Advanced
Construction
Information
Development Ltd.

BIM Model Audit

Annex 5 Hands-on workshop on Examining Building Information Modelling (BIM) deliverables for Project Manager, Architect & Technical Officer

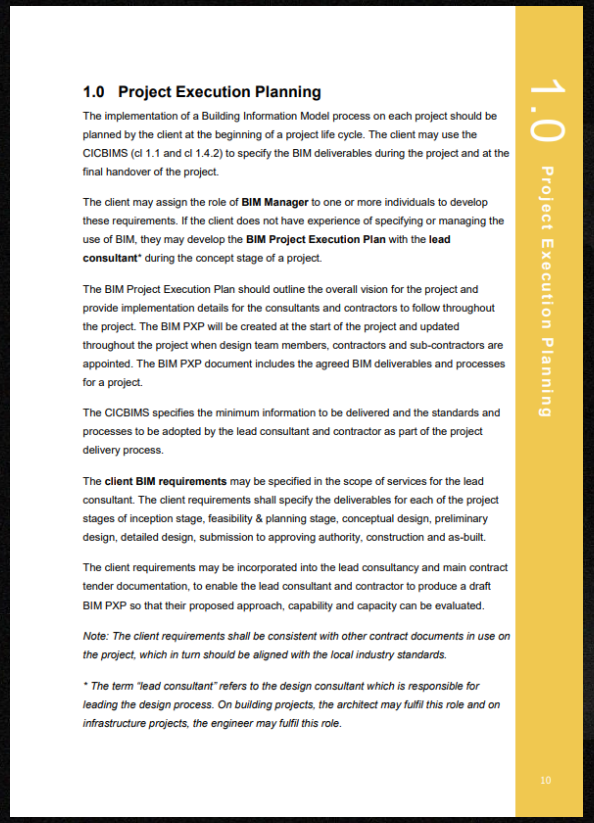
1. BIM Modelling Standard

1.1 CIC standard

The CIC BIM Modelling Standard mainly divided by four inter-related sections . The first section is related to the content of Project Execution Plan (PXP), for example the client BIM requirement, BIM deliverable and processes of project, etc.

The second part is Modelling Methodology. It mainly includes purpose and use of the model and information extracted form the model.

CIC BIM Standard (Phase One)



1.0 Project Execution Planning

The implementation of a Building Information Model process on each project should be planned by the client at the beginning of a project life cycle. The client may use the CICBIMS (cl 1.1 and cl 1.4.2) to specify the BIM deliverables during the project and at the final handover of the project.

The client may assign the role of **BIM Manager** to one or more individuals to develop these requirements. If the client does not have experience of specifying or managing the use of BIM, they may develop the **BIM Project Execution Plan** with the **lead consultant*** during the concept stage of a project.

The BIM Project Execution Plan should outline the overall vision for the project and provide implementation details for the consultants and contractors to follow throughout the project. The BIM PXP will be created at the start of the project and updated throughout the project when design team members, contractors and sub-contractors are appointed. The BIM PXP document includes the agreed BIM deliverables and processes for a project.

The CICBIMS specifies the minimum information to be delivered and the standards and processes to be adopted by the lead consultant and contractor as part of the project delivery process.

The **client BIM requirements** may be specified in the scope of services for the lead consultant. The client requirements shall specify the deliverables for each of the project stages of inception stage, feasibility & planning stage, conceptual design, preliminary design, detailed design, submission to approving authority, construction and as-built.

The client requirements may be incorporated into the lead consultancy and main contract tender documentation, to enable the lead consultant and contractor to produce a draft BIM PXP so that their proposed approach, capability and capacity can be evaluated.

Note: The client requirements shall be consistent with other contract documents in use on the project, which in turn should be aligned with the local industry standards.

** The term "lead consultant" refers to the design consultant which is responsible for leading the design process. On building projects, the architect may fulfil this role and on infrastructure projects, the engineer may fulfil this role.*

1.0 Project Execution Planning

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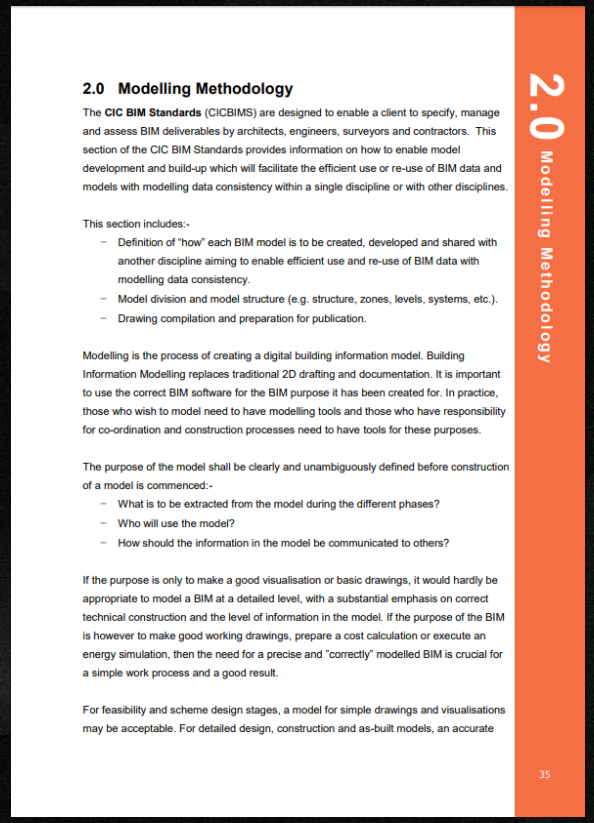
Project Execution Plan (PXP)



2.0 Modelling Methodology

The **CIC BIM Standards** (CICBIMS) are designed to enable a client to specify, manage and assess BIM deliverables by architects, engineers, surveyors and contractors. This section of the CIC BIM Standards provides information on how to enable model development and build-up which will facilitate the efficient use or re-use of BIM data and models with modelling data consistency within a single discipline or with other disciplines.

This section includes:-

- Definition of "how" each BIM model is to be created, developed and shared with another discipline aiming to enable efficient use and re-use of BIM data with modelling data consistency.
- Model division and model structure (e.g. structure, zones, levels, systems, etc.).
- Drawing compilation and preparation for publication.

Modelling is the process of creating a digital building information model. Building Information Modelling replaces traditional 2D drafting and documentation. It is important to use the correct BIM software for the BIM purpose it has been created for. In practice, those who wish to model need to have modelling tools and those who have responsibility for co-ordination and construction processes need to have tools for these purposes.

The purpose of the model shall be clearly and unambiguously defined before construction of a model is commenced:-

- What is to be extracted from the model during the different phases?
- Who will use the model?
- How should the information in the model be communicated to others?

If the purpose is only to make a good visualisation or basic drawings, it would hardly be appropriate to model a BIM at a detailed level, with a substantial emphasis on correct technical construction and the level of information in the model. If the purpose of the BIM is however to make good working drawings, prepare a cost calculation or execute an energy simulation, then the need for a precise and "correctly" modelled BIM is crucial for a simple work process and a good result.

For feasibility and scheme design stages, a model for simple drawings and visualisations may be acceptable. For detailed design, construction and as-built models, an accurate

2.0 Modelling Methodology

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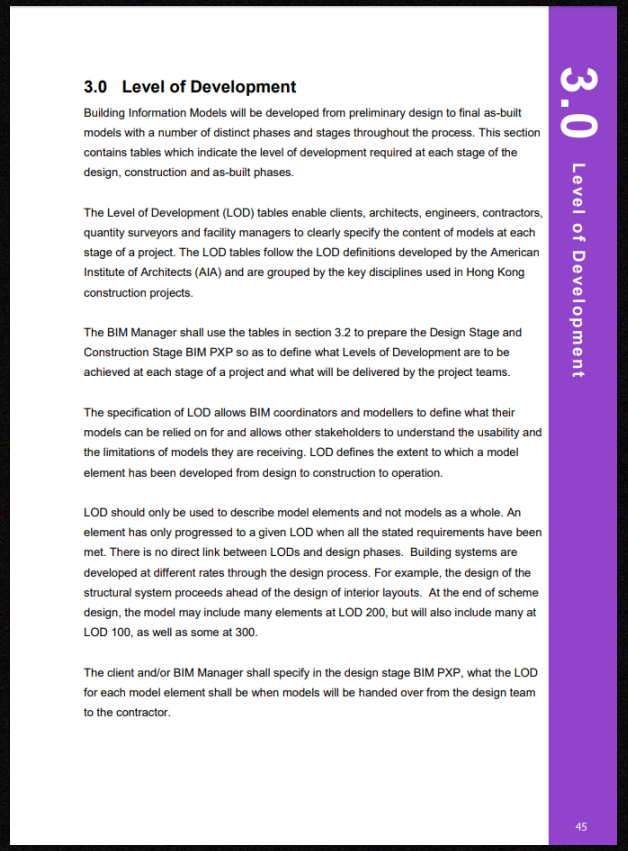
Modelling Methodology

1. BIM Modelling Standard

1.1 CIC standard

The third section of standard is Level of Development (LOD). BIM Manager can refer this section to define the LOD at each stage of a project and the level of deliverable from project team.

The final section is Component Presentation Style and Data Organization. This section included folder structure set up, model hierarchy and data structures, etc.



3.0 Level of Development

Building Information Models will be developed from preliminary design to final as-built models with a number of distinct phases and stages throughout the process. This section contains tables which indicate the level of development required at each stage of the design, construction and as-built phases.

The Level of Development (LOD) tables enable clients, architects, engineers, contractors, quantity surveyors and facility managers to clearly specify the content of models at each stage of a project. The LOD tables follow the LOD definitions developed by the American Institute of Architects (AIA) and are grouped by the key disciplines used in Hong Kong construction projects.

The BIM Manager shall use the tables in section 3.2 to prepare the Design Stage and Construction Stage BIM PXP so as to define what Levels of Development are to be achieved at each stage of a project and what will be delivered by the project teams.

The specification of LOD allows BIM coordinators and modellers to define what their models can be relied on for and allows other stakeholders to understand the usability and the limitations of models they are receiving. LOD defines the extent to which a model element has been developed from design to construction to operation.

LOD should only be used to describe model elements and not models as a whole. An element has only progressed to a given LOD when all the stated requirements have been met. There is no direct link between LODs and design phases. Building systems are developed at different rates through the design process. For example, the design of the structural system proceeds ahead of the design of interior layouts. At the end of scheme design, the model may include many elements at LOD 200, but will also include many at LOD 100, as well as some at 300.

The client and/or BIM Manager shall specify in the design stage BIM PXP, what the LOD for each model element shall be when models will be handed over from the design team to the contractor.

3.0 Level of Development

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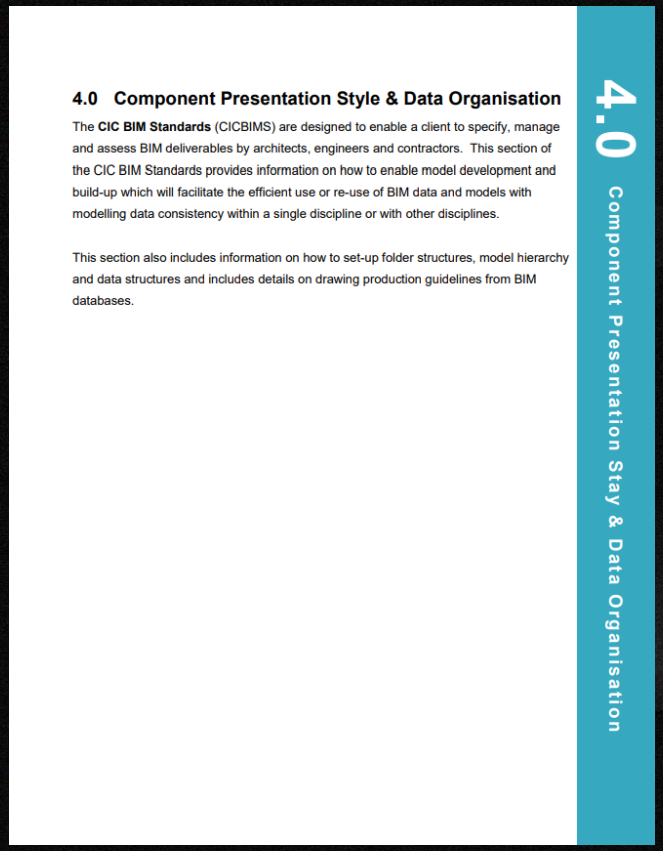
Level of Development (LOD)



4.0 Component Presentation Style & Data Organisation

The **CIC BIM Standards** (CICBIMS) are designed to enable a client to specify, manage and assess BIM deliverables by architects, engineers and contractors. This section of the CIC BIM Standards provides information on how to enable model development and build-up which will facilitate the efficient use or re-use of BIM data and models with modelling data consistency within a single discipline or with other disciplines.

This section also includes information on how to set-up folder structures, model hierarchy and data structures and includes details on drawing production guidelines from BIM databases.

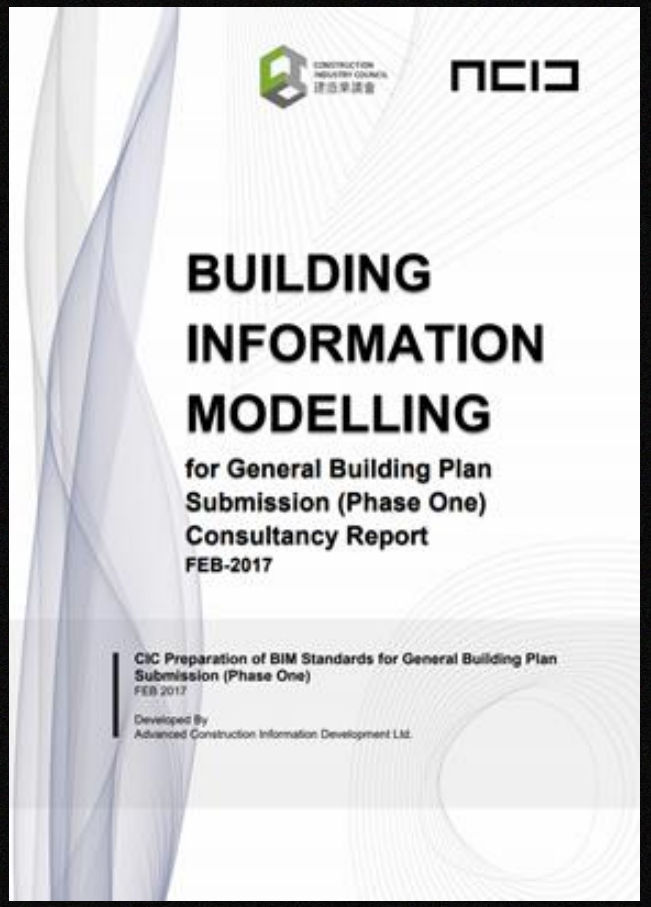
4.0 Component Presentation Stay & Data Organisation

Component Presentation Style and Data Organization

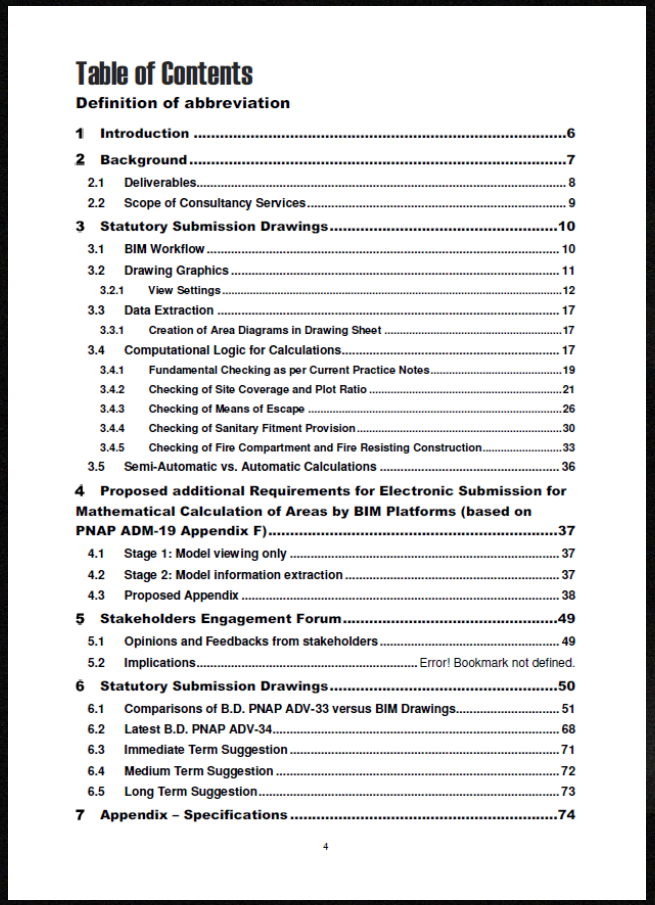
1. BIM Modelling Standard

1.1 CIC standard

The content of CIC BIM for provide an alternative method to help the industry to have a quick method to quality check their submission via BIM technology before making a formal submission.



CIC BIM for GBP Submission (Phase One)



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Definition of abbreviation

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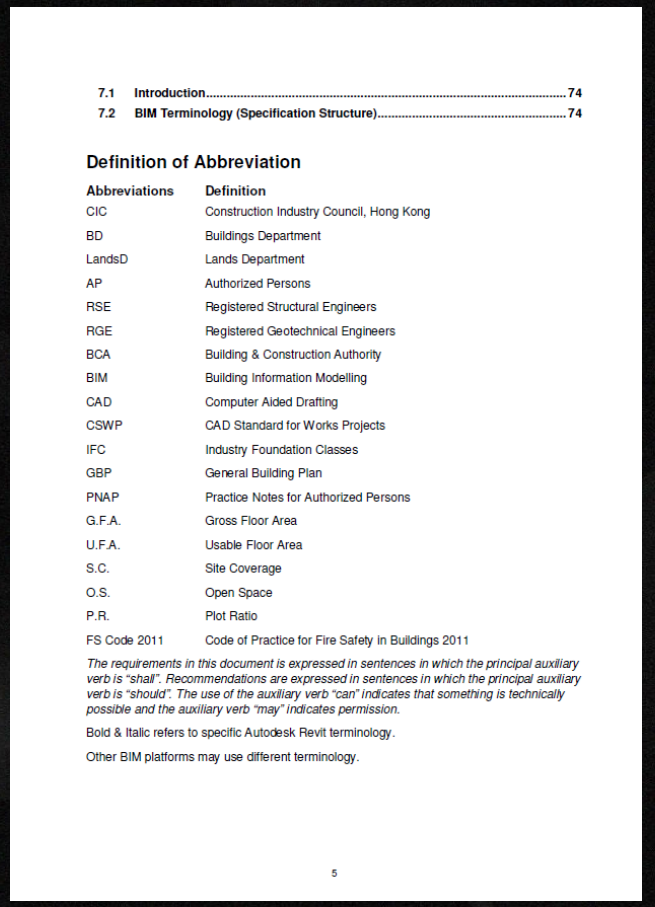

Definition of Abbreviation

Abbreviations	Definition
CIC	Construction Industry Council, Hong Kong
BD	Buildings Department
LandsD	Lands Department
AP	Authorized Persons
RSE	Registered Structural Engineers
RGE	Registered Geotechnical Engineers
BCA	Building & Construction Authority
BIM	Building Information Modelling
CAD	Computer Aided Drafting
CSWP	CAD Standard for Works Projects
IFC	Industry Foundation Classes
GBP	General Building Plan
PNAP	Practice Notes for Authorized Persons
G.F.A.	Gross Floor Area
U.F.A.	Usable Floor Area
S.C.	Site Coverage
O.S.	Open Space
P.R.	Plot Ratio
FS Code 2011	Code of Practice for Fire Safety in Buildings 2011

The requirements in this document is expressed in sentences in which the principal auxiliary verb is "shall". Recommendations are expressed in sentences in which the principal auxiliary verb is "should". The use of the auxiliary verb "can" indicates that something is technically possible and the auxiliary verb "may" indicates permission.

Bold & Italic refers to specific Autodesk Revit terminology.

Other BIM platforms may use different terminology.

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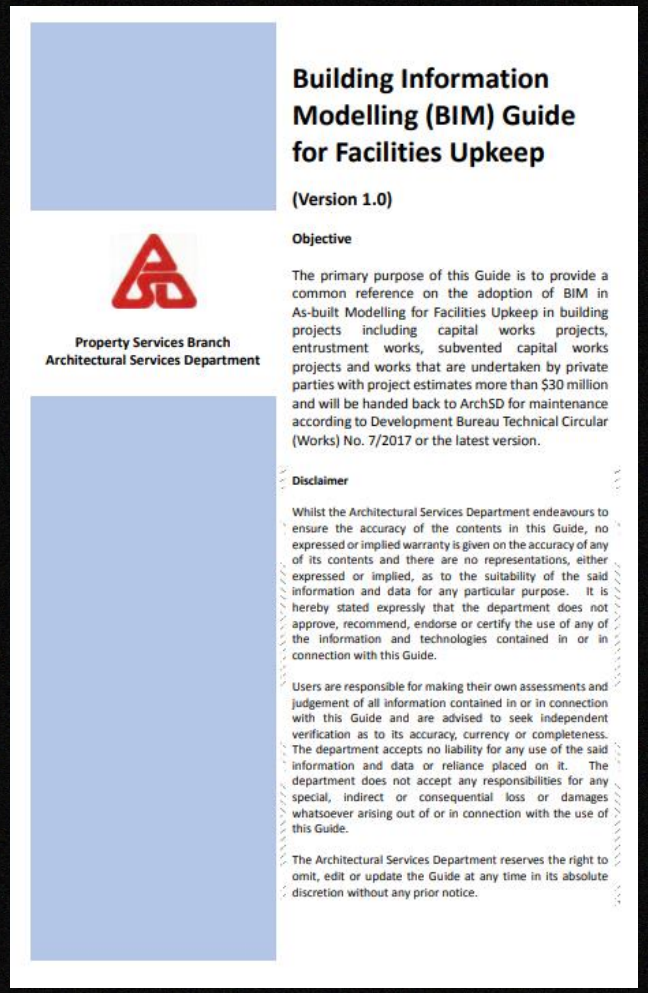
Content of CIC BIM for GBP Submission (Phase One)

1. BIM Modelling Standard

1.2 Internal standard



Building Information Modelling (BIM) Guide for Facilities Upkeep

(Version 1.0)

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. 7/2017 or the latest version.

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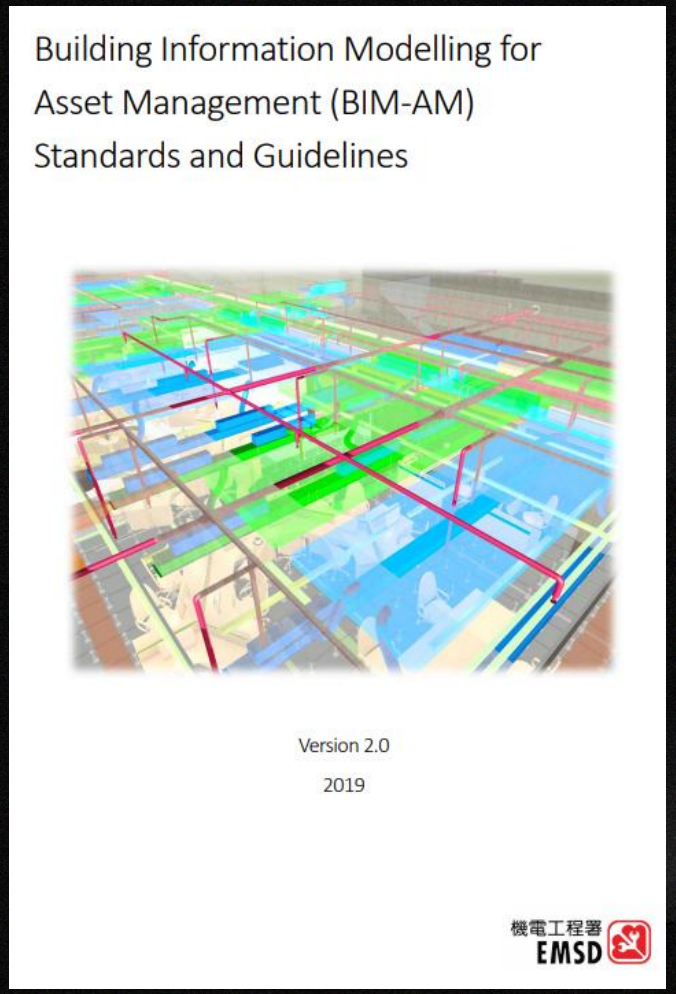
The Architectural Services Department reserves the right to omit, edit or update the Guide at any time in its absolute discretion without any prior notice.

ASD BIM Guide for Facilities Upkeep



Building Information Modelling for Asset Management (BIM-AM) Standards and Guidelines

Version 2.0

2019

機電工程署 EMSD

EMSD for BIM - AM Standard and Guideline

Building Information Modelling (BIM) Standards Manual for Development and Construction Division of Hong Kong Housing Authority

(Version 1.0)
November 2009

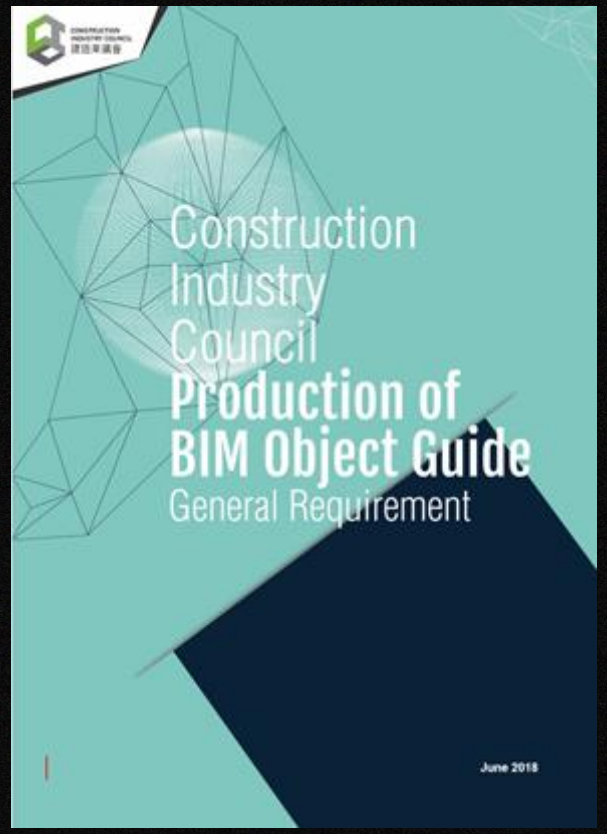
Prepared by Business Information Technology Unit
Development & Construction Division
Housing Department

BIM Standards Manual for Development and Construction Division of HKHA

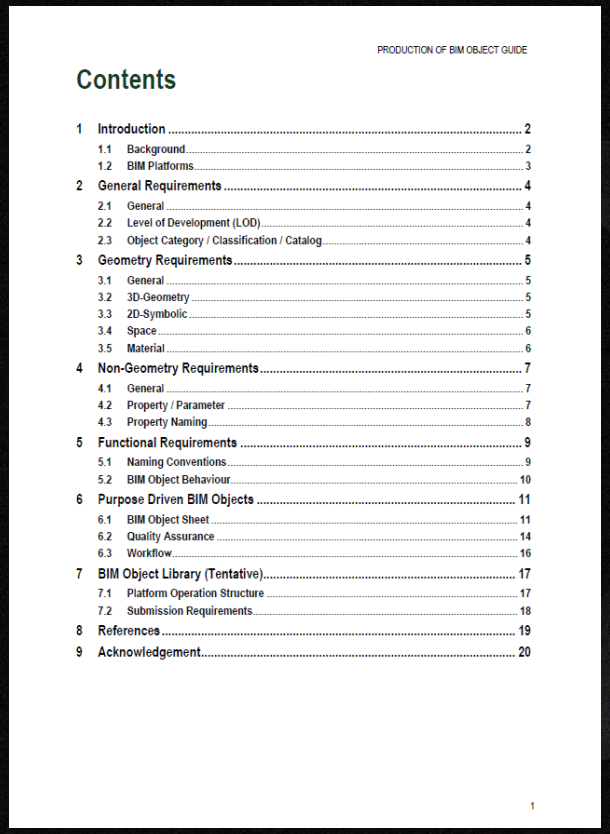
2. BIM Object Standard

2.1 CIC General Requirement Object Standard

CIC Production of BIM Object Guide General Requirement includes the LOD, geometry, information and functional requirement of BIM object. Not only technical details provided in the standard, but also the checking items in BIM Object check form for quality assurance.



CIC Production of BIM Object Guide General Requirement

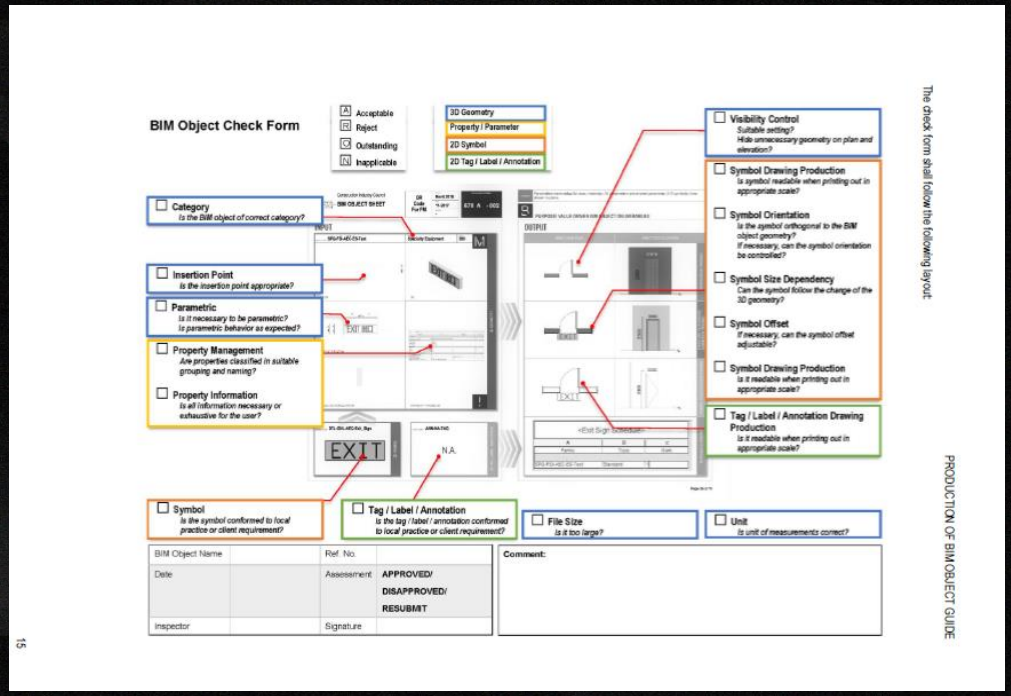


PRODUCTION OF BIM OBJECT GUIDE

Contents

1

Contents of CIC Technical BIM Object Guide Autodesk Revit



BIM Object Check Form

The check form shall follow the following layout.

PRODUCTION OF BIM OBJECT GUIDE

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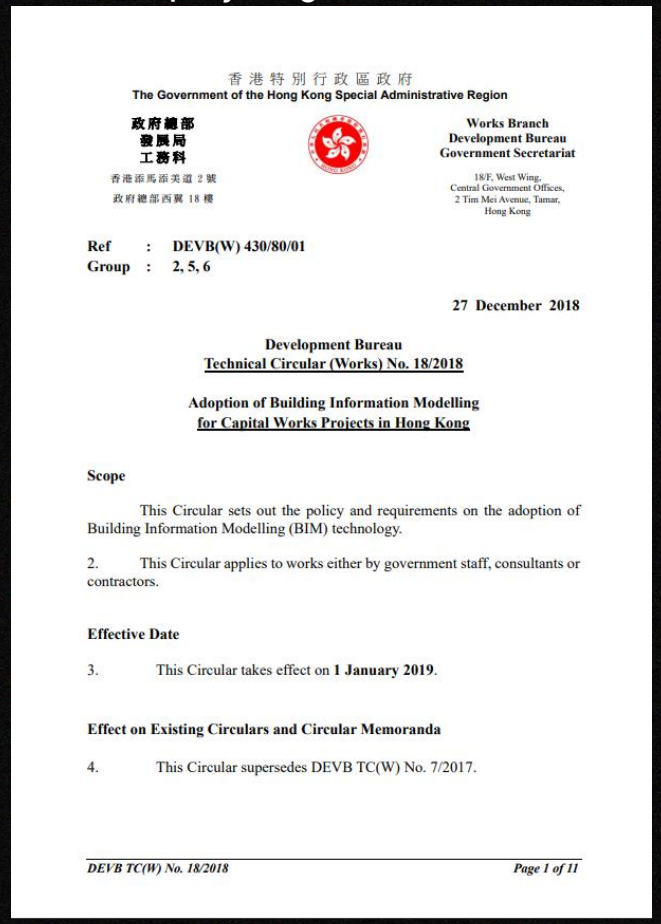
Quality Assurance by BIM Object Check Form

3. Project Execution Plan

3.1 BIM Use matrix

Technical Circular sets out the policy and requirements on the adoption of BIM. It listed out twenty BIM Use and shows the mandatory and optional BIM Uses respectively. In the Project Execution Plan, the client and designer can choose the their project goals and additional BIM uses.



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Ref : DEVB(W) 430/80/01
Group : 2, 5, 6

27 December 2018

Development Bureau
Technical Circular (Works) No. 18/2018

Adoption of Building Information Modelling for Capital Works Projects in Hong Kong

Scope

This Circular sets out the policy and requirements on the adoption of Building Information Modelling (BIM) technology.

2. This Circular applies to works either by government staff, consultants or contractors.

Effective Date

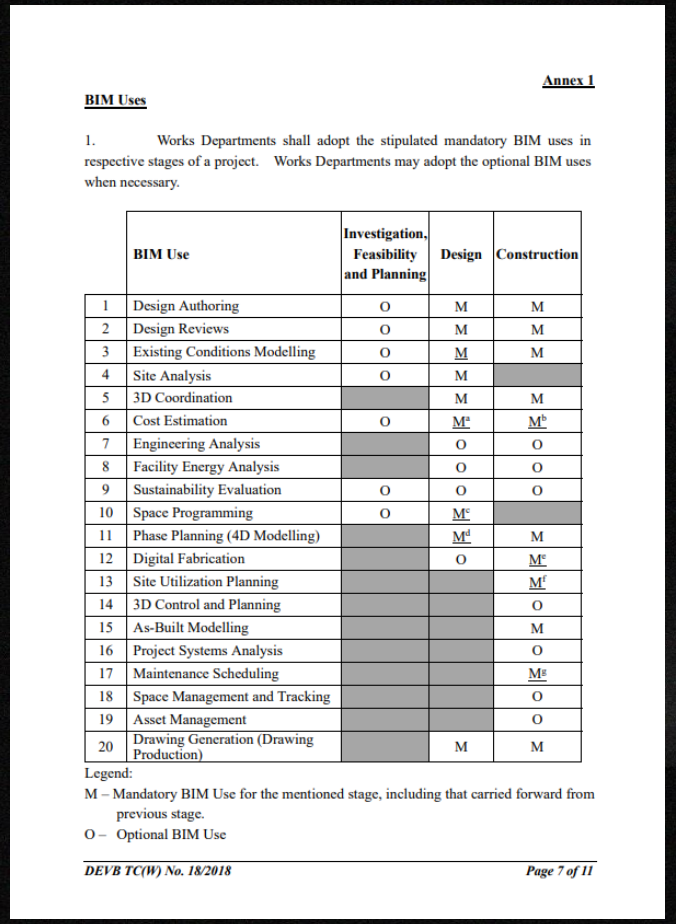
3. This Circular takes effect on **1 January 2019**.

Effect on Existing Circulars and Circular Memoranda

4. This Circular supersedes DEVB TC(W) No. 7/2017.

DEVB TC(W) No. 18/2018 *Page 1 of 11*

Technical Circular on 27 December 2018



Annex 1

BIM Uses

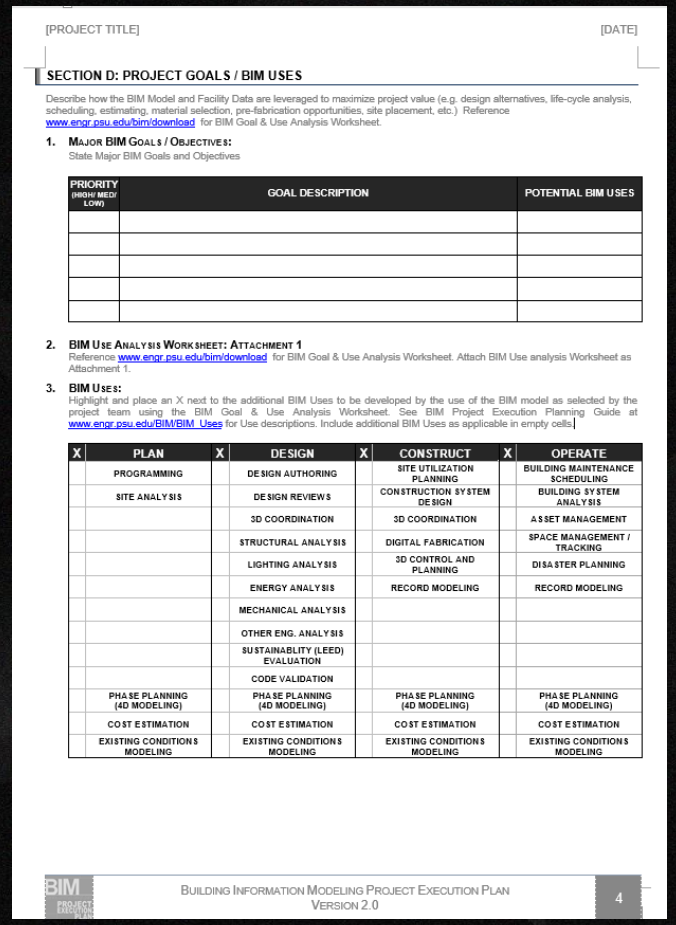
1. Works Departments shall adopt the stipulated mandatory BIM uses in respective stages of a project. Works Departments may adopt the optional BIM uses when necessary.

	BIM Use	Investigation, Feasibility and Planning	Design	Construction
1	Design Authoring	O	M	M
2	Design Reviews	O	M	M
3	Existing Conditions Modelling	O	M	M
4	Site Analysis	O	M	
5	3D Coordination		M	M
6	Cost Estimation	O	M[a]	M[b]
7	Engineering Analysis		O	O
8	Facility Energy Analysis		O	O
9	Sustainability Evaluation	O	O	O
10	Space Programming	O	M[c]	
11	Phase Planning (4D Modelling)		M[d]	M
12	Digital Fabrication		O	M[e]
13	Site Utilization Planning			M[f]
14	3D Control and Planning			O
15	As-Built Modelling			M
16	Project Systems Analysis			O
17	Maintenance Scheduling			M[g]
18	Space Management and Tracking			O
19	Asset Management			O
20	Drawing Generation (Drawing Production)		M	M

Legend:
M – Mandatory BIM Use for the mentioned stage, including that carried forward from previous stage.
O – Optional BIM Use

DEVB TC(W) No. 18/2018 *Page 7 of 11*

BIM Uses



[PROJECT TITLE] [DATE]

SECTION D: PROJECT GOALS / BIM USES

Describe how the BIM Model and Facility Data are leveraged to maximize project value (e.g. design alternatives, life-cycle analysis, scheduling, estimating, material selection, pre-fabrication opportunities, site placement, etc.) Reference www.engr.psu.edu/bim/download for BIM Goal & Use Analysis Worksheet.

1. **Major BIM Goals / Objectives:**
State Major BIM Goals and Objectives

PRIORITY (HIGH/ MED/ LOW)	GOAL DESCRIPTION	POTENTIAL BIM USES

2. **BIM Use Analysis Worksheet: Attachment 1**
Reference www.engr.psu.edu/bim/download for BIM Goal & Use Analysis Worksheet. Attach BIM Use analysis Worksheet as Attachment 1.

3. **BIM Uses:**
Highlight and place an X next to the additional BIM Uses to be developed by the use of the BIM model as selected by the project team using the BIM Goal & Use Analysis Worksheet. See BIM Project Execution Planning Guide at www.engr.psu.edu/BIM/BIM_Uses for Use descriptions. Include additional BIM Uses as applicable in empty cells.

X	PLAN	X	DESIGN	X	CONSTRUCT	X	OPERATE
	PROGRAMMING		DESIGN AUTHORING		SITE UTILIZATION PLANNING		BUILDING MAINTENANCE SCHEDULING
	SITE ANALYSIS		DESIGN REVIEWS		CONSTRUCTION SYSTEM DESIGN		BUILDING SYSTEM ANALYSIS
			3D COORDINATION		3D COORDINATION		ASSET MANAGEMENT
			STRUCTURAL ANALYSIS		DIGITAL FABRICATION		SPACE MANAGEMENT / TRACKING
			LIGHTING ANALYSIS		3D CONTROL AND PLANNING		DISASTER PLANNING
			ENERGY ANALYSIS		RECORD MODELING		RECORD MODELING
			MECHANICAL ANALYSIS				
			OTHER ENG. ANALYSIS				
			SUSTAINABLITY (LEED) EVALUATION				
			CODE VALIDATION				
	PHASE PLANNING (4D MODELING)		PHASE PLANNING (4D MODELING)		PHASE PLANNING (4D MODELING)		PHASE PLANNING (4D MODELING)
	COST ESTIMATION		COST ESTIMATION		COST ESTIMATION		COST ESTIMATION
	EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING

BIM PROJECT EXECUTION PLAN | BUILDING INFORMATION MODELING PROJECT EXECUTION PLAN VERSION 2.0 | 4

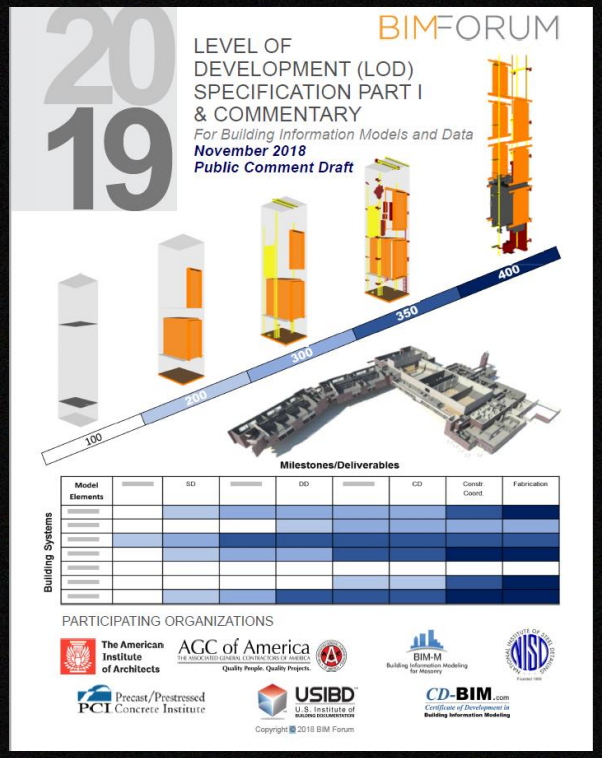
Project Execution Plan (PXP) template

3. Project Execution Plan

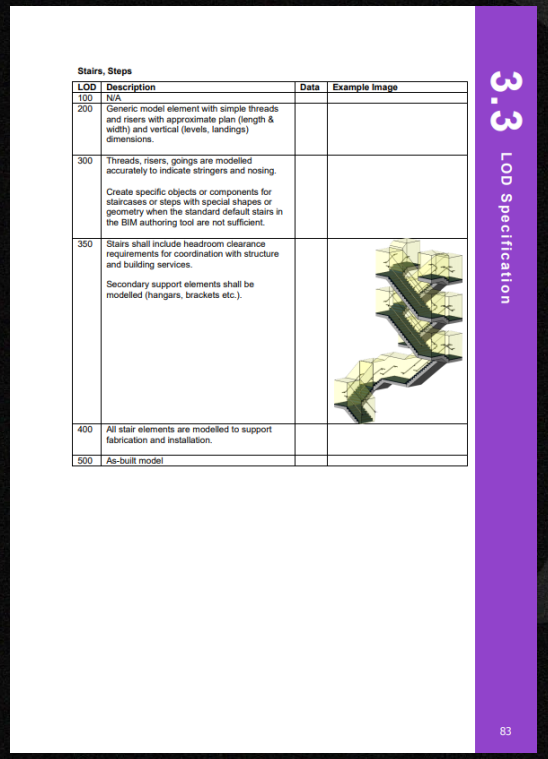
3.2 LOD level

Level of Development describes the level of completeness to which a model element is developed, both graphical and non-graphical data. LOD 2019 Specification and CIC BIM Standard are contained level of development in the context of graphics and information.

The MLD Matrix in PXP identifies the required LOD of BIMs from Workstage 1 – 4 by the responsible parties (ARC, STR, BSE, CIV and FAC). Design elements are tabulated based upon the HK CICBIMS.



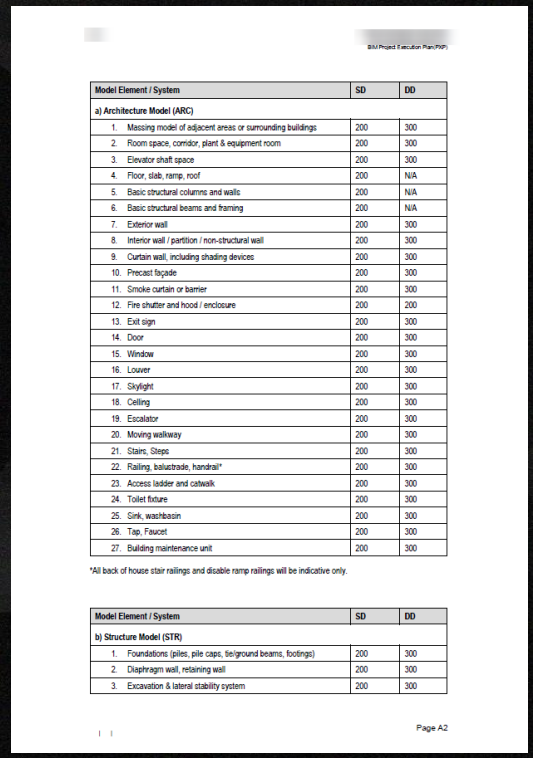
LOD Specification Part I 2019



Stairs, Steps

LOD	Description	Data	Example Image
100	N/A		
200	Generic model element with simple threads and risers with approximate plan (length & width) and vertical (levels, landings) dimensions.		
300	Threads, risers, goings are modelled accurately to indicate stringers and nosing. Create specific objects or components for staircases or steps with special shapes or geometry when the standard default stairs in the BIM authoring tool are not sufficient.		
350	Stairs shall include headroom clearance requirements for coordination with structure and building services. Secondary support elements shall be modelled (hangars, brackets etc.).		
400	All stair elements are modelled to support fabrication and installation.		
500	As-built model		

CIC BIM Standard



Model Element / System	SD	DD
a) Architecture Model (ARC)		
1. Massing model of adjacent areas or surrounding buildings	200	300
2. Room space, corridor, plant & equipment room	200	300
3. Elevator shaft space	200	300
4. Floor, slab, ramp, roof	200	N/A
5. Basic structural columns and walls	200	N/A
6. Basic structural beams and framing	200	N/A
7. Exterior wall	200	300
8. Interior wall / partition / non-structural wall	200	300
9. Curtain wall, including shading devices	200	300
10. Precast façade	200	300
11. Smoke curtain or barrier	200	300
12. Fire shutter and hood / enclosure	200	200
13. Exit sign	200	300
14. Door	200	300
15. Window	200	300
16. Louver	200	300
17. Skylight	200	300
18. Ceiling	200	300
19. Escalator	200	300
20. Moving walkway	200	300
21. Stairs, Steps	200	300
22. Railing, balustrade, handrail*	200	300
23. Access ladder and catwalk	200	300
24. Toilet fixture	200	300
25. Sink, washbasin	200	300
26. Tap, Faucet	200	300
27. Building maintenance unit	200	300

*All back of house stair railings and disable ramp railings will be indicative only.

