc3	Textual		If the element has associated contractual submission from contractor/manufacturer/supplier, relevant documents of such contractor/manufacturer/supplier shall be provided to PSB	Catalogue/warranty/test report/material origin, etc. 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.
25	PSB_Element4	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
26	PSB_Sub-element4	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
27	PSB_Component4	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
28	PSB_Attribute4	Textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
29	PSB_Remarks4	Textual			
30	PSB_manufacturer4	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.
31	PSB_element_doc4	textual		If the element has associated contractual submission from contractor/manufacturer/supplier, relevant documents of such contractor/manufacturer/supplier shall be provided to PSB	Catalogue/warranty/test report/material origin, etc. 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.

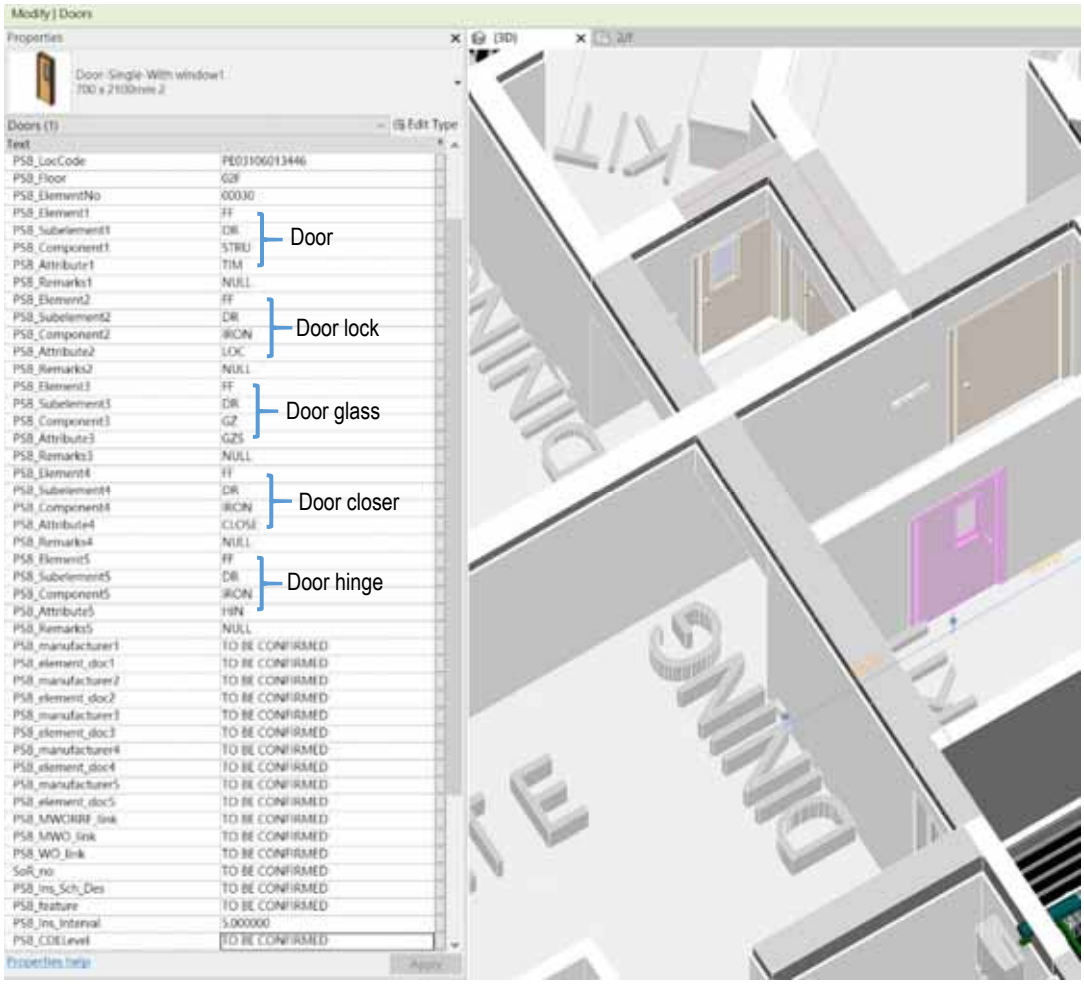
Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
32	PSB_Element5	textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
33	PSB_Sub-element5	textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
34	PSB_Component5	textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
35	PSB_Attribute5	textual		The value shall refer to Elemental Code Relation table and its code table.	The value shall refer to Elemental Code Relation table and its code table.
36	PSB_Remarks5	textual			
37	PSB_manufacturer5	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.
38	PSB_element_doc5	textual		If the element has associated contractual submission from contractor/manufacturer/supplier, relevant documents of such contractor/manufacturer/supplier shall be provided to PSB	Catalogue/warranty/test report/material origin, etc. 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.
39	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.
40	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.

Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
41	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.
42	SoR_no	textual			This textual value will be replaced by URL(s) by PSB's system to read schedule of rates record in a customized pop-up windows upon customization of relevant ArchSD's system, such as ACTION System.
43	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.
44	PSB_Ins_Interval	3 digits		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.
45	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.
46	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".

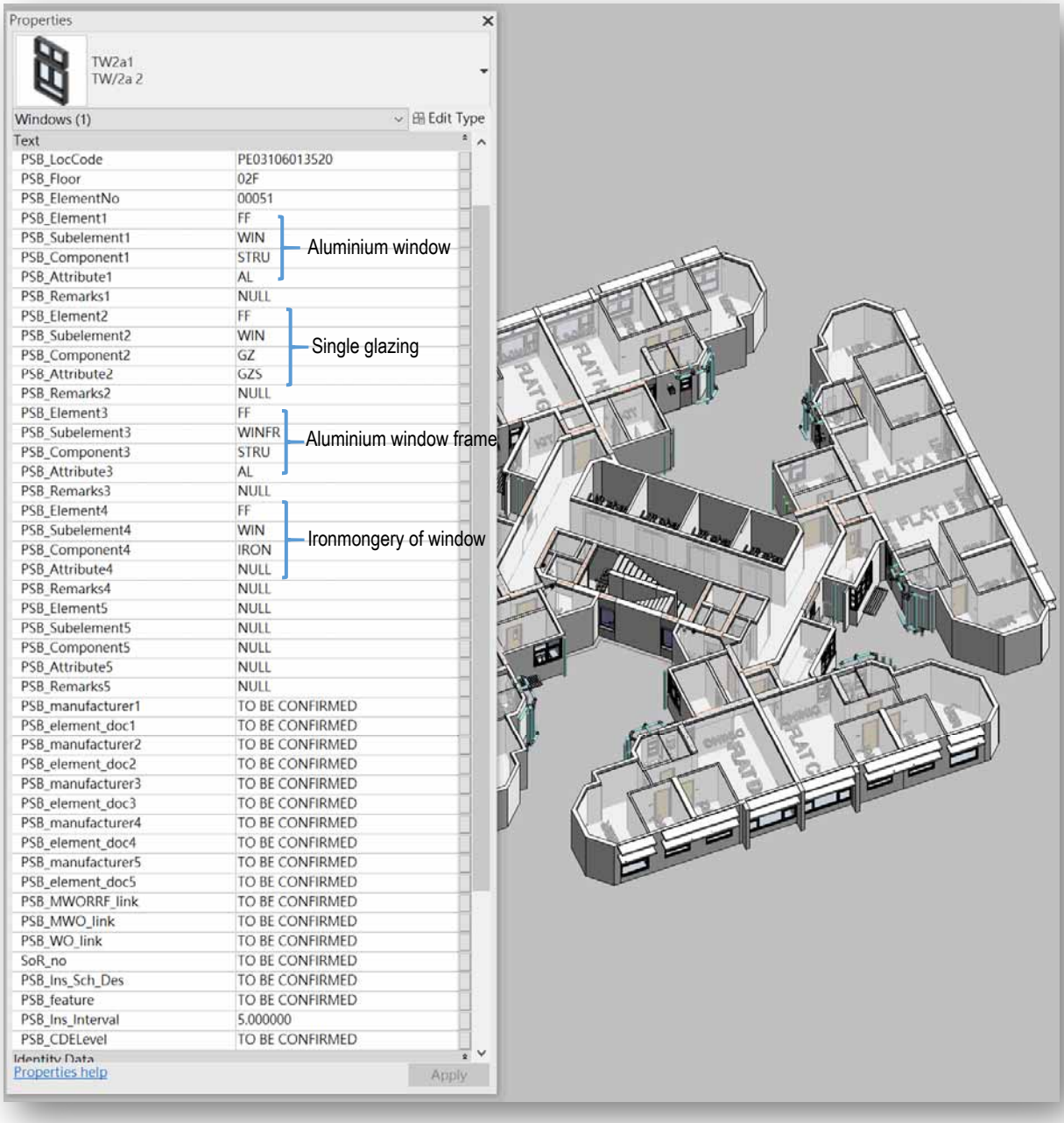
Remark: For the non-applicable project parameters, the Contractor shall input “NULL” to the corresponding BIM element(s) of as-built model.