Model Element / System	SD	DD
b) Structure Model (STR)		
1. Foundations (piles, pile caps, tie/ground beams, footings)	200	300
2. Diaphragm wall, retaining wall	200	300
3. Excavation & lateral stability system	200	300

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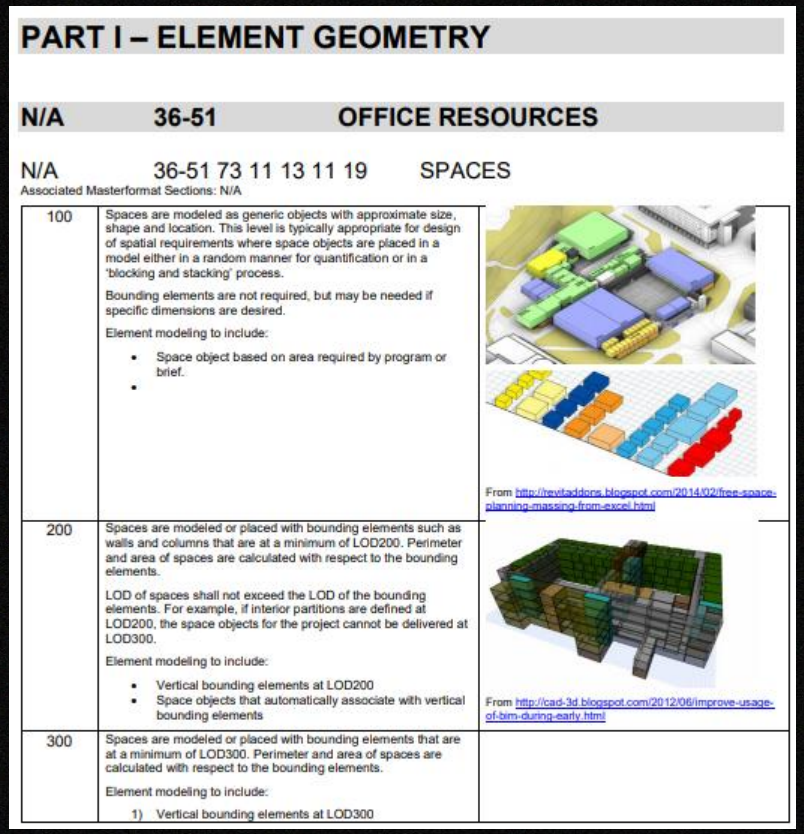
MLD Matrix in PXP

3. Project Execution Plan

3.2 LOD level

Generally speaking, we can use project life cycle to describe different LOD. LOD 100 is conceptual design, LOD 200 is preliminary design, LOD 300 is detail design, LOD 400 is Shop Drawing and LOD 500 is As Built drawing.



PART I – ELEMENT GEOMETRY

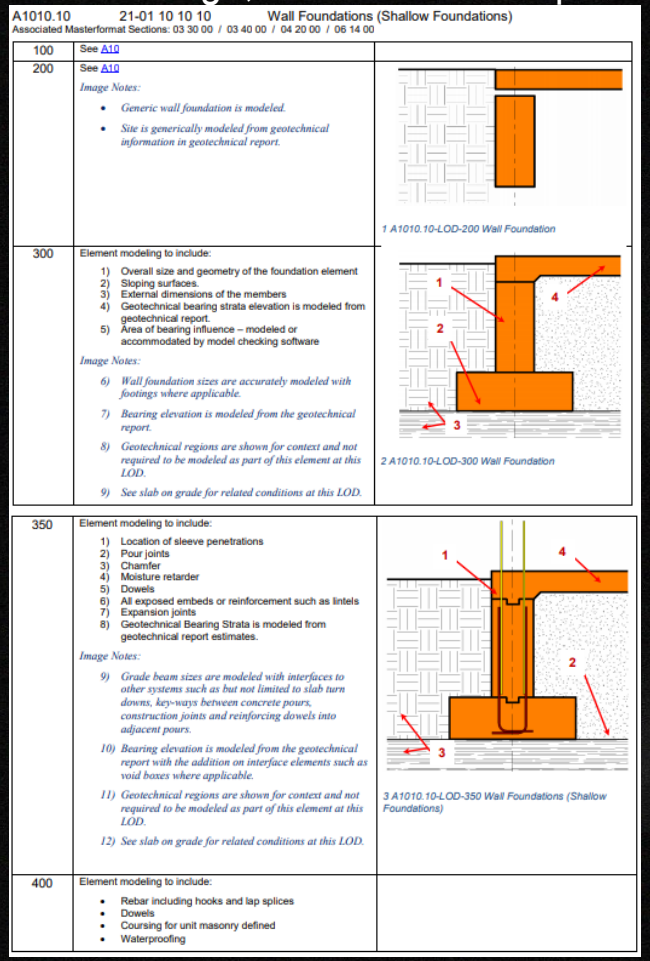
N/A 36-51 OFFICE RESOURCES

N/A 36-51 73 11 13 11 19 SPACES

Associated Masterformat Sections: N/A

100	Spaces are modeled as generic objects with approximate size, shape and location. This level is typically appropriate for design of spatial requirements where space objects are placed in a model either in a random manner for quantification or in a 'blocking and stacking' process. Bounding elements are not required, but may be needed if specific dimensions are desired. Element modeling to include: • Space object based on area required by program or brief. •	From http://revitaddons.blogspot.com/2014/02/free-space-planning-massing-from-excel.html
200	Spaces are modeled or placed with bounding elements such as walls and columns that are at a minimum of LOD200. Perimeter and area of spaces are calculated with respect to the bounding elements. LOD of spaces shall not exceed the LOD of the bounding elements. For example, if interior partitions are defined at LOD200, the space objects for the project cannot be delivered at LOD300. Element modeling to include: • Vertical bounding elements at LOD200 • Space objects that automatically associate with vertical bounding elements	From http://cad-3d.blogspot.com/2012/06/improve-usage-of-bim-during-early.html
300	Spaces are modeled or placed with bounding elements that are at a minimum of LOD300. Perimeter and area of spaces are calculated with respect to the bounding elements. Element modeling to include: 1) Vertical bounding elements at LOD300	

LOD Element Geometry list

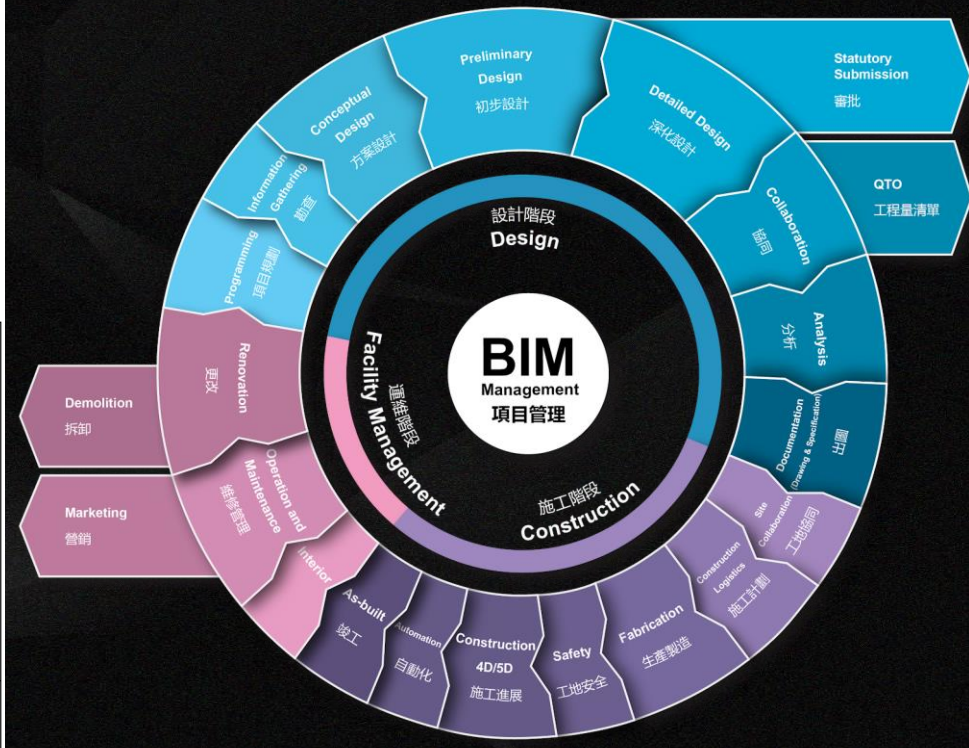


A1010.10 21-01 10 10 10 Wall Foundations (Shallow Foundations)

Associated Masterformat Sections: 03 30 00 / 03 40 00 / 04 20 00 / 06 14 00

100	See A10	
200	See A10 *Image Notes:* • *Generic wall foundation is modeled.* • *Site is generically modeled from geotechnical information in geotechnical report.*	*1 A1010.10-LOD-200 Wall Foundation*
300	Element modeling to include: 1) Overall size and geometry of the foundation element 2) Sloping surfaces. 3) External dimensions of the members 4) Geotechnical bearing strata elevation is modeled from geotechnical report. 5) Area of bearing influence – modeled or accommodated by model checking software *Image Notes:* *6) Wall foundation sizes are accurately modeled with footings where applicable.* *7) Bearing elevation is modeled from the geotechnical report.* *8) Geotechnical regions are shown for context and not required to be modeled as part of this element at this LOD.* *9) See slab on grade for related conditions at this LOD.*	*2 A1010.10-LOD-300 Wall Foundation*
350	Element modeling to include: 1) Location of sleeve penetrations 2) Pour joints 3) Chamfer 4) Moisture retarder 5) Dowels 6) All exposed embeds or reinforcement such as lintels 7) Expansion joints 8) Geotechnical Bearing Strata is modeled from geotechnical report estimates. *Image Notes:* *9) Grade beam sizes are modeled with interfaces to other systems such as but not limited to slab turn downs, key-ways between concrete pours, construction joints and reinforcing dowels into adjacent pours.* *10) Bearing elevation is modeled from the geotechnical report with the addition on interface elements such as void boxes where applicable.* *11) Geotechnical regions are shown for context and not required to be modeled as part of this element at this LOD.* *12) See slab on grade for related conditions at this LOD.*	*3 A1010.10-LOD-350 Wall Foundations (Shallow Foundations)*
400	Element modeling to include: • Rebar including hooks and lap splices • Dowels • Coursing for unit masonry defined • Waterproofing	

LOD 100 - 500 Requirement

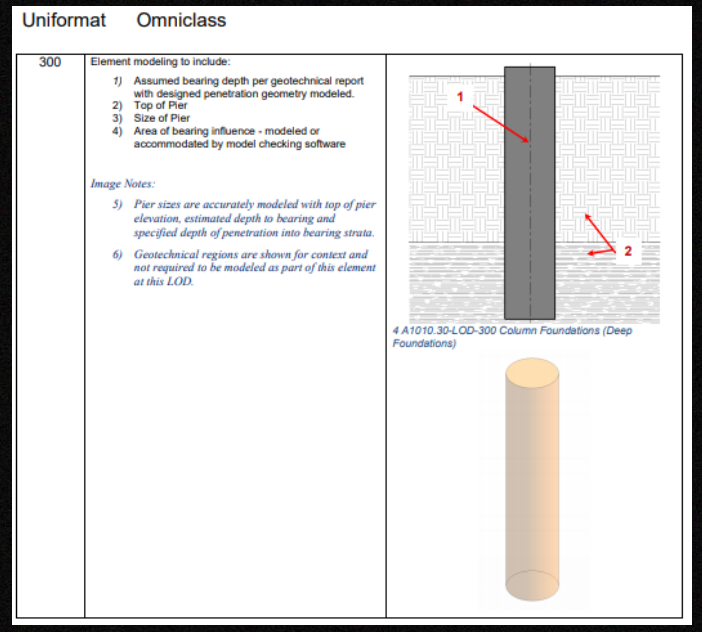


3. Project Execution Plan

3.3 Standards

Definition of LOD is shown in BIM Forum LOD Specification 2019.

- LOD300 is defined as the element should be modelled in specific size, depth and location.
- LOD 400 defined as the details of parts inside the model should be modelled as well, like rebar including hooks and splices.
- LOD 500 defined as the model elements is field verified representation.



Uniformat Omniclass

300

Element modeling to include:

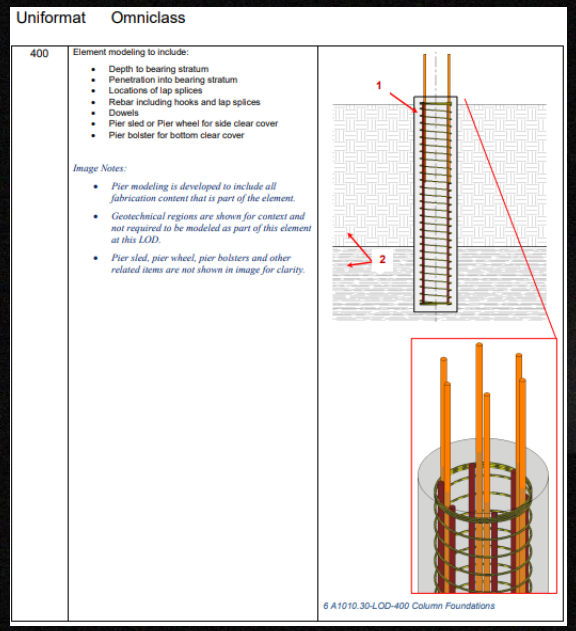
1) Assumed bearing depth per geotechnical report with designed penetration geometry modeled.
2) Top of Pier
3) Size of Pier
4) Area of bearing influence - modeled or accommodated by model checking software

Image Notes:

5) *Pier sizes are accurately modeled with top of pier elevation, estimated depth to bearing and specified depth of penetration into bearing strata.*
6) *Geotechnical regions are shown for context and not required to be modeled as part of this element at this LOD.*

4 A1010.30-LOD-300 Column Foundations (Deep Foundations)

LOD 300



Uniformat Omniclass

400

Element modeling to include:

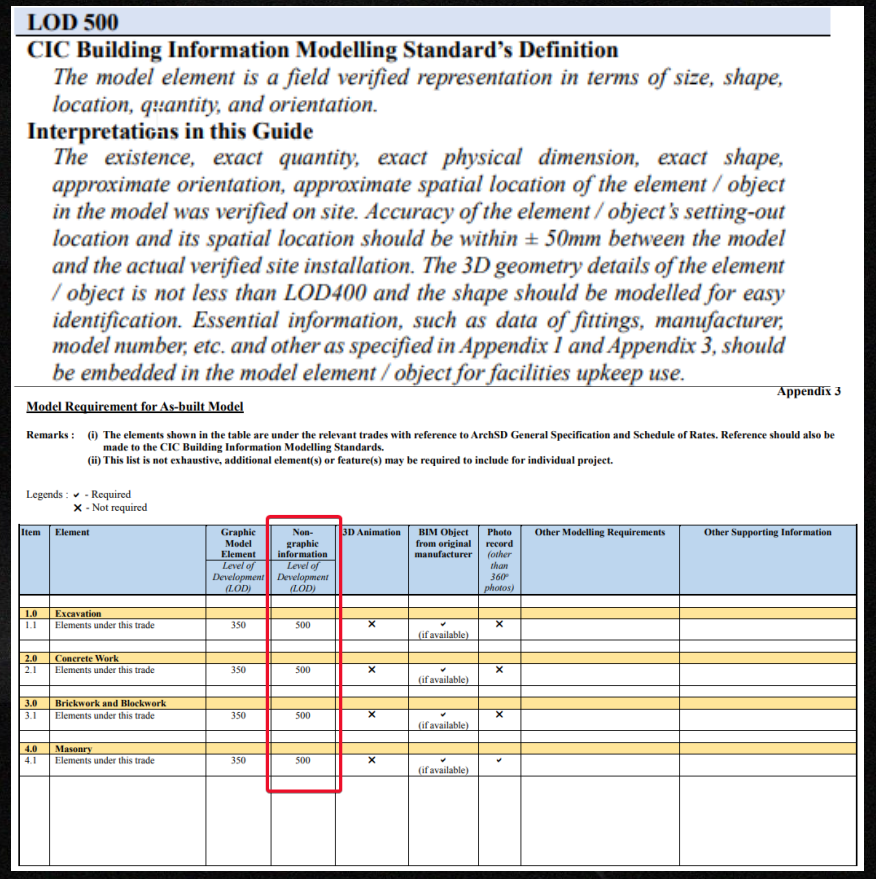
- Depth to bearing stratum
- Penetration into bearing stratum
- Locations of lap splices
- Rebar including hooks and lap splices
- Dowels
- Pier sled or Pier wheel for side clear cover
- Pier bolster for bottom clear cover

Image Notes:

- *Pier modeling is developed to include all fabrication content that is part of the element.*
- *Geotechnical regions are shown for context and not required to be modeled as part of this element at this LOD.*
- *Pier sled, pier wheel, pier bolsters and other related items are not shown in image for clarity.*

6 A1010.30-LOD-400 Column Foundations

LOD 400



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.

Appendix 3

Model Requirement for As-built Model

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

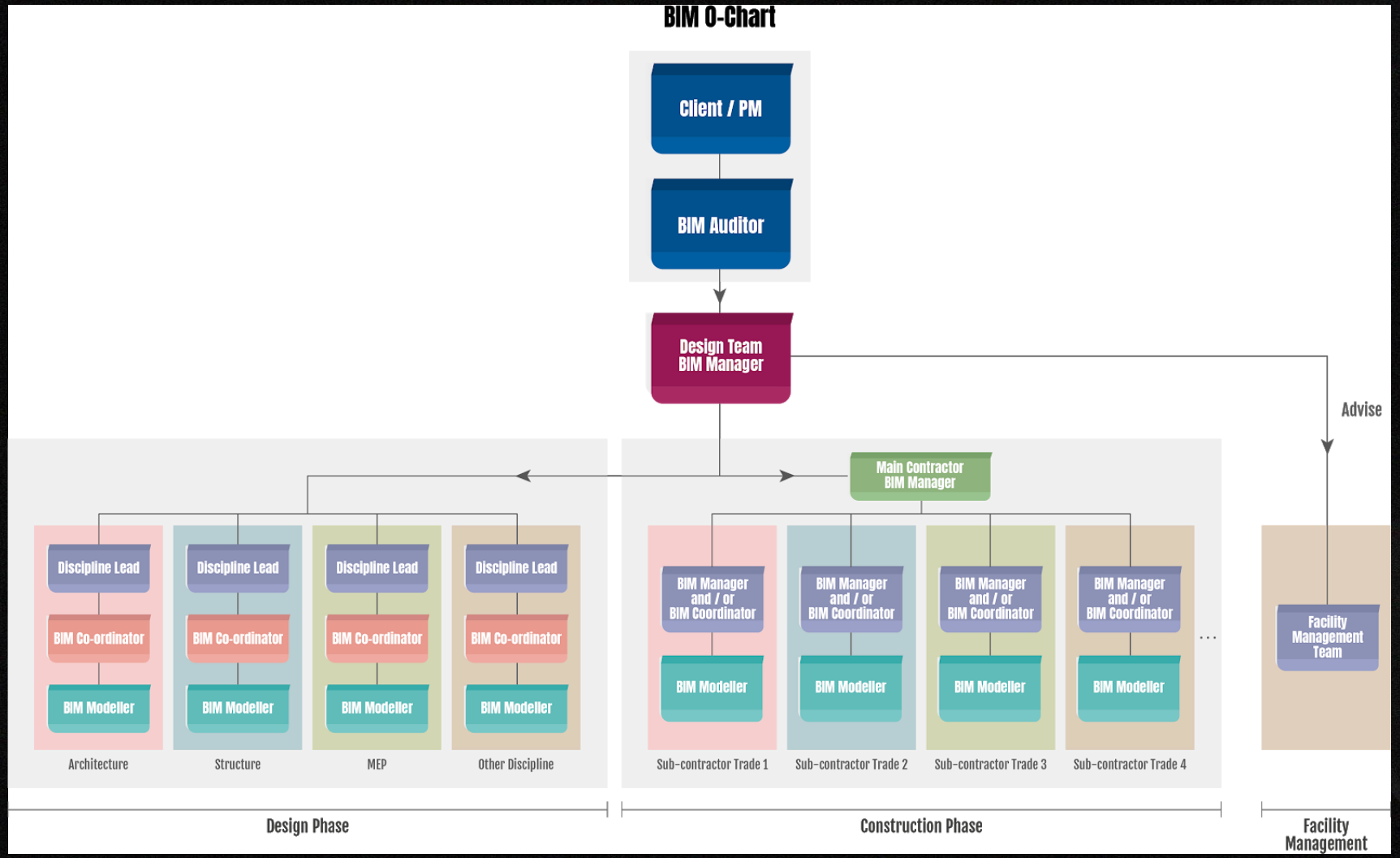
Item	Element	Graphic Model Element *Level of Development (LOD)*	Non-graphic information *Level of Development (LOD)*	3D Animation	BIM Object from original manufacturer	Photo record *(other than 360° photos)*	Other Modelling Requirements	Other Supporting Information
1.0	**Excavation**							
1.1	Elements 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)	✔		

LOD 500

4. BIM Roles - Modeler, Discipline Lead, BIM Manager/ Information Manager, Auditor

The responsibility of BIM manager is quality control.

BIM O-Chart for Design stage and Construction stage



5. Model Audit Procedure

5.1 Submission log

BIM model deliverable schedule is used to show the status of BIM model. Every parties shall upload their BIM model the week after BIM Coordination Meeting. BIM Manager have to update this schedule after the BIM Coordination Meeting as a record for every parties.

In order to check whether there is any late submission of the model, the table shows the submission schedule of every level of the tower.

As you can see from the legend of the table shown below, model submission date by discipline coordinator, clash analysis and model audit checklist submission date by BIM Manager are shown in the table so that all the parties can trace back the BIM model status.

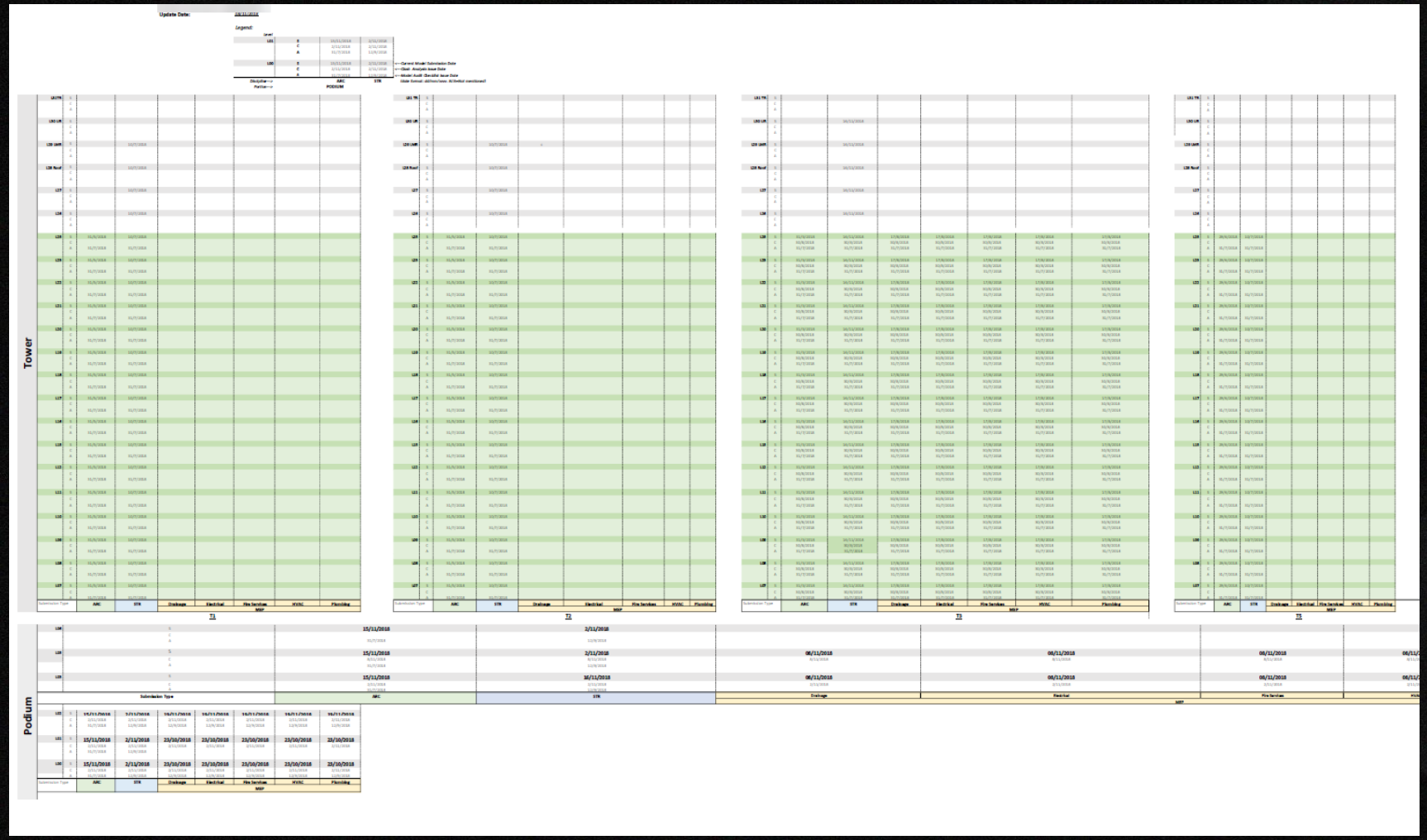
[redacted] - BIM Model Status					
Update Date:	*08/11/2018*				
	Legend:				
	Level				
	L01	S	15/11/2018	2/11/2018	
		C	2/11/2018	2/11/2018	
		A	31/7/2018	12/9/2018	
	L00	S	15/11/2018	2/11/2018	*<---Current Model Submission Date*
		C	2/11/2018	2/11/2018	*<---Clash Analysis Issue Date*
		A	31/7/2018	12/9/2018	*<---Model Audit Checklist Issue Date*
	Discipline--->		**ARC**	**STR**	*(date format: dd/mm/yyyy, N/A=Not mentioned)*

L31 TR	S							
	C							
	A							
L30 UR	S		16/11/2018					
	C							
	A							
L29 LMR	S		16/11/2018					
	C							
	A							
L28 Roof	S		16/11/2018					
	C							
	A							
L27	S		16/11/2018					
	C							
	A							
L26	S		16/11/2018					
	C							
	A							
L25	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L23	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L22	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L21	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L20	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L19	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L18	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L17	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L16	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L15	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L12	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L11	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L10	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L09	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L08	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
L07	S	31/5/2018	16/11/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018	17/8/2018
	C	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018	30/8/2018
	A	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018	31/7/2018
Submission Type		**ARC**	**STR**	**Drainage**	**Electrical**	**Fire Services**	**HVAC**	**Plumbing**
				MEP				
				I3				

5. Model Audit Procedure

5.1 Submission log

Submission log can be shown in a diagram format. The table below shows the submission log is divided into podium and tower section respectively. The level with green color represent typical floor of the tower.



Example of Submission log

5. Model Audit Procedure

5.2 Comparison of versioning

For Information versioning

For design coordination, model file A should be linked with model file B and model C. As the model have to update the week after the BIM Coordination Meeting, the updated central model should override the previous model.

Based on single source of truth (SSOT), the file name of model file should not be changed. Otherwise, the link of the file will be unloaded.

In documentation stage, model A,B,C will be inked into sheet file. The model file should override the previous model in the sheet file automatically as well.

For software versioning,

The following software choices have been established to deliver the prioritised BIM objectives. Any software version changes and updates must be explicitly agreed by design team, contractor (post tender) and the BIM Manager before implementation.
The version of software depend on the update version in that year.

BIM Use	User	Software	Version
Design Authoring	ARC/CIV/BSE/CON/FAC/STR	Revit	
Spatial Planning	ARC	Revit	
Libraries of assemblies / systems / components	ARC/CIV/BSE/CON/FAC/STR	Revit	
3D Coordination	ARC/CIV/BSE/CON/FAC/STR	Navisworks Manage/ Fuzor	
Design Reviews	ARC/CIV/BSE/CON/FAC/STR/ Client	Navisworks Freedom / Revit / Design Review/ Fuzor	

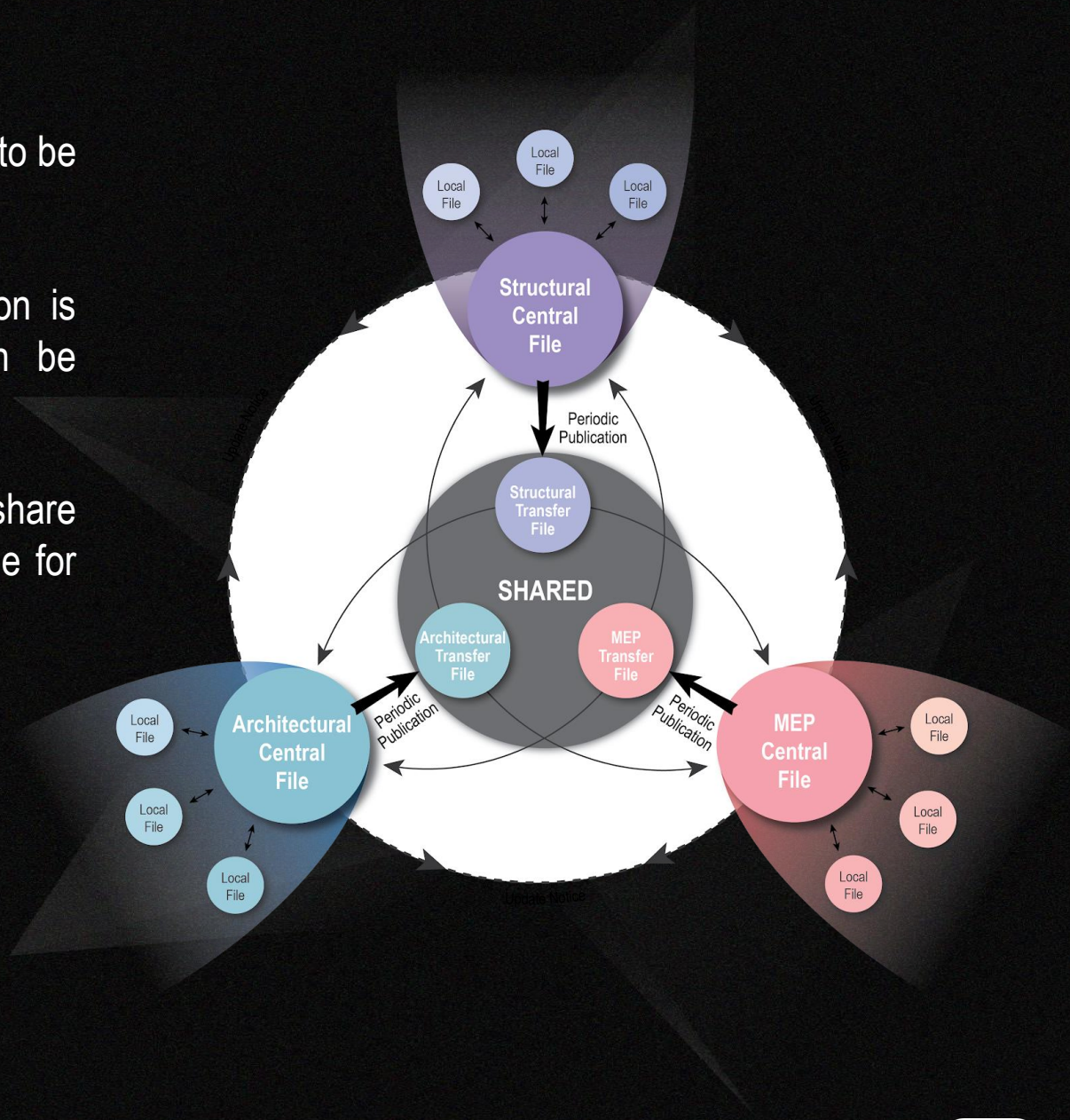
5. Model Audit Procedure

5.3 Collaboration Check

Information in the form of documents, drawings and models are to be uploaded / logged via a CDE.

This process will ensure consistent and accessible information is provided to the project team and also accountability can be determined.

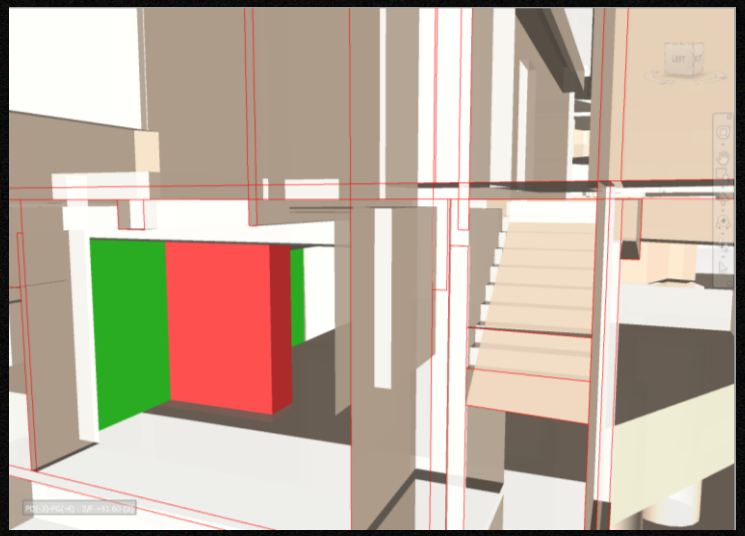
The BIM coordination team will upload a central model to share folder every week. The transfer file should be link to central file for different discipline.



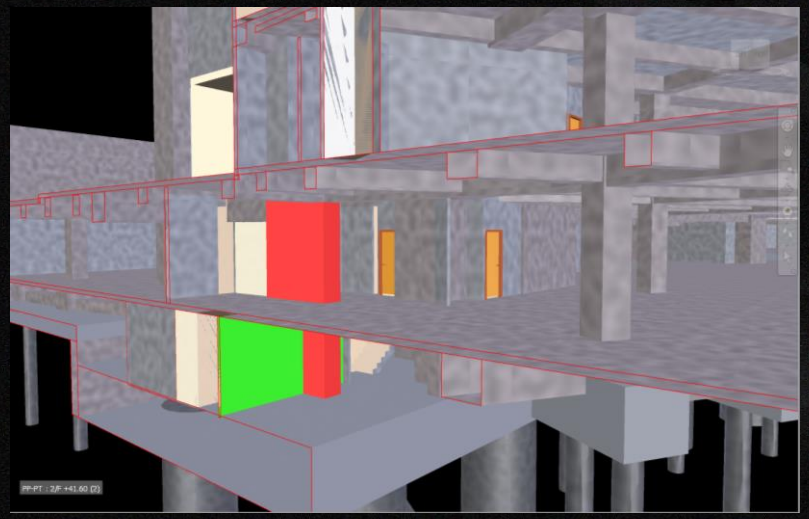
5. Model Audit Procedure

5.4 Navisworks checking

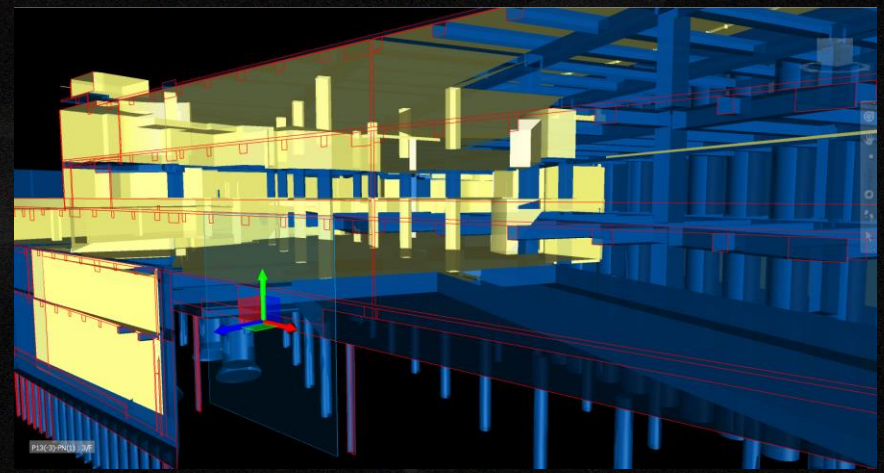
Navisworks is a tool for checking the model. The “Clash Detection” function in Naviswork can assist user to implement interference check. Not only interference check, BIM Manager and BIM Discipline can also override the color of model to implement visual check. For example, we can override ARC model is blue in color and STR model in yellow is color, using the “Enable Section” to cut the section of model. It is easier for them to discover the problem that no related to clash.



Example of interference check



Example of interference check

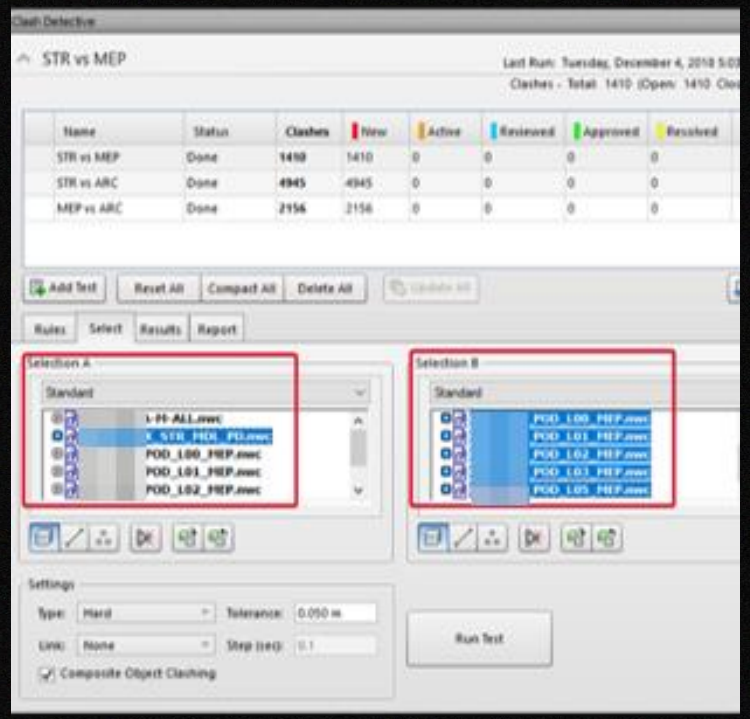


Visual Check

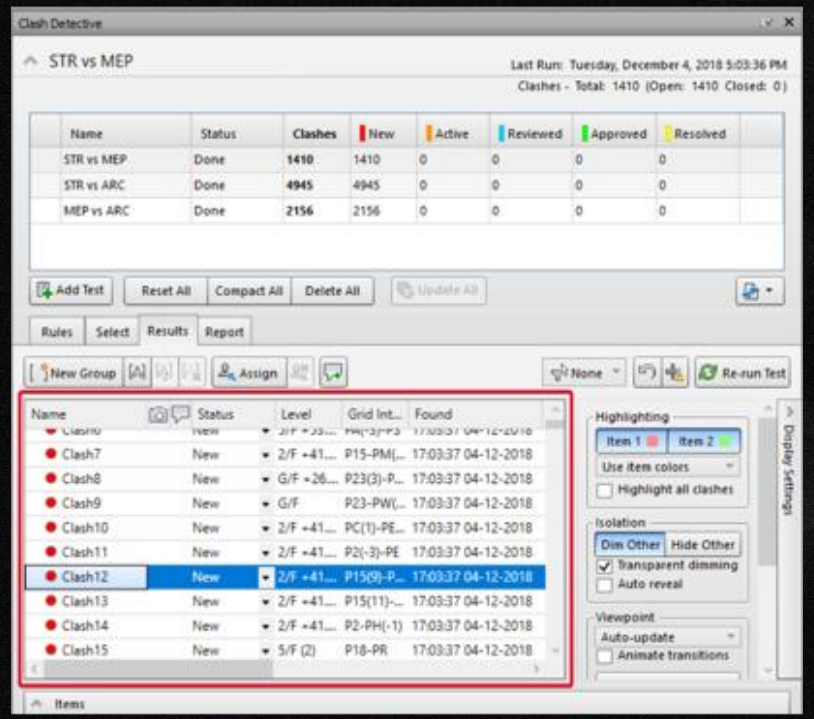
5. Model Audit Procedure

5.5 Clash Detection, Prioritization, Visualization and Elimination

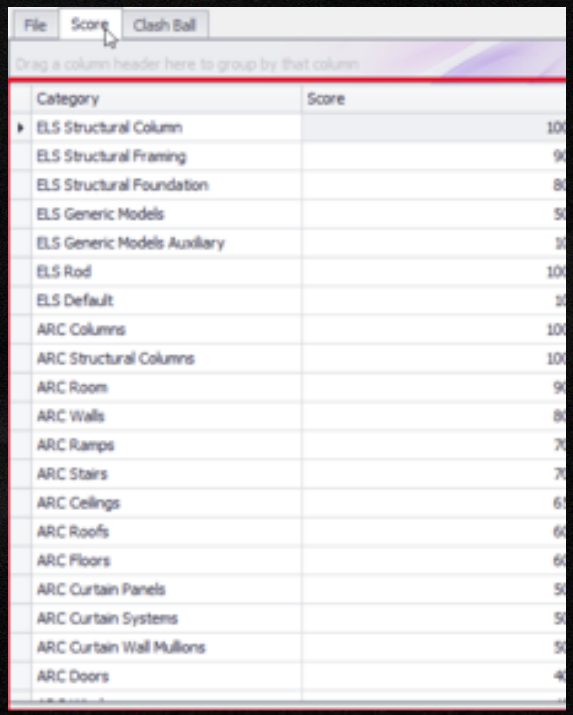
Clash detection in Naviswork can only implement detection and reporting. It is suggested to use C-DRIVE (Programming by A.C.I.D) to implement Clash Detection. For C-DRIVE, C means clash, D means Detection, R means Reporting, I means Prloritization, V means Visualization and E means Elimination.



Cross Discipline Clash Detection



Reporting by Naviswork

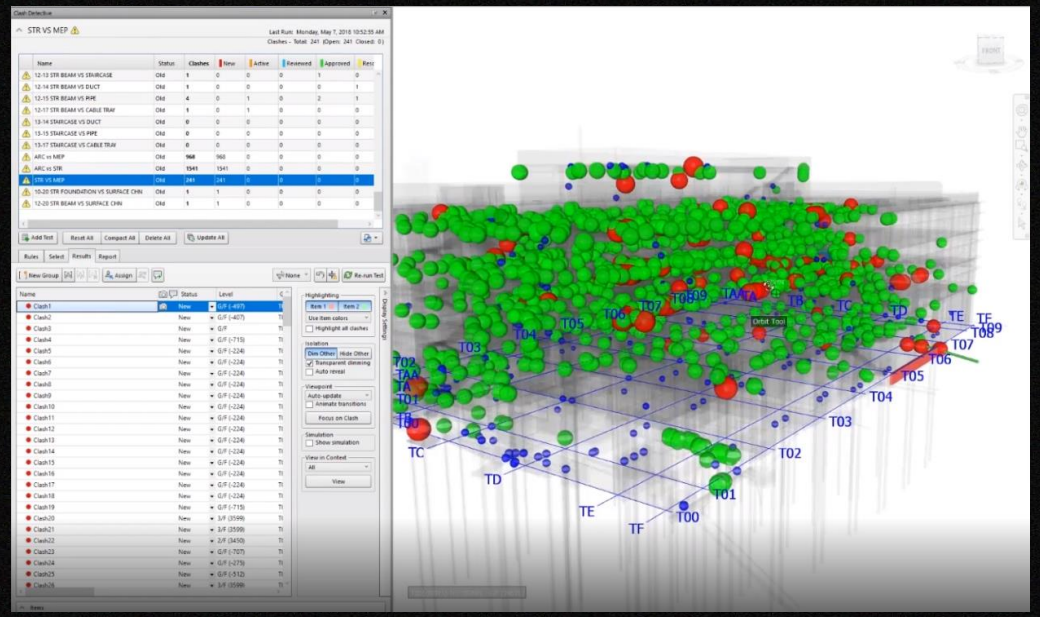


Prioritization by using scoring

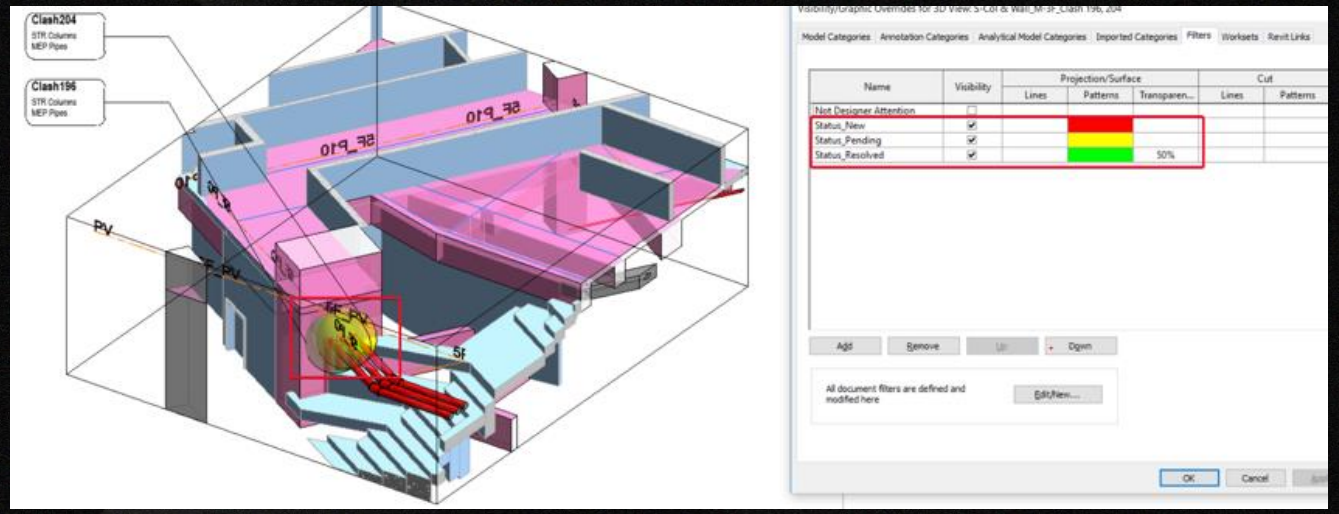
5. Model Audit Procedure

5.5 Clash Detection, Prioritization, Visualization and Elimination

Clash Marker generated in BIM Model which contained the information of location of clash, clash number, clash with higher score (Major clash). User can visual check the clash on floor plan, part plan, 3D model in sheet. The schedule can show the information of clash marker. For elimination, discipline coordinator can changed the color of clash marker from red (New clash) to green (Resolved clash).



Visualization



Elimination

6. System Audit

Five checking should be performed by each discipline before issue:

6.1 Fundamental Checking

Checks	Definition	Responsible	Software	Frequency
Visual check	Ensure there are no unintended model components and the design intent has been followed.	Discipline BIM Coordinator	Revit / Naviswork/ Fuzor/ A360	Weekly or before WIP exchange and end of each workstage
Interference check, Clash detection	Detect problems in the model where two building components are clashing including soft and hard.	Discipline BIM Coordinator	Revit / Naviswork/ Fuzor	Weekly or before WIP exchange and end of each workstage
Standards check	Ensure that the project BIM standards have been followed (e.g. fonts, dimensions, line styles, levels, file and object naming, classification, room numbering.	Discipline BIM Coordinator	Revit	Weekly or before WIP exchange and end of each workstage
Model data check	Process used to ensure that the project data set has no undefined, incorrectly defined or duplicated elements and the reporting process on non-compliant elements and corrective action plans.	Discipline BIM Coordinator	Revit	Weekly or before WIP exchange and end of each workstage
Model Audit	**See Appendix F "BIM Model Audit Checklist"**	**BIM Manager**	**Revit / Naviswork/ Fuzor**	Bi-weekly

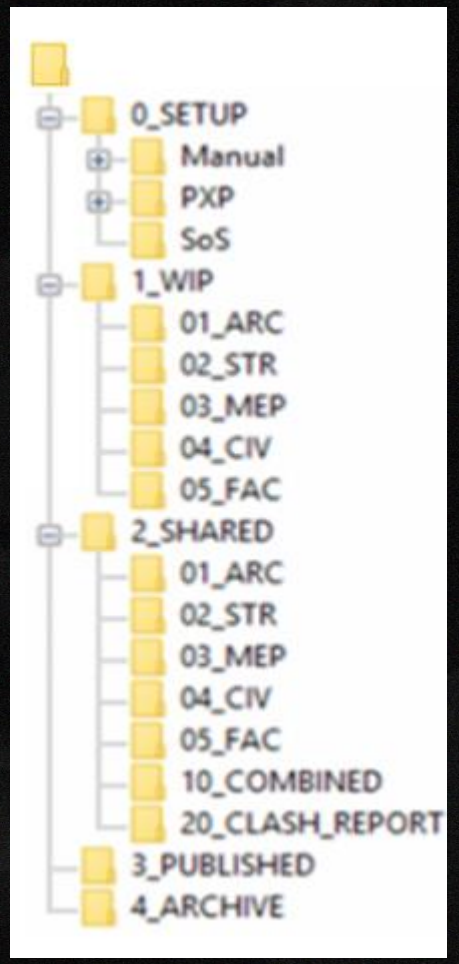
6. System Audit

6.2 Common Data Environment Check

BIM Manager shall set up a CDE for every parties to upload the model and sheet file. WIP information refers to data which is in production and has not been checked or verified for official distribution outside the authoring team. Project team has agreed to include a "_WIP" suffix to the naming of WIP files as a differentiator.

The WIP upload frequency shall be weekly unless agreed otherwise by the BIM Manager. Weekly uploads are from experience considered to be a good balance to achieve positive collaborative working without creating an abortive work caused by design fluidity.

Information will be uploaded to CDE in line with the agreed project programme.



Folder structure of the CDE

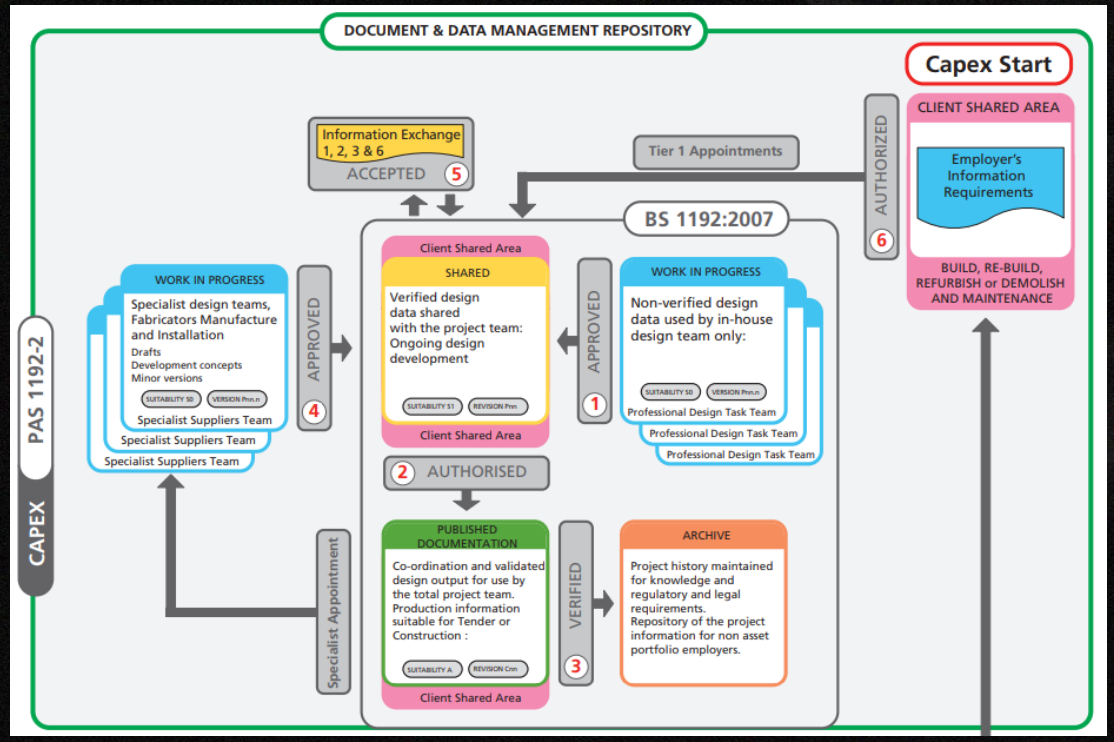
6. System Audit

6.3 Collaboration Check

Verified / approved design data is used to coordinate BIMs between disciplines, facilitating 3D coordination and the production / extraction of unified project data. This information should be checked and approved prior to distribution over CDE.

Each design team shall also save a copy of these files in the corresponding “Shared” folder on the CDE for other teams to make reference to. Models should be issued as produced, containing all necessary linked and native design information.

Discipline BIM Coordinators are responsible for ensuring information is distributed in the correct location and correct format on CDE.



PAS 1192-2:2013 Extending Common Data Environment

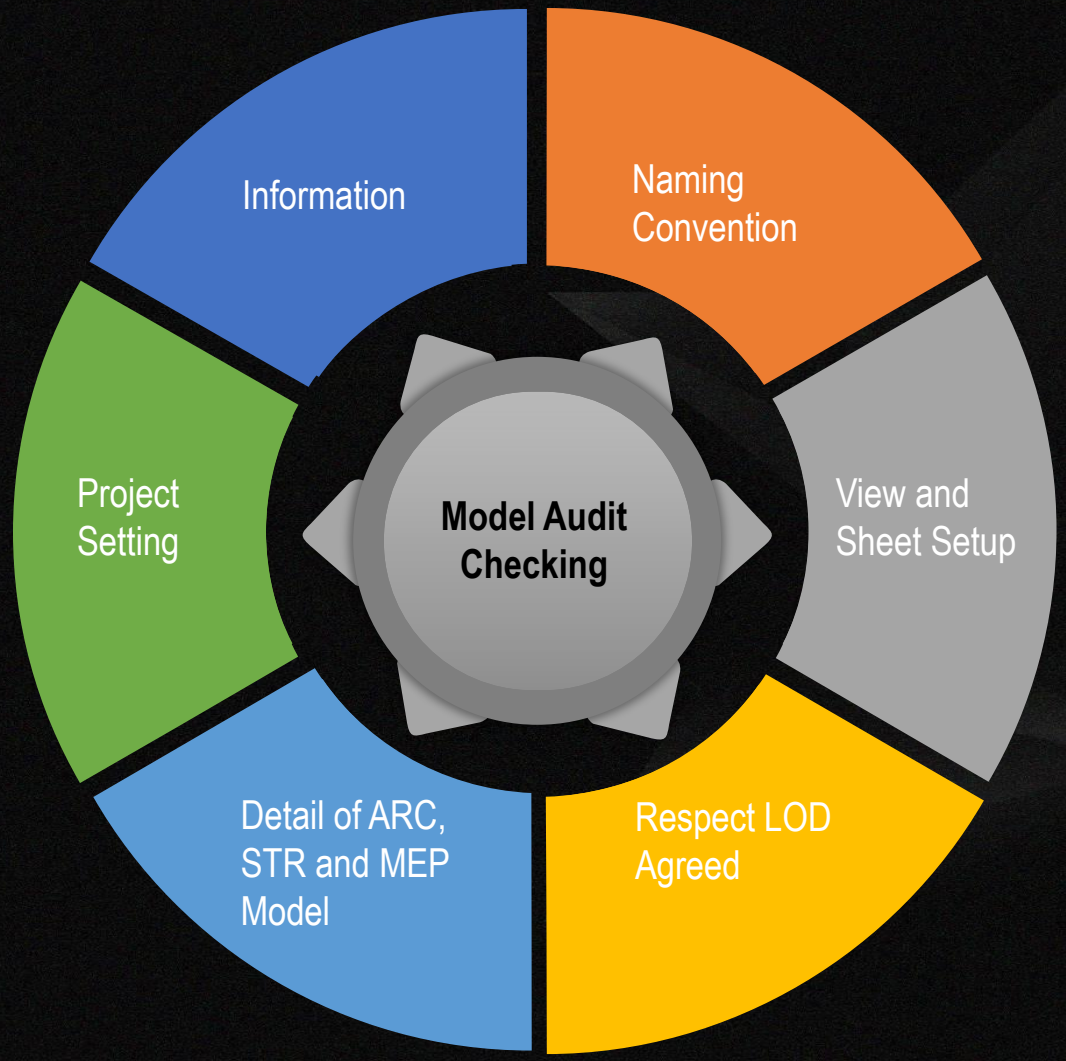
6. Model Audit Procedure

At the beginning of the project, check the model have to be checked … the following are the items that we need to concern… *We need to check the model at least twice to make sure the model is comply with standard.

Project information loaded, Project organization, file size

Gridline, Reference level setting up, share coordinate

Wall joint Connection, slab, beam connection



Families Naming follow FLIP guideline

Setting of drawing production

See whether the model can meet the requirement of LOD or not

Layout of Model Audit Checklist

Audit check point
Quote Standard

Evidence
Screen capture of the project file

Comment
Point out the mistake of the model and make suggestion

Compliance
Tick ,N/A , not yet completed

Target Completion Date
the date we expect he/she revise

Completion Date
Real Completion Date

Feedback:
The comment from designer (if they so not want to amend the model)

BIM Project Audit Checklist

Project Title	Audit Report Number
Project Number	
Discipline	
Central File Name	
BIM Coordinator	
Audit Date	
BIM Manager	

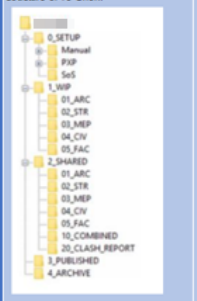
Numb	AUDIT CHECK POINT	EVIDENCE	COMMENT	COMPLIANCE	TARGET COMPLETION DATE	COMPLETION DATE	FEEDBACK
	GENERAL						
13	INFORMATION AND NAMING						
30	PROJECT SETTING						
43	ARC						
46	STR						
50	MEP						
51	BEHAVIOR OF ELEMENTS						
52	Respect LOD agreed (Duct)						
56	For Duct System Setting , please refer to EMSD Section 3.5.1.						
57	System type name shall consist of the system code and subsystem code separated by a hyphen "-"						
58	For Duct system, system abbreviation shall input sub-system code in EMSD BIM Standard Section 2.4. e.g. EAD.						

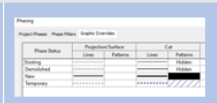
Model Audit Checklist

1. Ask the parties to amend the models according to the highlighted red items in model audit checklist.
2. Fill in the “Feedback” column in model audit checklist and reply us if they have any suggestion for the comments.

BIM Project Audit Checklist

Project Title	[redacted]	Audit Report Number	1
Project Number	[redacted]		
Discipline	[redacted]		
Central File Name	[redacted]		
BIM Coordinator	[redacted]		
Audit Date	30/7/2018		
BIM Manager	Advanced Construction Information Development		

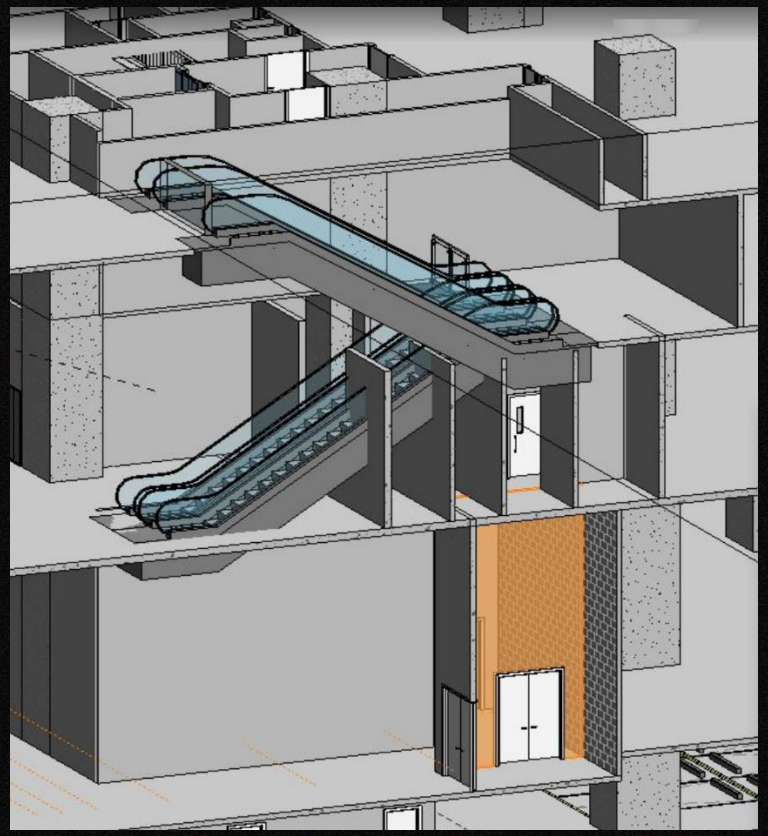
Numb	AUDIT CHECK POINT	EVIDENCE	COMMENT	COMPLIANCE	TARGET COMPLETION DATE	COMPLETION DATE	FEEDBACK
	GENERAL						
1	Windows Explorer organization- Project revit folder structure and naming protocols. (CIC BIM Standard Section 4.1 “BIM Standard shall be stored within the project filing system.”) Below is folder structure of To Shek. 	A360 and FTP are used as CDE temporarily.	It is suggested to use the folder structure of To Shek from the PXP Section 6.2.2 “Work in Progress”	To be confirmed	To be confirmed	To be confirmed	
2	Consultant Incoming CAD files - Consultants in folder	No incoming CAD files in the folder temporarily	N/A	N/A	N/A	N/A	

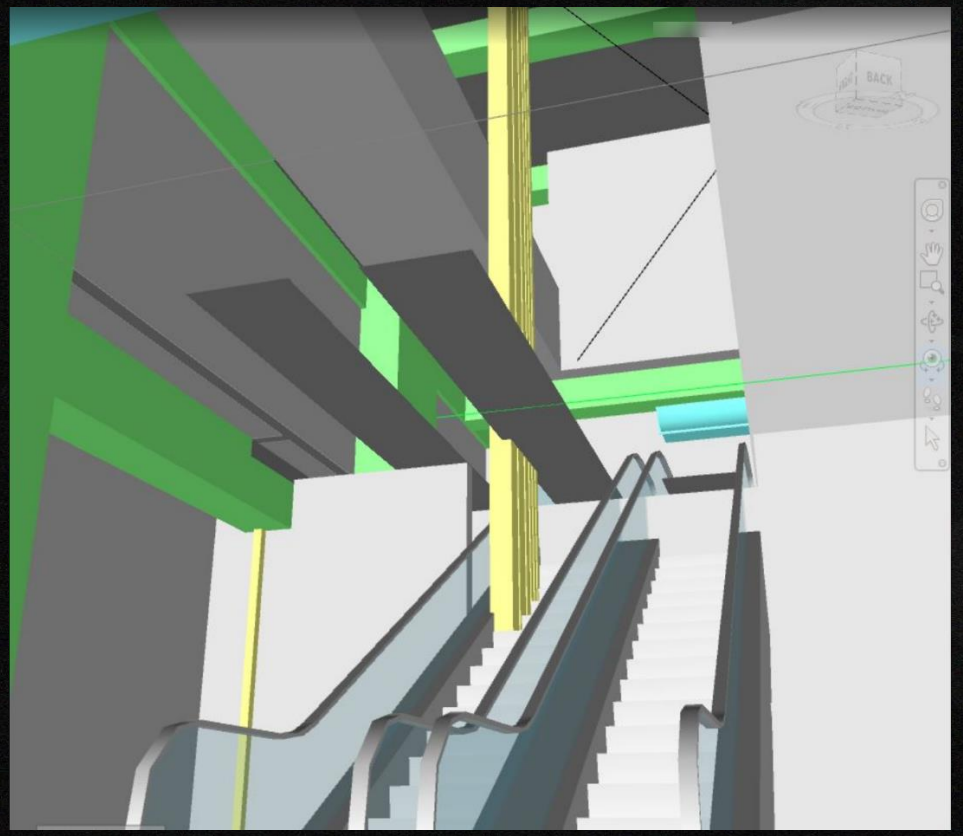
35	Phases - Graphic Overrides Refer to Revit naming protocols		Default Phase Graphic in Revit	N/A	N/A	N/A	
36	Review Warnings Are the review warning in the project under 50?		✓	✓	30/7/2018	30/7/2018	
37	Grid and level Set out - Have the grids and level been set out correctly? Is it DWG or RVT? Is it used by copy monitor?		For grid and level setting out, please use copy the gridline and level from ARC model by using copy monitor.	Not yet completed	13/8/2018		Revised

7. Model Audit Checklist

7.1 Visual Check

Visual check the model to ensure that there are no unintended model components and the design intent has been followed. For example, structural column clashes with escalator, this is obvious to discover when BIM Manager and discipline coordinator visual check the model. It is suggested that to visual check the model by using Autodesk Navisworks Manage and Fuzor.

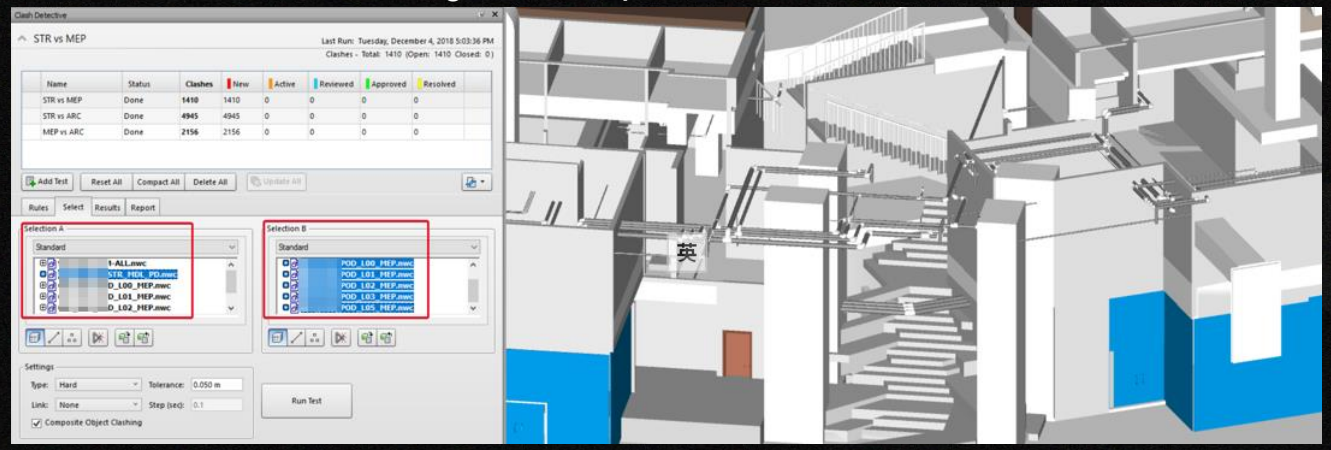




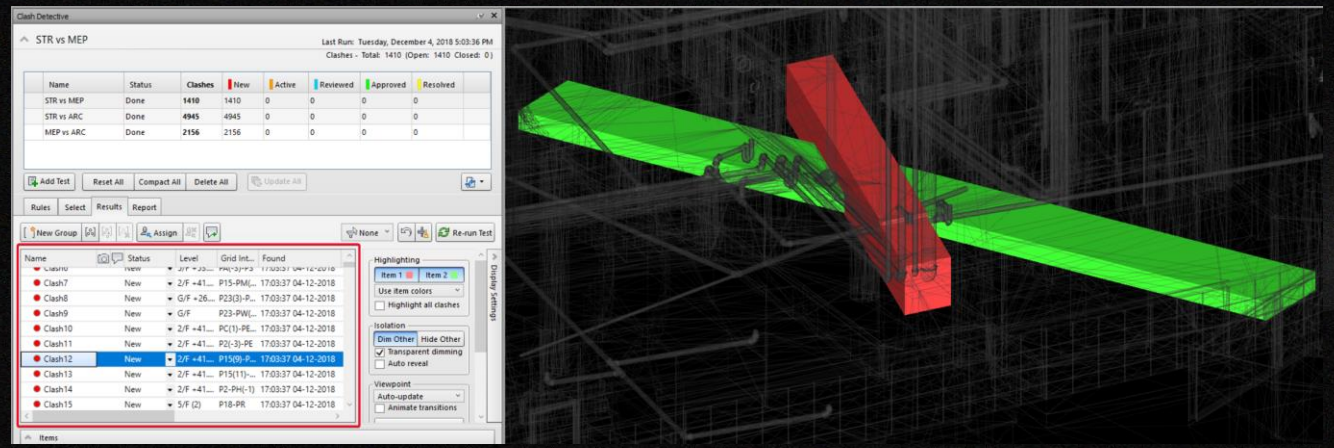
7 Model Audit Checklist

7.2 Interference Check

Interference Check is used to detect problems in the model where two building components are clashing including soft and hard. For interference check, clash detection will be run with using Autodesk Navisworks Manage software throughout with a concentration on resolving clashes prior to submission of the models.



Cross Discipline Clash Detection in Navisworks



Clash result in Navisworks

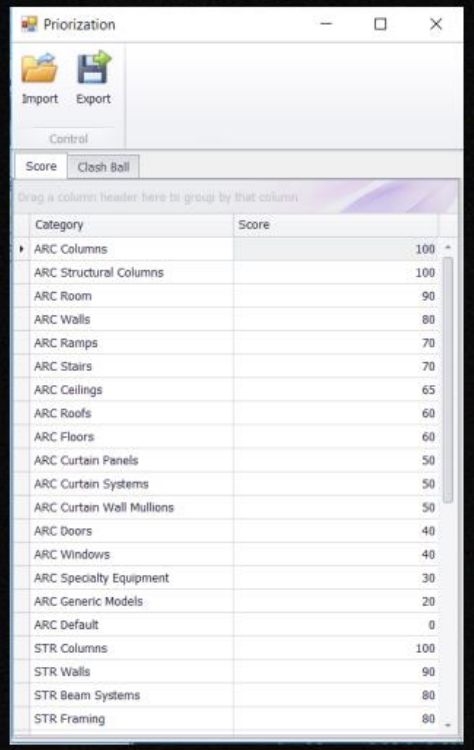
7 Model Audit Checklist

7.2 Interference Check

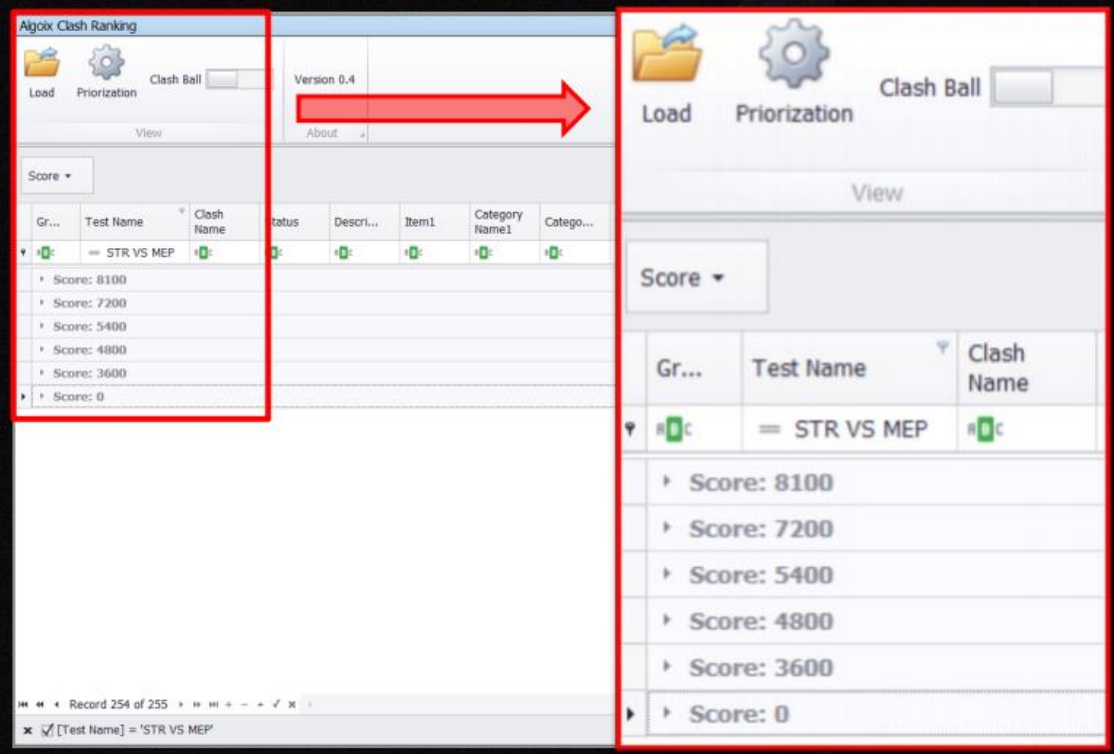
- Review a coordinated MEP model
  - Check clash between Columns & MEP services
  - Check clash between STR Framing & MEP services
  - Check Sloped pipes
  - Check clash between Door & MEP routings…..

CLASH PRIORIZATION

PRIORITIZATION SCORE SETTING



CLASHES GROUPING BY SCORE



7 Model Audit Checklist

7.3 Standard Check

Standard Check is used to ensure that the BIM Standard have been followed (fonts, dimensions, line styles, levels/layers, etc). Naming convention in Chinese should be rejected.

9.5 Line Weights

Line weights control the graphical display of on-screen data as well as all published output. Line weights assigned to Model elements are scale dependent whilst those associated with Annotation objects are fixed.

There are 16 model line weights. Each can be given a plotted thickness across the range of drawing scales as defined below.

- Thin Lines mode **shall not** be used as this distorts the production requirements of publication output and promotes over-modelling and over-detailing.
- Line weights are assigned project-wide by category of component and can be overridden by view and by element. Individual lines on elements can also be overridden. Overriding should be kept to a minimum to aid consistency.
- The plotted appearance of modelled components shall be represented in a manner that provides 'depth' to the drawing and allows for adequate differentiation of elements cut in section, profile view and priority elements.

Pen	1:10	1:20	1:50	1:100	1:200	1:500	Perspective	Annotation
1	0.1300	0.1300	0.1300	0.0600	0.0600	0.0600	0.0600	0.0600
2	0.1500	0.1500	0.1500	0.1300	0.0600	0.0600	0.1300	0.1300
3	0.1800	0.1800	0.1800	0.1500	0.1300	0.0600	0.1500	0.1500
4	0.2000	0.2000	0.2000	0.1800	0.1500	0.1300	0.1800	0.1800
5	0.2500	0.2200	0.2200	0.2000	0.1800	0.1500	0.2000	0.2000
6	0.3500	0.2500	0.2500	0.2200	0.2000	0.1800	0.2200	0.2200
7	0.4000	0.3500	0.3500	0.2500	0.2200	0.2000	0.2500	0.2500
8	0.5000	0.4000	0.4000	0.3500	0.2500	0.2200	0.3500	0.3500
9	0.6000	0.5000	0.5000	0.4000	0.3500	0.2500	0.4000	0.4000
10	0.7000	0.6000	0.6000	0.5000	0.4000	0.3500	0.5000	0.5000
11	1.0000	0.7000	0.7000	0.6000	0.5000	0.4000	0.6000	0.6000
12	1.4000	1.0000	1.0000	0.7000	0.6000	0.5000	0.7000	0.7000
13	2.0000	1.4000	1.4000	1.0000	0.7000	0.6000	1.0000	1.0000
14	3.0000	2.0000	2.0000	1.4000	1.0000	0.7000	1.4000	1.4000
15	4.0000	3.0000	3.0000	2.0000	1.4000	1.0000	2.0000	2.0000
16	5.0000	4.0000	4.0000	3.0000	2.0000	1.4000	3.0000	3.0000

9.6 Line Patterns

The supplied templates contain a number of defined Line Patterns for use in all draughting production work. These Line Patterns are defined below and any additional Line Patterns shall be created by the Coordinator and named according to the naming conventions described in Section 0.

Name	Pattern															
	1		2		3		4		5		6		7		8	
	Type	Value	Type	Value	Type	Value	Type	Value	Type	Value	Type	Value	Type	Value	Type	Value
Demolished	Dash	3	Space	1.5												
Elevation Swing	Dash	2	Space	1												
Grid Line	Dash	12	Space	3	Dash	3	Space	3								
Hidden	Dash	4	Space	2												
Overhead	Dash	2.5	Space	1.5												
Window Swing	Dash	6	Space	3	Dash	3	Space	3								
AEC_Centre	Dash	12	Space	4	Dash	4	Space	4								
AEC_Dash 1.5mm	Dash	1.5	Space	1.5												
AEC_Dash 3mm	Dash	3	Space	3												
AEC_Dash 3mm Loose	Dash	3	Space	6												
AEC_Dash 9mm	Dash	9	Space	4												
AEC_Dash Dot 3mm	Dash	3	Space	2	Dot		Space	2								
AEC_Dash Dot 6mm	Dash	6	Space	4	Dot		Space	4								
AEC_Dash Dot Dot 6mm	Dash	6	Space	4	Dot		Space	4	Dot		Space	4				
AEC_Dot 4mm	Dot		Space	4												
AEC_Dot 1mm	Dot		Space	1												
AEC_Dot 2mm	Dot		Space	2												
AEC_Double Dash	Dash	15	Space	4	Dash	6	Space	4	Dash	6	Space	4				
AEC_Hidden 2mm	Dash	2	Space	1												
AEC_Triple Dash	Dash	15	Space	4	Dash	6	Space	4	Dash	6	Space	4	Dash	6	Space	4

9.7 Line Styles

Line Styles are defined in the supplied templates as a project setting. These styles are documented below and any additional Line Styles shall be created by the Coordinator and named according to the naming conventions described in Section 0.

Category	Line Weight	Line Colour	Line Pattern
	Projection		
Lines	3	RGB 000-161-000	Solid
Area Boundary	12	RGB 128-000-255	Solid
Beyond	3	Black	Dashed
Centreline	3	Black	AEC_Centre
Demolished	3	Black	Demolished
Hidden	3	Black	Hidden
Overhead	2	Black	Overhead
Room Separation	12	Cyan	AEC_Dash 3mm
Sketch	6	Magenta	Solid
Space Separation	12	Green	AEC_Dash 3mm
Axis of Rotation	12	Blue	AEC_Centre
Hidden Lines	3	RGB 000-161-000	AEC_Dash 3mm
Insulation Batting Lines	3	Black	Solid
Lines	3	RGB 000-161-000	Solid
Medium Lines	5	Black	Solid
Thin Lines	1	Black	Solid
Wide Lines	10	Black	Solid
General			
AEC_1-Solid	1	Black	Solid
AEC_3-Solid	3	Black	Solid
AEC_5-Solid	5	Black	Solid
AEC_6-Solid	6	Black	Solid
AEC_7-Solid	7	Black	Solid
AEC_8-Solid	8	Black	Solid
AEC_9-Solid	9	Black	Solid
AEC_10-Solid	10	Black	Solid
Architectural			
AEC_10-DPC	10	Magenta	Solid
AEC_10-DPM	10	RGB 000-128-000	AEC_Double Dash
Structural			
AEC_8-RNF_Mesh	8	Black	AEC_Dash Dot 6mm
AEC_11-Rebar	11	Black	Solid

Information from AEC (UK) BIM Protocol for Autodesk Revit

7 Model Audit Checklist

7.3 Standard Check

7.3.1 General Standard Check for all model

7.3.1.1 Project Revit folder structure

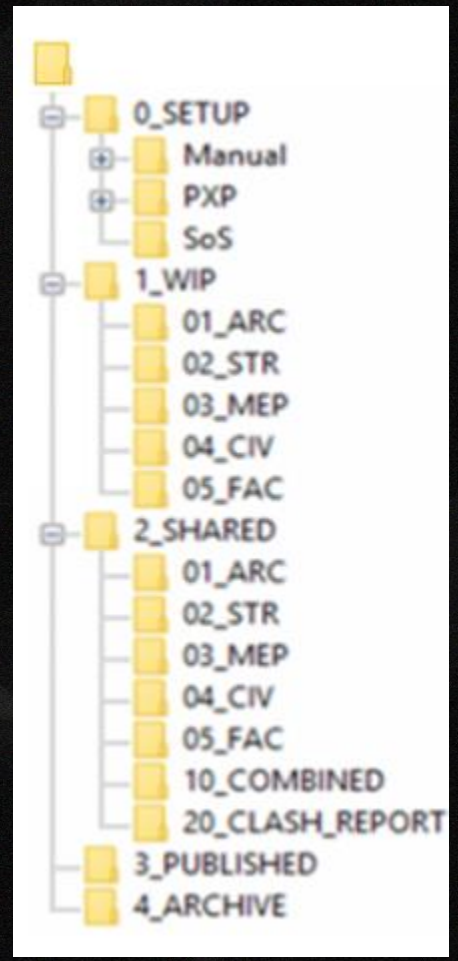
Details can be found in **BIM Standard** and **Project Execution Plan (PXP)**

For BIM Standard
CIC BIM Standard Section 4.1 “Folder Structure”……“*BIM Standard shall be stored within the project filling system*.”

For PXP
If there is a Common Data Environment (CDE) or FTP in your project... It is suggested that to use the folder structure in PXP Section 6.2.2 “Work in Progress”

7.3.1.2 Consultant Incoming CAD files - Consultants in folder

A folder in CDE to save the CAD file from designer.



Folder structure of the project

7 Model Audit Checklist

7.3 Standard Check

7.3.1 General Standard Check for all model

7.3.1.3 Revit Working File Naming

PXP Section 4.2.4 “Model Naming Structure” mentioned that “According to BS1192:2007, model naming structure should be followed or as an alternative the file naming convention as below:

[Project] – [Author] – [Discipline] – [Type] – [Document Number] – [Building Zone] – [Building Level] – [Workstage]

Definition	Code Format	Details
Project	1 to 8 alphanumeric	Project reference coding
Author	3 alphanumeric	The list of agent responsible codes can be downloaded from the Development Bureau website at: www.devb-wb.gov.hk/cswp
Discipline	3 alphanumeric	Indicates the discipline code
Type	3 alphanumeric	Document Type
Document Number	4 alphanumeric	Identifier of the document / file number
Building Zone	3 alphanumeric	Identifier of the building, area, phase or zone of the project the file is relates to if the project is sub-dived by zones
Building Level	3 alphanumeric	Identifier of the level
Workstage	3 alphanumeric	Identifier of the project workstage

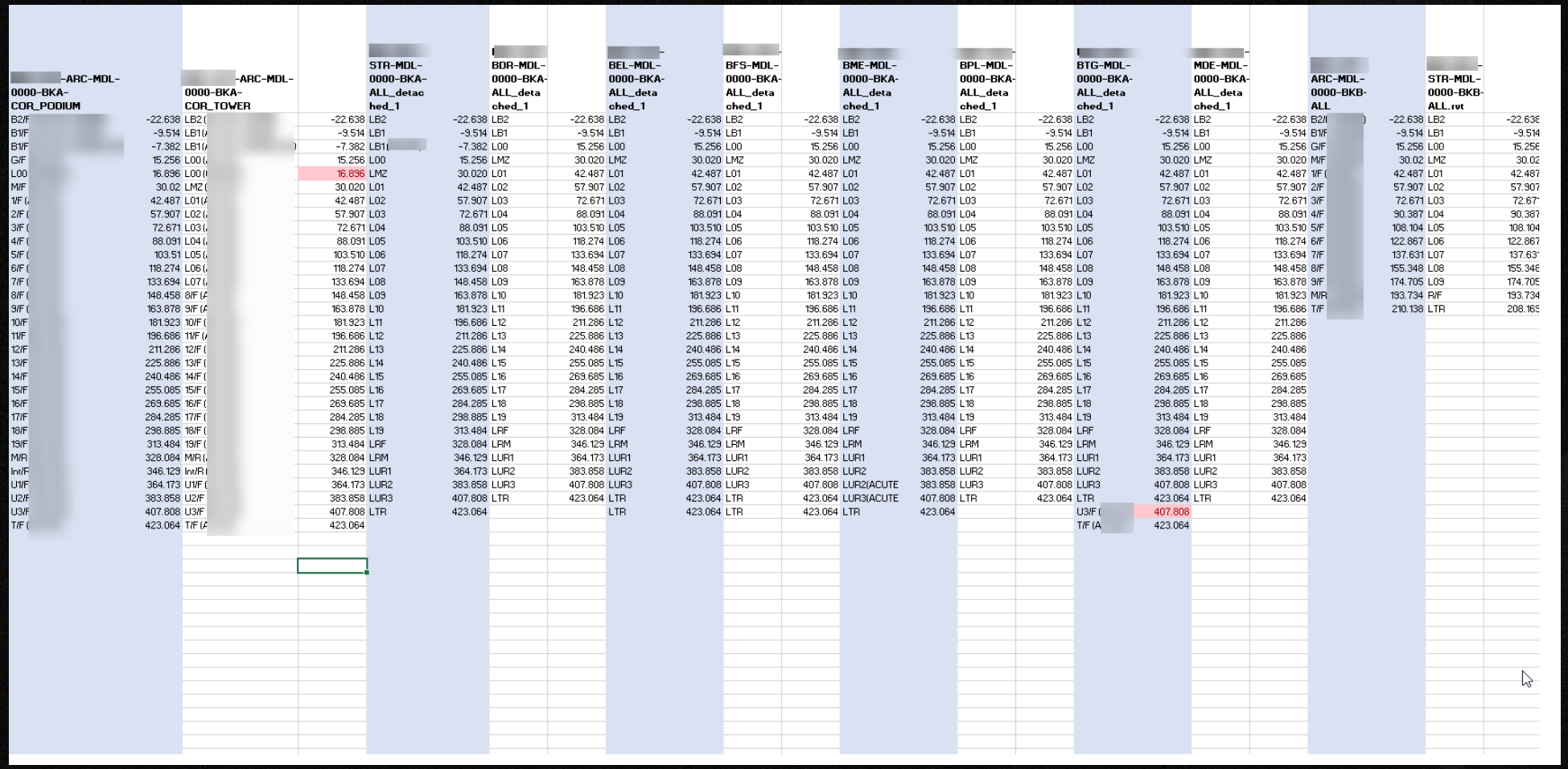
[Discipline]:

ACO	–	Acoustic Engineering
ARC	–	Architecture
BIM	–	Building Information Modelling
BEL	–	Electrical Engineering
BFS	–	Fire Services Engineering
BLT	–	Lighting Design
BME	–	Mechanical Services Engineering
BDR	–	Drainage Engineering
BPL	–	Plumbing Engineering
BTG	–	Town Gas
CIV	–	Civil Engineering
ELV	–	Extra Low Voltage System Engineering

7 Model Audit Checklist

7.3 Standard Check

7.3.1 General Standard Check for all model



[redacted]-ARC-MDL-0000-BKA-COR_PODIUM		[redacted]-ARC-MDL-0000-BKA-COR_TOWER		STR-MDL-0000-BKA-ALL_detached_1		BDR-MDL-0000-BKA-ALL_detached_1		BEL-MDL-0000-BKA-ALL_detached_1		BFS-MDL-0000-BKA-ALL_detached_1		BME-MDL-0000-BKA-ALL_detached_1		BPL-MDL-0000-BKA-ALL_detached_1		BTG-MDL-0000-BKA-ALL_detached_1		MDE-MDL-0000-BKA-ALL_detached_1		ARC-MDL-0000-BKB-ALL		STR-MDL-0000-BKB-ALL.rvt	
B2/F	-22.638	LB2	-22.638	LB2	-22.638	LB2	-22.638	LB2	-22.638	LB2	-22.638	LB2	-22.638	LB2	-22.638	LB2	-22.638	LB2	-22.638	B2/F	-22.638	LB2	-22.638
B1/F	-9.514	LB1	-9.514	LB1	-9.514	LB1	-9.514	LB1	-9.514	LB1	-9.514	LB1	-9.514	LB1	-9.514	LB1	-9.514	LB1	-9.514	B1/F	-9.514	LB1	-9.514
B1/F	-7.382	LB1	-7.382	LB1	-7.382	L00	15.256	L00	15.256	L00	15.256	L00	15.256	L00	15.256	L00	15.256	L00	15.256	G/F	15.256	L00	15.256
G/F	15.256	L00	15.256	L00	15.256	LMZ	30.020	LMZ	30.020	LMZ	30.020	LMZ	30.020	LMZ	30.020	LMZ	30.020	LMZ	30.020	M/F	30.02	LMZ	30.02
L00	16.896	L00	16.896	LMZ	30.020	L01	42.487	L01	42.487	L01	42.487	L01	42.487	L01	42.487	L01	42.487	L01	42.487	1/F	42.487	L01	42.487
M/F	30.02	LMZ	30.020	L01	42.487	L02	57.907	L02	57.907	L02	57.907	L02	57.907	L02	57.907	L02	57.907	L02	57.907	2/F	57.907	L02	57.907
1/F	42.487	L01	42.487	L02	57.907	L03	72.671	L03	72.671	L03	72.671	L03	72.671	L03	72.671	L03	72.671	L03	72.671	3/F	72.671	L03	72.67
2/F	57.907	L02	57.907	L03	72.671	L04	88.091	L04	88.091	L04	88.091	L04	88.091	L04	88.091	L04	88.091	L04	88.091	4/F	90.387	L04	90.387
3/F	72.671	L03	72.671	L04	88.091	L05	103.510	L05	103.510	L05	103.510	L05	103.510	L05	103.510	L05	103.510	L05	103.510	5/F	108.104	L05	108.104
4/F	88.091	L04	88.091	L05	103.510	L06	118.274	L06	118.274	L06	118.274	L06	118.274	L06	118.274	L06	118.274	L06	118.274	6/F	122.867	L06	122.867
5/F	103.51	L05	103.510	L06	118.274	L07	133.694	L07	133.694	L07	133.694	L07	133.694	L07	133.694	L07	133.694	L07	133.694	7/F	137.631	L07	137.63
6/F	118.274	L06	118.274	L07	133.694	L08	148.458	L08	148.458	L08	148.458	L08	148.458	L08	148.458	L08	148.458	L08	148.458	8/F	155.348	L08	155.346
7/F	133.694	L07	133.694	L08	148.458	L09	163.878	L09	163.878	L09	163.878	L09	163.878	L09	163.878	L09	163.878	L09	163.878	9/F	174.705	L09	174.705
8/F	148.458	8/F	148.458	L09	163.878	L10	181.923	L10	181.923	L10	181.923	L10	181.923	L10	181.923	L10	181.923	L10	181.923	M/R	193.734	R/F	193.734
9/F	163.878	9/F	163.878	L10	181.923	L11	196.686	L11	196.686	L11	196.686	L11	196.686	L11	196.686	L11	196.686	L11	196.686	T/F	210.138	LTR	208.169
10/F	181.923	10/F	181.923	L11	196.686	L12	211.286	L12	211.286	L12	211.286	L12	211.286	L12	211.286	L12	211.286	L12	211.286				
11/F	196.686	11/F	196.686	L12	211.286	L13	225.886	L13	225.886	L13	225.886	L13	225.886	L13	225.886	L13	225.886	L13	225.886				
12/F	211.286	12/F	211.286	L13	225.886	L14	240.486	L14	240.486	L14	240.486	L14	240.486	L14	240.486	L14	240.486	L14	240.486				
13/F	225.886	13/F	225.886	L14	240.486	L15	255.085	L15	255.085	L15	255.085	L15	255.085	L15	255.085	L15	255.085	L15	255.085				
14/F	240.486	14/F	240.486	L15	255.085	L16	269.685	L16	269.685	L16	269.685	L16	269.685	L16	269.685	L16	269.685	L16	269.685				
15/F	255.085	15/F	255.085	L16	269.685	L17	284.285	L17	284.285	L17	284.285	L17	284.285	L17	284.285	L17	284.285	L17	284.285				
16/F	269.685	16/F	269.685	L17	284.285	L18	298.885	L18	298.885	L18	298.885	L18	298.885	L18	298.885	L18	298.885	L18	298.885				
17/F	284.285	17/F	284.285	L18	298.885	L19	313.484	L19	313.484	L19	313.484	L19	313.484	L19	313.484	L19	313.484	L19	313.484				
18/F	298.885	18/F	298.885	L19	313.484	LRF	328.084	LRF	328.084	LRF	328.084	LRF	328.084	LRF	328.084	LRF	328.084	LRF	328.084				
19/F	313.484	19/F	313.484	LRF	328.084	LRM	346.129	LRM	346.129	LRM	346.129	LRM	346.129	LRM	346.129	LRM	346.129	LRM	346.129				
M/R	328.084	M/R	328.084	LRF	328.084	LUR1	364.173	LUR1	364.173	LUR1	364.173	LUR1	364.173	LUR1	364.173	LUR1	364.173	LUR1	364.173				
Int/F	346.129	Int/R	346.129	LUR1	364.173	LUR2	383.858	LUR2	383.858	LUR2	383.858	LUR2	383.858	LUR2	383.858	LUR2	383.858	LUR2	383.858				
U1/F	364.173	U1/F	364.173	LUR2	383.858	LUR3	407.808	LUR3	407.808	LUR3	407.808	LUR2(ACUTE	383.858	LUR3	407.808	LUR3	407.808	LUR3	407.808				
U2/F	383.858	U2/F	383.858	LUR3	407.808	LTR	423.064	LTR	423.064	LTR	423.064	LUR3(ACUTE	407.808	LTR	423.064	LTR	423.064	LTR	423.064				
U3/F	407.808	U3/F	407.808	LTR	423.064			LTR	423.064	LTR	423.064	LTR	423.064			U3/F	407.808						
T/F	423.064	T/F	423.064													T/F	423.064						

Example of Revit Working File Naming

7 Model Audit Checklist

7.3 Standard Check

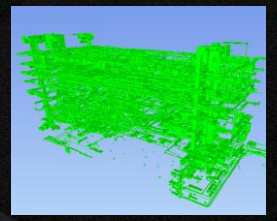
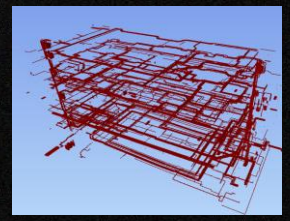
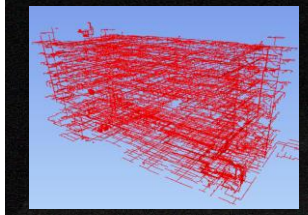
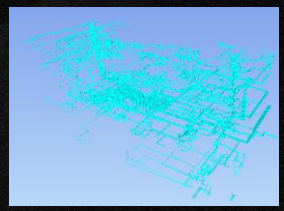
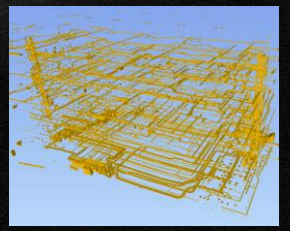
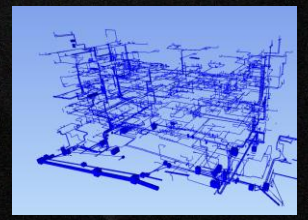
7.3.1 General Standard Check for all model

7.3.1.3 Revit Working File Naming

- In design stage, MEP models should be segregated according to their disciplines.