Appendix 2 – Examples of PSB Standard Parameters in Objects

Example 1: Door and associated ironmongeries



Example 2: Window and associated ironmongeries



Appendix 3 – 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	Graphic Model Element *Level of Development (LOD)*	Non-graphic information *Level of Development (LOD)*	3D Animation	BIM Object from original manufacturer	Photo record *(other than 360° photos)*	Other Modelling Requirements	Other Supporting Information
1.0	Excavation							
1.1	Elements under this trade	350	500	✕	✔ (if available)	✕		
2.0	Concrete Work							
2.1	Elements under this trade	350	500	✕	✔ (if available)	✕		
3.0	Brickwork and Blockwork							
3.1	Elements under this trade	350	500	✕	✔ (if available)	✕		
4.0	Masonry							
4.1	Elements under this trade	350	500	✕	✔ (if available)	✔		
5.0	Roofing and Waterproofing							
5.1	Elements under this trade (unless otherwise specified below)	350	500	✕	✔ (if available)	✔	1) Showing shop drawings 2) Showing Maintenance access	1) Contractor / Specialist Contractor information. 2) Brand name and model information. 3) Technical literature. 4) Guarantee and warranty. 5) O&M manual. 6) Cyclical maintenance requirement (if applicable).

Item	Element	Graphic Model Element *Level of Development (LOD)*	Non-graphic information *Level of Development (LOD)*	3D Animation	BIM Object from original manufacturer	Photo record *(other than 360° photos)*	Other Modelling Requirements	Other Supporting Information
5.2	Waterproofing	350	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	500	500	✔ (in LOD 350 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	350	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.
6.0	Carpentry and Joinery							
6.1	Elements under this trade (unless otherwise specified below)	350	500	✗	✔ (if available)	✗		1) Brand name and model information. 2) Technical literature.
6.2	Fire resisting door set, windows, partition and enclosure	350	500	✗	✔ (if available)	✔	1) Showing fixing details including all accessories, ironmongeries, joints, supporting frames, etc.	1) Ditto (to Item 6.1). 2) Fire certificate.
6.3	Acoustic door, panel, fixtures	350	500	✗	✔ (if available)	✔	1) Showing fixing details including all accessories, ironmongeries, etc.	1) Ditto (to Item 6.1). 2) Warranty and certificate. 3) Specification of the acoustic properties.
7.0	Ironmongery							
7.1	Elements under this trade	350	500	✗	✔ (if available)	✗		1) Brand name and model information. 2) Technical literature. 3) O&M manual.
8.0	Steel and Metal Work							

Item	Element	Graphic Model Element *Level of Development (LOD)*	Non-graphic information *Level of Development (LOD)*	3D Animation	BIM Object from original manufacturer	Photo record *(other than 360° photos)*	Other Modelling Requirements	Other Supporting Information
8.1	Elements under this trade (unless otherwise specified below)	350	500	✗	✓ (if available)	✗		1) Brand name and model information. 2) Technical literature.
8.2	Fall arrest system	350	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	350	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.
8.4	Proprietary shutter, swing and sliding door	350	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	350	500	✗	✓ (if available)	✗		1) Ditto (to Item 8.1).
9.0	Plastering and Finishes							
9.1	Elements under this trade (unless otherwise specified below)	350	500	✗	✓ (if available)	✗		1) Brand name and model information. 2) Technical literature.
9.2	Suspended ceiling system	350	500	✗	✓ (if available)	✓	1) Showing fixing details including frames, etc.	1) Ditto (to Item 9.1). 2) Test certificates and manufacturer's guarantee.
9.3	Acoustic plaster / fire resisting fireproofing plaster	350	500	✗	✓ (if available)	✗		1) Ditto (to Item 9.1). 2) Manufacturer's recommendation on application. 3) Manufacturer's guarantee.
9.4	Floor tiles, slabs, paving blocks	350	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.

Item	Element	Graphic Model Element *Level of Development (LOD)*	Non-graphic information *Level of Development (LOD)*	3D Animation	BIM Object from original manufacturer	Photo record *(other than 360° photos)*	Other Modelling Requirements	Other Supporting Information
9.5	Flexible tiles and sheet finishes	350	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.
9.6	Stone or marble slabs / tiles	350	500	✔ (in LOD 350; 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	350	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	350	500	✗	✔ (if available)	✗		
11.0	Plumbing and Drainage							
11.1	Elements under this trade (unless otherwise specified below)	350	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) Type of joints & jointing method. 3) Size, volume, capacity, physical dimension, etc. 4) Technical literature. 5) O&M Manual. 6) Cyclical maintenance requirement (if applicable).

Item	Element	Graphic Model Element *Level of Development (LOD)*	Non-graphic information *Level of Development (LOD)*	3D Animation	BIM Object from original manufacturer	Photo record *(other than 360° photos)*	Other Modelling Requirements	Other Supporting Information
11.2	Glass-fibre reinforced plastic water tank	350	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.
11.3	Pressure Reducing Value	350	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	350	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)	350	500	✗	✓ (if available)	✗	1) Showing fixing details.	1) Brand name, model information and technical literature for proprietary product.
12.2	Glazing	350	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	350	500	✗	✓ (if available)	✓	1) Ditto (to Item 12.1).	1) Ditto (to Item 12.1).
13.0	Painting							
13.1	Elements under this trade	350	500	✗	✓ (if available)	✗		1) Brand name, model information and technical literature. 2) Test certificates, warranty and certificate (if applicable).
14.0	Recreational / Sports Surfacing and Protective Padding							

Item	Element	Graphic Model Element *Level of Development (LOD)*	Non-graphic information *Level of Development (LOD)*	3D Animation	BIM Object from original manufacturer	Photo record *(other than 360° photos)*	Other Modelling Requirements	Other Supporting Information
14.1	Elements under this trade (unless otherwise specified below)	350	500	✗	✓ (if available)	✗		1) Brand name, model information and technical literature.
14.2	Proprietary sport flooring system	350	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	350	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	350	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)	350	500	✗	✓ (if available)	✗		1) Brand name, model information and 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.	350	500	✗	✓ (if available)	✓	1) Showing fixing details including all accessories, ironmongeries, etc.	1) Ditto (to Item 15.1).
15.3	Proprietary fume cupboards	350	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.
15.4	Flag pole	350	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.