[Discipline]:

ACO	–	Acoustic Engineering
ARC	–	Architecture
BIM	–	Building Information Modelling
BEL	–	Electrical Engineering
BFS	–	Fire Services Engineering
BLT	–	Lighting Design
BME	–	Mechanical Services Engineering
BDR	–	Drainage Engineering
BPL	–	Plumbing Engineering
BTG	–	Town Gas
CIV	–	Civil Engineering
ELV	–	Extra Low Voltage System Engineering

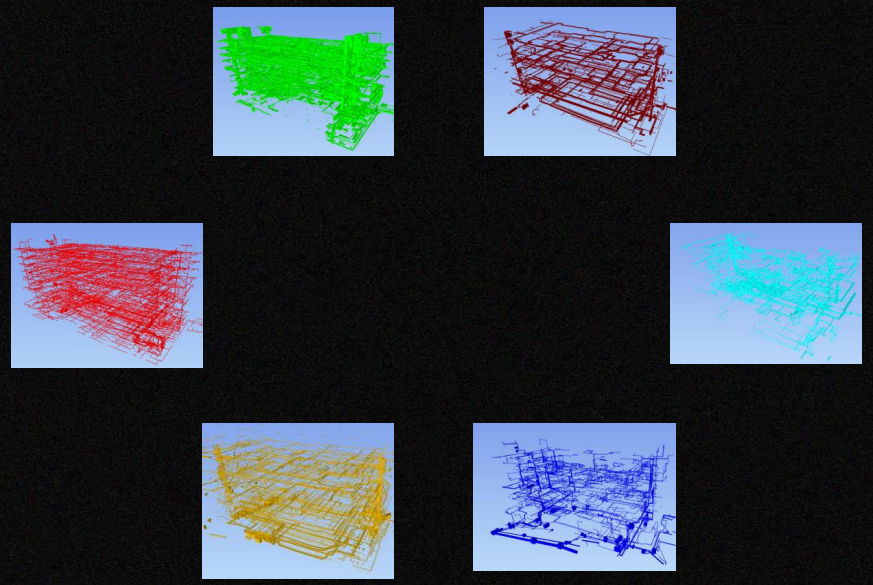
7 Model Audit Checklist

7.3 Standard Check

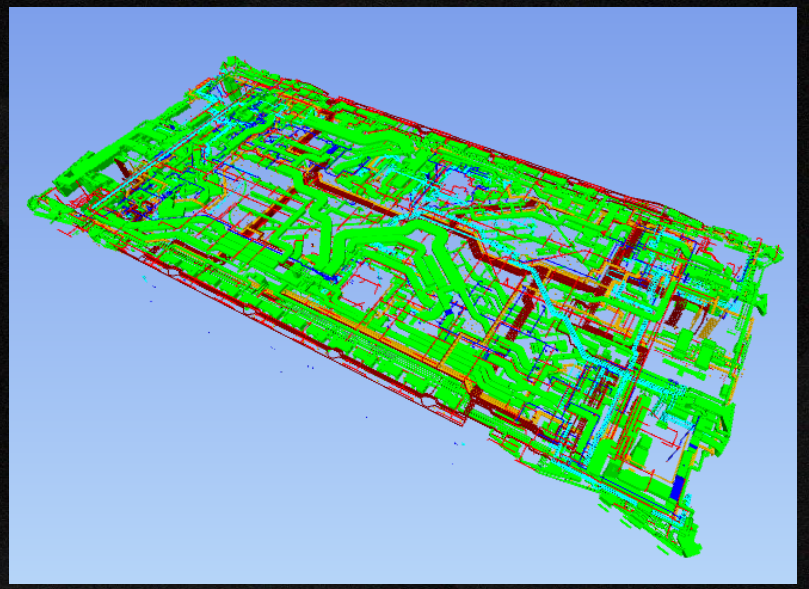
7.3.1 General Standard Check for all model

7.3.1.3 **Revit Working File Naming**

- In construction stage, there are several model segregation methods on MEP models.



Independent models for each discipline



Combined disciplines models for each floor

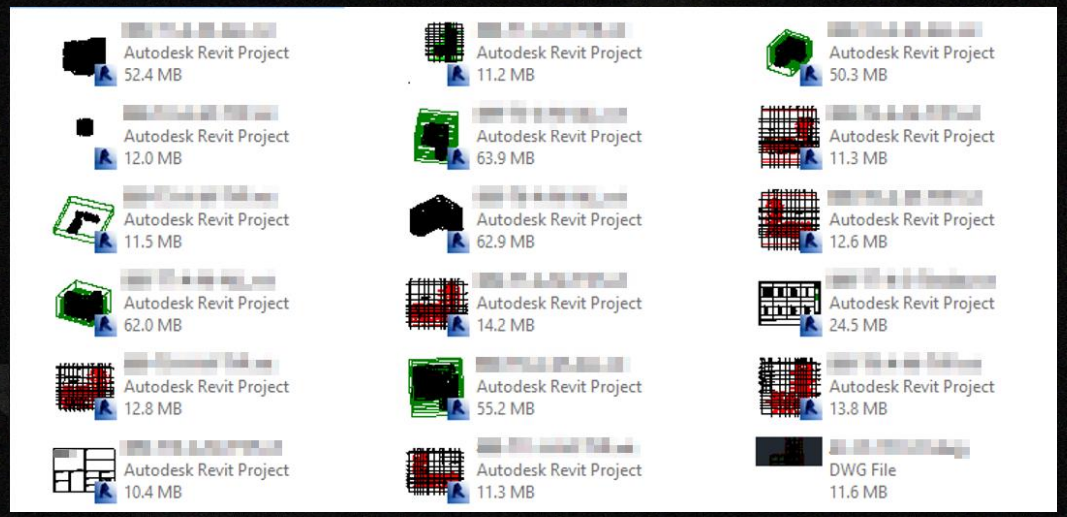
7 Model Audit Checklist

7.3 Standard Check

7.3.1 General Standard Check for all model

7.3.1.4 **File size**

File size should not exceed 400MB



7.3.1.5 **Revit version - Refer to Software version**

CIC BIM Standard Section 1.5.6.1 *"The BIM and CAD software and versions that will be used by the design team and contractor shall be agrees before starting the project."*

PXP Section 6.4 "Software" also mentioned the version of software version.

6.4 Software

The following software choices have been established to deliver the prioritised BIM objectives. Any software version changes and updates must be explicitly agreed by design team, contractor (post tender) and the BIM Manager before implementation.

BIM Use	User	Software	Version
Design Authoring	ARC/CIV/BSE/CON/FAC/STR	Revit	2018
Spatial Planning	ARC	Revit	2018
Libraries of assemblies / systems / components	ARC/CIV/BSE/CON/FAC/STR	Revit	2018
3D Coordination	ARC/CIV/BSE/CON/FAC/STR	Navisworks Manage/ Fuzor	2018
Design Reviews	ARC/CIV/BSE/CON/FAC/STR/ Client	Navisworks Freedom / Revit / Design Review/ Fuzor	2018

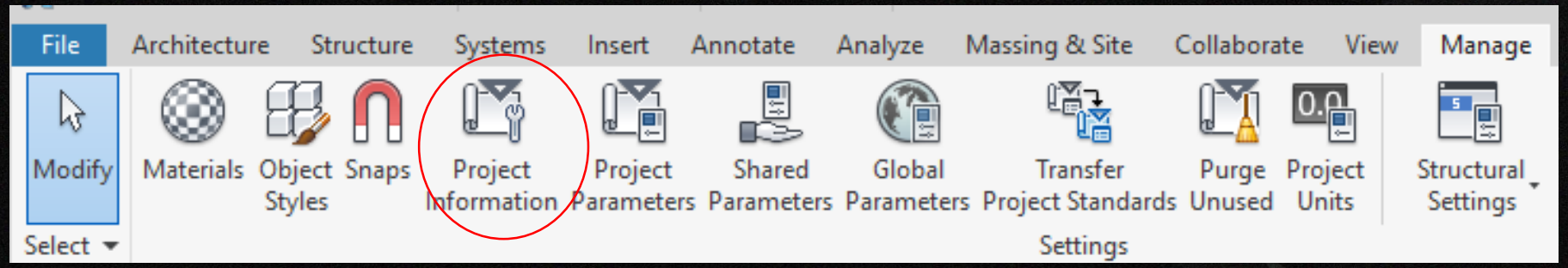
7 Model Audit Checklist

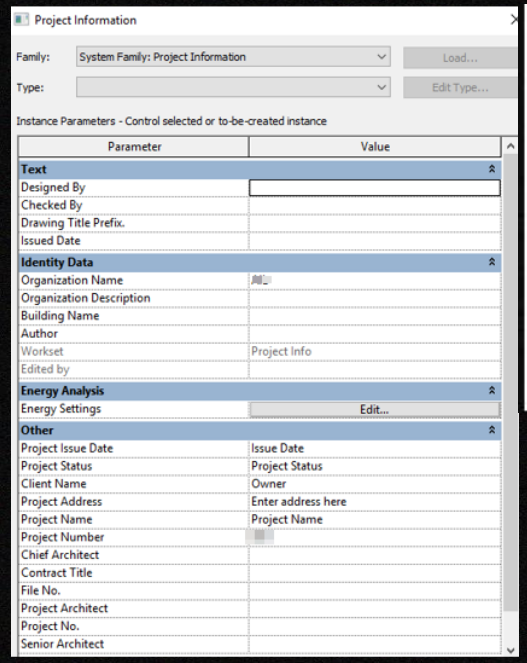
7.3 Standard Check

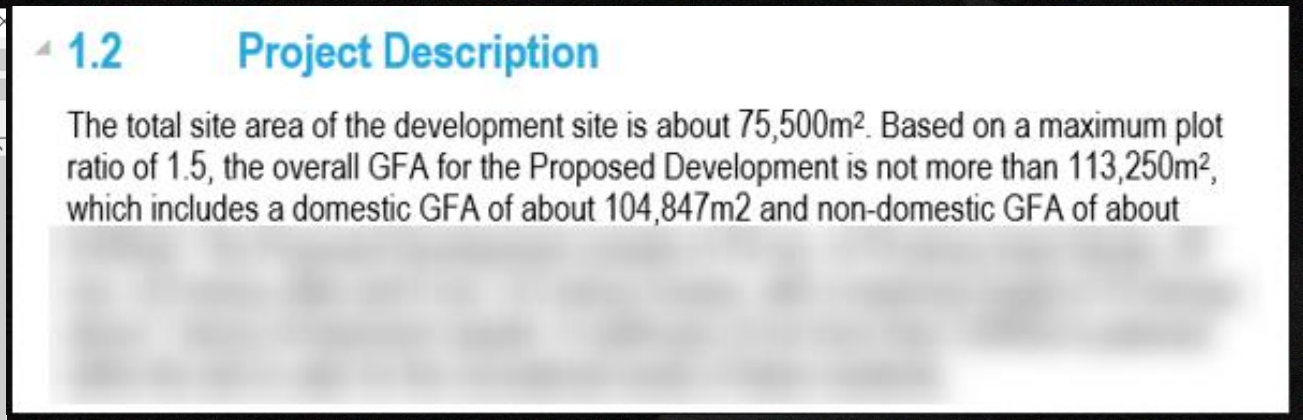
7.3.1 General Standard Check for all model

7.3.1.6 Project information loaded

Information of project should be completed. For the information, please refer to PXP section 1.2 “Project Description”







1.2 Project Description

The total site area of the development site is about 75,500m². Based on a maximum plot ratio of 1.5, the overall GFA for the Proposed Development is not more than 113,250m², which includes a domestic GFA of about 104,847m2 and non-domestic GFA of about

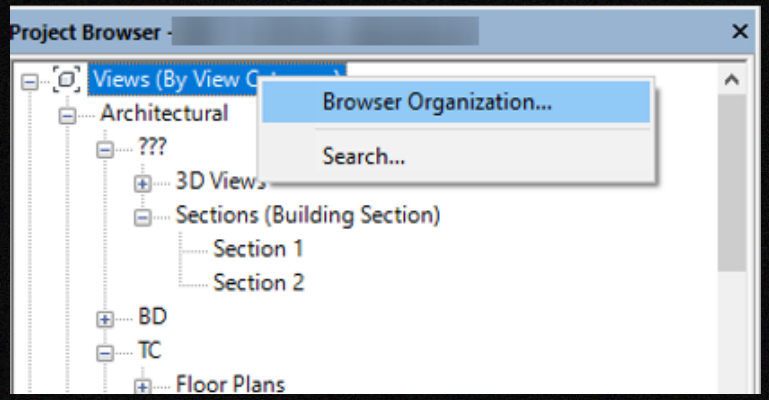
7 Model Audit Checklist

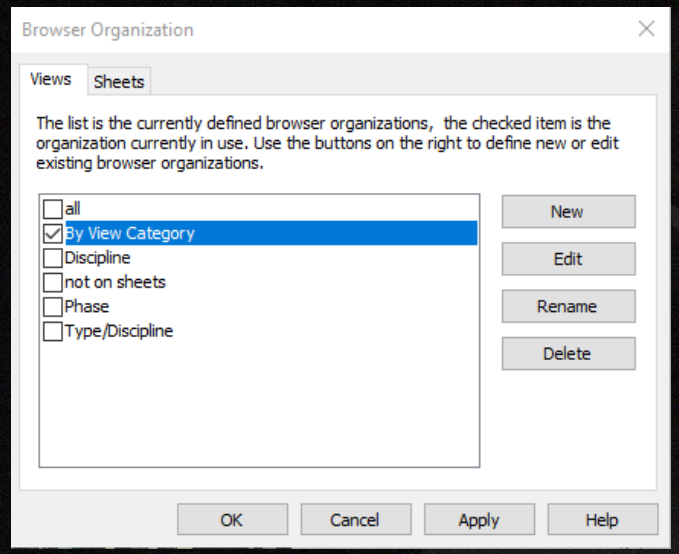
7.3 Standard Check

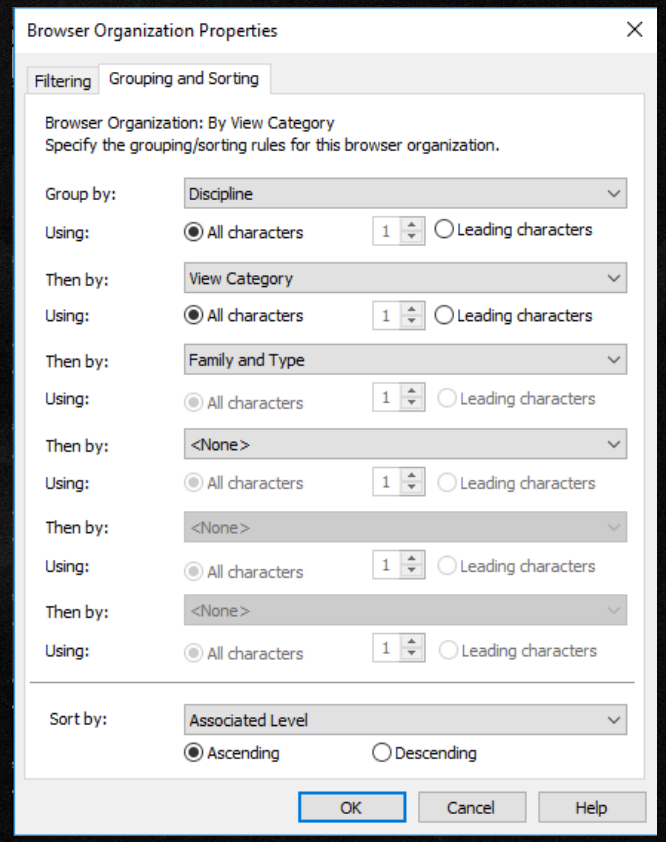
7.3.1 General Standard Check for all model

7.3.1.4 Project browser organization clear

Make sure the structure of the project browser is clear







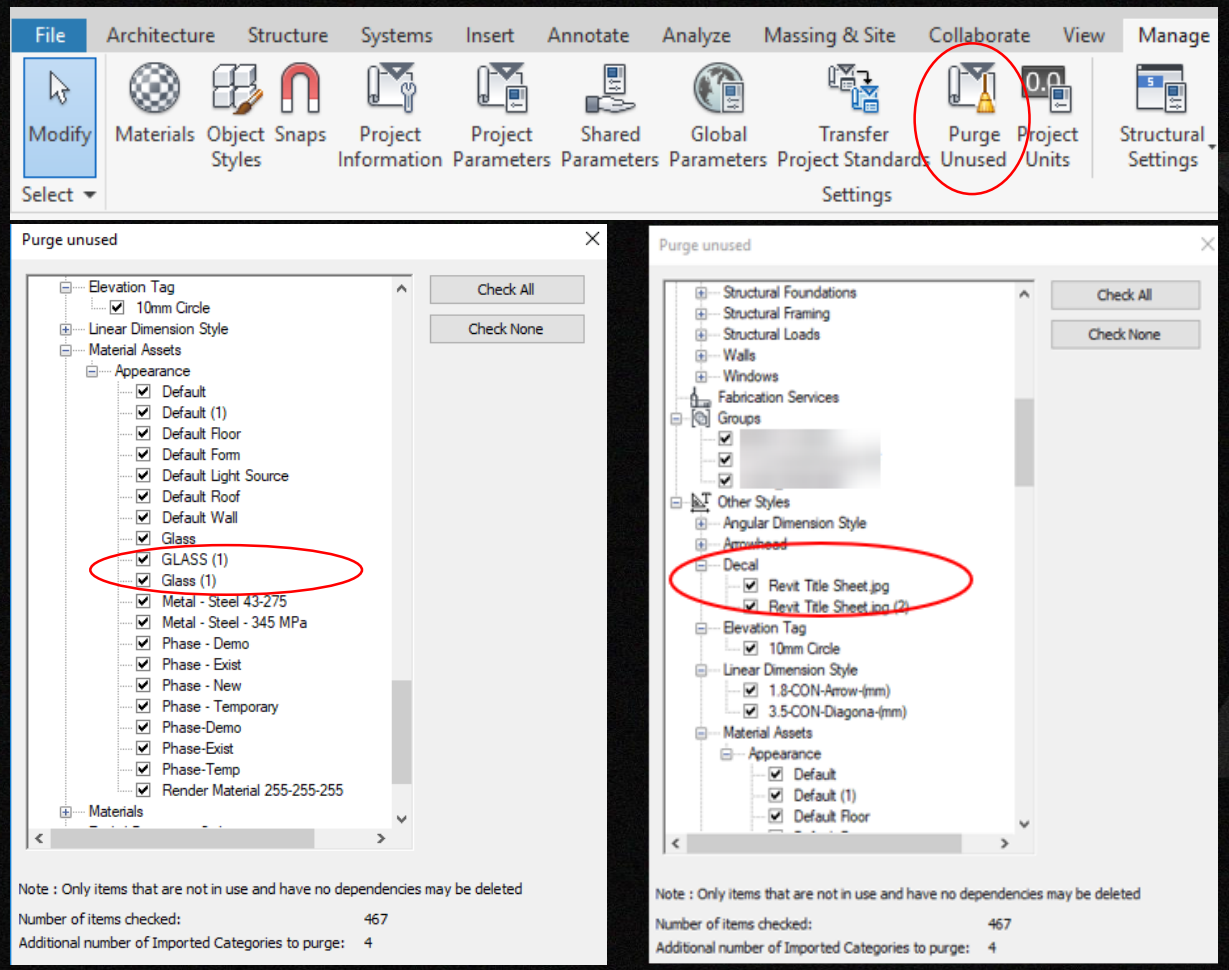
7 Model Audit Checklist

7.3 Standard Check

7.3.1 General Standard Check for all model

7.3.1.8 Purged file

Purged unused information



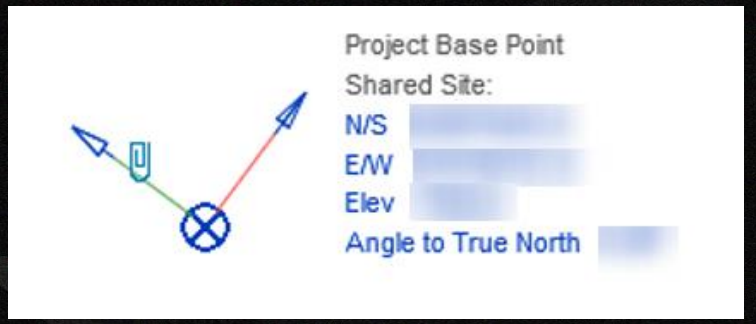
7 Model Audit Checklist

7.3 Standard Check

7.3.1 General Standard Check for all model

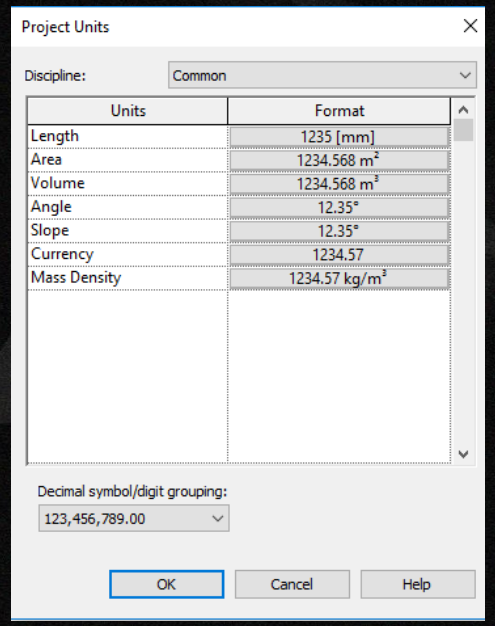
7.3.1.9 Correct Coordinates system

According to CIC Standard Section 1.5.5.1 BIM Origin & Orientation, the origin or base point and its orientation of the project shall be based on the project location and its reference to the Hong Kong 1980 Grid (HK1980 Grid) and Hong Kong Principal Datum.



7.3.1.10 Correct units & rounding

To calculate GFA area, the unit of project should be 0.001m². The unit of length is mm.



7 Model Audit Checklist

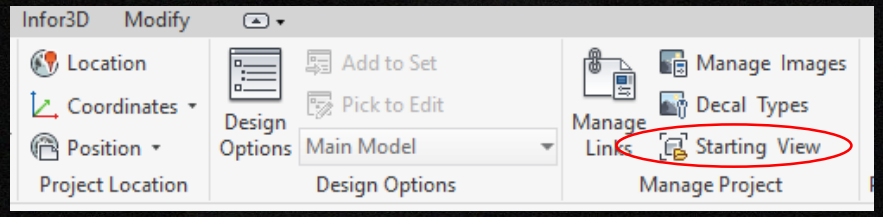
7.3 Standard Check

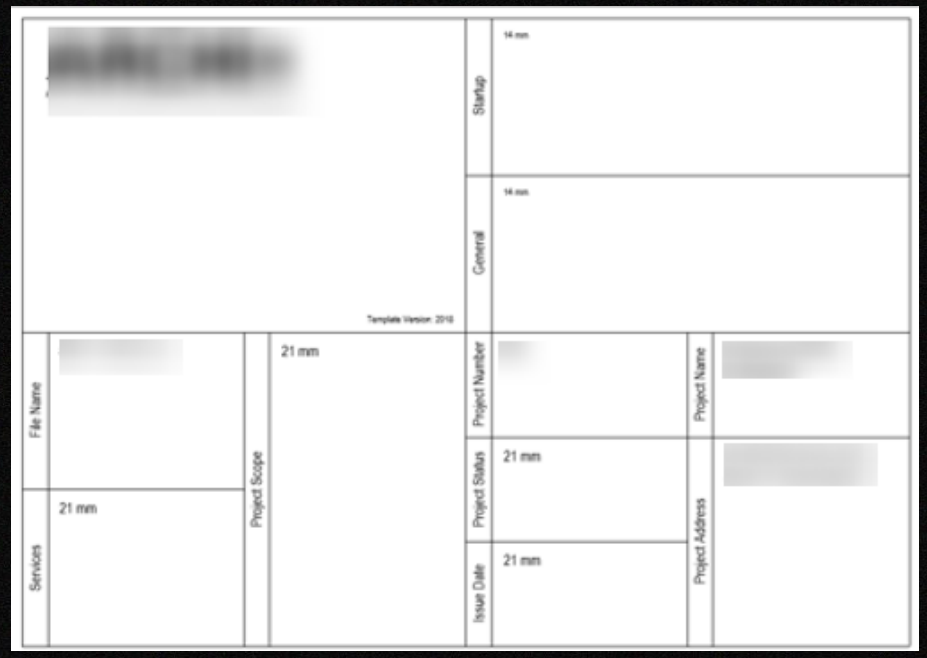
7.3.1 General Standard Check for all model

7.3.1.11 & 7.3.1.12. Starting view presence and its information

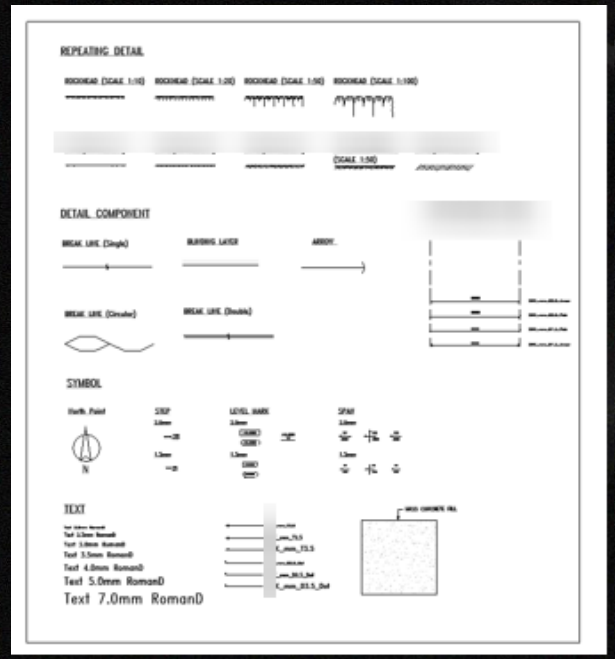
Necessary Information including:

- Name of company
- Project information
- Project name
- Project number

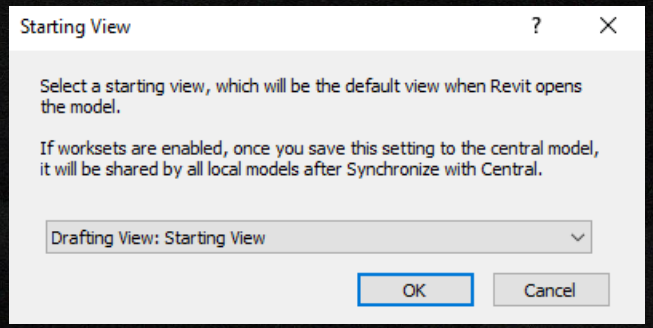




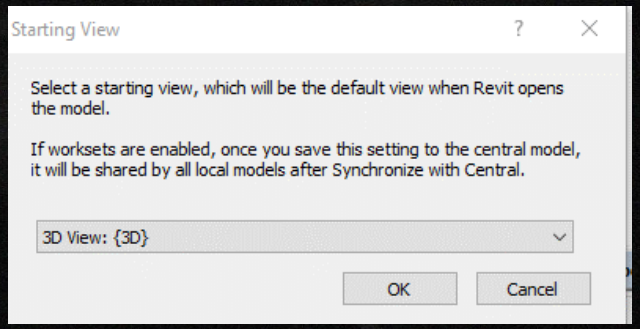
GOOD Example



BAD Example



GOOD Example



BAD Example

7 Model Audit Checklist

7.3 Standard Check

7.3.2 Information an Naming

7.3.2.14 Sheet Naming

Refer to CIC Standard "*Sheet naming shall be based on the document and drawing numbering protocols established for the project.*"

These names automatically match the text as it appears in the title block and any schedule."

Example of ARC Model

7 Model Audit Checklist

7.3 Standard Check

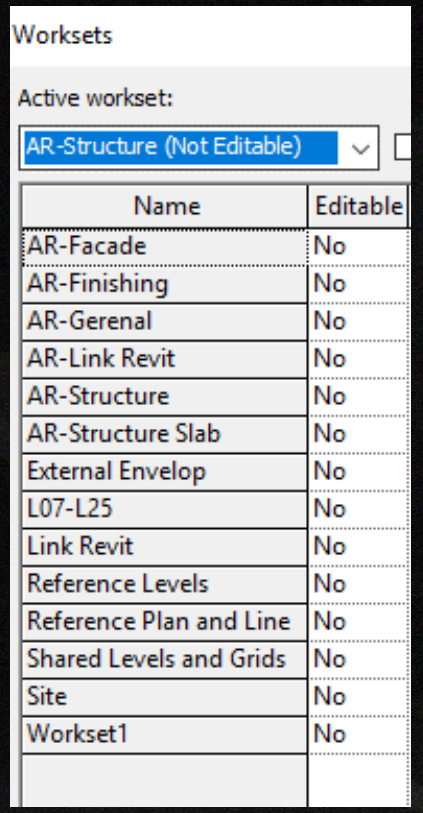
7.3.2 Information and Naming

7.3.2.15 Workset Naming

CIC BIM Standard Section 2.3.1“*... the Collaborative Information Management Standard shall address the model coordination procedues*”

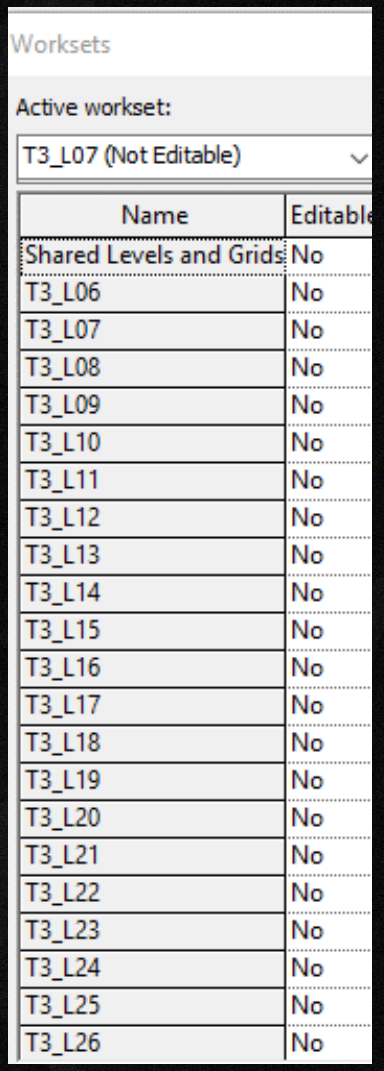
Workset of ARC Model

1. External Envelop
2. Vertical transportation
3. Site
4. ARC (Structure)



Name	Editable
AR-Facade	No
AR-Finishing	No
AR-Gerenal	No
AR-Link Revit	No
AR-Structure	No
AR-Structure Slab	No
External Envelop	No
L07-L25	No
Link Revit	No
Reference Levels	No
Reference Plan and Line	No
Shared Levels and Grids	No
Site	No
Workset1	No

Example of ARC Model



Name	Editable
Shared Levels and Grids	No
T3_L06	No
T3_L07	No
T3_L08	No
T3_L09	No
T3_L10	No
T3_L11	No
T3_L12	No
T3_L13	No
T3_L14	No
T3_L15	No
T3_L16	No
T3_L17	No
T3_L18	No
T3_L19	No
T3_L20	No
T3_L21	No
T3_L22	No
T3_L23	No
T3_L24	No
T3_L25	No
T3_L26	No

Example of STR Model

7 Model Audit Checklist

7.3 Standard Check

7.3.2 Information and Naming

7.3.2.16 Material Naming – According to HA S7.tandard D.MET Section 2.2 (e)

Individual Finish Materials (Stored Inside Projects) Format:

<Finish Type> - <Manufacturer> - <Code> - <Descriptor>

Examples:

- Paint – AEC Paint – AC440 – Vintage Brown Matte
- Glass – AEC Glazing – Series 1205 – Clear
- Aluminium – AEC Metal – AC120 – Anodized (Clear)
- Fabric – AEC Fabrics –AC F820 – Hounds tooth – Black/White

For QTO purpose, measure the volume of concrete, the concrete grade shall be mark down for each element

7 Model Audit Checklist

7.3 Standard Check

7.3.2 Information and Naming

7.3.2.17 Line Styles Naming

Refer to AEC (UK) BIM Protocol for Autodesk Revit Section 8.3.

Format of Line Style Name *"Company Name-Line Weight-Description"*

Format of Line Pattern Name "*Company Name_Description-Line Weight*"

Category	Line Weight Projection	Line Color	Line Pattern
Lines	3	RGB 000-166-000	Solid
<Area Boundary>	12	RGB 128-000-255	Solid
<Beyond>	3	Black	AIL_Dash 1.5mm
<Centerline>	3	Black	AIL_Centre
<Demolished>	3	Black	AIL_Demolished
<Fabric Envelope>	1	RGB 127-127-127	Solid
<Fabric Sheets>	1	RGB 064-064-064	Solid
<Hidden>	3	Black	AIL_Hidden
<Overhead>	2	Black	AIL_Overhead
<Room Separation>	12	Cyan	AIL_Dash 3mm
<Sketch>	6	Magenta	Solid
<Space Separation>	12	Green	AIL_Dash 3mm
AIL_1-Soild	1	Black	Solid
AIL_3-Soilld	3	Black	Solid
AIL_5-Soild	5	Black	Solid
AIL_6-Soild	6	Black	Solid
AIL_7-Soild	7	Black	Solid
AIL_8-Soild	8	Black	Solid
AIL_9-Soild	9	Black	Solid
AIL_10-DPC	10	Magenta	Solid
AIL_10-DPM	10	RGB 000-128-000	AIL_Double Dash

Good Example of ARC Model

Category	Line Weight Projection	Line Color	Line Pattern
Lines	1	RGB 000-166-0	Solid
1 Arup Continuous Line	1	Black	Solid
1 Arup Dashdot Line	1	Black	Solid
5 Arup Continuous Line	5	Black	Solid
<Area Boundary>	6	RGB 128-000-25	Solid
<Beyond>	1	Black	Solid
<Centerline>	1	Black	Center
<Demolished>	1	Black	Demolished
<Fabric Envelope>	1	RGB 127-127-12	Dash
<Fabric Sheets>	1	RGB 064-064-06	Solid
<Hidden>	1	Black	Hidden
<Overhead>	1	Black	Overhead
<Room Separation>	1	Black	Solid
<Sketch>	3	Magenta	Solid
<Space Separation>	1	Black	
Axis of Rotation	6	Blue	Center
CappingBeamSOL	1	Magenta	Aligning Line
Contours	1	PANTONE 808 C	Solid
Hidden Lines	1	RGB 000-166-00	Dash
Insulation Batting Lines	1	Black	Solid
Lines	1	RGB 000-166-00	Solid

Bad Example of ELS Model

11.7 Line Styles

Category	Line Weight Projection	Line Colour	Line Pattern
Lines	3	RGB 000-161-000	Solid
Area Boundary	12	RGB 128-000-255	Solid
Beyond	3	Black	Solid
Centreline	3	Black	AEC_Centre
Demolished	3	Black	Demolished
Hidden	3	Black	Hidden
Overhead	2	Black	Overhead
Room Separation	12	Cyan	AEC_Dash 3mm
Sketch	6	Magenta	Solid
Space Separation	12	Green	AEC_Dash 3mm
Axis of Rotation	12	Blue	AEC_Centre
Hidden Lines	3	RGB 000-161-000	AEC_Dash 3mm
Insulation Batting Lines	3	Black	Solid
Lines	3	RGB 000-161-000	Solid
Medium Lines	5	Black	Solid
Thin Lines	1	Black	Solid
Wide Lines	10	Black	Solid
General			
AEC_1-Solid	1	Black	Solid
AEC_3-Solid	3	Black	Solid
AEC_5-Solid	5	Black	Solid
AEC_6-Solid	6	Black	Solid
AEC_7-Solid	7	Black	Solid
AEC_8-Solid	8	Black	Solid
AEC_9-Solid	9	Black	Solid
AEC_10-Solid	10	Black	Solid
Architectural			
AEC_10-DPC	10	Magenta	Solid
AEC_10-DPM	10	RGB 000-128-000	AEC_Double Dash
Structural			
AEC_8-RNF_Mesh	8	Black	AEC_Dash Dot 6mm
AEC_11-Rebar	11	Black	Solid

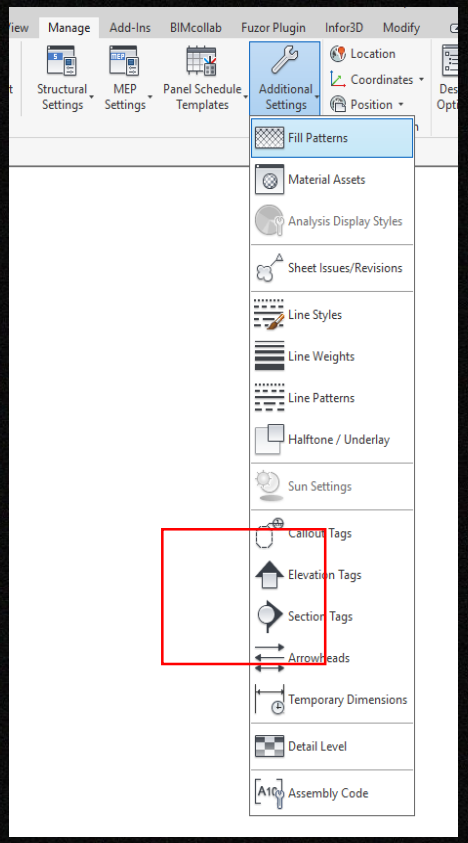
AEC(UK) BIM Protocol Standard naming

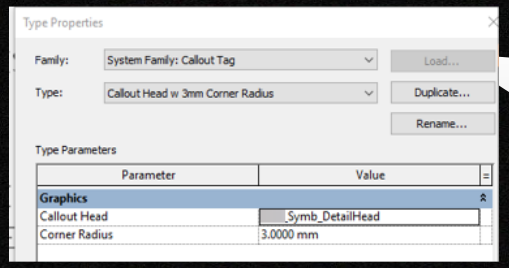
7 Model Audit Checklist

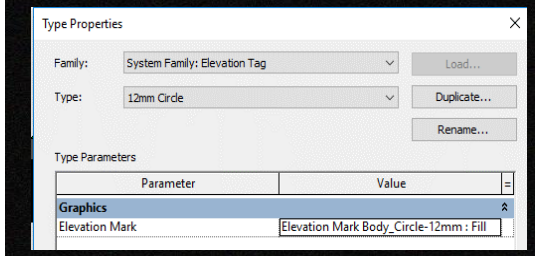
7.3 Standard Check

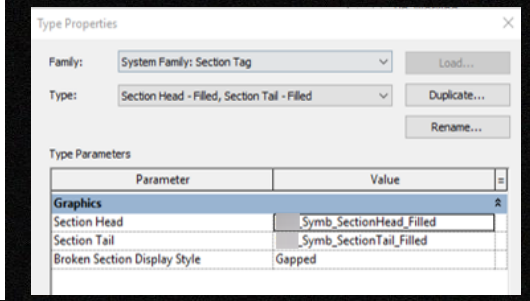
7.3.2 Information and Naming

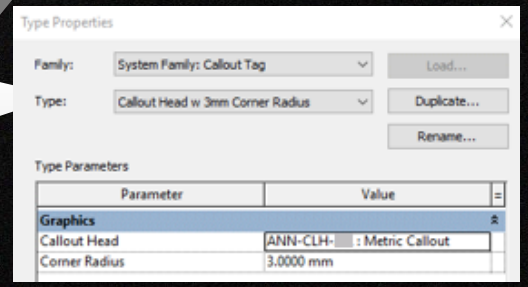
- 7.3.2.18-21. Naming Convention – Callout Tag, Section Tag, Section Tag and Families Naming
- FILP Guideline Section 18 "*Suggested Family Type for use with the FLIP system based on FLIP-specific naming convention system and technical consideration for the local market*"

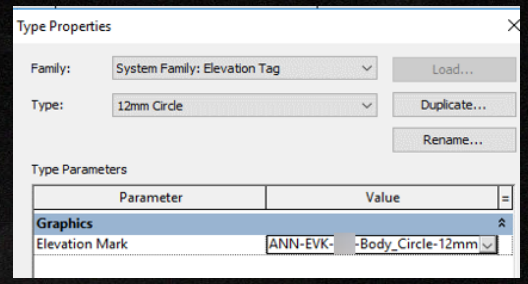


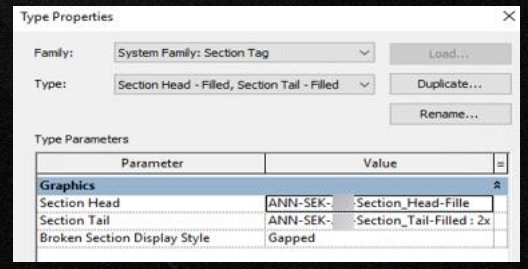












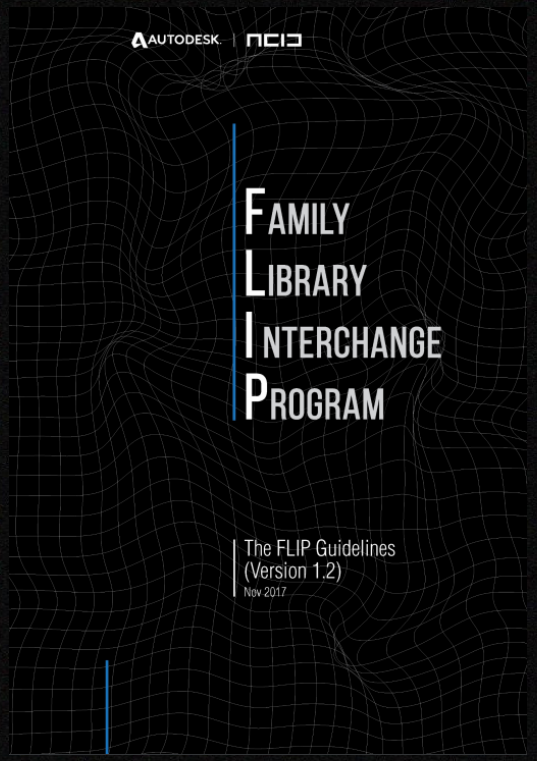
7 Model Audit Checklist

7.3 Standard Check

7.3.2 Information and Naming

7.3.2.21 Families Naming -

Refer to FILP Guideline (FILP Guideline Section 18 “Suggested Family Type for use with the FLIP system based on FLIP-specific naming convention system and technical consideration for the local market”)



The FLIP Guidelines

FLIP Master Type List (Ver. 1.6.5)							Naming convention of the LOADABLE FAMILY is based on the format as below in RED						
Last Updated: 27 APR 2018							<Category> - <Functional Type> - <Originator> - <Descriptor 1> - <Descriptor 2>						
Category based on Revit 2018							DOR – SGL – AEC – Wood – w_Louver .rfa						
							Note: If a Family created does not match any Functional Type, Category is followed by Originator and Descriptor(s)						
Category	A	S	M	E	P	Category (Short form)	Functional Type	Functional Type (Short form)	Originator (Manufacturer)	1st_Descriptor 1	2nd_Descriptor	CSWP Element Code	Suggested Family Template
Annotations	A	S	M	E	P	ANN	Refer to "Loadable_Annotation_Family" tab of this excel table						
Air Terminals			M			ART	Diffuser, Register, Grill	AIR	RVT	Exhaust_Diffuser			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Diffuser, Register, Grill	AIR	RVT	Exhaust_Grill			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Diffuser, Register, Grill	AIR	RVT	Return_Diffuser			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Diffuser, Register, Grill	AIR	RVT	Return_Grill			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Diffuser, Register, Grill	AIR	RVT	Return Register			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Diffuser, Register, Grill	AIR	RVT	Supply_Diffuser			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Diffuser, Register, Grill	AIR	RVT	Supply_Grill			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Diffuser, Register, Grill	AIR	RVT	Supply_Register			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Diffuser, Register, Grill	AIR	RVT	Louver			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Hood	HOD	RVT	Condensate			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Hood	HOD	RVT	Fume			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Hood	HOD	RVT	Grease			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Hood	HOD	RVT	Intake			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Hood	HOD	RVT	Range			Metric Mechanical Equipment.rft
Air Terminals			M			ART	Other	OTR					Metric Mechanical Equipment.rft
Cable Tray Fittings				E		CTF	Channel	CHN	RVT	Horizontal_Bend			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Channel	CHN	RVT	Horizontal_Cross			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Channel	CHN	RVT	Horizontal_Tee			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Channel	CHN	RVT	Reducer			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Channel	CHN	RVT	Union			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Channel	CHN	RVT	Vertical_InBend			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Channel	CHN	RVT	Vertical_OutBend			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Channel	CHN					Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Ladder	LDR	RVT	Horizontal_Bend			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Ladder	LDR	RVT	Horizontal_Cross			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Ladder	LDR	RVT	Horizontal_Tee			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Ladder	LDR	RVT	Reducer			Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Ladder	LDR					Metric Electrical Fixture.rft
Cable Tray Fittings				E		CTF	Ladder	LDR	RVT	Vertical_InBend			Metric Electrical Fixture.rft

FLIP Master Type List

7 Model Audit Checklist

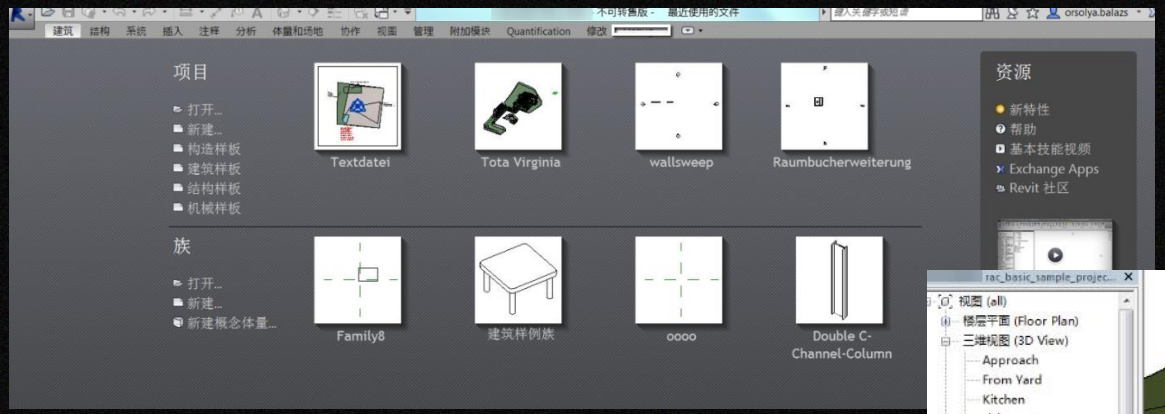
7.3 Standard Check

7.3.2 Information and Naming

7.3.2.21 Families Naming -

Refer to FILP Guideline (FILP Guideline Section 18 “Suggested Family Type for use with the FLIP system based on FLIP-specific naming convention system and technical consideration for the local market”)

Please be noted that there is no in-place families in the model and no Chinese naming convention in the model.