Item	Element	Graphic Model Element *Level of Development (LOD)*	Non-graphic information *Level of Development (LOD)*	3D Animation	BIM Object from original manufacturer	Photo record *(other than 360º photos)*	Other Modelling Requirements	Other Supporting Information
15.5	Sanitary fittings	350	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	350	500	✕	✓ (if available)	✕		1) Ditto (to Item 15.1). 2) WELS information.
15.7	Braille and tactile map	350	500	✕		✓		1) Certificate issued by recognized certifying body.
16.0	Partitions and Cubicle System							
16.1	Elements under this trade (unless otherwise specified below)	350	500	✕	✓ (if available)	✕	1) Showing fixing details including all accessories, ironmongeries, insulation, supporting frame, track, rail, finishes, etc.	1) Brand name, model information and technical literature.
16.2	Demountable partition system	350	500	✕	✓ (if available)	✕	1) Ditto (to Item 16.1).	2) Ditto (to Item 16.1). 3) Warranty and certificate. 4) O&M manual.
16.3	Dry wall partition	350	500	✕	✓ (if available)	✕	1) Ditto (to Item 16.1).	2) Ditto (to Item 16.1). 3) Fire certificate for fire resisting partition.
16.4	Sliding / folding partition including acoustic partitions	350	500	✕	✓ (if available)	✓	1) Ditto (to Item 16.1).	2) Ditto (to Item 16.1). 3) Warranty and certificate. 4) O&M manual.
16.5	Toilet cubicle system	350	500	✕	✓ (if available)	✕	1) Ditto (to Item 16.1).	2) Ditto (to Item 16.1). 3) Warranty and certificate. 4) O&M manual.
17.0	Landscape Work							
17.1	Elements under this trade	350	500	✕	✓ (if available)	✕		
18.0	Geotechnical Works							
18.1	Elements under this trade	350	500	✕	✓ (if available)	✕		
19.0	Trees							

Item	Element	Graphic Model Element *Level of Development (LOD)*	Non-graphic information *Level of Development (LOD)*	3D Animation	BIM Object from original manufacturer	Photo record *(other than 360° photos)*	Other Modelling Requirements	Other Supporting Information
19.1	Elements under this trade	200	350	✗	✗	✔		For i) OVT and ii) tress on registered SIMAR slope only.
20.0	Curtain Wall							
20.1	Elements under this trade	500	500	✔ (in LOD 350 or above; Step-by-step process showing the assemble & disassemble of fixtures)	✔ (if available)	✔	1) Showing details including fixing, connection, anchorages, spandrels & supporting system, type of finishes, water bars, movement joints, etc. 2) Showing maintenance access.	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) OTTV calculation. 4) O&M manual. 5) Warranty. 6) Cyclical maintenance requirement (if applicable).
21.0	Others (not mentioned above)							
21.1	Elements under this trade	350	500	✗	✔ (if available)	✔		1) Cyclical maintenance requirement (if applicable), e.g. building element is subject to periodic inspection / testing, heritage, asbestos containing materials, etc.
21.2	Special feature / Building structure with historical value (*exact feature / structure to be specified by the PSB)	350	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	500	500	✔ (in LOD 350 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.

Item	Element	Graphic Model Element *Level of Development (LOD)*	Non-graphic information *Level of Development (LOD)*	3D Animation	BIM Object from original manufacturer	Photo record *(other than 360° photos)*	Other Modelling Requirements	Other Supporting Information
21.4	Other items covered in i) Architectural Model & ii) Plumbing & Drainage Model but not listed above.	350	500	✗	✔ (if available)	✔		1) Ditto (to Item 21.1).
21.5	Furniture	350	350	✗	✗	✗	1) Showing the layout including the furniture.	

Appendix 4 – Creating Sheet Record

Item	Description	Information Contained in :	
		As-built Model	Sheet Record
1.0	Location Drawings		
	(a) List of Drawings	Required	Required
	(b) Site / location / block plan showing the size and position of the building and of other buildings in the immediate vicinity, and neighbouring streets	Required	Required
	(c) GLA/Lot boundary, lease boundary, right of way, etc.	Required	Required
	(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	Required	Required
	(e) Existing layout / demolition plan (if existing works should be shown)	Required	Required
	(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	Required	Required
	(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;	Required	Required
	(h) Plans and sections of the proposed site formation works and associated surface water drainage works	Required	Required
	(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	Required	Required
	(j) Canopy, bridge or other projection over a street or unleased Government land, plans showing clearly the nature and dimension of such projection	Required	Required
2.0	Principal Elements		
	(a) Architectural features / wall sections	Required	Required
	(b) Roofing details	Required	Required
	(c) Staircases	Required	Required
	(d) Lift Shafts	Required	Required
	(e) Openings for skylights / escalators, etc.	Required	Required
3.0	Component drawings / assembly drawings		
	(a) Door schedules and details	Required	Required
	(b) Window schedules and details	Required	Required
	(c) Glass / metal louvres schedules	Required	Required
	(d) Roller shutter schedules	Required	Required

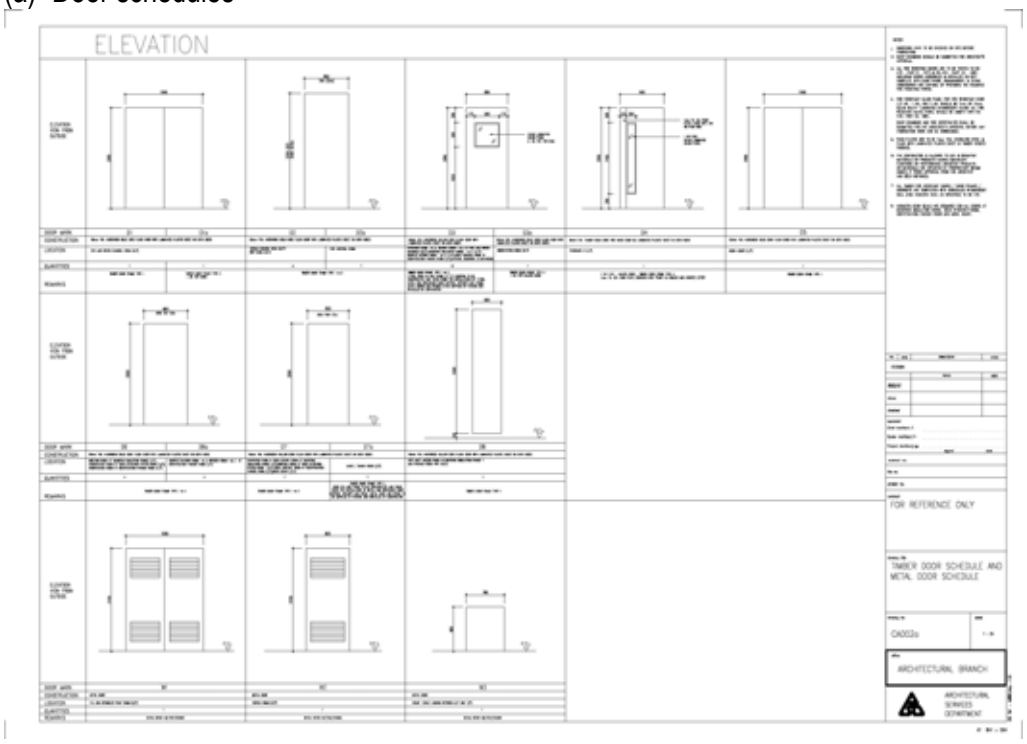
Item	Description	Information Contained in :	
		As-built Model	Sheet Record
	(e) Sliding door / gate schedules	Required	Required
	(f) Finishing schedule and details	Required	Required
	(g) Ironmongery schedules	Required	Required
	(h) Sanitary fittings schedules	Required	Required
	(i) Glass block / grille wall schedules and details	Required	Required
	(j) Waterproofing and tanking system	Required	Required
4.0	Suspended ceiling system / special flooring system		
	(a) Reflected ceiling plans and details	Required	Required
	(b) Raised floors and details	Required	Required
	(c) Sports flooring system	Required	Required
5.0	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	Required	Required
	(b) Vertical diagrams	Required	Required
	(c) Manholes schedule	Required	Required
	(d) Drainage details (e.g. manholes, BITG, gully trap, surface/stepped channels, channel covers, grease trap, petrol interceptor, septic tanks, etc.)	Required	Required
6.0	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.); connexions to WSD main / well.	Required	Required
	(b) Vertical diagrams	Required	Required
7.0	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	Required	Required
	(b) Sections	Required	Required
	(c) Elevations	Required	Required
	(d) Details	Required	Required
8.0	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	Required	Required
	(b) Sections	Required	Required
	(c) Elevations	Required	Required
	(d) Details	Required	Required
	(e) Landscape plans and details	Required	Required
9.0	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.)	Required	Required
	(b) Hidden and exposed structural elements	Required	Required
	(c) Skylights	Required	Required

Item	Description	Information Contained in :	
		As-built Model	Sheet Record
	(d) Projections	Required	Required
	(e) Railing and parapets	Required	Required
	(f) Expansion / Construction / Movement Joints	Required	Required
10.0	Others		
	(a) List of Proprietary Products, Warranty Period, Scope of Warranty and Details of Suppliers and Manufacturers	Required	Required
	(b) List, Details, Dimensions, Respective Locations and Quantity of Spare Materials, Finishes and Parts and their Storage Area;	Required	Required
	(c) Management and Maintenance Responsibilities	Required	Required
	(d) Location and Details of Special Feature that need attention	Required	Required
	(e) Traffic Impact Assessment, Drainage Impact Assessment, Environmental Impact Assessment, etc.	Required	Required
	(f) Engineering Conditions, Assignment, Deed of Mutual Covenants, etc.	Required	Required

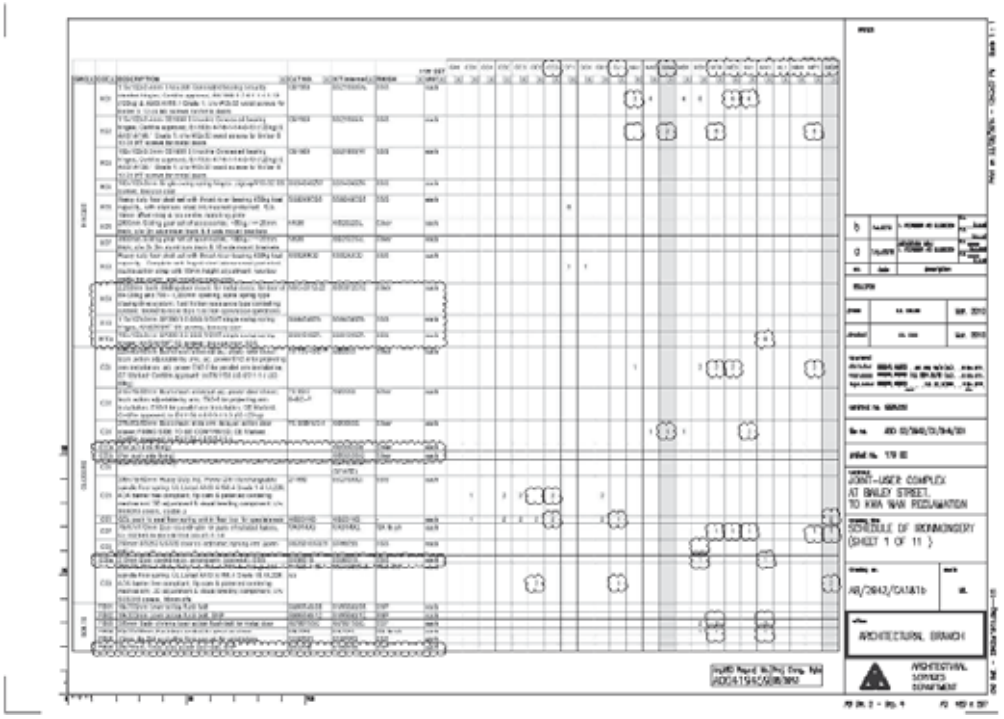
Appendix 5 – Examples of As-built Modelling