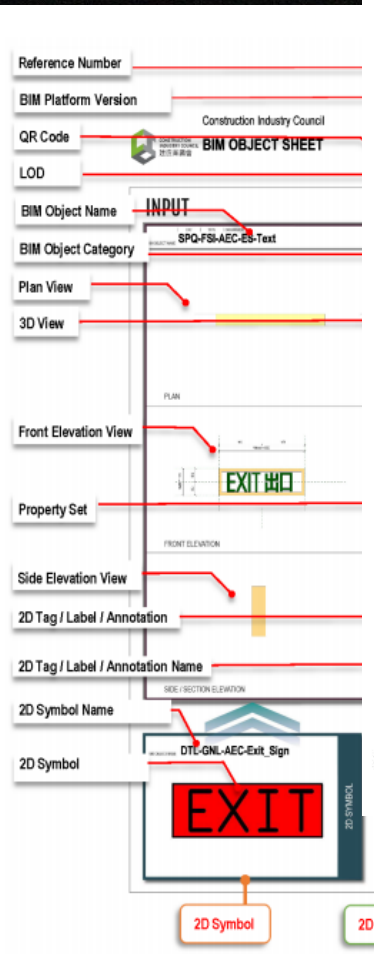


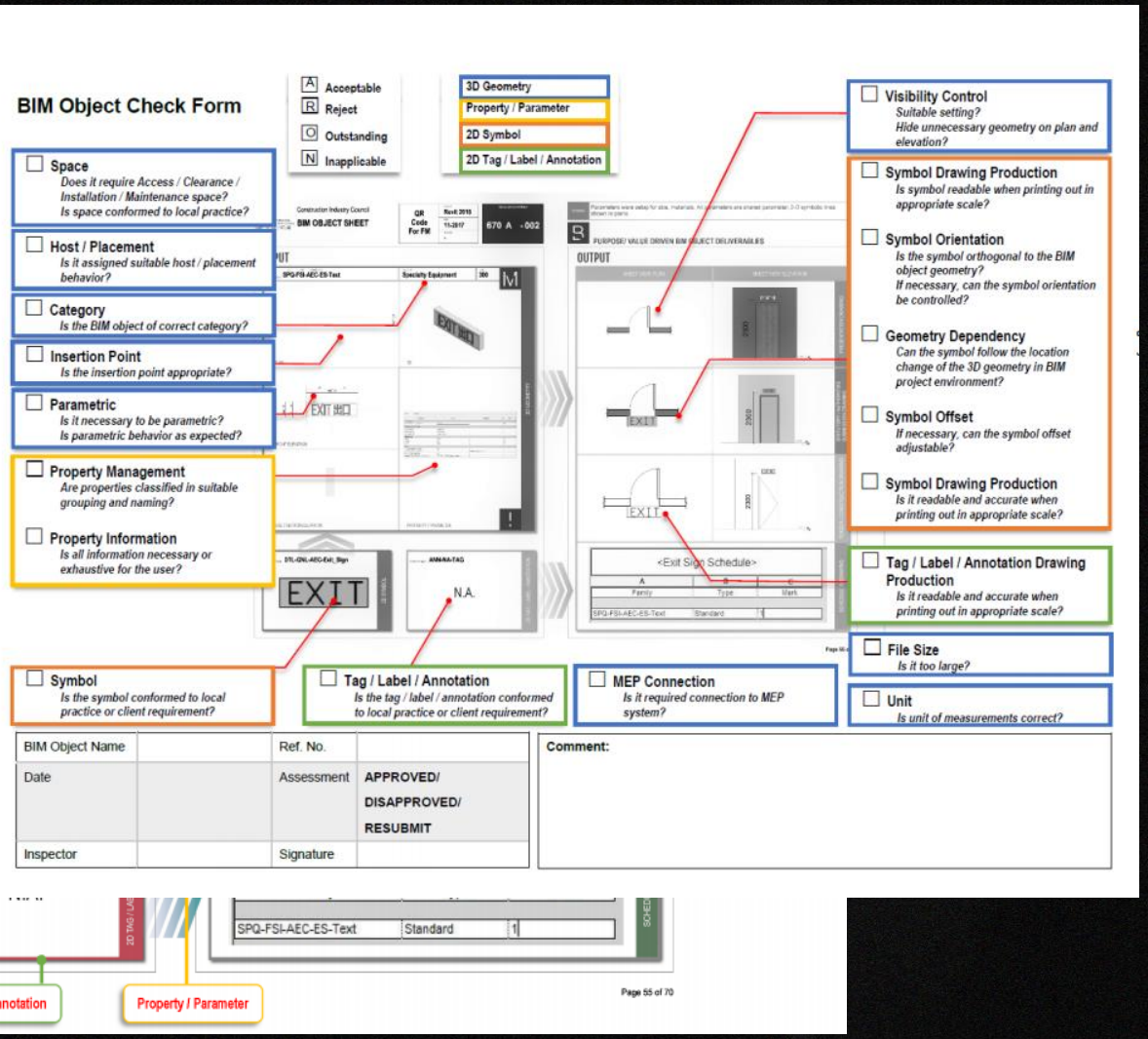
7 Model Audit Checklist

7.3 Standard Check

7.3.2 Information and Naming

7.3.2.21 Families Naming -





7 Model Audit Checklist

7.3 Standard Check

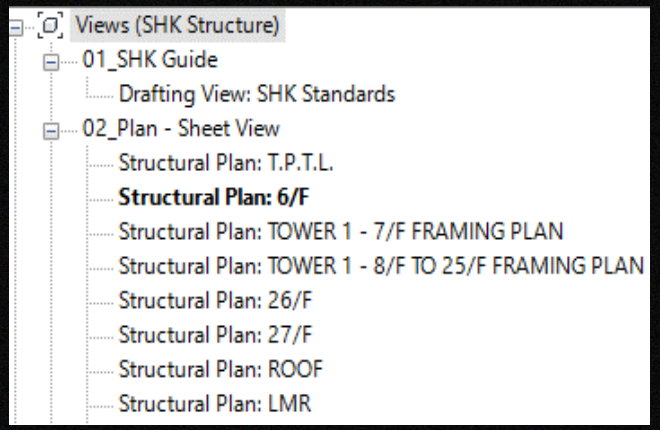
7.3.2 Information and Naming

7.3.2.19 Levels Naming an View Naming

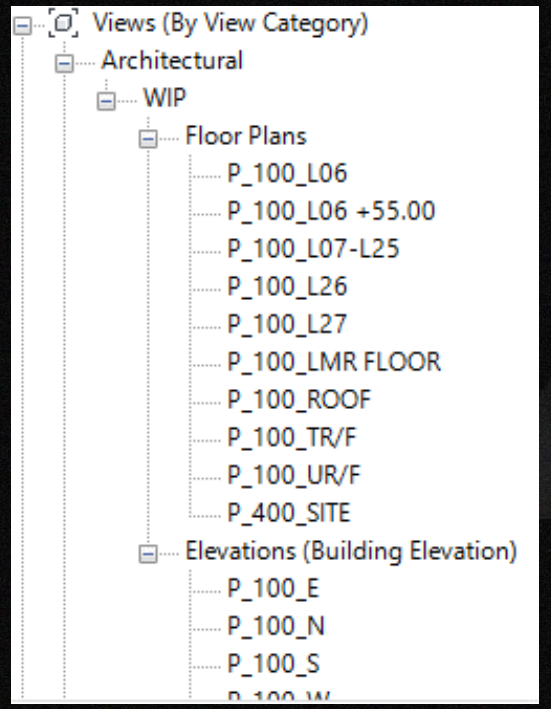
At the beginning of the project, Architect and BIM Manager shall define the naming of level in Project Execution Plan.

Refer to PXP Section 4.2.7, together with the room and space naming a level numbering and naming system should be implemented commonly by all project disciplines.

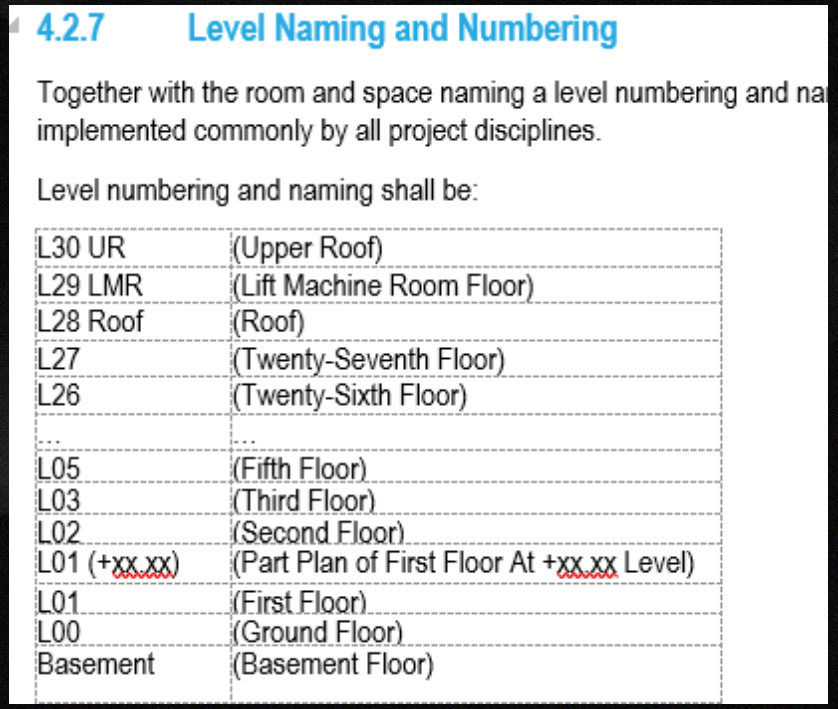
Format of view naming: Purpose_Scale_Level



Bad Example



Good Example



4.2.7 Level Naming and Numbering

Together with the room and space naming a level numbering and na
implemented commonly by all project disciplines.

Level numbering and naming shall be:

L30 UR	(Upper Roof)
L29 LMR	(Lift Machine Room Floor)
L28 Roof	(Roof)
L27	(Twenty-Seventh Floor)
L26	(Twenty-Sixth Floor)
…	…
L05	(Fifth Floor)
L03	(Third Floor)
L02	(Second Floor)
L01 (+xx.xx)	(Part Plan of First Floor At +xx.xx Level)
L01	(First Floor)
L00	(Ground Floor)
Basement	(Basement Floor)

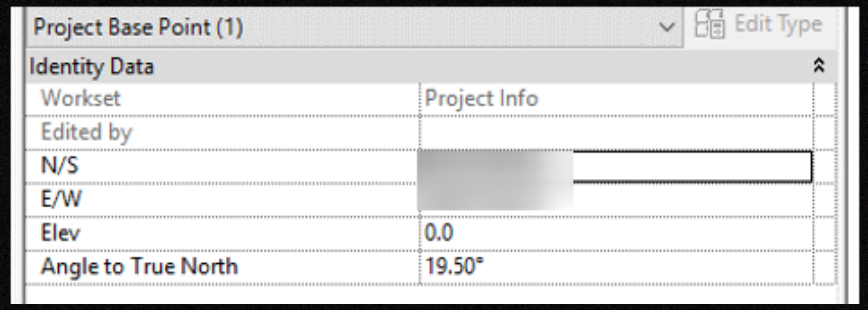
7 Model Audit Checklist

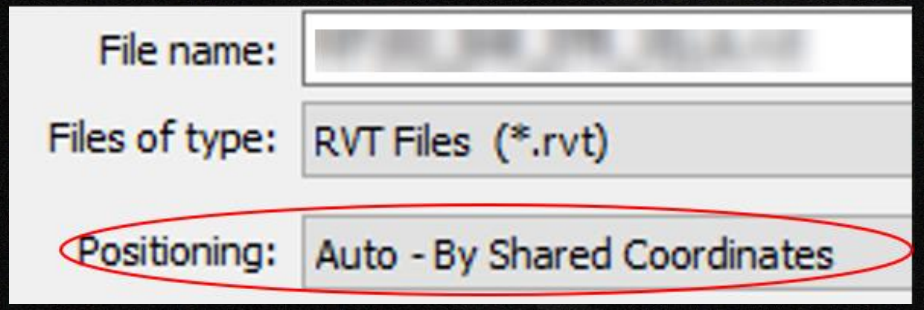
7.3 Standard Check

7.3.3 Project Setting

7.3.3.32 Share Coordination Setup

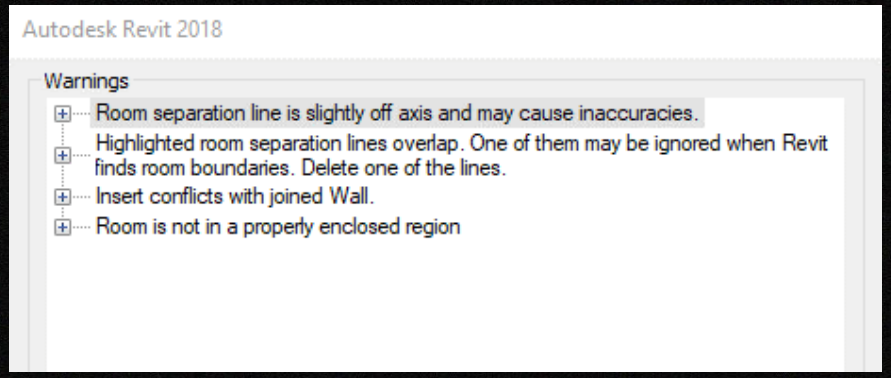
Link Revit model by share coordinate.





7.3.3.36 Review Warnings

Are the review warning in the project under 50?



7 Model Audit Checklist

7.3.3.42 Line Weights

7.3 Standard Check

7.3.3 Project Setting

- It is suggested that line weights shall be set according to AEC (UK) BIM Protocol for Autodesk Revit Section 9.5. *"The plotted appearance of modelled components shall be represented in a manner that provides 'depth: to the drawing and allows for adequate differentiation of elements cut in section, profile view and priority element "*

GOOD Example

Pen	1:10	1:20	1:50	1:100	1:200	1:500	Perspective	Annotation
1	0.1300	0.1300	0.1300	0.0600	0.0600	0.0600	0.0600	0.0600
2	0.1500	0.1500	0.1500	0.1300	0.0600	0.0600	0.1300	0.1300
3	0.1800	0.1800	0.1800	0.1500	0.1300	0.0600	0.1500	0.1500
4	0.2000	0.2000	0.2000	0.1800	0.1500	0.1300	0.1800	0.1800
5	0.2500	0.2200	0.2200	0.2000	0.1800	0.1500	0.2000	0.2000
6	0.3500	0.2500	0.2500	0.2200	0.2000	0.1800	0.2200	0.2200
7	0.4000	0.3500	0.3500	0.2500	0.2200	0.2000	0.2500	0.2500
8	0.5000	0.4000	0.4000	0.3500	0.2500	0.2200	0.3500	0.3500
9	0.6000	0.5000	0.5000	0.4000	0.3500	0.2500	0.4000	0.4000
10	0.7000	0.6000	0.6000	0.5000	0.4000	0.3500	0.5000	0.5000
11	1.0000	0.7000	0.7000	0.6000	0.5000	0.4000	0.6000	0.6000
12	1.4000	1.0000	1.0000	0.7000	0.6000	0.5000	0.7000	0.7000
13	2.0000	1.4000	1.4000	1.0000	0.7000	0.6000	1.0000	1.0000
14	3.0000	2.0000	2.0000	1.4000	1.0000	0.7000	1.4000	1.4000
15	4.0000	3.0000	3.0000	2.0000	1.4000	1.0000	2.0000	2.0000
16	5.0000	4.0000	4.0000	3.0000	2.0000	1.4000	3.0000	3.0000

BAD Example

	1 : 10	1 : 20	1 : 50	1 : 100	1 : 200	1 : 500				
1	0.1800 mm	0.1800 mm	0.1800 mm	0.1000 mm	0.1000 mm	0.1000 mm	1	0.1000 mm	1	0.1000 mm
2	0.2500 mm	0.2500 mm	0.2500 mm	0.1800 mm	0.1000 mm	0.1000 mm	2	0.1800 mm	2	0.1800 mm
3	0.3500 mm	0.3500 mm	0.3500 mm	0.2500 mm	0.1800 mm	0.1000 mm	3	0.2500 mm	3	0.2500 mm
4	0.7000 mm	0.5000 mm	0.5000 mm	0.3500 mm	0.2500 mm	0.1800 mm	4	0.3500 mm	4	0.3500 mm
5	1.0000 mm	0.7000 mm	0.7000 mm	0.5000 mm	0.3500 mm	0.2500 mm	5	0.5000 mm	5	0.5000 mm
6	1.4000 mm	1.0000 mm	1.0000 mm	0.7000 mm	0.5000 mm	0.3500 mm	6	0.7000 mm	6	0.7000 mm
7	2.0000 mm	1.4000 mm	1.4000 mm	1.0000 mm	0.7000 mm	0.5000 mm	7	1.0000 mm	7	1.0000 mm
8	2.8000 mm	2.0000 mm	2.0000 mm	1.4000 mm	1.0000 mm	0.7000 mm	8	1.4000 mm	8	1.4000 mm
9	4.0000 mm	2.8000 mm	2.8000 mm	2.0000 mm	1.4000 mm	1.0000 mm	9	2.0000 mm	9	2.0000 mm
10	5.0000 mm	4.0000 mm	4.0000 mm	2.8000 mm	2.0000 mm	1.4000 mm	10	2.8000 mm	10	2.8000 mm
11	6.0000 mm	5.0000 mm	5.0000 mm	4.0000 mm	2.8000 mm	2.0000 mm	11	4.0000 mm	11	4.0000 mm
12	7.0000 mm	6.0000 mm	6.0000 mm	5.0000 mm	4.0000 mm	2.8000 mm	12	5.0000 mm	12	5.0000 mm
13	8.0000 mm	7.0000 mm	7.0000 mm	6.0000 mm	5.0000 mm	4.0000 mm	13	6.0000 mm	13	6.0000 mm
14	9.0000 mm	8.0000 mm	8.0000 mm	7.0000 mm	6.0000 mm	5.0000 mm	14	7.0000 mm	14	7.0000 mm
15	9.0000 mm	9.0000 mm	9.0000 mm	8.0000 mm	7.0000 mm	6.0000 mm	15	8.0000 mm	15	8.0000 mm
16	9.0000 mm	9.0000 mm	9.0000 mm	9.0000 mm	8.0000 mm	7.0000 mm	16	10.0000 mm	16	10.0000 mm

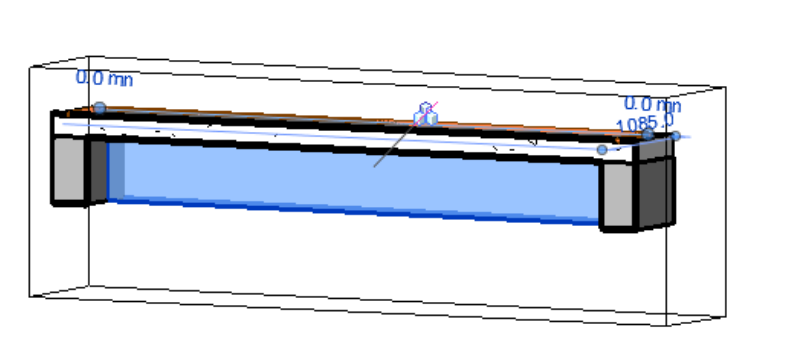
7 Model Audit Checklist

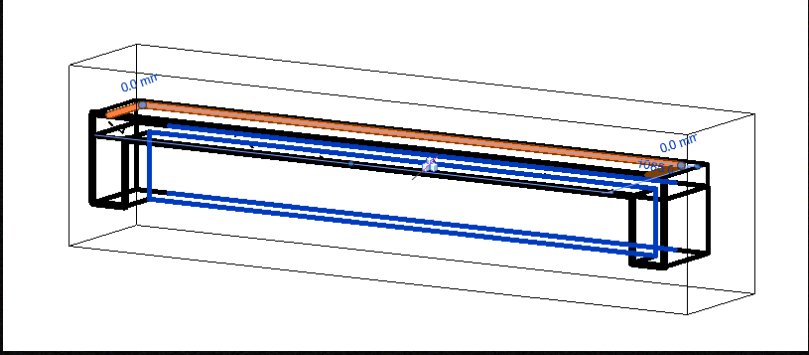
7.3.4.47 STR - Beam/column/slab connections

7.3 Standard Check

7.3.4 Detail Model Checking

Beam should not be under slab if quantity take off is needed.





Information from schedule

- Size and length of beam can be shown in schedule
- Material is defined as “by category.”
- Suggest SE to add **parameter** - Concrete grade / WP concrete / light weight concrete fill / curved elements stated

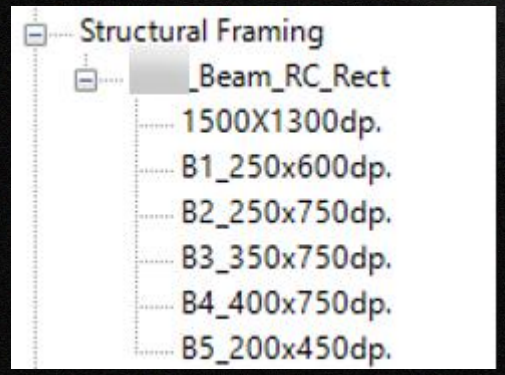
<Structural Framing Schedule>

A	B	C	D	E	F	G	H	I
Beam Depth	Beam Size	Beam Width	Family and Type	Length	Location	OmniClass T	Reference Level	Structural Material
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	1235	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	1085	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	4150	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	1000	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	4700	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	2650	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	1350	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	1275	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	2375	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	4050	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	4575	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	1475	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	2650	7/F	Beams	7/F	<By Category>
600	250x600dp.	250	_Beam_RC_Rect: B1_250x600dp.	4575	7/F	Beams	7/F	<By Category>

Structural framing schedule

Type Name

- Do not follow FLIP guideline
- Use B1-B5 to define the size of beam temporarily



Families

7 Model Audit Checklist

7.3 Standard Check

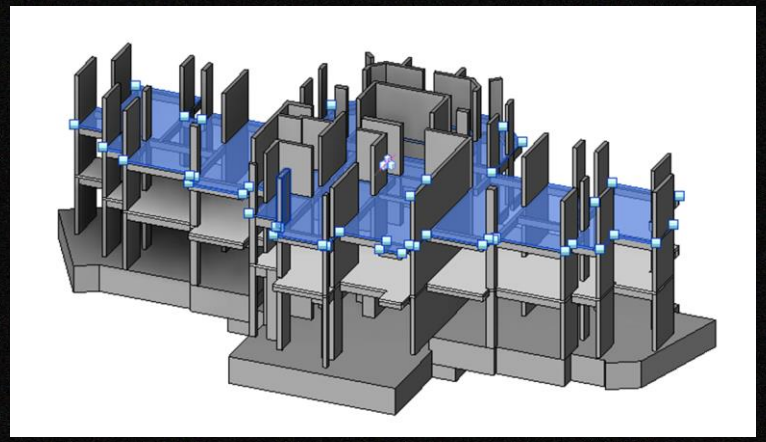
7.3.4 Detail Model Checking

7.3.4.47 STR - Beam/column/slab connections

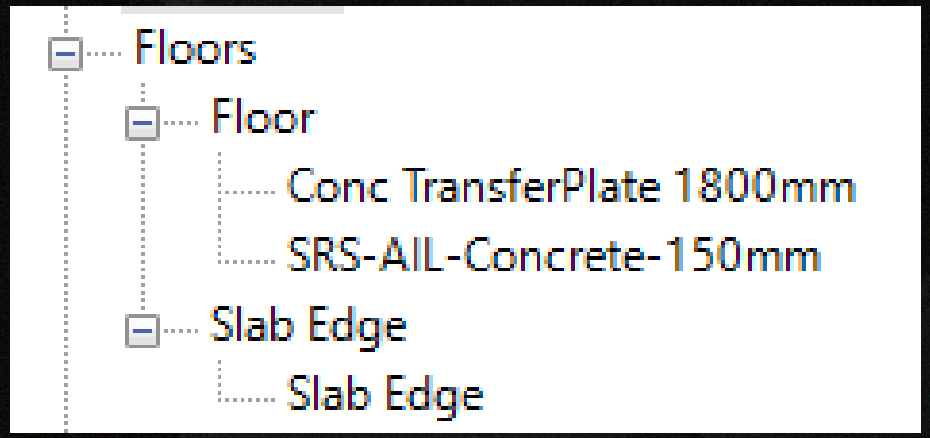
- Slab is not divided for different area.
- Some of STR Material is defined as by category or Concrete, Cast in Situ.
- Suggest SE to add parameter - Concrete grade / WP concrete / light weight concrete fill / curved elements stated

Type Name

- Do not follow FLIP guideline



3D view



Families

Floor Schedule

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Absorptance	Area	Core Thickn	Family and Type	Function	Heat Transf	Height Offse	Level	Location	Perimeter	Roughness	Slab Thickn	Structural	Structural Material	Volume
0.1	328 m²	1800	Floor: Conc TransferPlate 1800	Interior		0	T.P.T.L.	6/F	125722	1	1800	☑	<By Category>	589.76 m³
0.1	132 m²	1800	Floor: Conc TransferPlate 1800	Interior		-900	T.P.T.L.	6/F	47779	1	1800	☑	<By Category>	236.72 m³
0.7	393 m²	150	Floor: SRS-AIL-Concrete-150m	Interior	6.9733	0	7/F	7/F	173964	3		☑	Concrete, Cast In Situ	59.00 m³
0.7	395 m²	150	Floor: SRS-AIL-Concrete-150m	Interior	6.9733	0	8/F	8/F	173964	3		☑	Concrete, Cast In Situ	59.21 m³

Floor Schedule

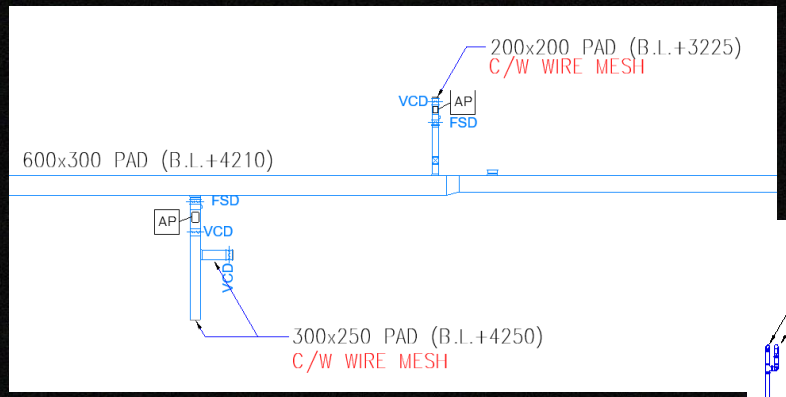
7 Model Audit Checklist

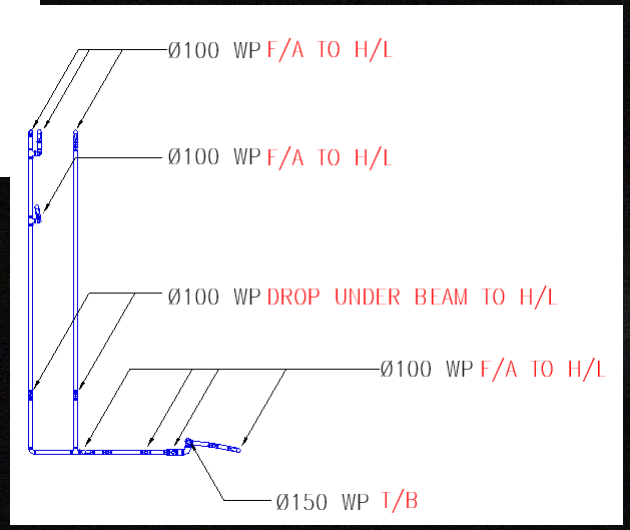
7.3 Standard Check

7.3.4 Detail Model Checking

7.3.4.53 All systems are defined as System Families. Accessories are Loadable Families

- All systems should be modelled using Revit SYSTEM families (eg: Duct, Pipe, Cable Tray…) instead of “LINE”.
- Physical information (such MEP system, size, elevation etc) should be assigned correctly in order to retrieve the information from Revit using “TAG” instead of “Text” for drawing production.





Using System Families to prepare MEP models

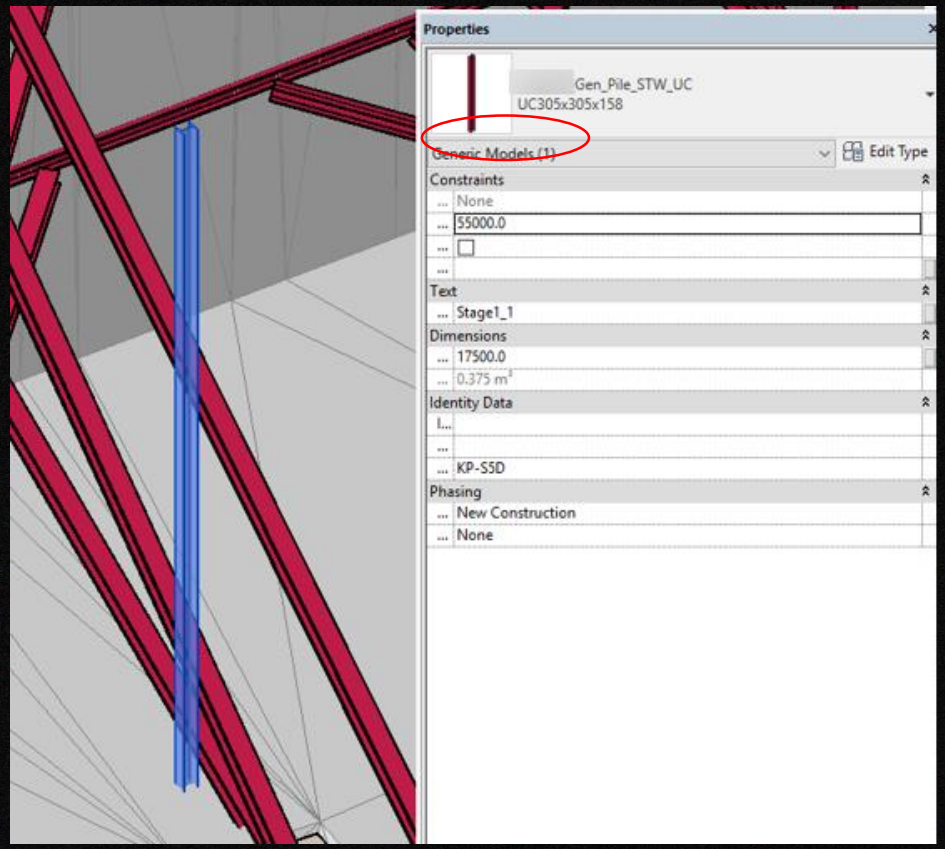
7 Model Audit Checklist

7.3.4.69 Categories used correctly

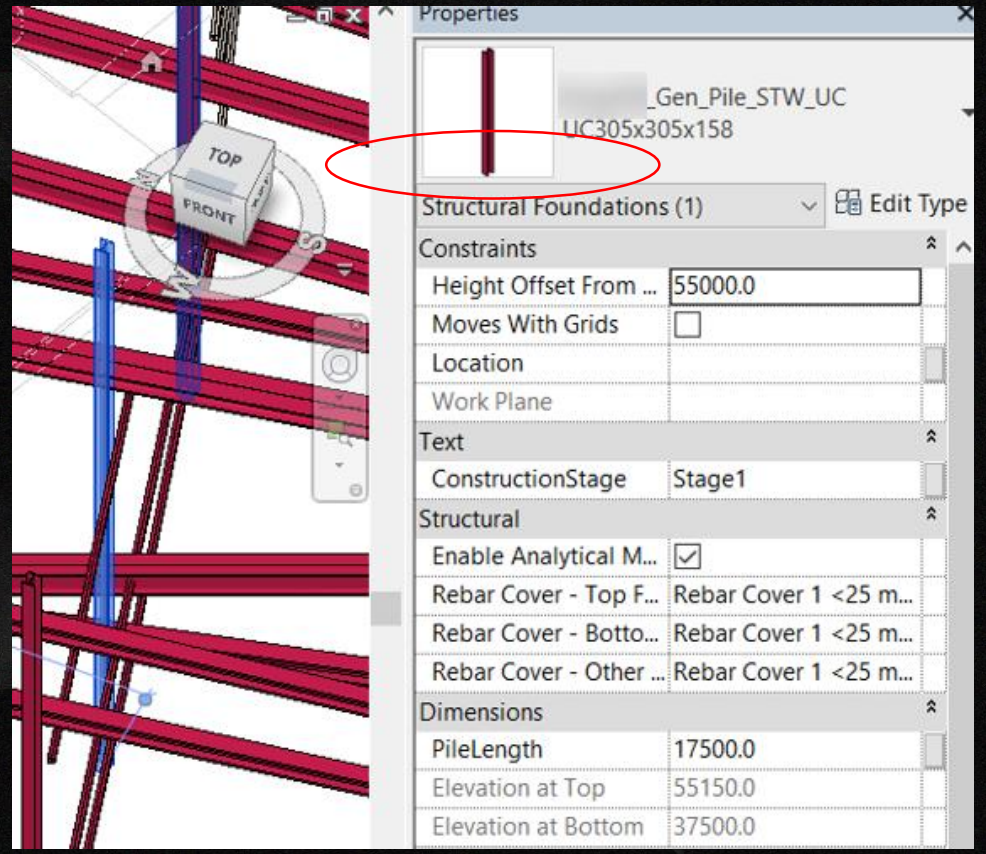
7.3 Standard Check

7.3.5 Respect LOD agreed (Overall)

Below is an example of ELS model, the pile is used by Generic model at the beginning. After model checking, we advised that party to use structural foundation.



BAD Example of ELS Model



GOOD Example of ELS Model

7 Model Audit Checklist

7.3.5.70 Generic model's presence, category undefined

7.3 Standard Check

7.3.5 Respect LOD agreed (Overall)

Schedule is used to found out Generic model.

<Generic Model Schedule>

A	B	C	D	E	F	G	H
Family	Family and Type	Level	Location	Phase Creat	Phase Demo	Type	Volume
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x250x600dp.	7/F	7/F	New Constru	None	250x250x60	0.04 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x250x600dp.	7/F	7/F	New Constru	None	250x250x60	0.04 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x300x600dp.	7/F	7/F	New Constru	None	250x300x60	0.05 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x250x600dp.	7/F	7/F	New Constru	None	250x250x60	0.04 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x250x600dp.	7/F	7/F	New Constru	None	250x250x60	0.04 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x300x600dp.	7/F	7/F	New Constru	None	250x300x60	0.05 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x250x600dp.	8/F	7/F	New Constru	None	250x250x60	0.04 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x250x600dp.	8/F	7/F	New Constru	None	250x250x60	0.04 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x300x600dp.	8/F	7/F	New Constru	None	250x300x60	0.05 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x250x600dp.	8/F	7/F	New Constru	None	250x250x60	0.04 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x250x600dp.	8/F	7/F	New Constru	None	250x250x60	0.04 m□
_Corbel_RC_Rect	_Corbel_RC_Rect: 250x300x600dp.	8/F	7/F	New Constru	None	250x300x60	0.05 m□

7 Model Audit Checklist

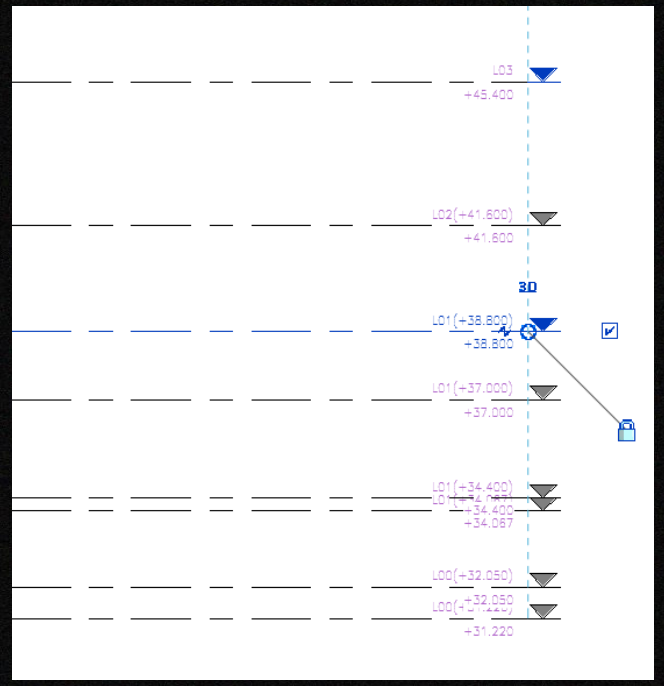
7.3.5.77 Reference level set up correctly

7.3 Standard Check

7.3.5 Common for all discipline/ General Geometry Check

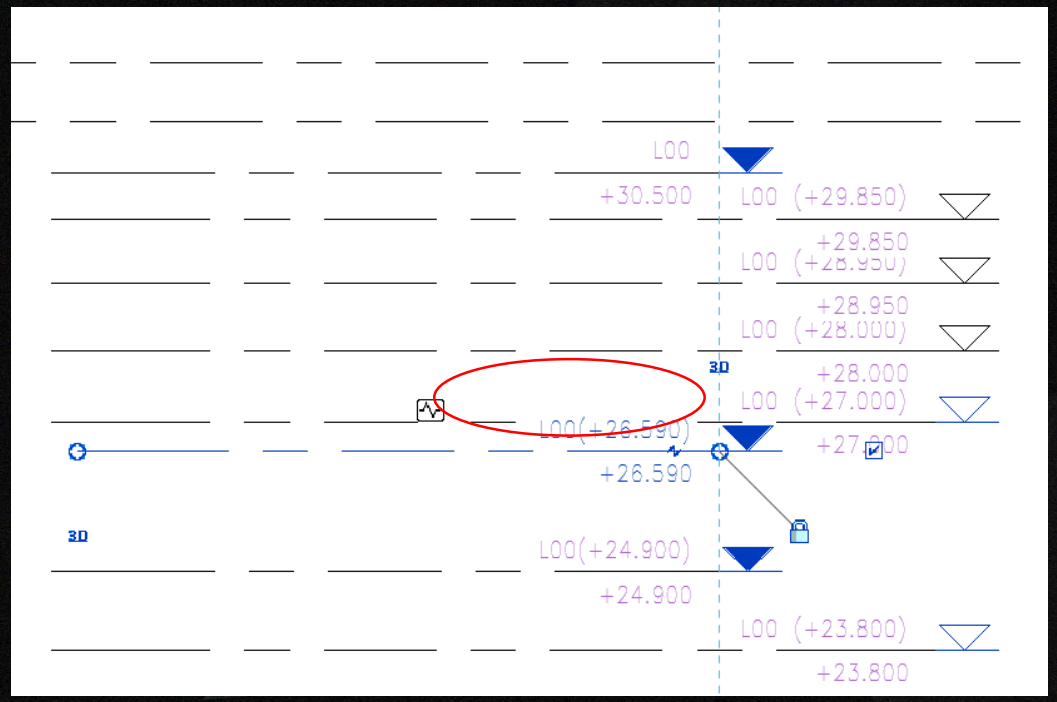
1. Set up projects with mPD (Mean Sea Level)
2. Copy monitor the gridline and level from ARC model (Symbol of copy monitor should be appeared when click the level)

The follow is the case of STR model:



BAD Example of STR Model

- To many level
- Do not copy monitor the level from ARC model



Revised after workshop

- Copy monitor the level from ARC model

7 Model Audit Checklist

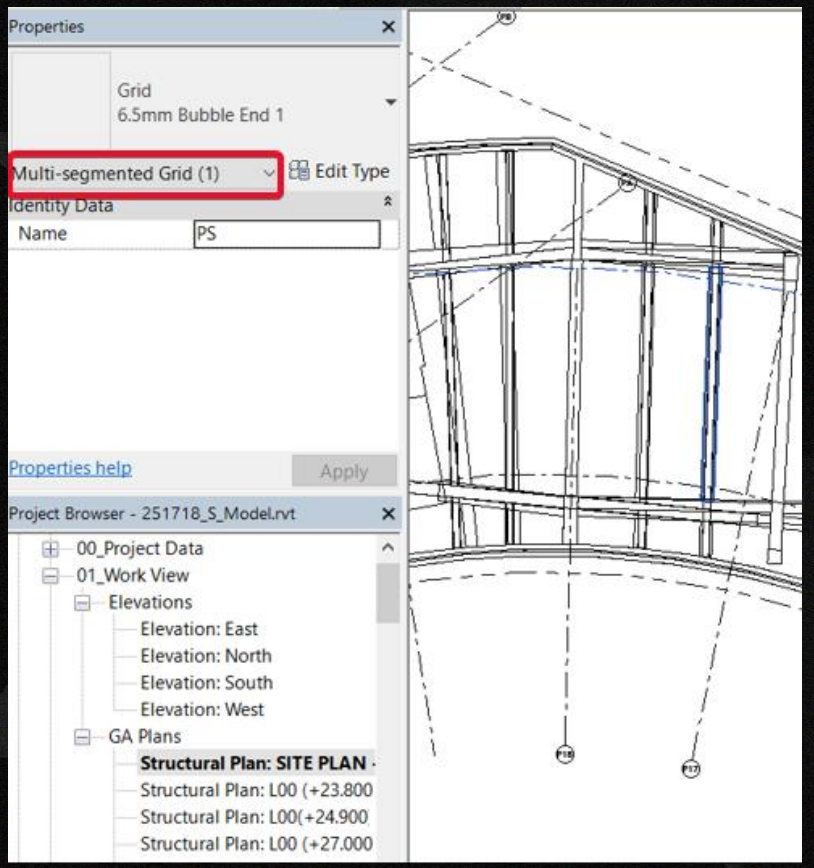
7.3 Standard Check

7.3.5 Common for all discipline/ General Geometry Check

7.3.5.77 Reference level set up correctly

Example of gridline copy monitor

Cannot copy monitor the multi-segment grid



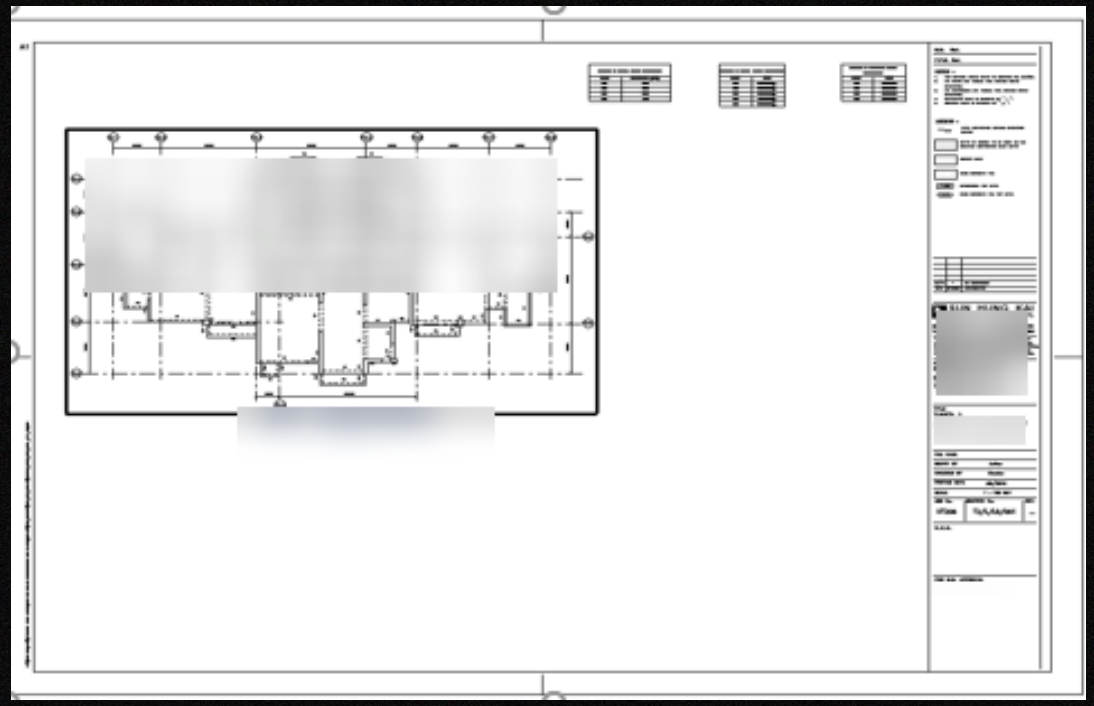
7 Model Audit Checklist

7.3 Standard Check

7.3.6 View and Sheet Set up

7.3.6.81. Clear view uses (Working deliverables, Coord, QC)

7.3.6.83. Proper title block information

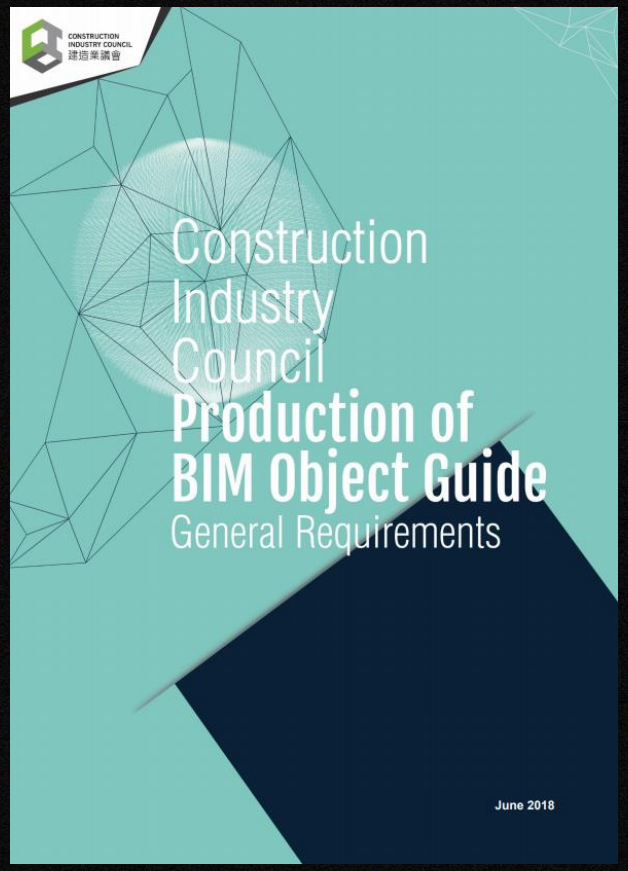


7 Model Audit Checklist

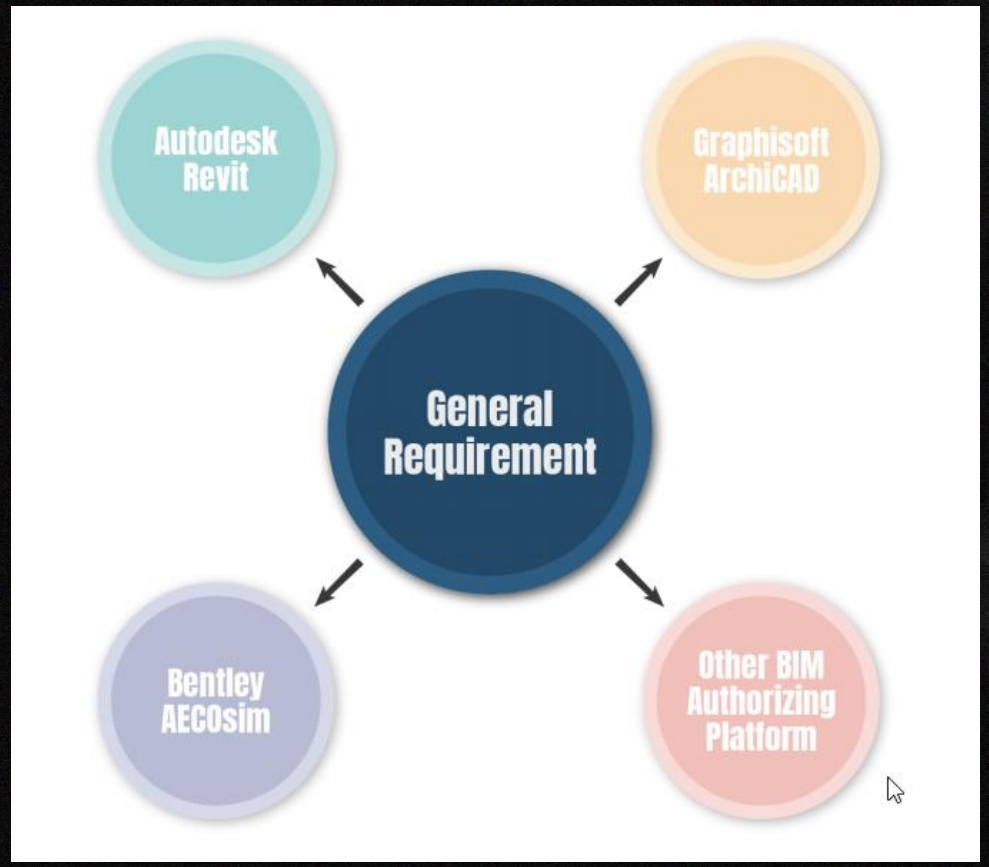
7.3 Standard Check

7.3.6 View and Sheet Set up

- MEP equipment involves many symbols, therefore, a good MEP family should be capable to present in 3D model and 2D symbol according to different presentation requirements.