1. Sheet Production - Typical Drawing Schedules

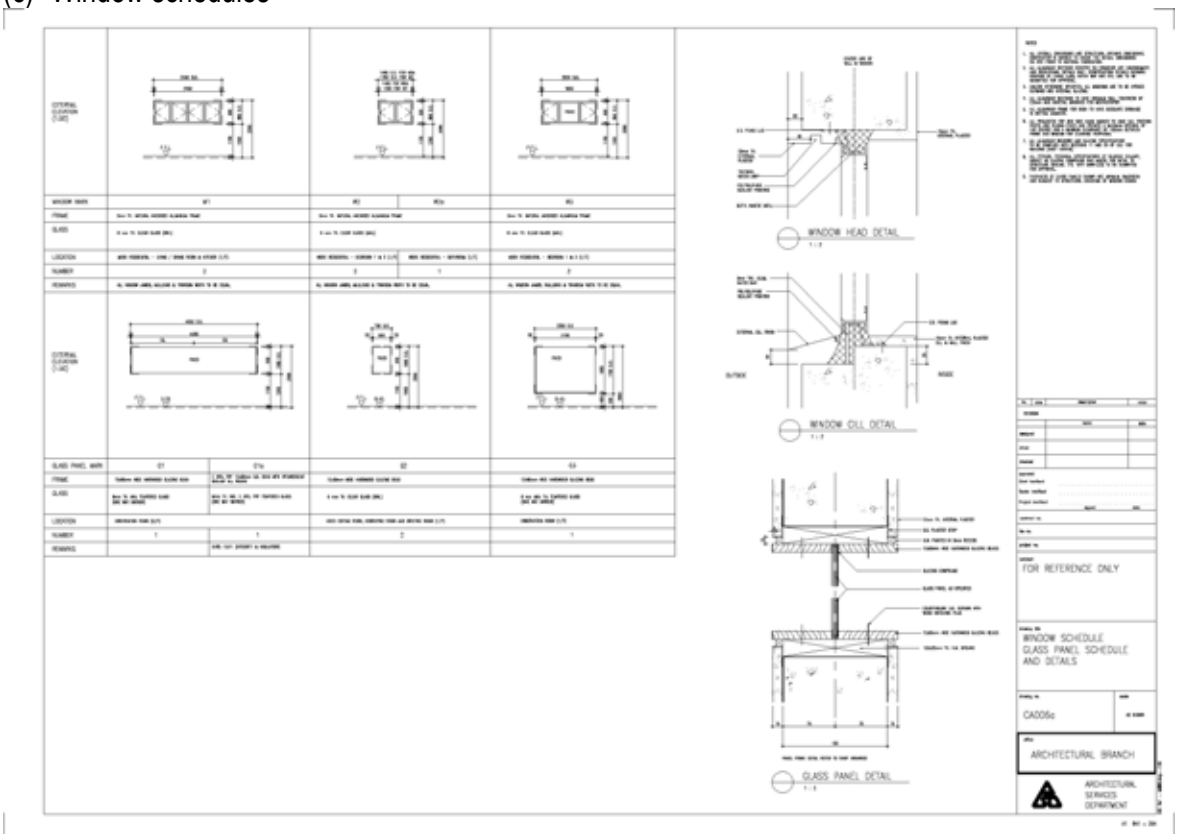
(a) Door schedules



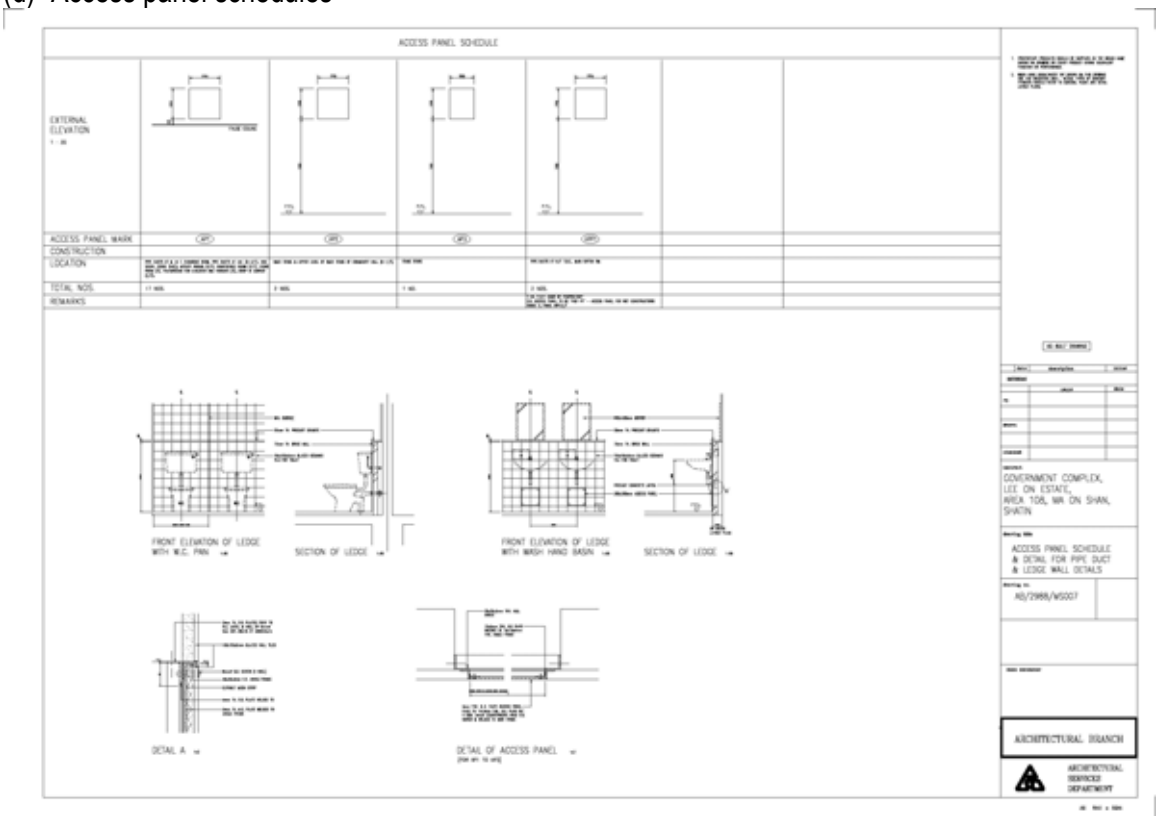
(b) Ironmongery schedules



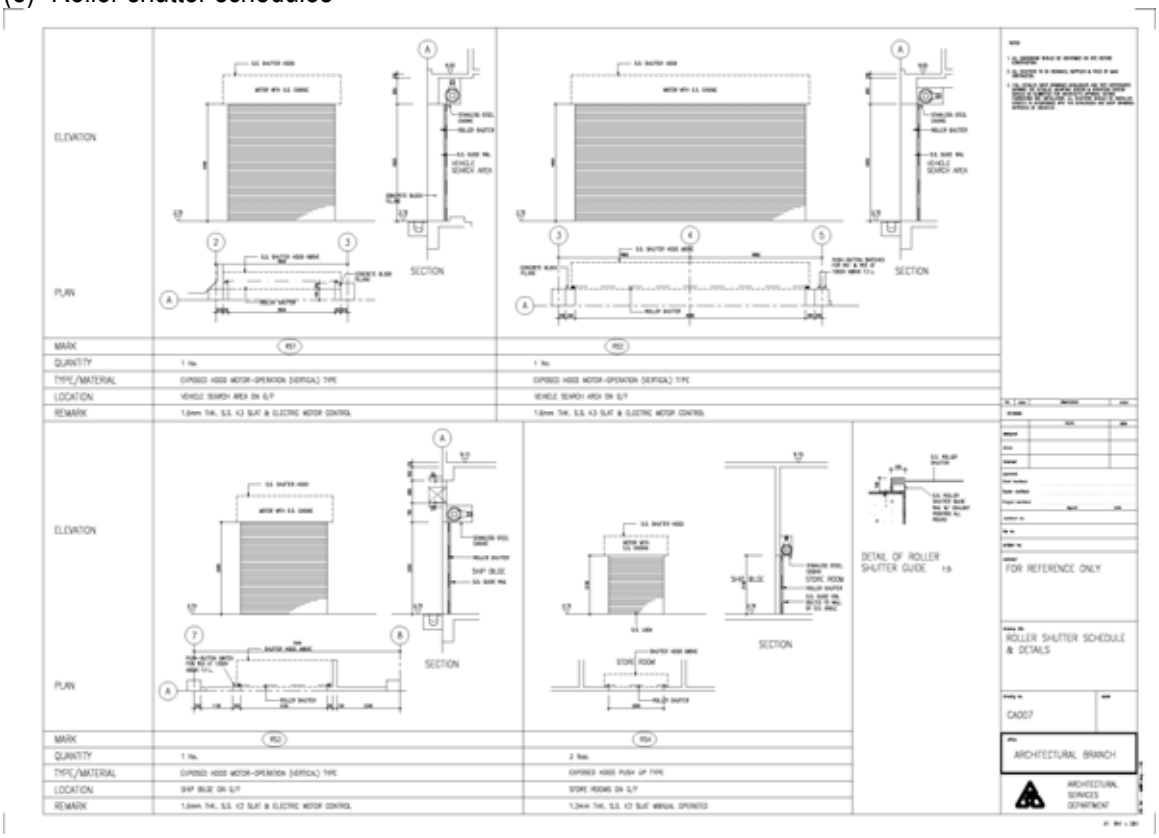
(c) Window schedules



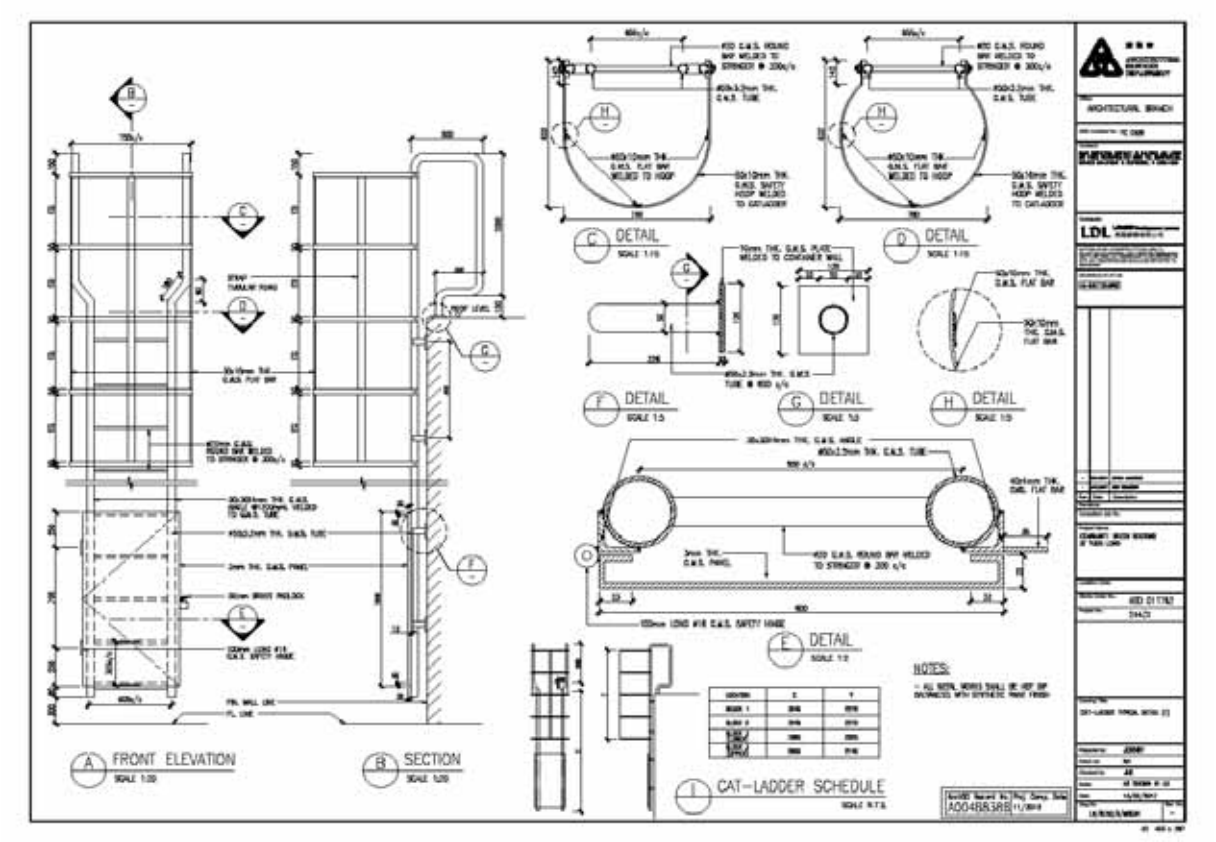
(d) Access panel schedules



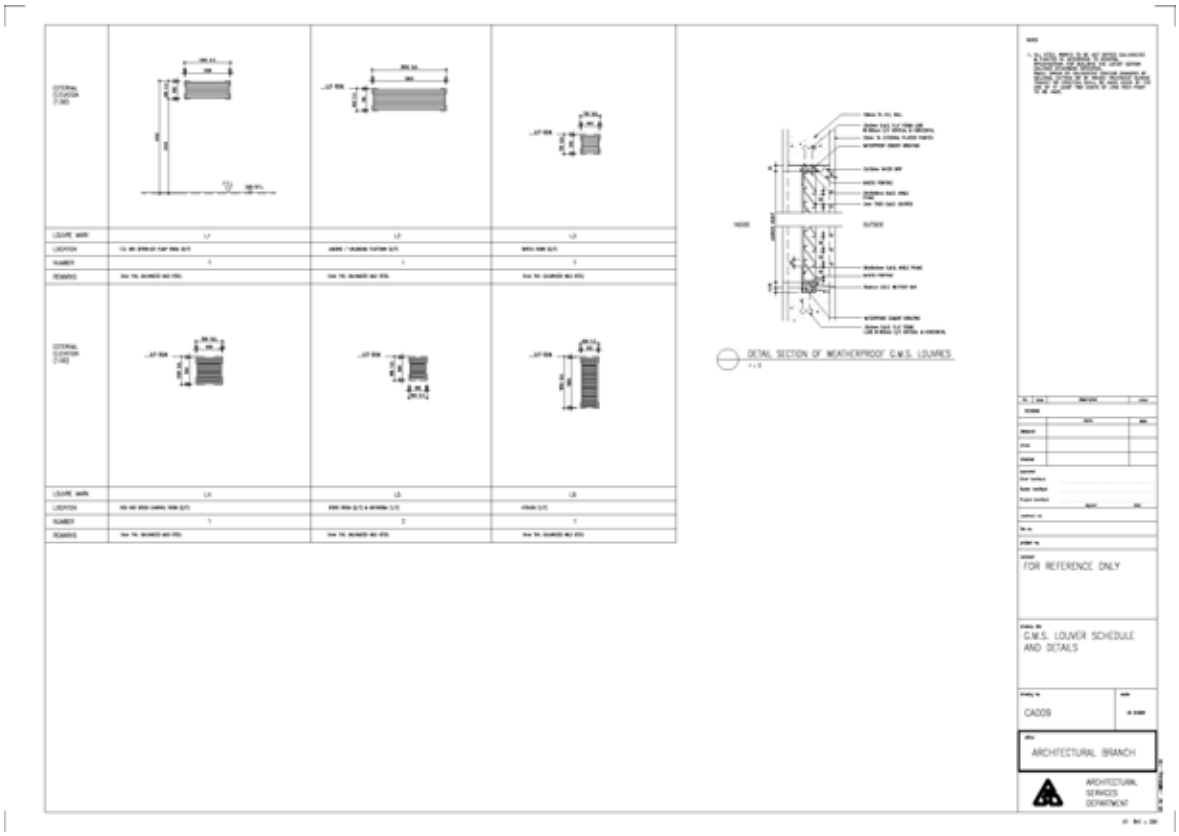
(e) Roller shutter schedules



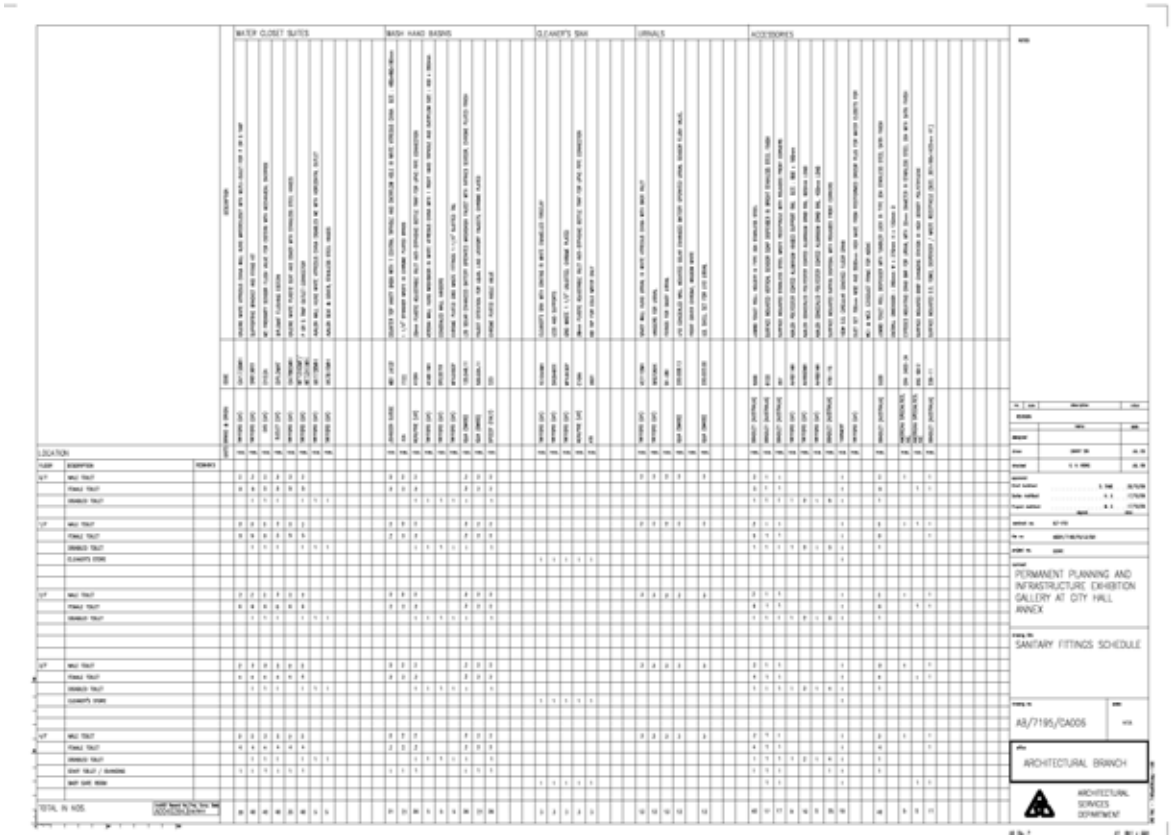
(f) Cat ladder schedules

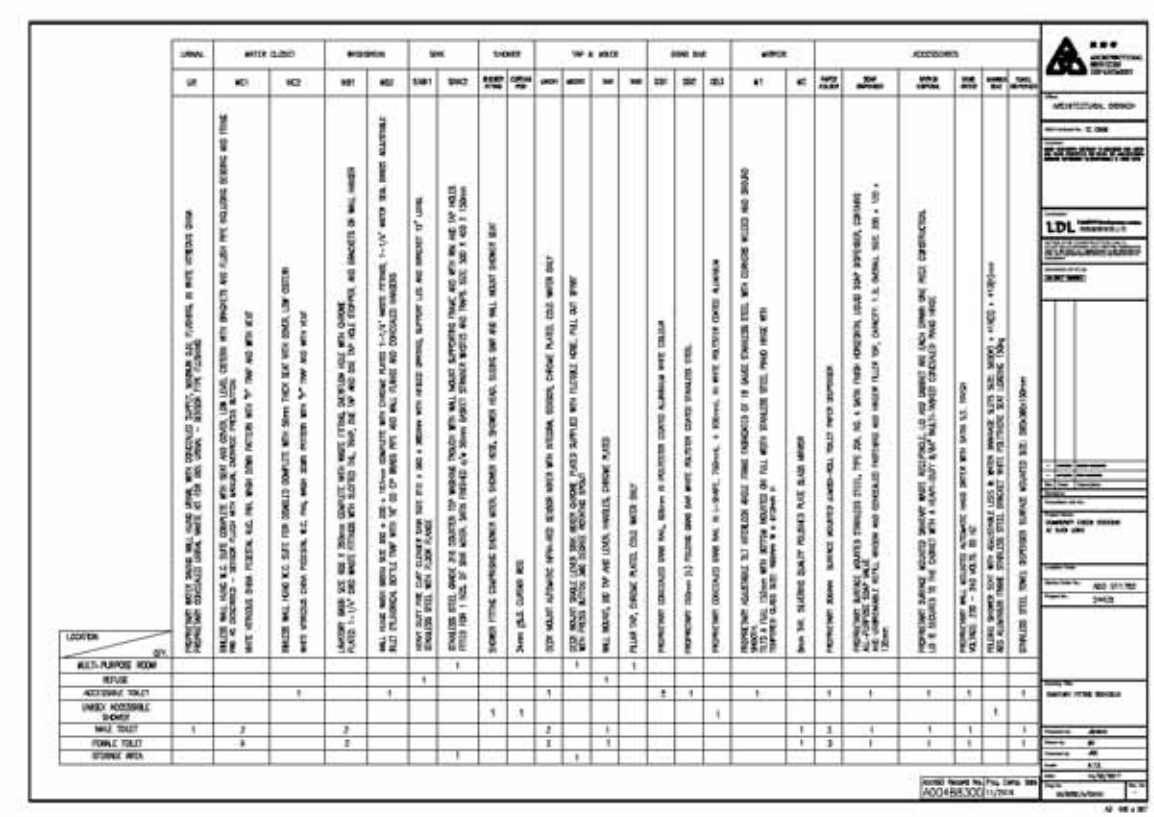

A FRONT ELEVATION
B SECTION
C DETAIL
D DETAIL
F DETAIL
G DETAIL
H DETAIL
E DETAIL
I CAT-LADDER SCHEDULE
NOTES:
LDL

(g) Louvre schedules

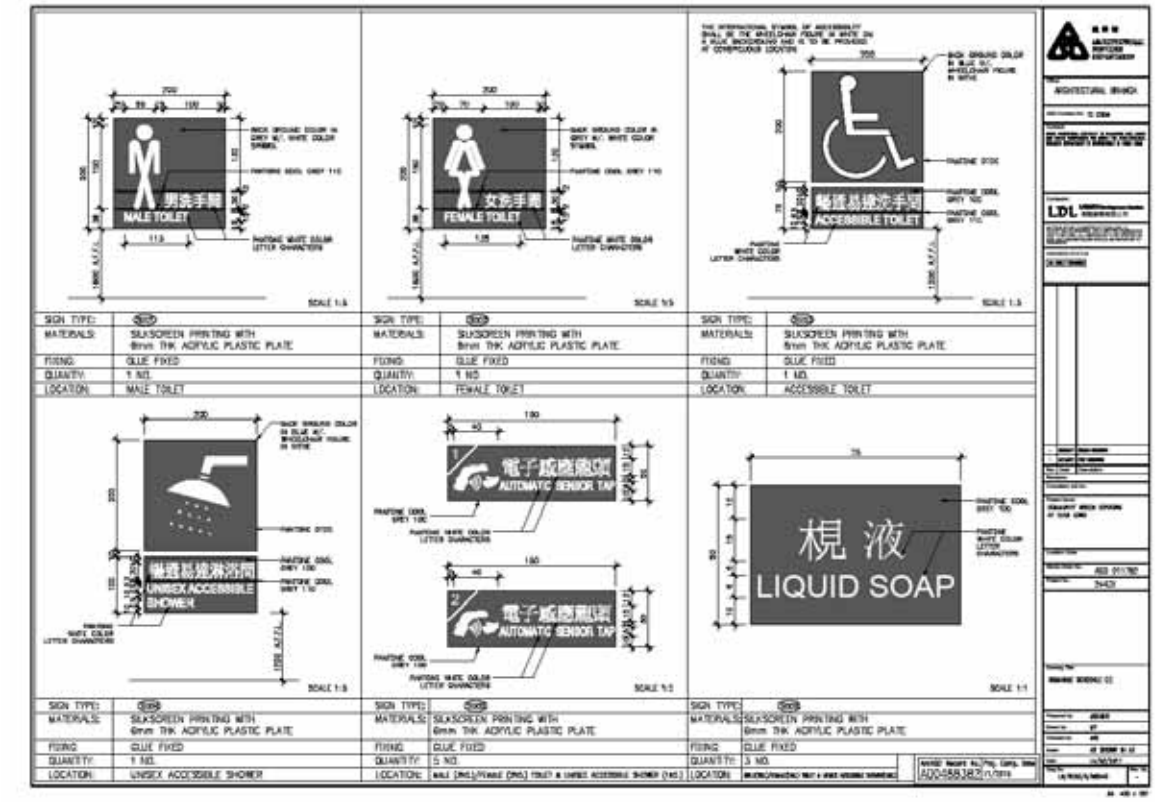


(h) Sanitary fittings schedules