Reference



7 Model Audit Checklist

7.3 Standard Check

7.3.6 View and Sheet Set up

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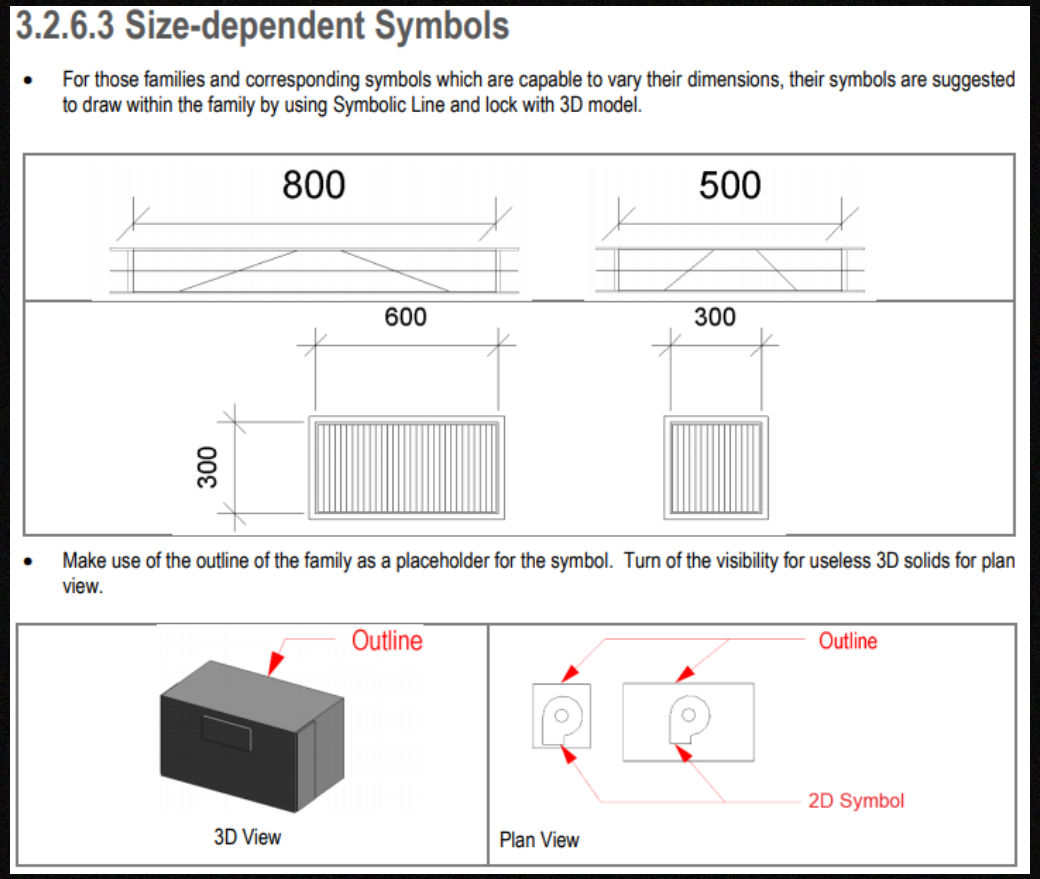
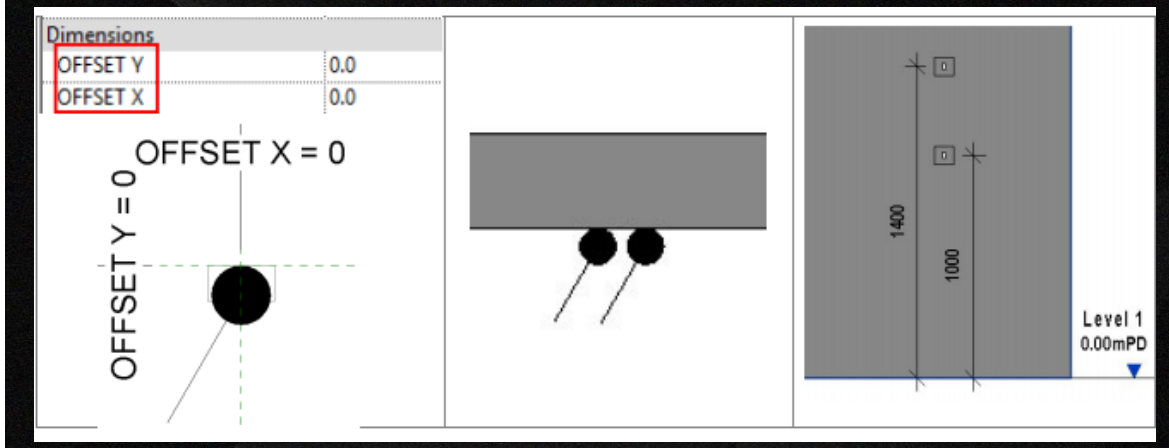




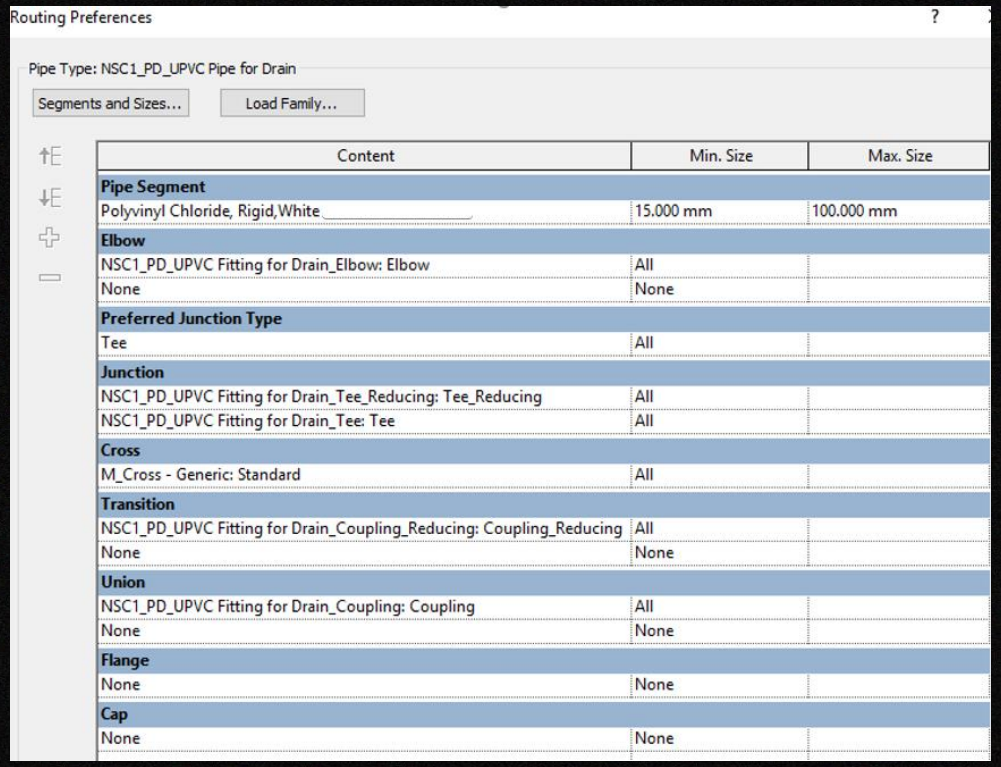
CIC - Technical BIM Object Guide

7 Model Audit Checklist

7.3 Standard Check

7.3.6 View and Sheet Set up

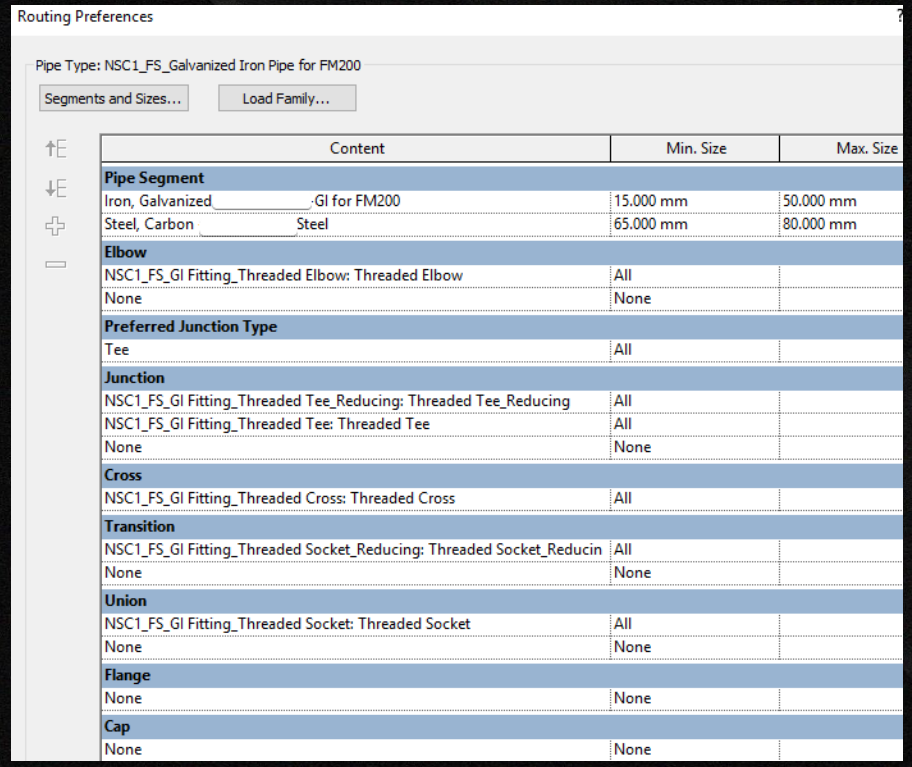
- For MEP design phase, pipes type and systems should be well prepared. However, the routing preference (pipe fitting families assignment) could be based on Generic fitting families form Autodesk according to the nature of the pipe system and type.
- For MEP construction models, all pipes should be assigned with correct pipe fittings as per its material and usage.
- Generic pipe fitting families from Autodesk are not suitable for HK practices.


Routing Preferences

Pipe Type: NSC1_PD_UPVC Pipe for Drain

Segments and Sizes... | Load Family...

Content	Min. Size	Max. Size
Pipe Segment		
Polyvinyl Chloride, Rigid,White	15.000 mm	100.000 mm
Elbow		
NSC1_PD_UPVC Fitting for Drain_Elbow: Elbow	All	
None	None	
Preferred Junction Type		
Tee	All	
Junction		
NSC1_PD_UPVC Fitting for Drain_Tee_Reducing: Tee_Reducing	All	
NSC1_PD_UPVC Fitting for Drain_Tee: Tee	All	
Cross		
M_Cross - Generic: Standard	All	
Transition		
NSC1_PD_UPVC Fitting for Drain_Coupling_Reducing: Coupling_Reducing	All	
None	None	
Union		
NSC1_PD_UPVC Fitting for Drain_Coupling: Coupling	All	
None	None	
Flange		
None	None	
Cap		
None	None	


Routing Preferences

Pipe Type: NSC1_FS_Galvanized Iron Pipe for FM200

Segments and Sizes... | Load Family...

Content	Min. Size	Max. Size
Pipe Segment		
Iron, Galvanized GI for FM200	15.000 mm	50.000 mm
Steel, Carbon Steel	65.000 mm	80.000 mm
Elbow		
NSC1_FS_GI Fitting_Threaded Elbow: Threaded Elbow	All	
None	None	
Preferred Junction Type		
Tee	All	
Junction		
NSC1_FS_GI Fitting_Threaded Tee_Reducing: Threaded Tee_Reducing	All	
NSC1_FS_GI Fitting_Threaded Tee: Threaded Tee	All	
None	None	
Cross		
NSC1_FS_GI Fitting_Threaded Cross: Threaded Cross	All	
Transition		
NSC1_FS_GI Fitting_Threaded Socket_Reducing: Threaded Socket_Reducin	All	
None	None	
Union		
NSC1_FS_GI Fitting_Threaded Socket: Threaded Socket	All	
None	None	
Flange		
None	None	
Cap		
None	None	

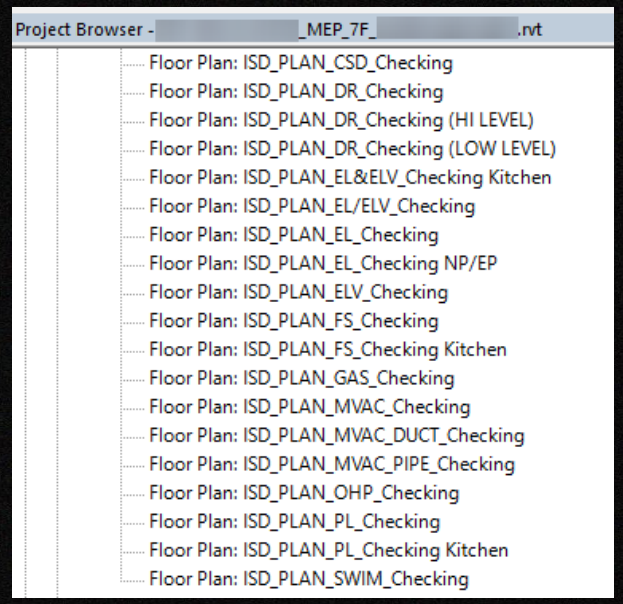
Routing Preference for Pipe during construction phase

7 Model Audit Checklist

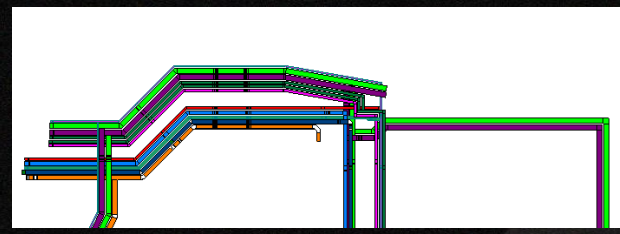
7.3 Standard Check

7.3.6 View and Sheet Set up

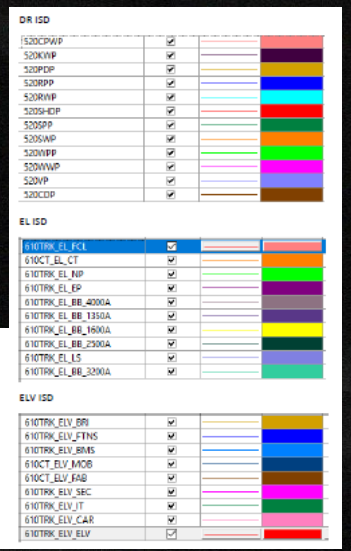
- If the project has adopted Combined disciplines models for each floor, model should be prepared with ISD (Individual Service Drawing) for reference.
- Each system should be prepared with unique color for easy tracing. Corresponding legend should be provided.



Sample of ISD view list



Sample of ISD view



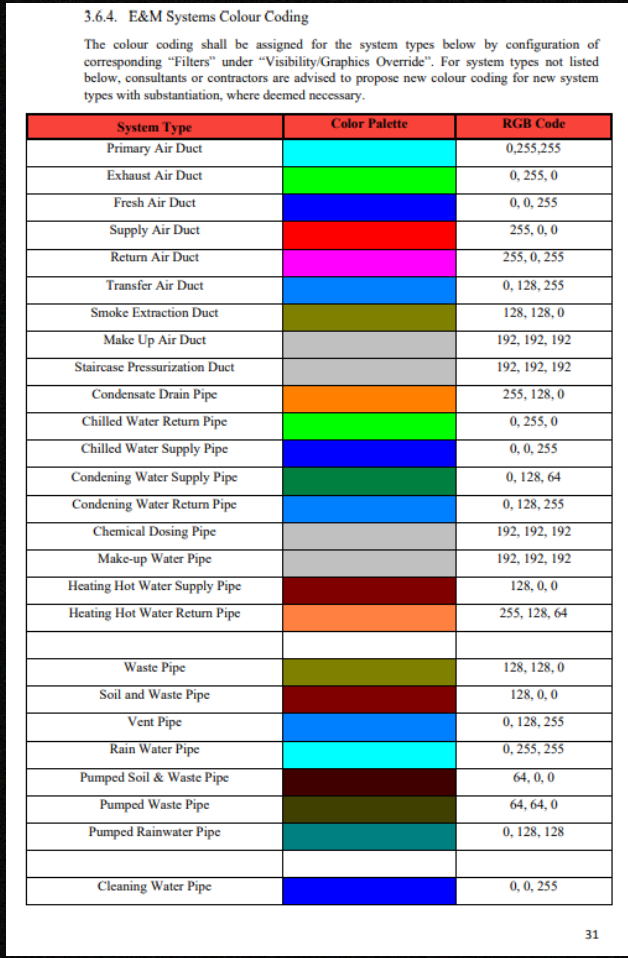
Sample of ISD color legend

7 Model Audit Checklist

7.3 Standard Check

7.3.6 View and Sheet Set up

- EMSD has published BIM-AM Standards and Guidelines on 2017.
- There is a list of indication on MEP system color legend.



3.6.4. E&M Systems Colour Coding

The colour coding shall be assigned for the system types below by configuration of corresponding "Filters" under "Visibility/Graphics Override". For system types not listed below, consultants or contractors are advised to propose new colour coding for new system types with substantiation, where deemed necessary.

System Type	Color Palette	RGB Code
Primary Air Duct		0,255,255
Exhaust Air Duct		0, 255, 0
Fresh Air Duct		0, 0, 255
Supply Air Duct		255, 0, 0
Return Air Duct		255, 0, 255
Transfer Air Duct		0, 128, 255
Smoke Extraction Duct		128, 128, 0
Make Up Air Duct		192, 192, 192
Staircase Pressurization Duct		192, 192, 192
Condensate Drain Pipe		255, 128, 0
Chilled Water Return Pipe		0, 255, 0
Chilled Water Supply Pipe		0, 0, 255
Condening Water Supply Pipe		0, 128, 64
Condening Water Return Pipe		0, 128, 255
Chemical Dosing Pipe		192, 192, 192
Make-up Water Pipe		192, 192, 192
Heating Hot Water Supply Pipe		128, 0, 0
Heating Hot Water Return Pipe		255, 128, 64
Waste Pipe		128, 128, 0
Soil and Waste Pipe		128, 0, 0
Vent Pipe		0, 128, 255
Rain Water Pipe		0, 255, 255
Pumped Soil & Waste Pipe		64, 0, 0
Pumped Waste Pipe		64, 64, 0
Pumped Rainwater Pipe		0, 128, 128
Cleaning Water Pipe		0, 0, 255

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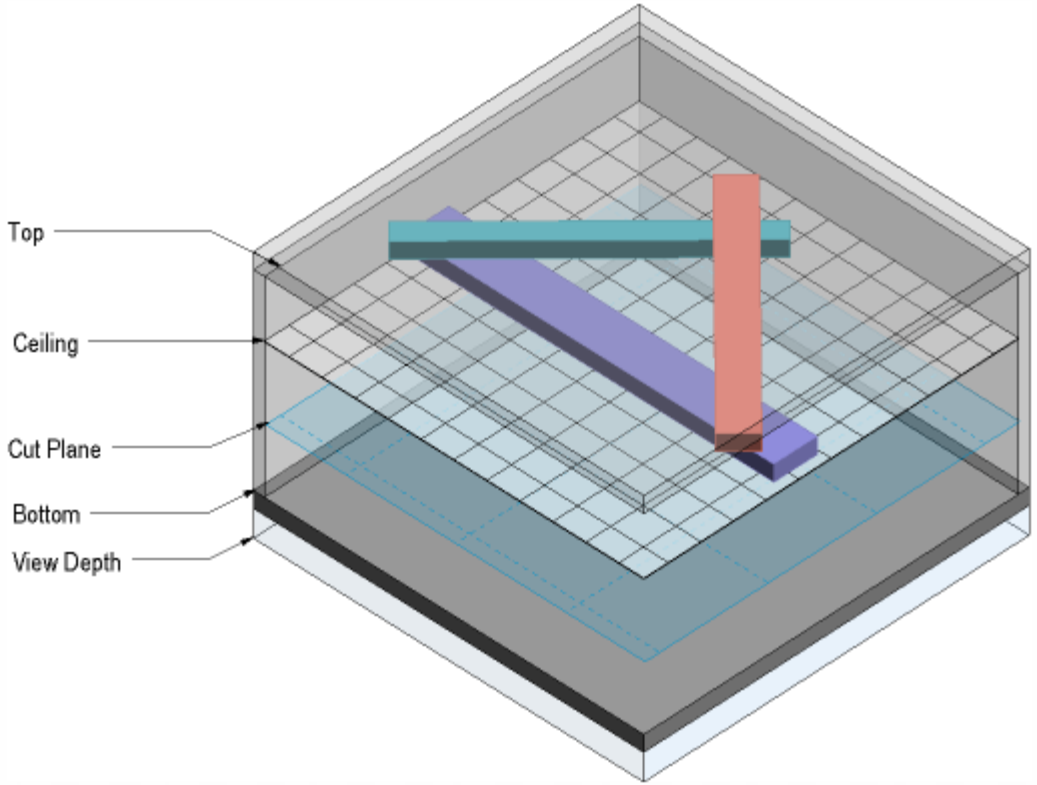
7 Model Audit Checklist

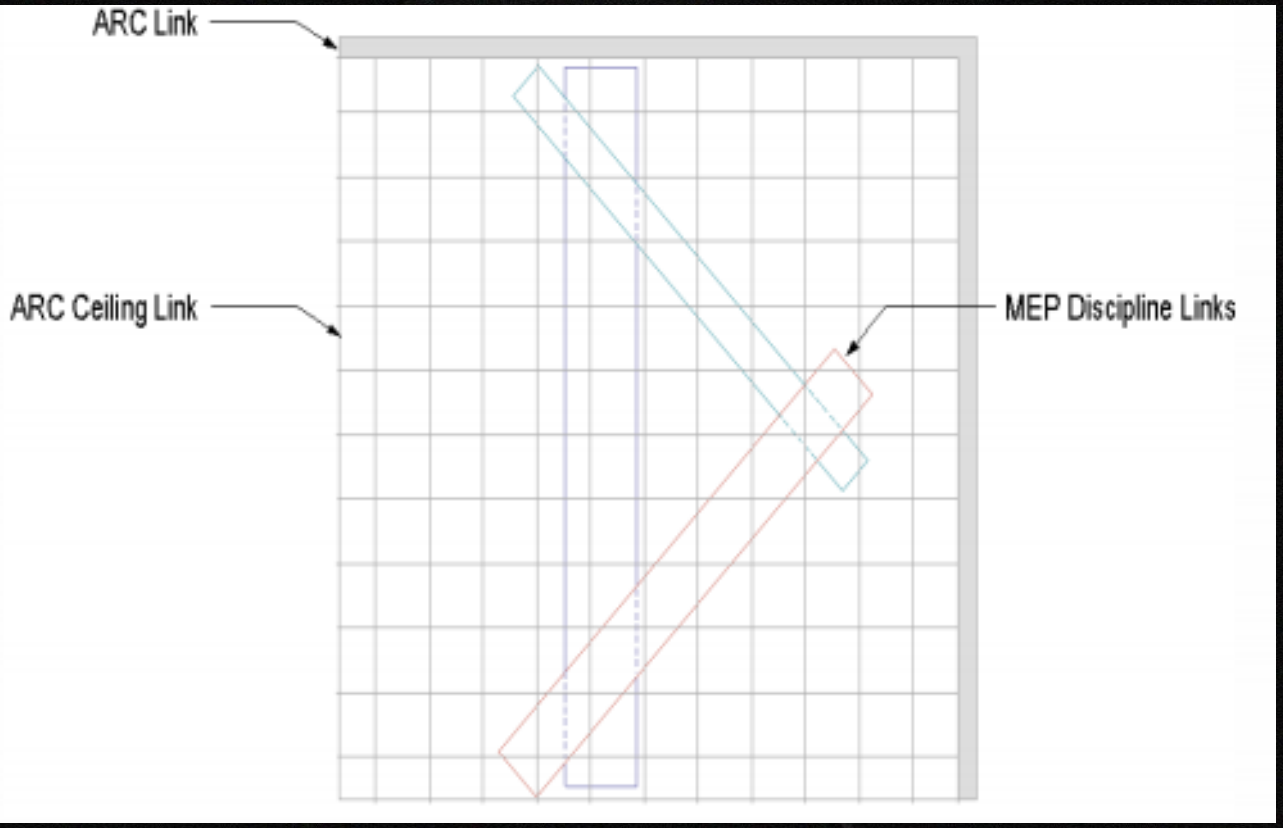
7.3 Standard Check

7.3.6 View and Sheet Set up

- All drawings should be produced from BIM models.
- All background information should be BIM models, i.e. ARC layout, STR framing layout, Façade layout etc.
- No CAD drawing is allowed to be imported to the sheet as background.



Example of MEP models with linked other discipline models



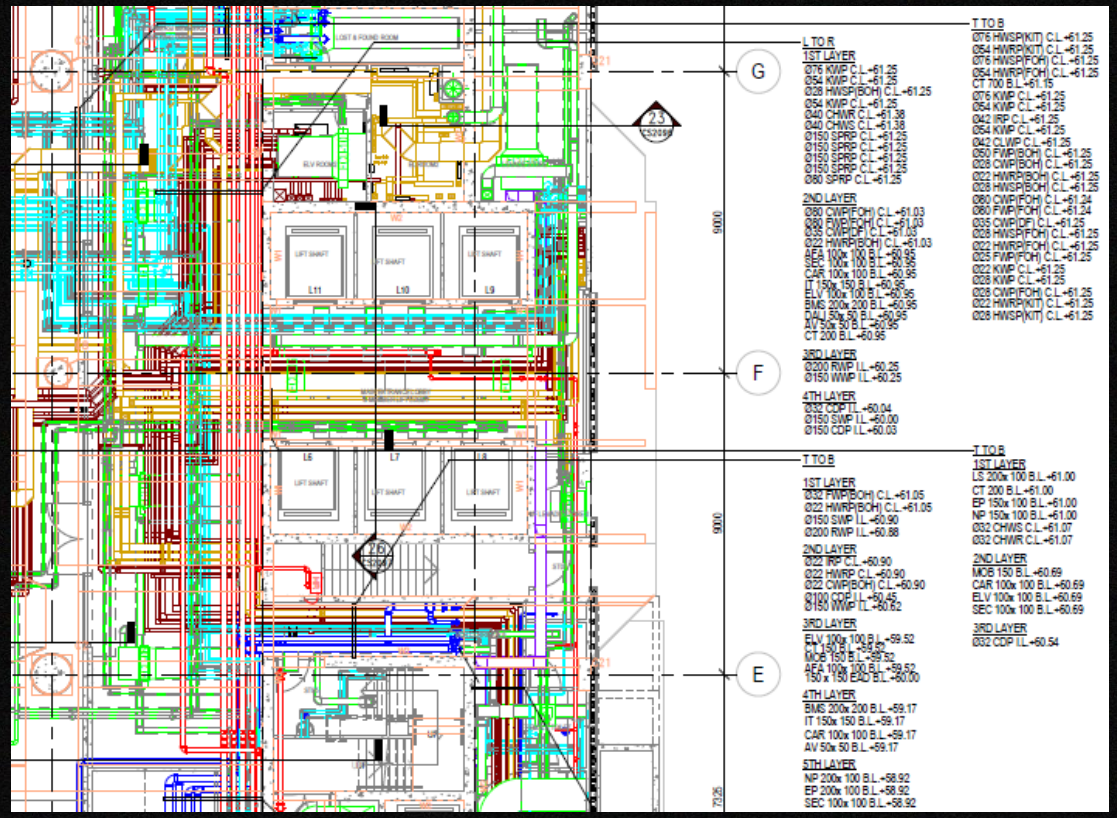
Example of MEP drawing production standard

7 Model Audit Checklist

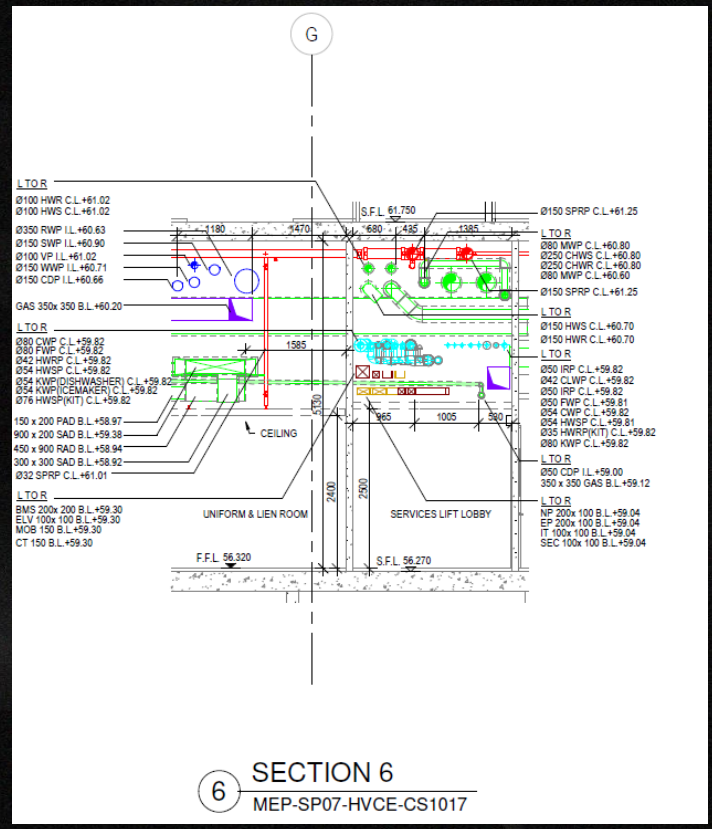
7.3 Standard Check

7.3.6 View and Sheet Set up

- All drawings should be produced from BIM models.
- All background information should be BIM models, i.e. ARC layout, STR framing layout, Façade layout etc.
- No CAD drawing is allowed to be imported to the sheet as background.



Example of Combined Services Drawing (CSD) - Plan



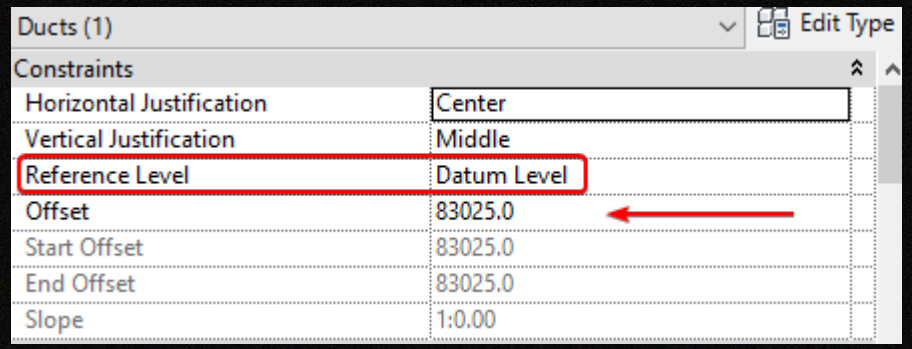
Example of Combined Services Drawing (CSD) - Section

7 Model Audit Checklist

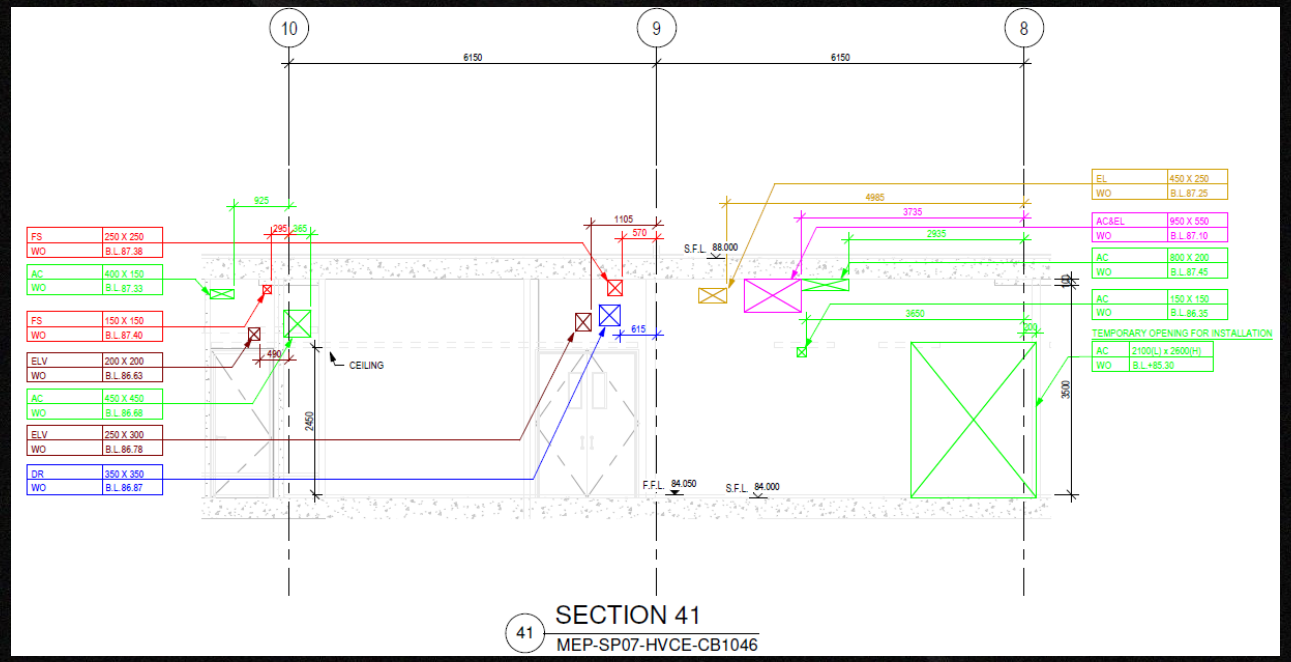
7.3 Standard Check

7.3.6 View and Sheet Set up

- As Revit cannot recognize the finishing floor level (FFL), therefore, all MEP routing should be modelled based on the Datum (0 mPD) level as Reference Level.
- Preparing for Combined Builder's Work Drawing (CBWD), opening families should be modelled basked on the Datum (0 mPD) level.
- Absolute level can be retrieved for construction.



Example of Reference Level setting



Example of Combined Builder's Work Drawing (CBWD) - Section

7 Model Audit Checklist

7.4 Data/ Information integrity Check

•Describe the QC validation process used to ensure that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements and the reporting process on noncompliant elements and corrective action plans .

•Data/ Information integrity check define some optional item shall [illegible] nual for Facilities Up keeping.

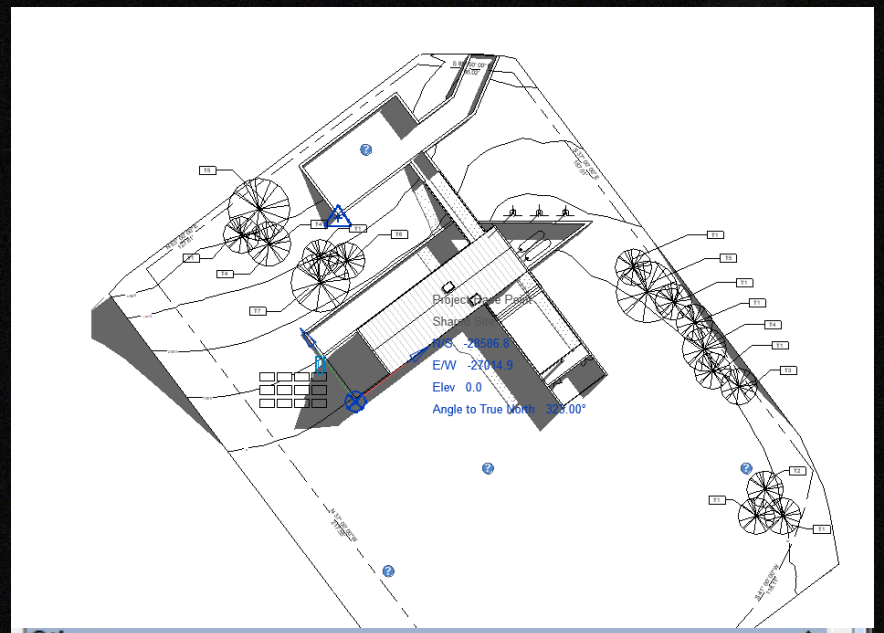
•Clients' BIM Standard/ Requirements
•Government BIM Standards

7 Model Audit Checklist

7.4 Data/ Information integrity Check

Process used to ensure that the project data set has no undefined, incorrectly defined or duplicated elements and the reporting process on non-compliant elements and corrective action plans.

- Project Information
- Model Location and Coordination
- Level Datum
- Current File Size
- Design Phasing
- Models and Link
- Family / Component classification and data continuity



Other	
Project Issue Date	Issue Date
Project Status	Project Status
Client Name	Owner
Project Address	Edit...
Project Name	Project Name
Project Number	Project Number

Manage Links

Revit | CAD Formats | DWF Markups | Point Clouds

Linked File	Status	Reference Type	Positions Not Saved	Saved Path	Path Type
Sample Project A12.rvt	Loaded	Overlay		C:\Users\dMb\Document	Relative
Sample Project C12.rvt	Loaded	Overlay		C:\Users\dMb\Document	Relative
SampleProject S12.rvt	Loaded	Overlay		C:\Users\dMb\Document	Relative

7 Model Audit Checklist

7.4 Data/ Information integrity Check

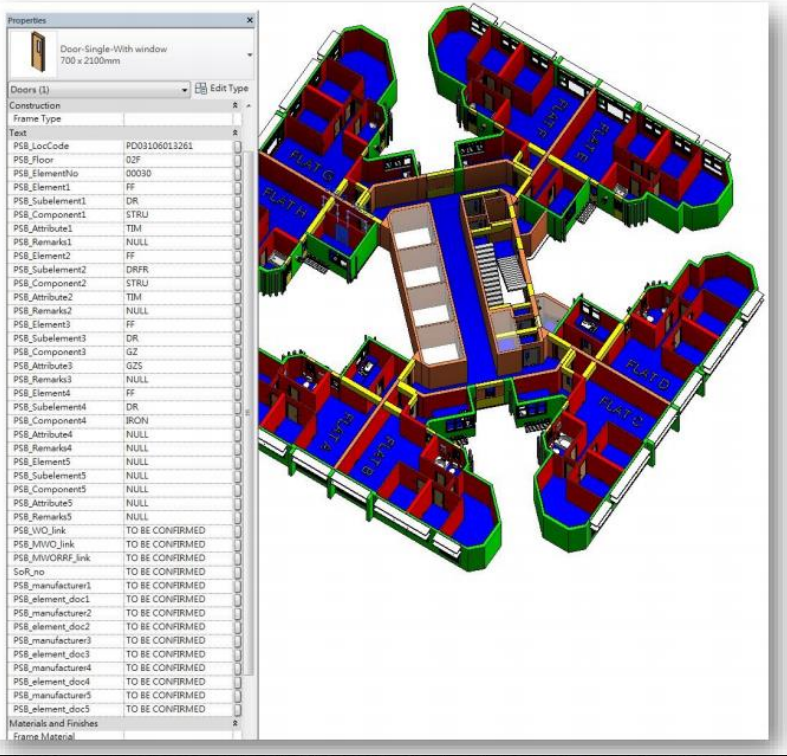
Appendix 1

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
2	PSB_Floor	3 characters	Yes	Typical data format refer to 'Floor code table'	This floor level shall be customized project parameter, say B5F (basement), LGF (lower ground floor), 0GF (ground floor), UG1 (upper ground floor), M1F (1/F mezzanine floor), M2F (2/F Mezzanine floor), 99F, LRF (lower roof floor, 0RF (roof floor), URF (upper roof), etc.)
3	PSB_ElementNo	5 digits	Yes	from 00001 to 99999	This element number shall be referring to LocCode-Floor-Element1-Subelement1 only.
4	PSB_Element1	textual	Yes	The value shall refer to Elemental Code Relation table and its code 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			

Appendix 2

Example of PSB Standard Parameters in Object



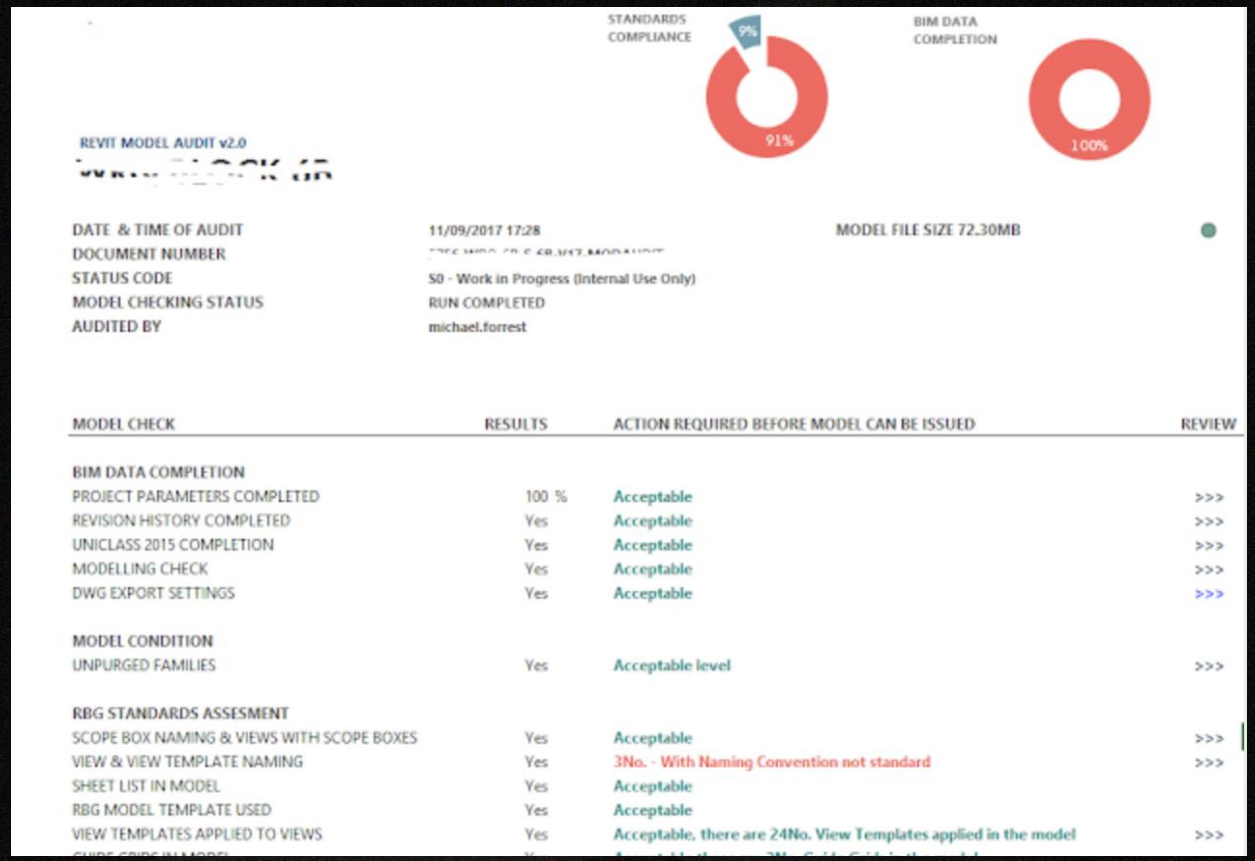
Required Parameter in As-built Model

7. Model Audit Checklist

7.5 Multi-disciplinary Check

It is BIM Manager / BIM Auditor's responsibility to administer, lead and manage the BIM process as per the BIM Execution Plan. Item in an audit report will usually cover items as:

- General Model Status
- Review model errors and warnings inside BIM model
- Conformity to Naming Standards
- Model Review
- Reports should be submitted to CDE and shared with the whole project team
- There are now automated model auditing tool on the market can greatly improve the reporting process.