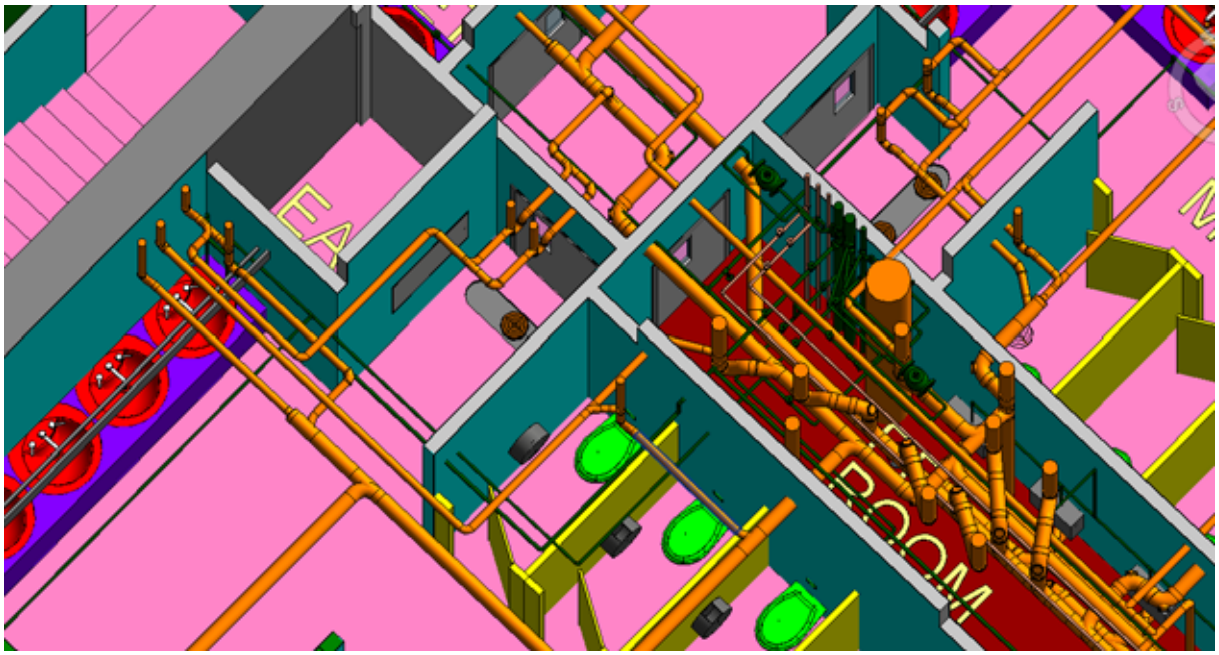
(i) Signage schedules



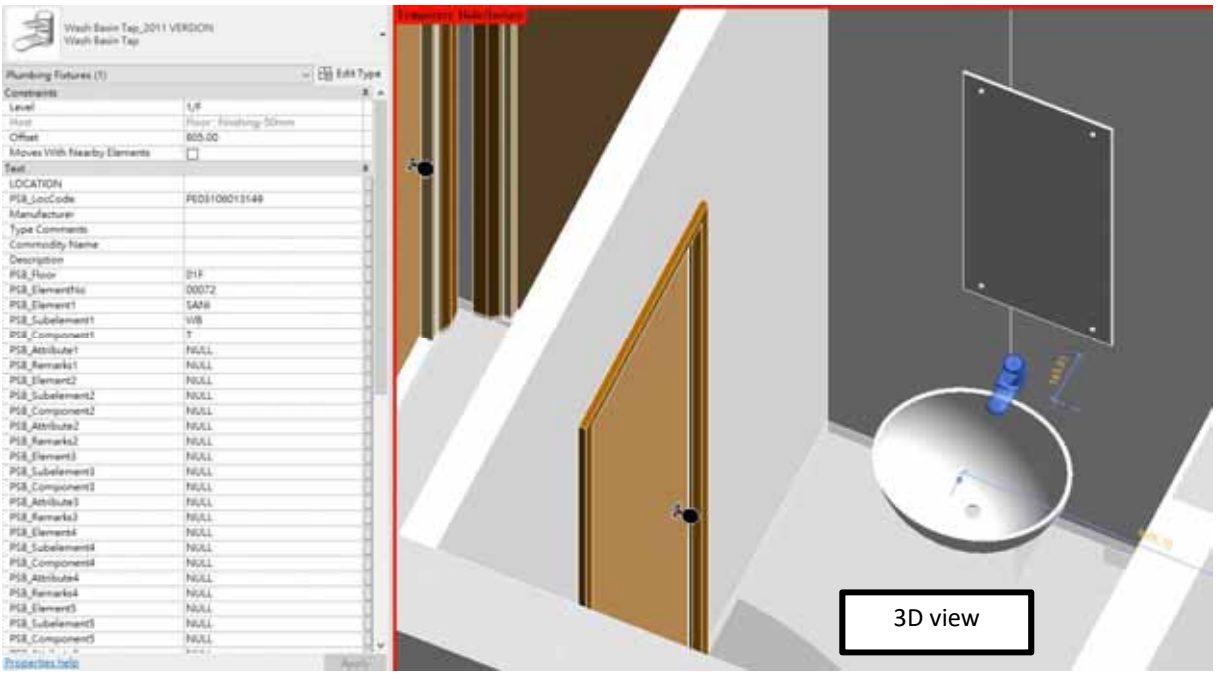
2. Special Modelling Requirements (Refer to Clause 2.3.4)

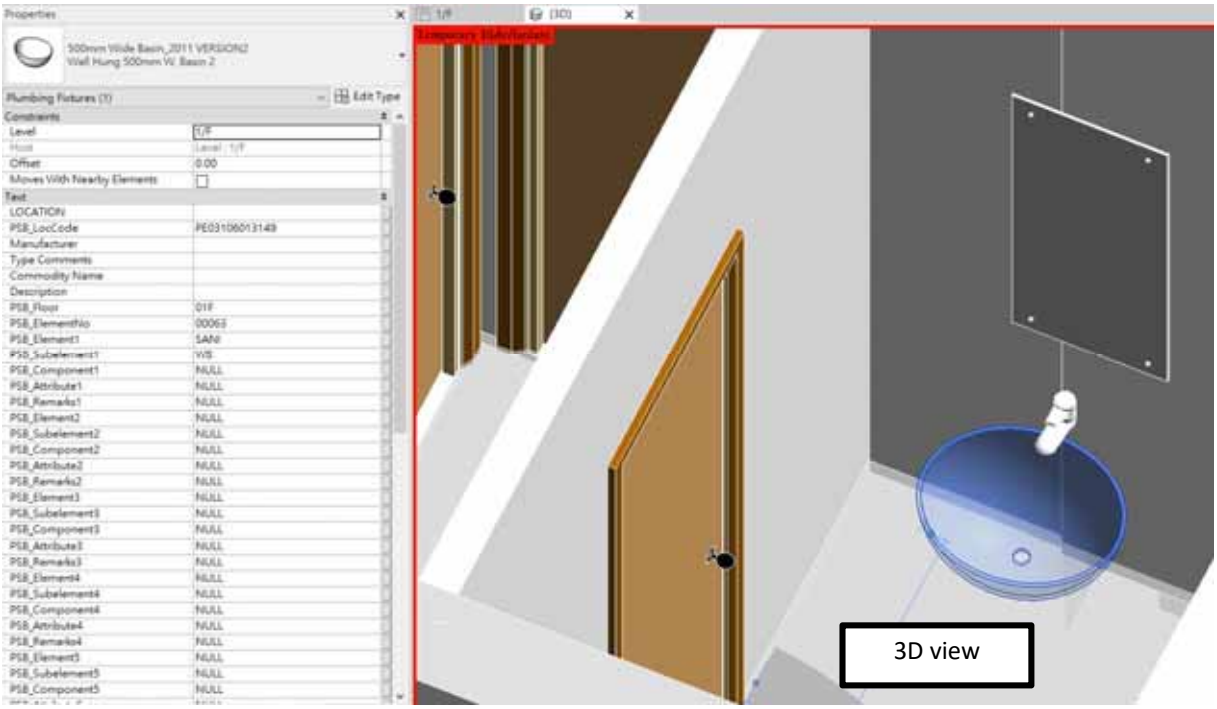
Example (a): Typical example of BIM element modelling at toilet area
(Note: Different components are highlighted in different colors for illustration.)

Wall – grey;