STANDARDS COMPLIANCE 91%

BIM DATA COMPLETION 100%

REVIT MODEL AUDIT v2.0

DATE & TIME OF AUDIT	11/09/2017 17:28	MODEL FILE SIZE 72.30MB
DOCUMENT NUMBER		
STATUS CODE	S0 - Work in Progress (Internal Use Only)	
MODEL CHECKING STATUS	RUN COMPLETED	
AUDITED BY	michael.forrest	

MODEL CHECK	RESULTS	ACTION REQUIRED BEFORE MODEL CAN BE ISSUED	REVIEW
BIM DATA COMPLETION			
PROJECT PARAMETERS COMPLETED	100 %	Acceptable	>>>
REVISION HISTORY COMPLETED	Yes	Acceptable	>>>
UNICLASS 2015 COMPLETION	Yes	Acceptable	>>>
MODELLING CHECK	Yes	Acceptable	>>>
DWG EXPORT SETTINGS	Yes	Acceptable	>>>
MODEL CONDITION			
UNPURGED FAMILIES	Yes	Acceptable level	>>>
RBG STANDARDS ASSESMENT			
SCOPE BOX NAMING & VIEWS WITH SCOPE BOXES	Yes	Acceptable	>>>
VIEW & VIEW TEMPLATE NAMING	Yes	3No. - With Naming Convention not standard	>>>
SHEET LIST IN MODEL	Yes	Acceptable	
RBG MODEL TEMPLATE USED	Yes	Acceptable	
VIEW TEMPLATES APPLIED TO VIEWS	Yes	Acceptable, there are 24No. View Templates applied in the model	>>>

8. Drawing Production Capability and Standard

8.1 Statutory Compliance

1.A combined model should be divided by different discipline

2. Drawing can be generated from BIM model. Drawing Generation from 3D model is mandatory.

Design Process

Deliverable

Annex 1

BIM Uses

1. Works Departments shall adopt the stipulated mandatory BIM uses in respective stages of a project. Works Departments may adopt the optional BIM uses when necessary.

	BIM Use	Investigation, Feasibility and Planning	Design	Construction
1	Design Authoring	O	M	M
2	Design Reviews	O	M	M
3	Existing Conditions Modelling	O	M	M
4	Site Analysis	O	M	
5	3D Coordination		M	M
6	Cost Estimation	O	M[a]	M[b]
7	Engineering Analysis		O	O
8	Facility Energy Analysis		O	O
9	Sustainability Evaluation	O	O	O
10	Space Programming	O	M[c]	
11	Phase Planning (4D Modelling)		M[d]	M
12	Digital Fabrication		O	M[e]
13	Site Utilization Planning			M[f]
14	3D Control and Planning			O
15	As-Built Modelling			M
16	Project Systems Analysis			O
17	Maintenance Scheduling			M[g]
18	Space Management and Tracking			O
19	Asset Management			O
20	Drawing Generation (Drawing Production)		M	M

Legend:

M – Mandatory BIM Use for the mentioned stage, including that carried forward from previous stage.

O – Optional BIM Use

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Design Presentation
Architectural Design
Structural Design
MEP Design
Landscape Design
Civil Design…

Statutory Submission – Legal
General Building Plan
Curtain Wall Submission,
Demolition Plan,
Site Formation Plan, Structural Submission,
Drainage Submission, Utility Submission…

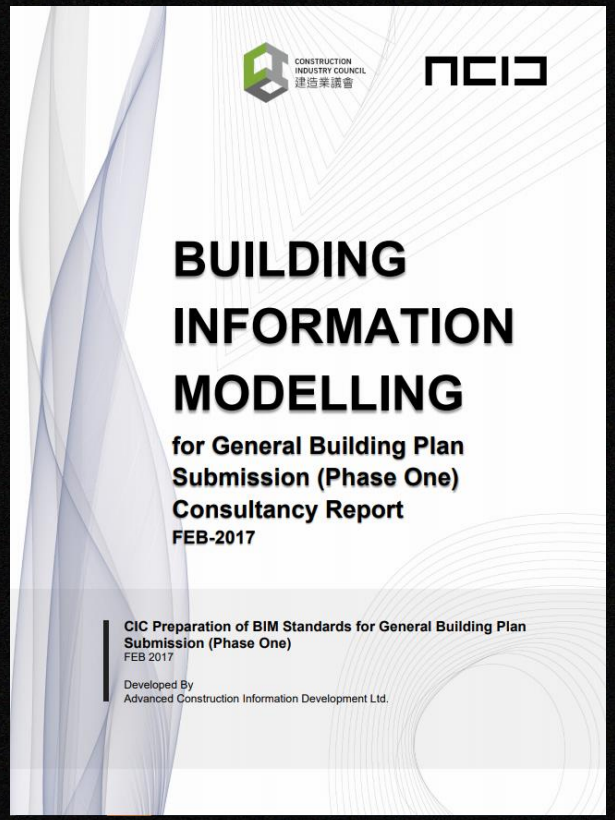
Construction – Contractual
Tender Drawing, Construction Drawing,
Shop Drawings,
Combined Services Drawings (CSD),
Combined Builder's Work Drawings (CBWD),
As-built Drawings…

8. Drawing Production Capability and Standard

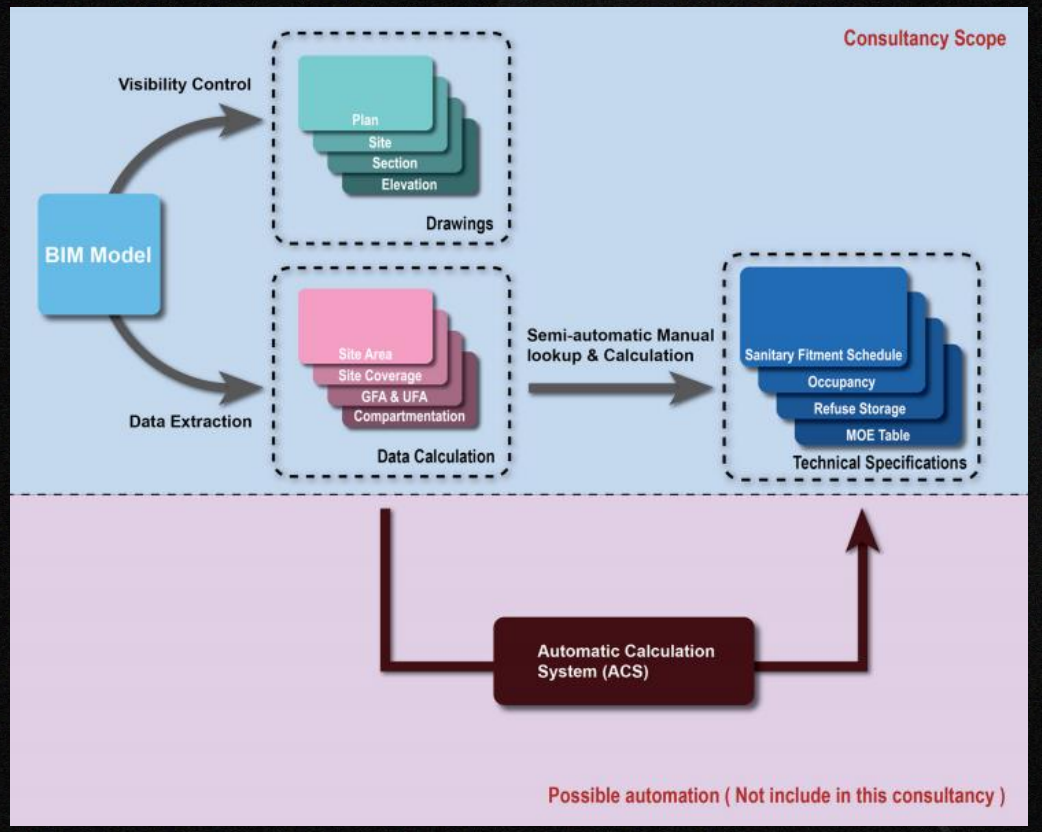
8.1 Statutory Compliance

Refer to BIM GBP Submission Consultancy Report (Phase One), the BIM Workflow basically separate into 3 parts:

1. Drawings - Set up specific views on sheet such as plan, section, elevation etc.
2. Data extraction - Create area plans and rooms for calculation purposes.
3. Calculation - Use schedules to calculate the technical specifications such as Sanitary Fitment Provision, Occupancy, Means of escape requirements, etc.



BIM GBP Submission Consultancy Report (Phase One)



GBP workflow and components

8. Drawing Production Capability and Standard

8.1 Statutory Compliance

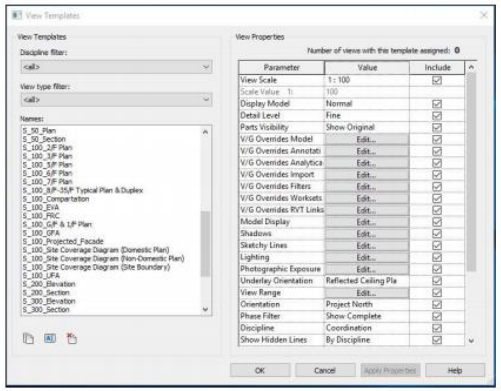
For Drawings, by creating the View Templates in the BIM model, it would allow us to set different color, line weight, view range, specific content to be shown or hidden on sheet, etc. to serve different drawing purposes such as Plan, Section, Elevation, EVA, GFA, UFA Diagram.

A systematic naming approach for View Templates will provide us an easy access to different views efficiently.

Naming System Sample

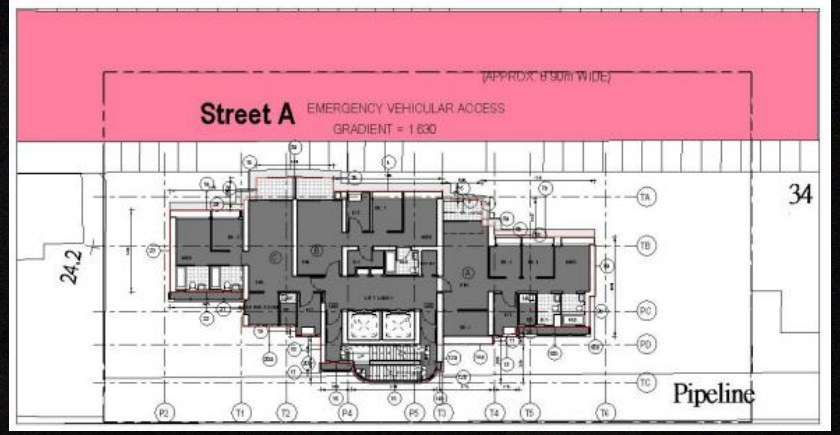
S_100_Elevation

Purpose (S=Submission) | Scale | Usage

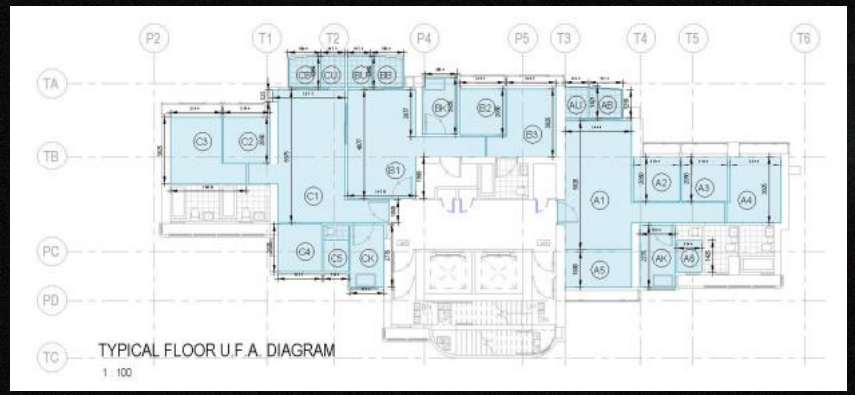


View setting and dialogue box

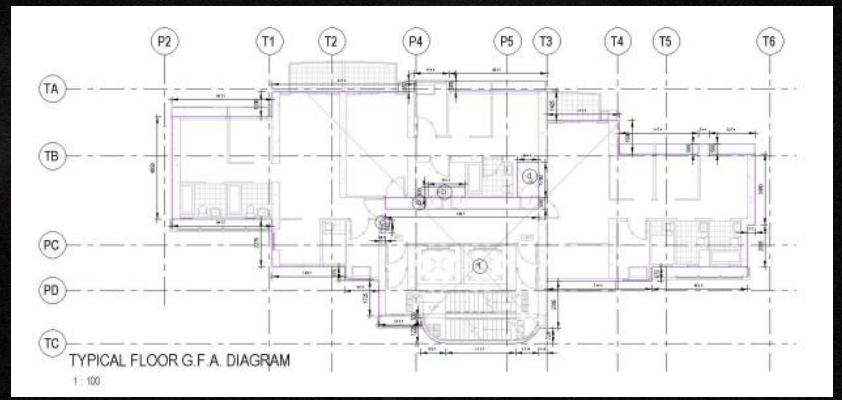
Typical plan view



EVA plan view



UFA Diagram view

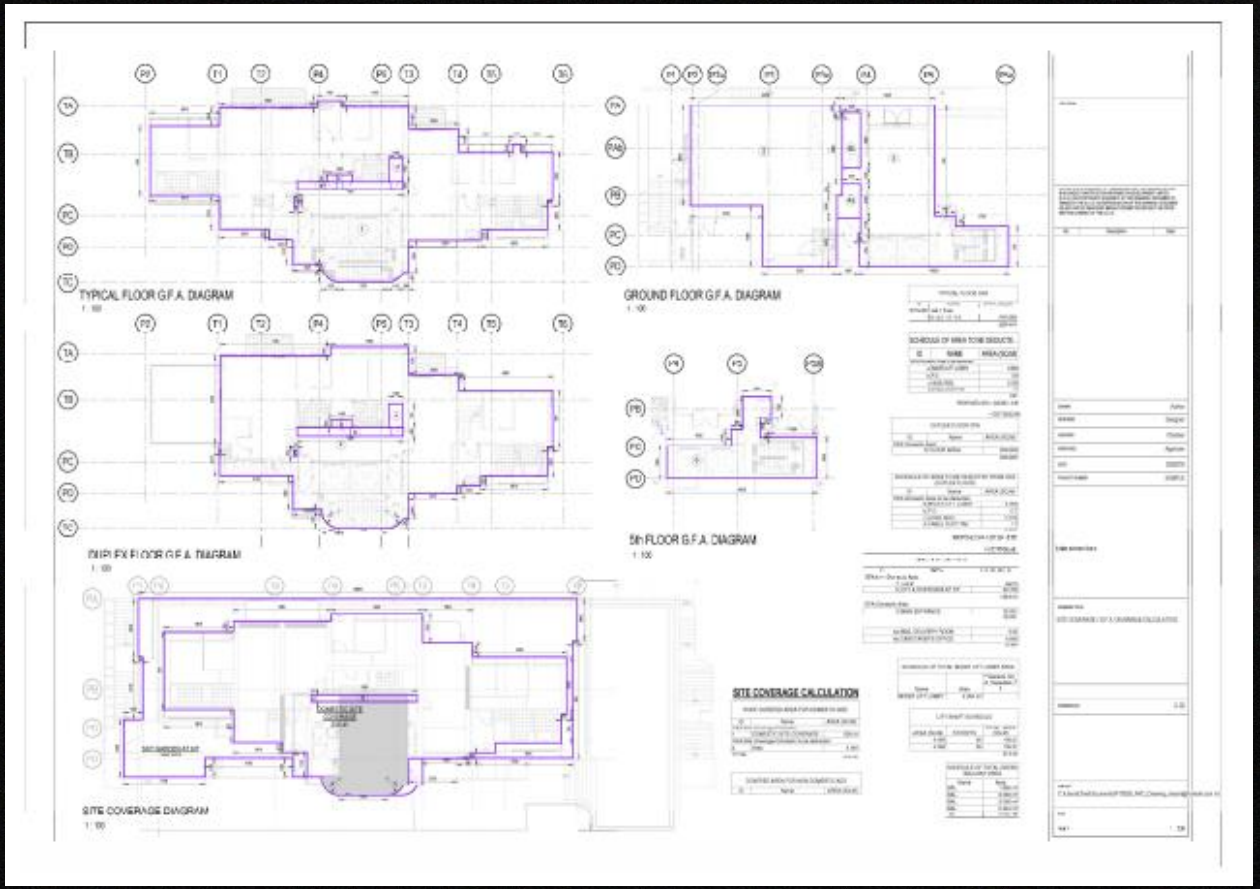


GFA Diagram view

8. Drawing Production Capability and Standard

8.1 Statutory Compliance

For Data Extraction, there will be one more step to further produce a proper submission drawing once area diagrams are ready. The area diagrams should be gathered and drag into a drawing sheet accompanied with the results in schedule to indicate the room areas. A set of drawing can be named and reviewed according to the drawing numbers



Typical area diagram drawing

8. Drawing Production Capability and Standard

8.1 Statutory Compliance

For Calculation, Buildings Department's PNAP ADM-19 highlights the requirements of the areas as defined for the purpose of the calculations. It requires the outline of the area concerned, classification of the area, identification code of the area and dimensions.

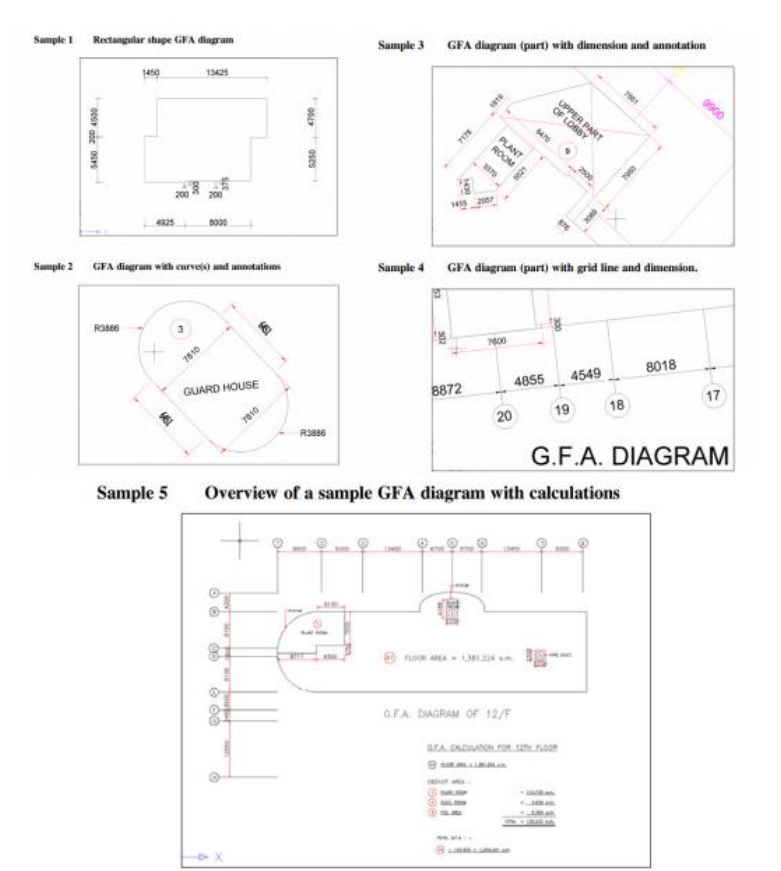


Figure 3-11. Example of Dimension Style in PNAP ADM-19 for area diagram

An example will be illustrated the workflow of UFA calculation process. By using the ***Room*** tool to find out the room area. Then classify the use of the area and check the relevant Code of Practice.

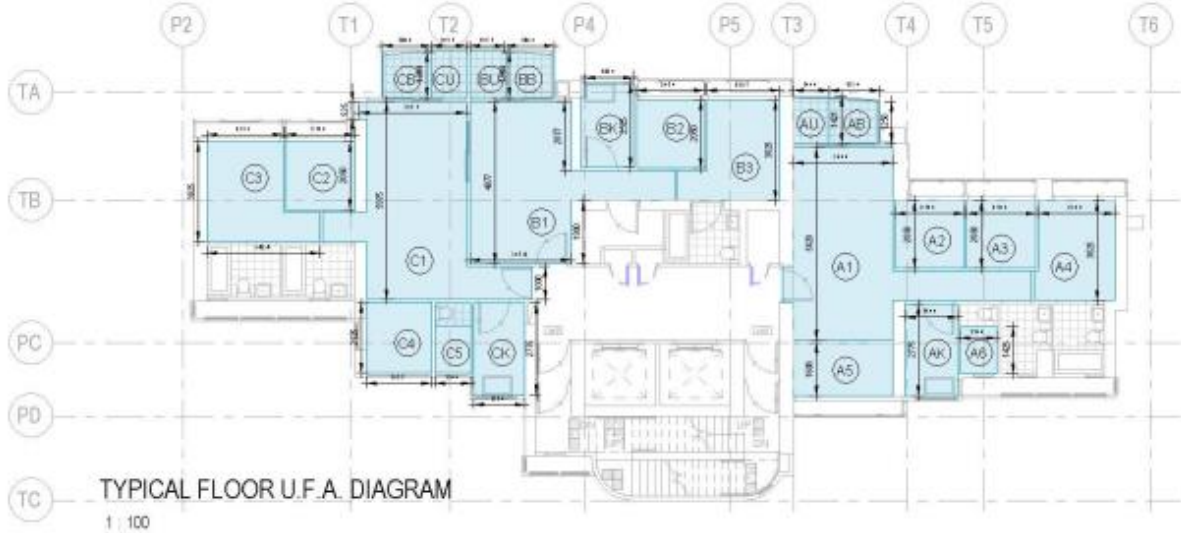
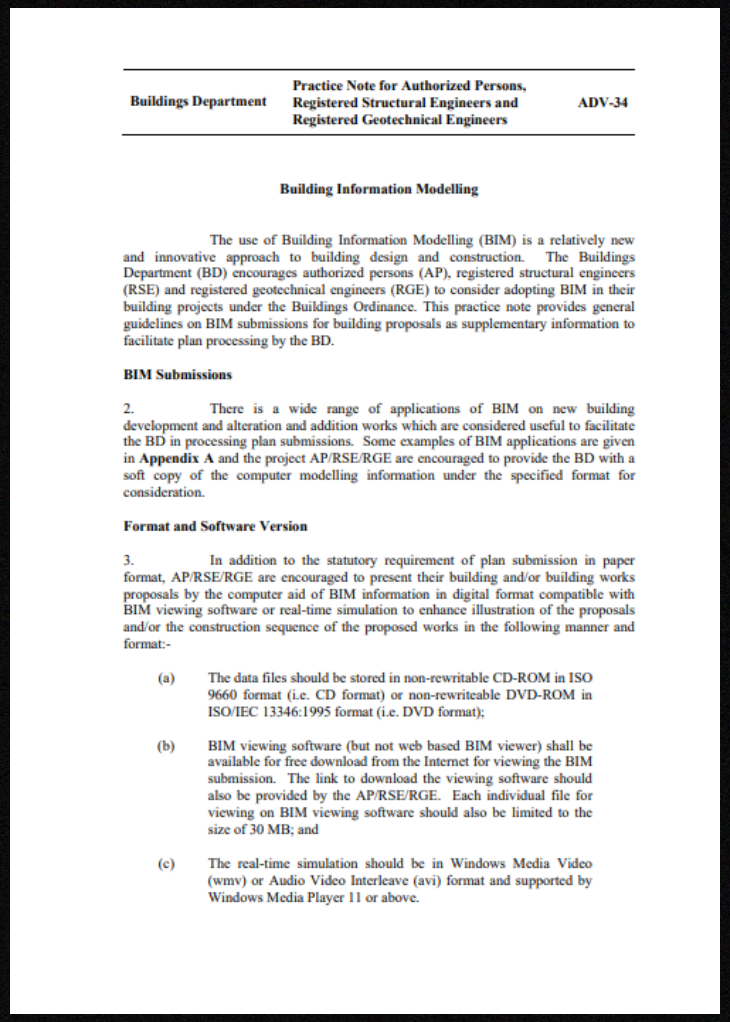


Figure 3-23. Automatic demarcation of room area by using Room tool

8. Drawing Production Capability and Standard

8.1 Statutory Compliance

ADV-34 is a general guidelines on BIM submissions for building proposals as supplementary information to facilitate plan processing by the BD. It is not a compulsory but will benefit to BD approval.



Buildings Department	Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers	ADV-34

Building Information Modelling

The use of Building Information Modelling (BIM) is a relatively new and innovative approach to building design and construction. The Buildings Department (BD) encourages authorized persons (AP), registered structural engineers (RSE) and registered geotechnical engineers (RGE) to consider adopting BIM in their building projects under the Buildings Ordinance. This practice note provides general guidelines on BIM submissions for building proposals as supplementary information to facilitate plan processing by the BD.

BIM Submissions

2. There is a wide range of applications of BIM on new building development and alteration and addition works which are considered useful to facilitate the BD in processing plan submissions. Some examples of BIM applications are given in **Appendix A** and the project AP/RSE/RGE are encouraged to provide the BD with a soft copy of the computer modelling information under the specified format for consideration.

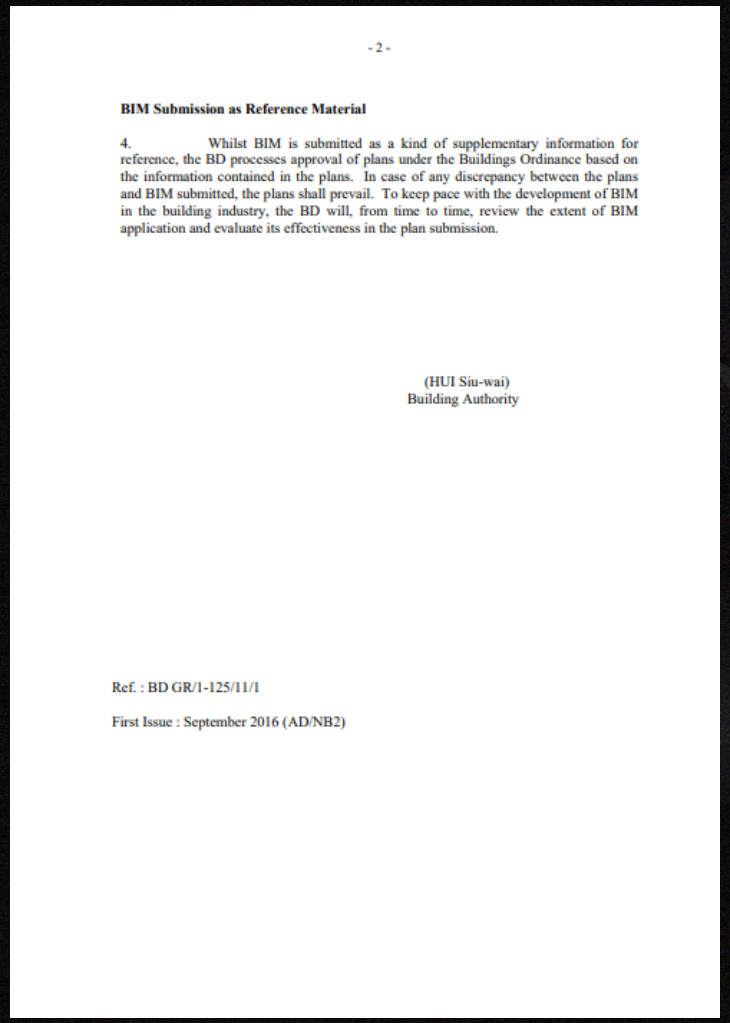
Format and Software Version

3. In addition to the statutory requirement of plan submission in paper format, AP/RSE/RGE are encouraged to present their building and/or building works proposals by the computer aid of BIM information in digital format compatible with BIM viewing software or real-time simulation to enhance illustration of the proposals and/or the construction sequence of the proposed works in the following manner and format:-

(a) The data files should be stored in non-rewritable CD-ROM in ISO 9660 format (i.e. CD format) or non-rewriteable DVD-ROM in ISO/IEC 13346:1995 format (i.e. DVD format);

(b) BIM viewing software (but not web based BIM viewer) shall be available for free download from the Internet for viewing the BIM submission. The link to download the viewing software should also be provided by the AP/RSE/RGE. Each individual file for viewing on BIM viewing software should also be limited to the size of 30 MB; and

(c) The real-time simulation should be in Windows Media Video (wmv) or Audio Video Interleave (avi) format and supported by Windows Media Player 11 or above.



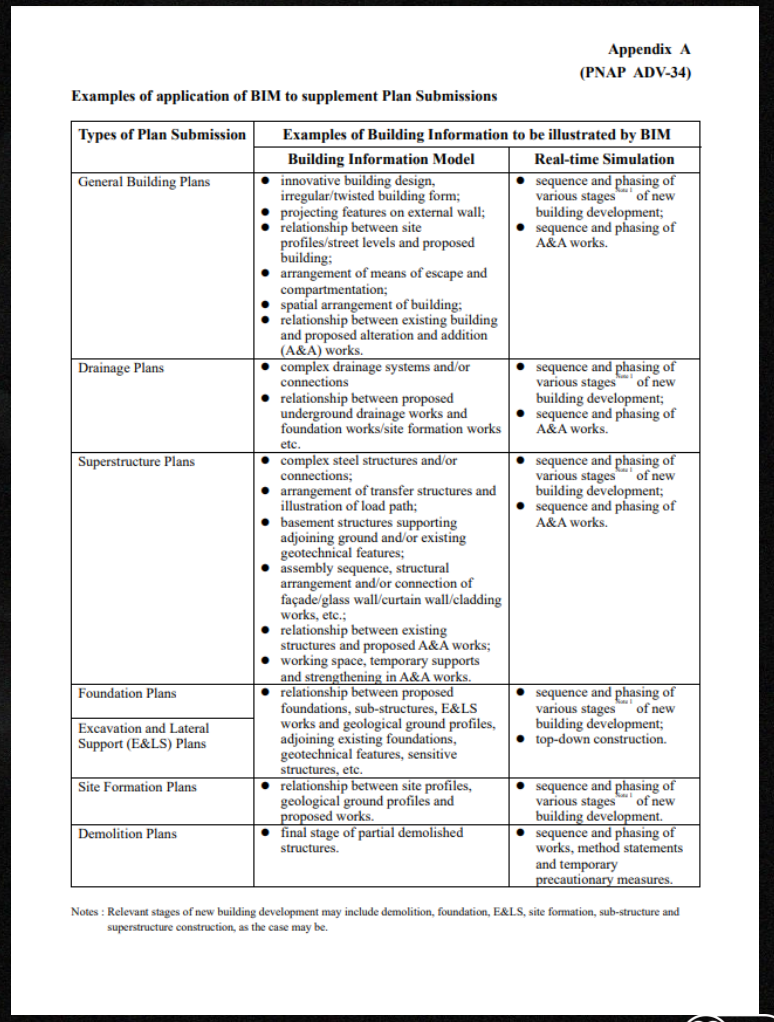
BIM Submission as Reference Material

4. Whilst BIM is submitted as a kind of supplementary information for reference, the BD processes approval of plans under the Buildings Ordinance based on the information contained in the plans. In case of any discrepancy between the plans and BIM submitted, the plans shall prevail. To keep pace with the development of BIM in the building industry, the BD will, from time to time, review the extent of BIM application and evaluate its effectiveness in the plan submission.

(HUI Siu-wai)
Building Authority

Ref. : BD GR/1-125/11/1

First Issue : September 2016 (AD/NB2)



Appendix A
(PNAP ADV-34)

Examples of application of BIM to supplement Plan Submissions

Types of Plan Submission	Examples of Building Information to be illustrated by BIM	
	Building Information Model	**Real-time Simulation**
General Building Plans	• innovative building design, irregular/twisted building form; • projecting features on external wall; • relationship between site profiles/street levels and proposed building; • arrangement of means of escape and compartmentation; • spatial arrangement of building; • relationship between existing building and proposed alteration and addition (A&A) works.	• sequence and phasing of various stages[Note 1] of new building development; • sequence and phasing of A&A works.
Drainage Plans	• complex drainage systems and/or connections • relationship between proposed underground drainage works and foundation works/site formation works etc.	• sequence and phasing of various stages[Note 1] of new building development; • sequence and phasing of A&A works.
Superstructure Plans	• complex steel structures and/or connections; • arrangement of transfer structures and illustration of load path; • basement structures supporting adjoining ground and/or existing geotechnical features; • assembly sequence, structural arrangement and/or connection of façade/glass wall/curtain wall/cladding works, etc.; • relationship between existing structures and proposed A&A works; • working space, temporary supports and strengthening in A&A works.	• sequence and phasing of various stages[Note 1] of new building development; • sequence and phasing of A&A works.
Foundation Plans Excavation and Lateral Support (E&LS) Plans	• relationship between proposed foundations, sub-structures, E&LS works and geological ground profiles, adjoining existing foundations, geotechnical features, sensitive structures, etc.	• sequence and phasing of various stages[Note 1] of new building development; • top-down construction.
Site Formation Plans	• relationship between site profiles, geological ground profiles and proposed works.	• sequence and phasing of various stages[Note 1] of new building development.
Demolition Plans	• final stage of partial demolished structures.	• sequence and phasing of works, method statements and temporary precautionary measures.

Notes : Relevant stages of new building development may include demolition, foundation, E&LS, site formation, sub-structure and superstructure construction, as the case may be.

8. Drawing Production Capability and Standard

8.1 Statutory Compliance

- New building development and alteration and addition works (A & A) which are considered useful to facilitate the BD in processing plan submissions.

- Project AP/RSE/RGE are encouraged to provide the BD with a soft copy of the computer modelling information under the specified format for consideration. (E.g. Revit, ArchiCAD, Tekla Model, CObie)

8. Drawing Production Capability and Standard

8.1 Statutory Compliance

For Format and Software version,

(a) The data files should be stored in non-rewritable CD-ROM in ISO 9660 format (i.e. CD format) or non-rewriteable DVD-ROM in ISO/IEC 13346:1995 format (i.e. DVD format);

(b) BIM viewing software shall be available for free download from the Internet for viewing the BIM submission (e.g. dwfx, nwd). The link to download the viewing software should also be provided by the AP/RSE/RGE. Each individual file for viewing on BIM viewing software should also be limited to the size of 30 MB.

(c) The real-time simulation should be in Windows Media Video (wmv) or Audio Video Interleave (avi) format and supported by Windows Media Player 11 or above. (e.g. Naviswork, Fuzor, Lumion...etc)

Common BIM Platform and Viewer

There are many viewers to view the dwf / dwfx file provided by Autodesk:

	dwf	dwfx
Autodesk Design Review	✓	✓
Autodesk DWF Viewer	✓	✗
Autodesk Navisworks Freedom	✓	✓

8. Drawing Production Capability and Standard

8.1 Statutory Compliance

	Types of Plan Submission	Examples of Building Information to be illustrated by BIM	
		Building Information Model	**Real-time Simulation**
AP	General Building Plans	• innovative building design, irregular/twisted building form; • projecting features on external wall; • relationship between site profiles/street levels and proposed building; • arrangement of means of escape and compartmentation; • spatial arrangement of building; • relationship between existing building and proposed alteration and addition (A&A) works.	• sequence and phasing of various stages[Note 1] of new building development; • sequence and phasing of A&A works.
AP	Drainage Plans	• complex drainage systems and/or connections • relationship between proposed underground drainage works and foundation works/site formation works etc.	• sequence and phasing of various stages[Note 1] of new building development; • sequence and phasing of A&A works.

Examples of application of BIM to supplement Plan Submissions

8. Drawing Production Capability and Standard

8.1 Statutory Compliance

RSE	Superstructure Plans	• complex steel structures and/or connections; • arrangement of transfer structures and illustration of load path; • basement structures supporting adjoining ground and/or existing geotechnical features; • assembly sequence, structural arrangement and/or connection of façade/glass wall/curtain wall/cladding works, etc.; • relationship between existing structures and proposed A&A works; • working space, temporary supports and strengthening in A&A works.	• sequence and phasing of various stages[Note 1] of new building development; • sequence and phasing of A&A works.
RSE	Foundation Plans	• relationship between proposed foundations, sub-structures, E&LS works and geological ground profiles, adjoining existing foundations, geotechnical features, sensitive structures, etc.	• sequence and phasing of various stages[Note 1] of new building development; • top-down construction.
RGE RSE	Excavation and Lateral Support (E&LS) Plans		
RGE RSE	Site Formation Plans	• relationship between site profiles, geological ground profiles and proposed works.	• sequence and phasing of various stages[Note 1] of new building development.
AP RSE	Demolition Plans	• final stage of partial demolished structures.	• sequence and phasing of works, method statements and temporary precautionary measures.

Notes : Relevant stages of new building development may include demolition, foundation, E&LS, site formation, sub-structure and superstructure construction, as the case may be.

8. Drawing Production Capability and Standard

8.2 Contractual Compliance

Contractual provisions adopted in pilot projects may continue to be used until advised otherwise.

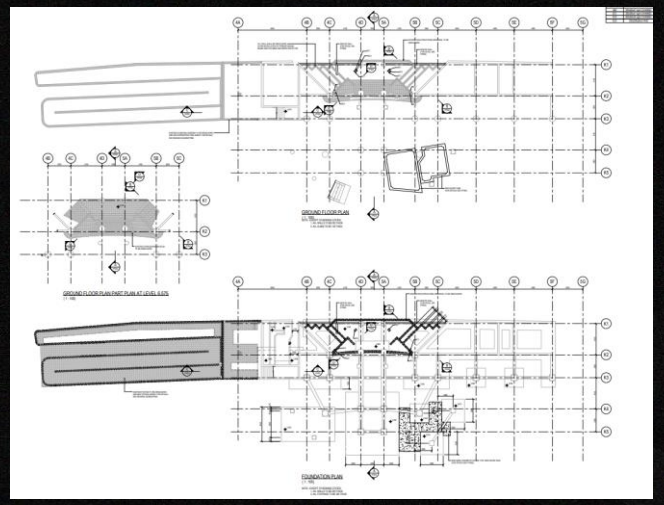
To cater for cases where small consultant or contractor firms may not be very well equipped with BIM expertise, provisions will be stipulated in the agreement or contract allowing the consultant or contractor to engage BIM sub-consultant or sub-contractor to assist them.

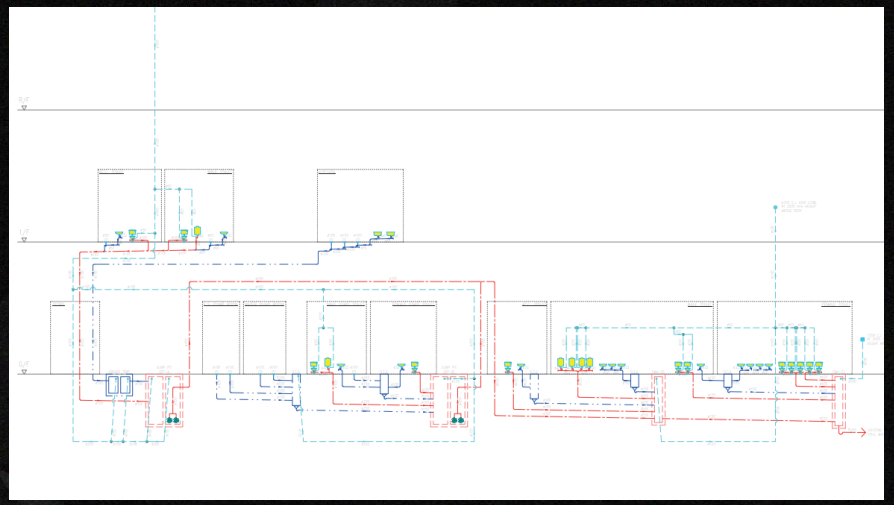
The agreement or contract shall also contain terms requiring the consultant or contractor to train up a number of staff of the employer/their staff and their subconsultant/sub-contractor staff.

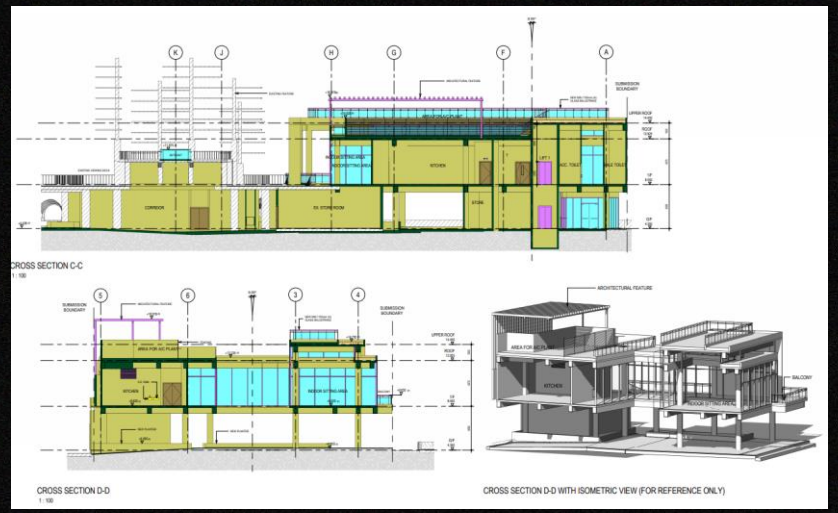
The Construction Industry Council (CIC) will suitably organise free BIM training places for WDs to allocate to their consultants/contractors successfully awarded the Agreements/Contracts. Sample provisions for the training requirements are enclosed in Annex 2 for reference.

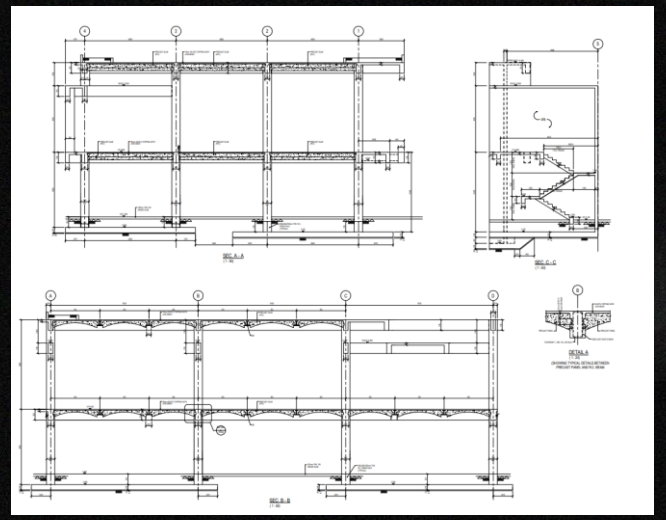
8. Drawing Production Capability and Standard

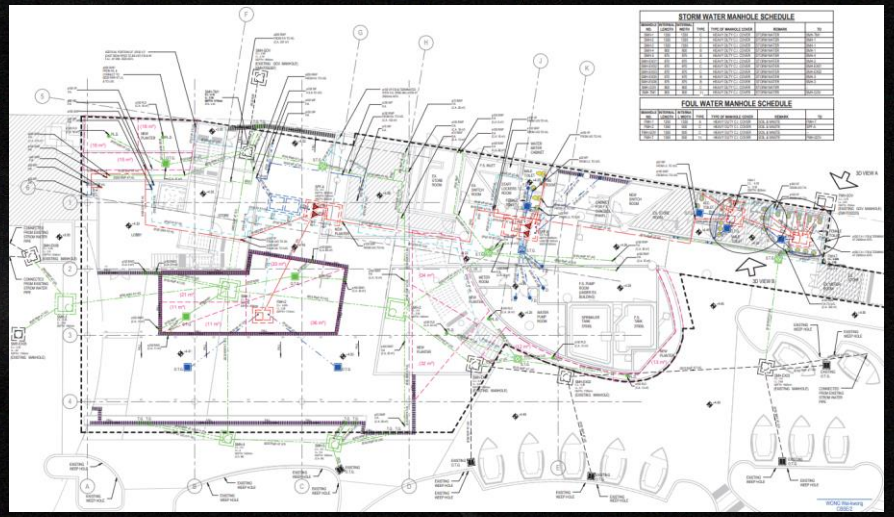
8.2 Local Practice











Architectural

Structural

MEP

9. Productivity Audit

9.1 Assessment Criteria

For Presentation Style of Deliverables,

Drawing Scale

(a) BIM *drawings* should be drawn in true size with precision rounded up to the nearest mm unit.