Wall finishes - greenish blue;
Floor finishes – pink;
Bench top – purple;
Basin – bright red;
Toilet cubicle – yellow;
Floor drain – brown; and
Water supply pipes – orange.

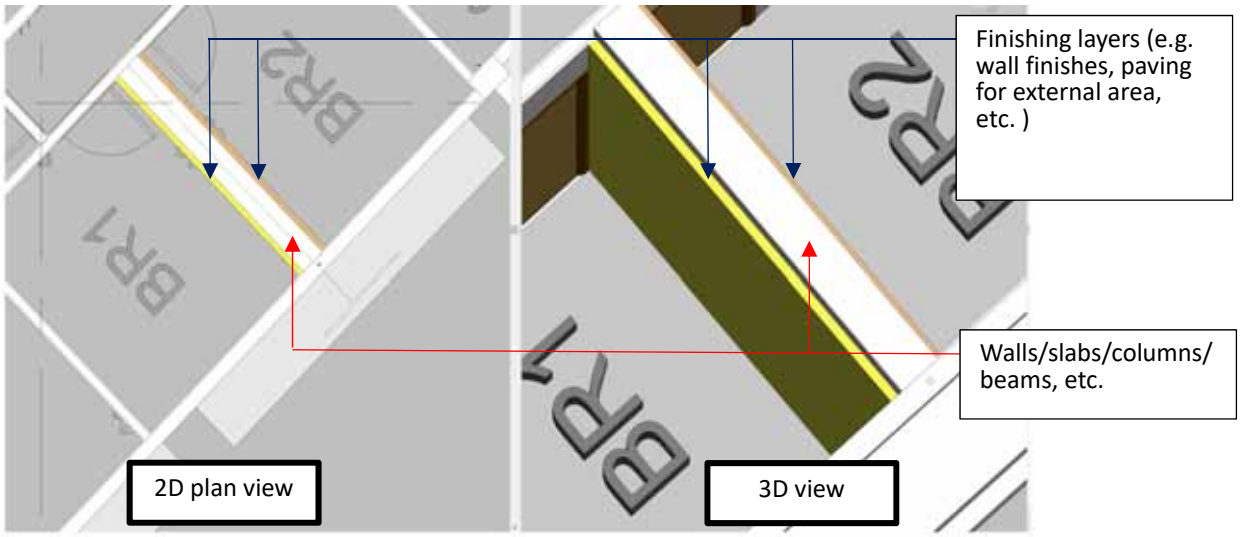


Example (B): Separation between Tap and Basin





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



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