Drawing Object within area diagram

(b) The position of the drawing shall be close to project base point, survey point 0,0 and drawing objects in area diagram shall not be grouped or blocked.

Area boundary (Area Boundaries in “Area Plans / Room” for Revit, “Zone” for Archicad”

(c) **All area boundaries** for BIM drawings intended for area calculation shall be closed.

Dimension

(f) All dimensions should be true dimensions generated automatically by the software and laid in the specified layers / **“category” (in Revit).** Text figures or figures manually inserted, amended or constructed for calculation purpose in the **BIM file** is not acceptable.

Decimal places of areas and volumes

(e) All areas and volumes should be presented in m^2 and m^3 units respectively and rounded up to 3 decimal places.

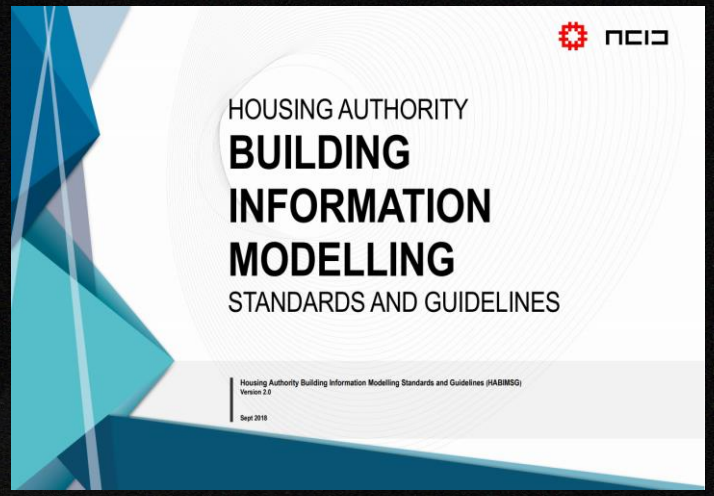
Suggested Text Font

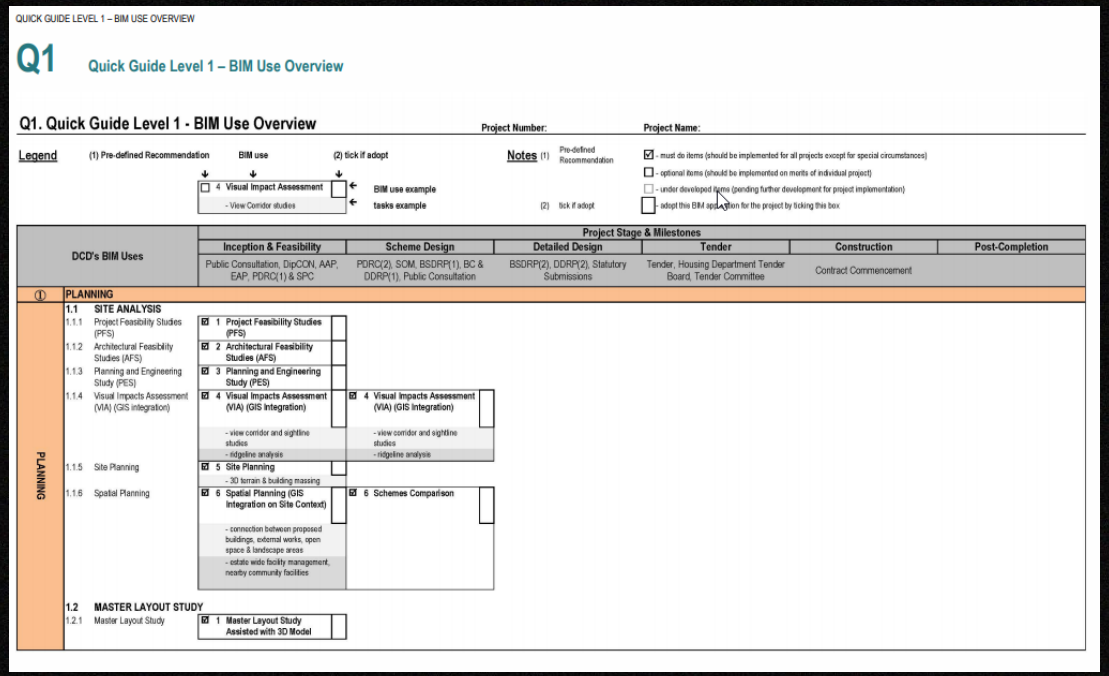
(f) Text style is not compulsory. Conventional text fonts are suggested. Common type such as “Arial Narrow” font in 2.5mm size is recommended for use in the text. as “Arial Narrow

9. Productivity Audit

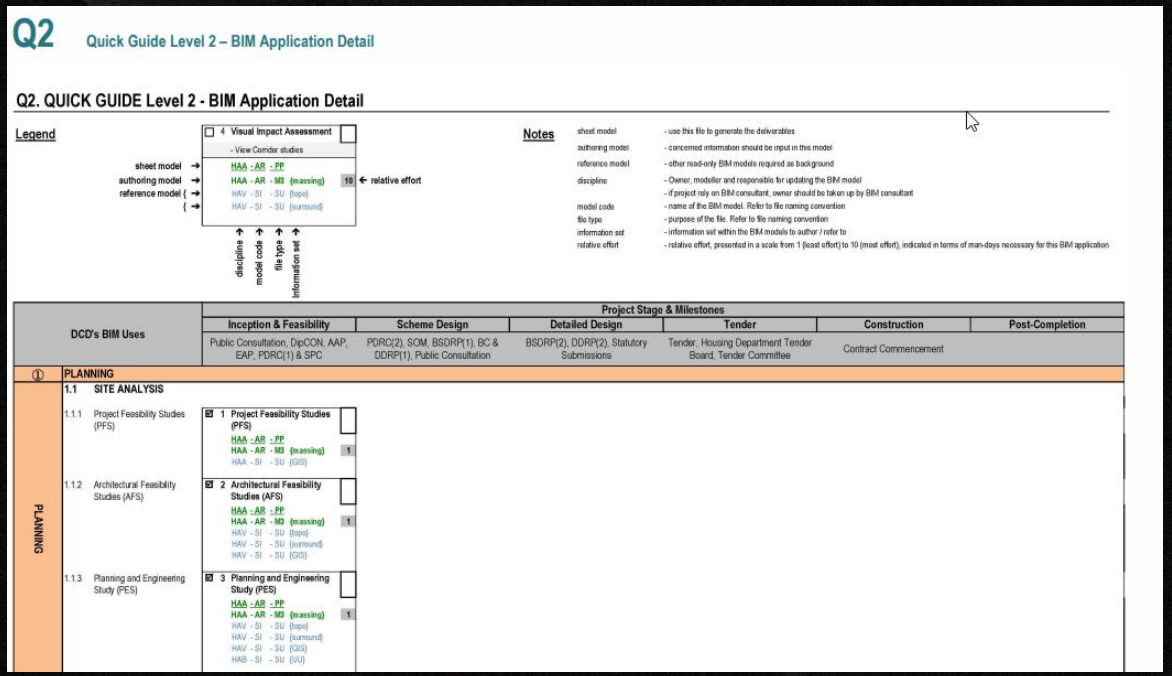
9.2 Standard Matching

HA Standard provided BIM strategy, BIM uses, BIM processes for BIM discipline coordinator and BIM Manager to build and audit the BIM model.





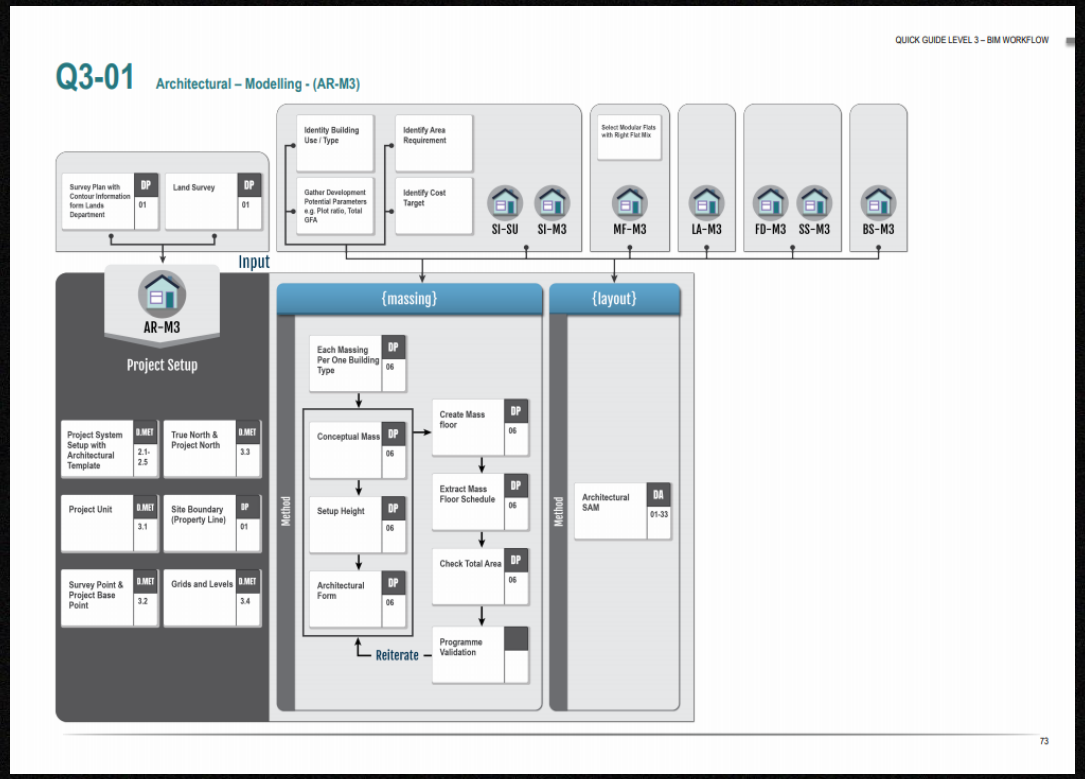
Level 1 -BIM Use Overview from HA Standard



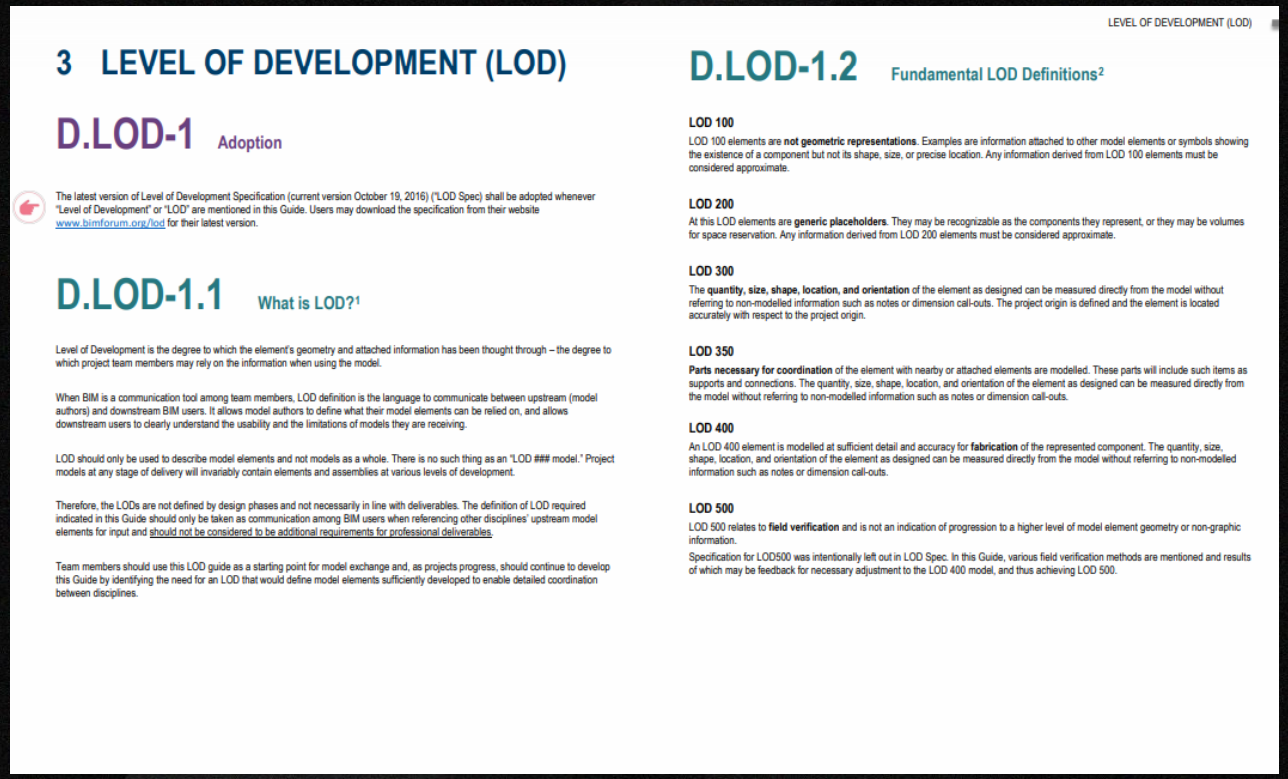
Level 2-BIM Application Detail from HA Standard

9. Productivity Audit

9.2 Standard Matching



Level 3 -Division of Model from HA Standard



Level 4 -Level of development from HA Standard

9. Productivity Audit

9.2 Standard Matching

Architectural Services Department -
Building Information Modelling (BIM) Guide for Facilities Upkeep

- Guideline for BIM to Facility Management upkeeping
- The Standard of Naming Component to be confirmed by BIM Manager
- Facility Management team can use the information to maintain the continue of upkeeping by the benefit of BIM input

Property Services Branch
Architectural Services Department

Building Information Modelling (BIM) Guide for Facilities Upkeep

(Version 1.0)

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. 7/2017 or the latest version.

Disclaimer

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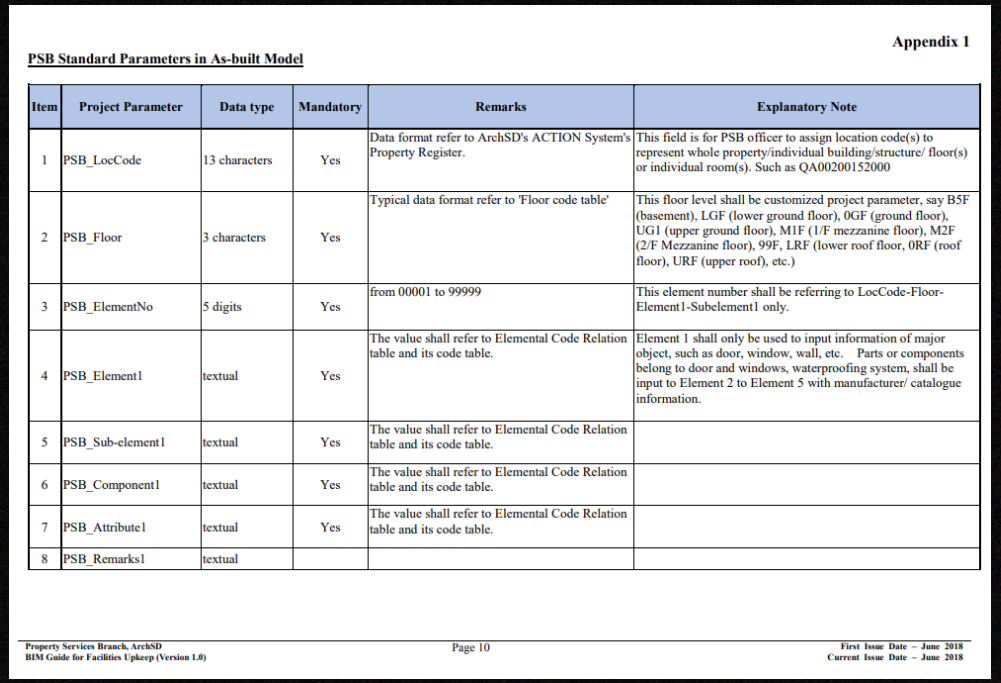
The Architectural Services Department reserves the right to omit, edit or update the Guide at any time in its absolute discretion without any prior notice.



Appendix 1

PSB Standard Parameters in As-built Model

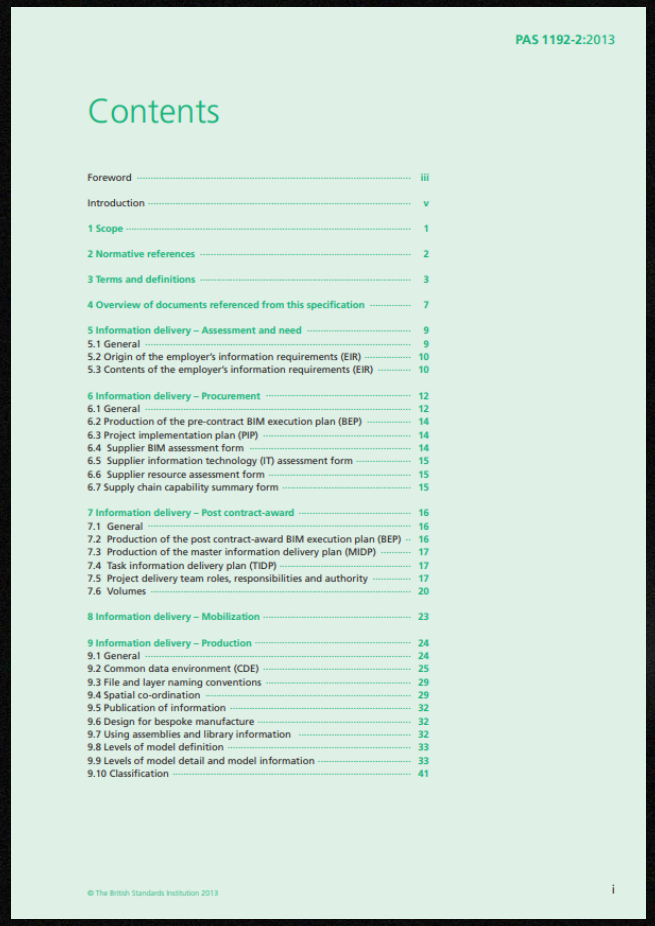
Item	Project Parameter	Data type	Mandatory	Remarks	Explanatory Note
1	PSB_LocCode	13 characters	Yes	Data format refer to ArchSD's ACTION System's Property Register.	This field is for PSB officer to assign location code(s) to represent whole property/individual building/structure/ floor(s) or individual room(s). Such as QA00200152000
2	PSB_Floor	3 characters	Yes	Typical data format refer to 'Floor code table'	This floor level shall be customized project parameter, say B5F (basement), LGF (lower ground floor), 0GF (ground floor), UG1 (upper ground floor), M1F (1/F mezzanine floor), M2F (2/F Mezzanine floor), 99F, LRF (lower roof floor, 0RF (roof floor), URF (upper roof), etc.)
3	PSB_ElementNo	5 digits	Yes	from 00001 to 99999	This element number shall be referring to LocCode-Floor-Element1-Subelement1 only.
4	PSB_Element1	textual	Yes	The value shall refer to Elemental Code Relation table and its code 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			

Property Services Branch, ArchSD
BIM Guide for Facilities Upkeep (Version 1.0)
Page 10
First Issue Date – June 2018
Current Issue Date – June 2018

9. Productivity Audit

9.2 Standard Matching

PAS 1192-2 provides specific guidance for the information management requirements associated with projects delivered using BIM. Not all information on a project will be originated, exchanged or managed in a BIM format. This information will also need to be managed in a consistent and structured way to enable efficient and accurate information exchange.



10. Audit Reporting

10.1 Format

The format for process and quality of information exchange e.g. IFC / BCF / XML…etc.

	C3D	RVT	ORD	ABD	Open Format	Shared Format	Related Tools
Alignment-based Road Model	Y		Y		IFC	XML	
Topography-related Site formation Model	Y		Y			XML	
Strata Models (Plugins)	GEO		GINT			XML	HolebaseSI
Utilities Model	Y	Y	SSU	Y	IFC	XML	
Bridge Segment Model	Y		OBD		IFC		
Bridge Substructure/Superstructure		G		G	IFC		
Tunnel Model	Y				IFC		Sub Assem composer
Retaining Wall Model	Y	G	Y	G	IFC		
4DMS						MP4	NWD/ Sychro
Drawings/Site Sketches	*	*	*	*	DXF	PDF	
3DVR						EXE	3DS/LRT
Asset Information (COBie)		Y		Y		COBIE	

- IFC 4.0
  - Latest Version support ALG
  - XML-based Text file
- COBie
  - BIM/FM Standard
  - PAS 1192-4
  - XLS file 13 tables
- XML
  - Terrain and alignments
  - XML-base Text files

Y - Default Function
G– Generic Solid

GEO – Geotechnical Module
GINT – GINT Module

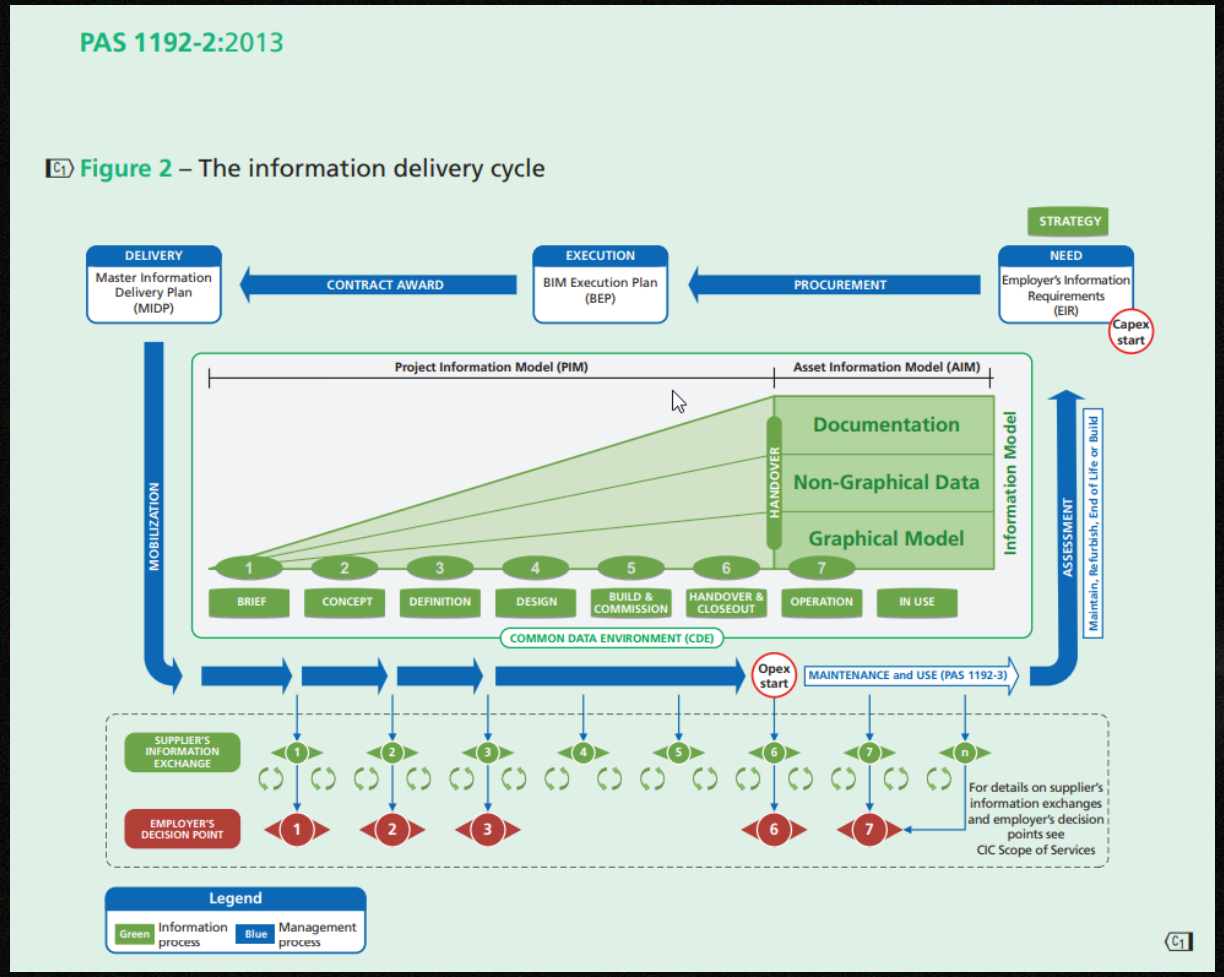
SSU: SubSurface Utilities
OBD: OpenBridge Designer

3DS: 3Ds Max
LDT: LumenRT

10. Audit Reporting

10.2 Workflow

The information delivery cycle shows the level of integration of digital information into asset & facility management.

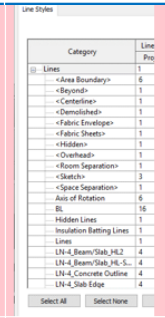
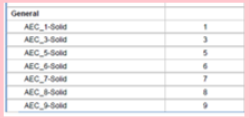
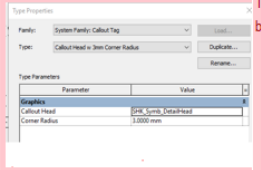
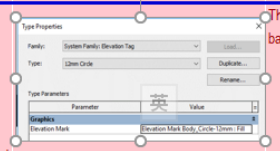
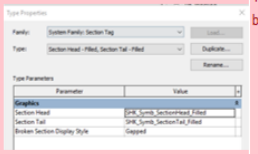


Level of integration of digital information from PAS 1192-2:2003

10. Audit Reporting

10.3 Feedback

After BIM Manager finish model auditing and generated model audit checklist, the BIM discipline coordinator can give them feedback to BIM Manager if have some arguments in audit check point.

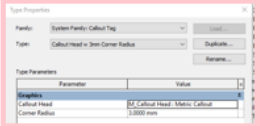
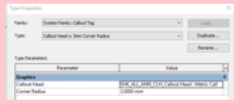
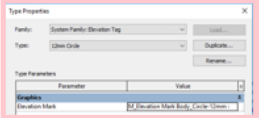
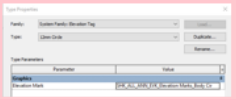
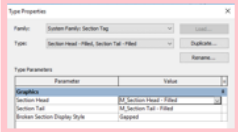
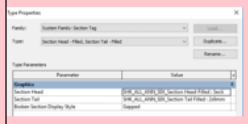
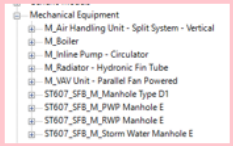
Numbe	AUDIT CHECK POINT	EVIDENCE	COMMENT	COMPLIANCE	TARGET COMPLETION DATE	COMPLETION DATE	FEEDBACK
	protocols (Please refer to AEC(UK) BIM Protocol for Autodesk Revit Section 9.7)		naming shall be " Company name(short form)_Line Weight-Line Pattern". 				
18	Callout Tag Naming - Refer to Revit naming protocols (FILP Guideline Section 18 "Suggested Family Type for use with the FLIP system based on FLIP-specific naming convention system and technical consideration for the local market")		The name of callout tag in model file shall be based on FLIP Standard.	Not yet completed	13/8/2018		As discussed, items related to annotation (for 2D drawing issuance) will remain unchanged to match with SHK ACAD drawing standard
19	Elevation Tag Naming - Refer to FILP Guideline (FILP Guideline Section 18 "Suggested Family Type for use with the FLIP system based on FLIP-specific naming convention system and technical consideration for the local market")		The name of elevation tag in this model file based on FLIP Standard.	Not yet completed	13/8/2018		As discussed, items related to annotation (for 2D drawing issuance) will remain unchanged to match with SHK ACAD drawing standard
20	Section Tag Naming - Refer to FILP Guideline (FILP Guideline Section 18 "Suggested Family Type for use with the FLIP system based on FLIP-specific naming convention system and technical consideration for the local market")		The name of section tag in this model file shall be based on FLIP Standard.	Not yet completed	13/8/2018		As discussed, items related to annotation (for 2D drawing issuance) will remain unchanged to match with SHK ACAD drawing standard

Example of Feedback in Model Audit Checklist

10. Audit Reporting

10.4 Issue Tracking

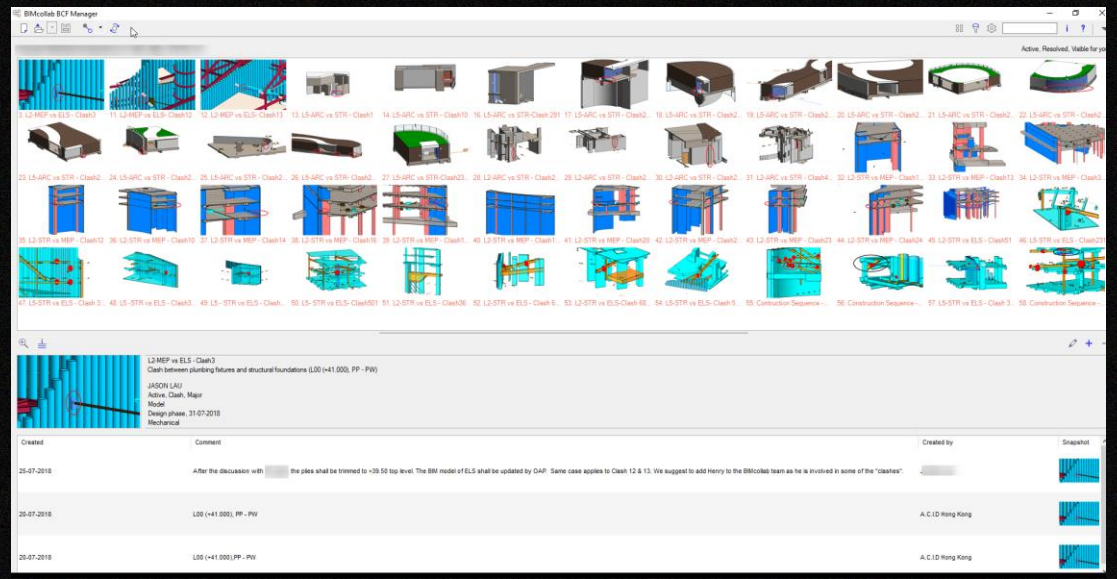
After the parties revised the model, BIM Manager have to check once again to see with the issue is solve or not.

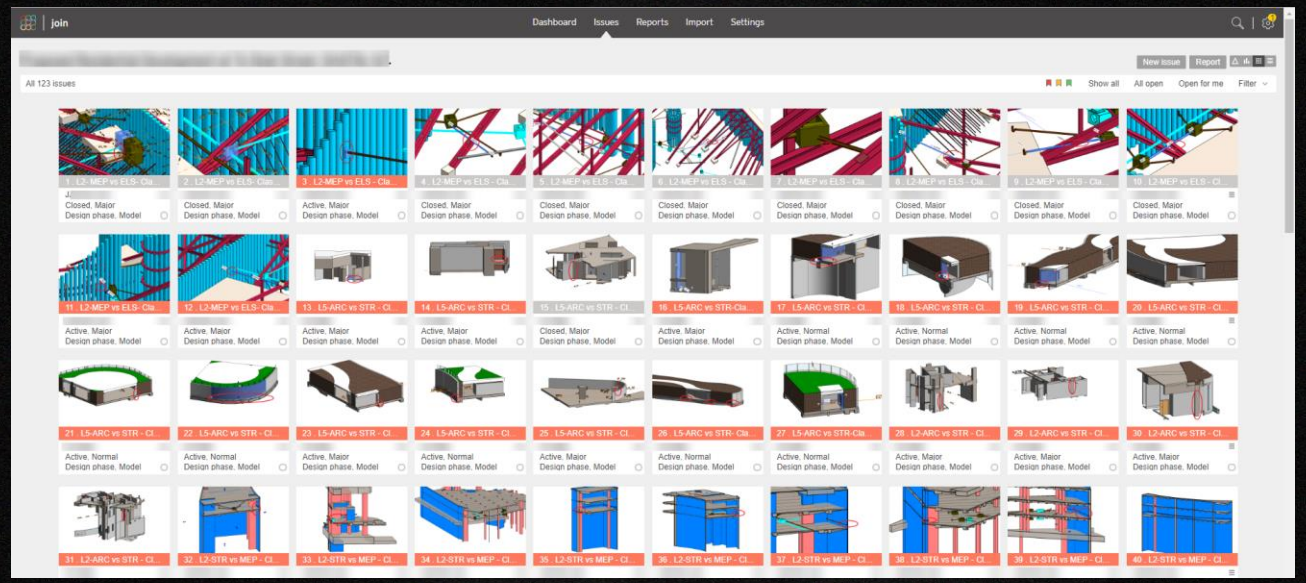
Numb	AUDIT CHECK POINT	EVIDENCE	COMMENT	COMPLIANCE	TARGET COMPLETION DATE	COMPLETION DATE	FEEDBACK	20180912 - 2nd CHECKING (EVIDENCE)	20180912 - 2nd COMMENT	20180912 - 2nd CHECKING (COMPLIANCE)	TARGET COMPLETION DATE	2nd FEEDBACK
18	Callout Tag Naming – Refer to Revit naming protocols (FILP Guideline Section 18 *Suggested Family Type for use with the FLIP system based on FLIP-specific naming convention system and technical consideration for the local market*)		The name of callout tag in model file shall be based on FLIP Standard.	Not yet completed	13/8/2018		Revised		The format of naming convention shall be ANN – <Functional Type> – <Originator> – <Descriptor 1> – <Descriptor 2>	Not yet completed.		
19	Elevation Tag Naming – Refer to FILP Guideline (FILP Guideline Section 18 *Suggested Family Type for use with the FLIP system based on FLIP-specific naming convention system and technical consideration for the local market*)		The name of elevation tag in this model file based on FLIP Standard.	Not yet completed	13/8/2018		Revised		The format of naming convention shall be ANN – <Functional Type> – <Originator> – <Descriptor 1> – <Descriptor 2>	Not yet completed.		
20	Section Tag Naming – Refer to FILP Guideline (FILP Guideline Section 18 *Suggested Family Type for use with the FLIP system based on FLIP-specific naming convention system and technical consideration for the local market*)		The name of section tag in this model file shall be based on FLIP Standard.	Not yet completed	13/8/2018		Revised		The format of naming convention shall be ANN – <Functional Type> – <Originator> – <Descriptor 1> – <Descriptor 2>	Not yet completed.	26/9/2018	
21	Families Naming – Refer to FILP Guideline (FILP Guideline Section 18 *Suggested Family Type for use with the FLIP system based on FLIP-specific naming convention system and technical consideration for the local market*)		FLIP system shall be based on FLIP-specific naming convention system and technical consideration for the local market	Not yet completed	13/8/2018		On Progress	See Sheet 2- Naming of MEP_L02		Not yet completed.	26/9/2018	

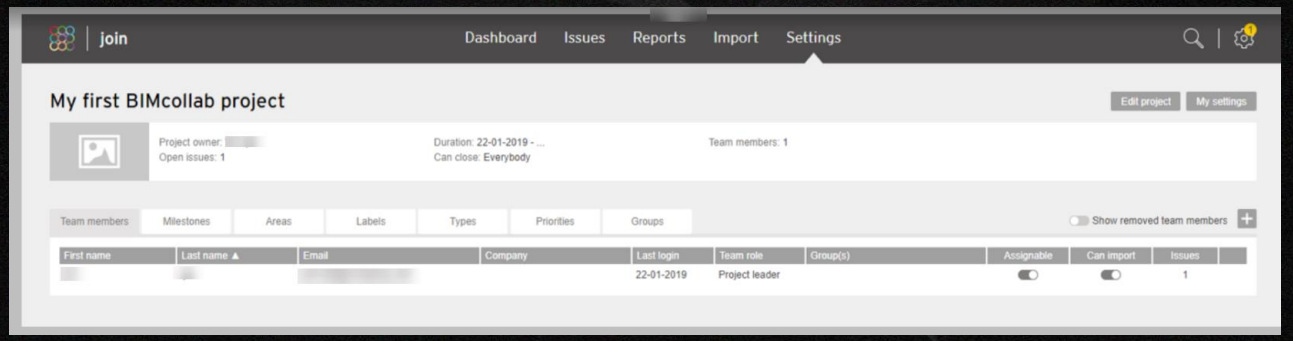
10. Audit Reporting

10.4 Issue Tracking

BIMCollab is a platform for BIM Manager and BIM Coordinator to trace back the issue in the BIM model. BIM Manger can assign which BIM Coordinator to solve the issue. BIM Manager can close the issue after the issue is resolved.

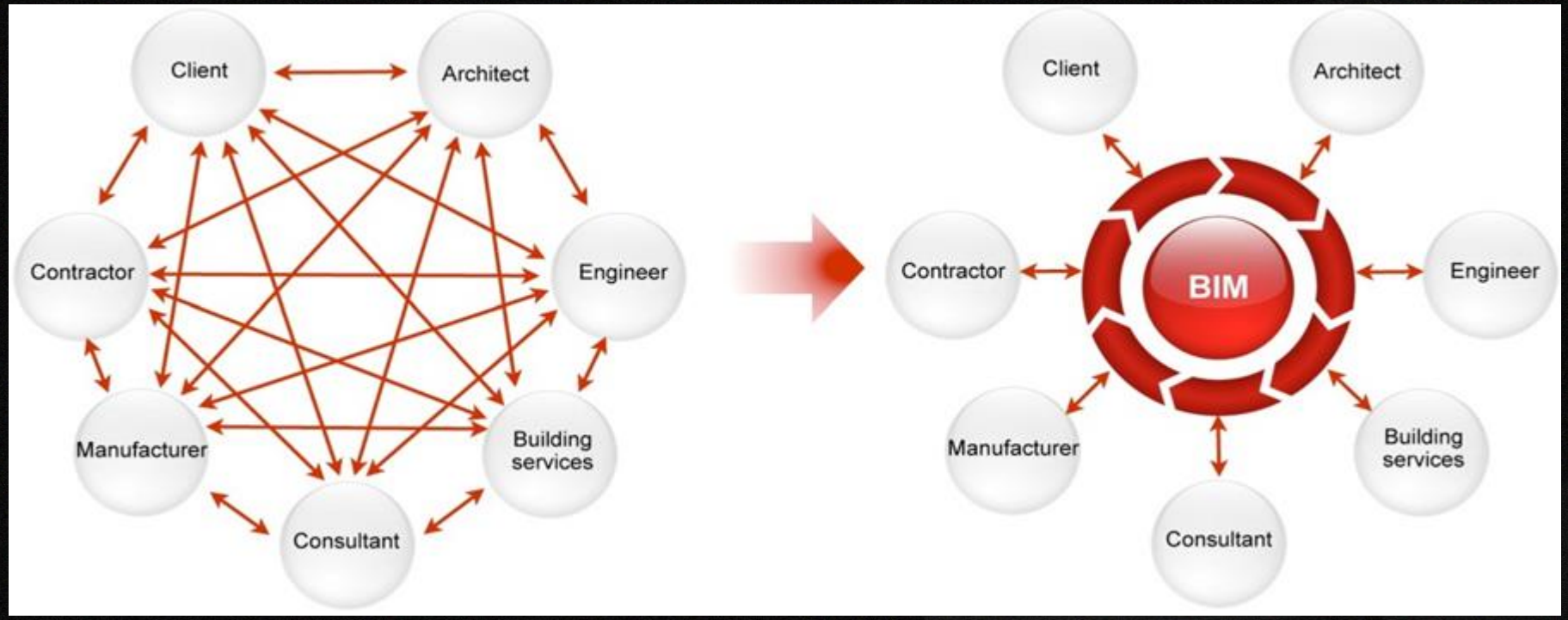






11. Good Industry Practice

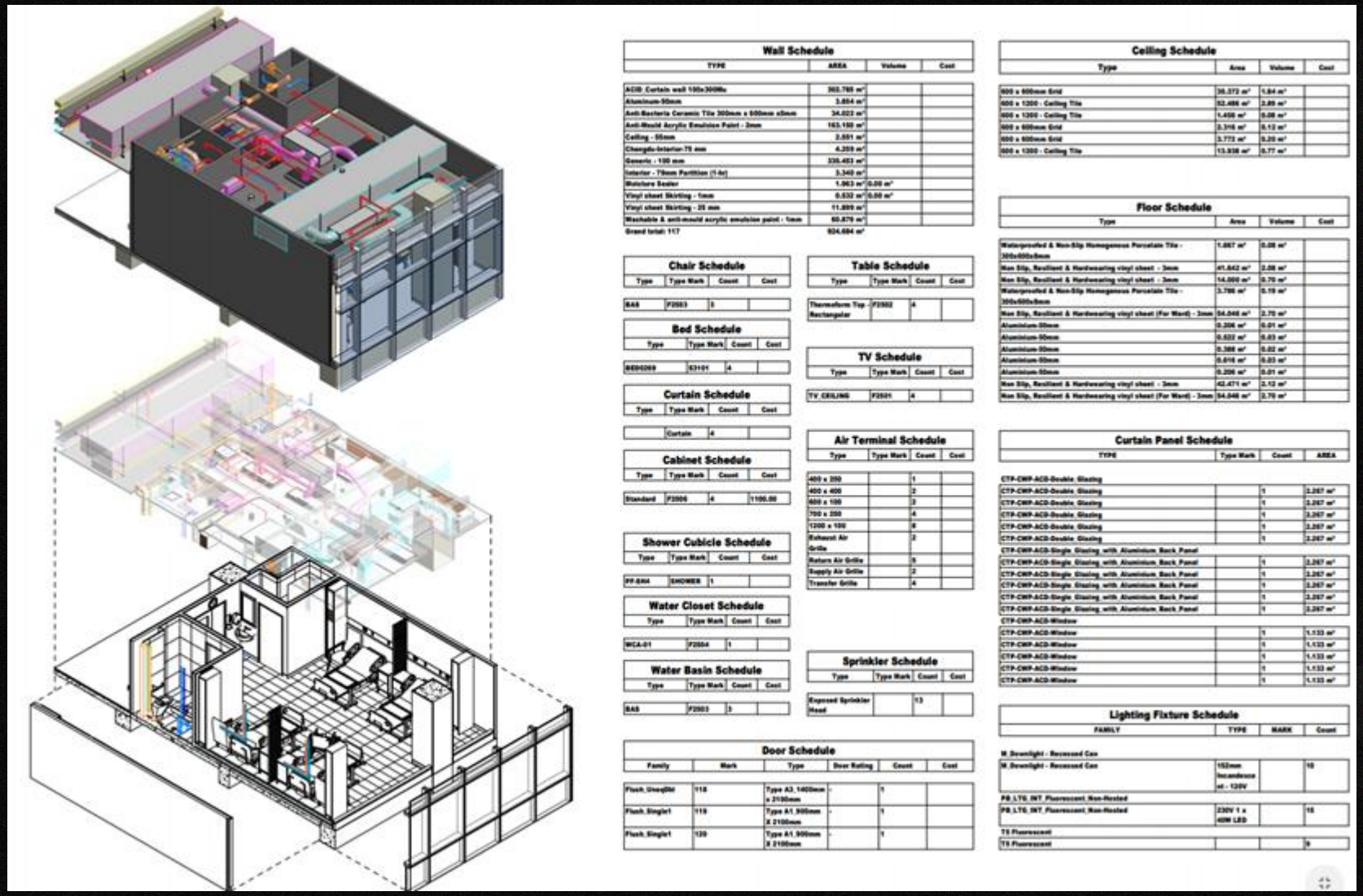
Current Industry Workflow vs BIM workflow



- Cross communication channels
- Different versions sent to different teams
- Duplicate designs
- Duplicate and overlapping data creating confusion across consultants

- Centralised model and information
- Live updates
- Parametric data to aid future phases
- Better coordination and collaboration
- Shared risk

11. Good Industry Practice



Wall Schedule

TYPE	AREA	Volume	Cost
ACIB Curtain wall 100x3000c	360.785 m²		
Aluminium-50mm	3.884 m²		
Anti-Bacteria Ceramic Tile 300mm x 600mm x5mm	34.022 m²		
Anti-Mould Acrylic Emulsion Paint - 2mm	163.150 m²		
Ceiling - 50mm	2.551 m²		
Changda-Interior-75 mm	4.209 m²		
Generic - 100 mm	330.453 m²		
Interior - 75mm Partition (1-hr)	3.340 m²		
Moisture Sealer	1.963 m²	0.00 m²	
Vinyl sheet Skirting - 1mm	0.532 m²	0.00 m²	
Vinyl sheet Skirting - 25 mm	11.809 m²		
Washable & anti-mould acrylic emulsion paint - 1mm	60.879 m²		
Grand total: 117	924.694 m²		

Ceiling Schedule

Type	Area	Volume	Cost
600 x 600mm Grid	36.372 m²	1.84 m²	
600 x 1200 - Ceiling Tile	52.486 m²	2.89 m²	
600 x 1200 - Ceiling Tile	1.458 m²	0.08 m²	
600 x 600mm Grid	2.316 m²	0.12 m²	
600 x 600mm Grid	3.772 m²	0.20 m²	
600 x 1200 - Ceiling Tile	13.938 m²	0.77 m²	

Chair Schedule

Type	Type Mark	Count	Cost
BAS	F2003	3	

Table Schedule

Type	Type Mark	Count	Cost
Thermoform Top - Rectangular	F2002	4	

Floor Schedule

Type	Area	Volume	Cost
Waterproofed & Non-Slip Homogeneous Porcelain Tile - 300x600x8mm	1.667 m²	0.08 m²	
Non Slip, Resilient & Hardwearing vinyl sheet - 3mm	41.842 m²	2.08 m²	
Non Slip, Resilient & Hardwearing vinyl sheet - 3mm	14.000 m²	0.70 m²	
Waterproofed & Non-Slip Homogeneous Porcelain Tile - 300x600x8mm	3.786 m²	0.19 m²	
Non Slip, Resilient & Hardwearing vinyl sheet (For Ward) - 3mm	54.048 m²	2.70 m²	
Aluminium-50mm	0.204 m²	0.01 m²	
Aluminium-50mm	0.622 m²	0.03 m²	
Aluminium-50mm	0.388 m²	0.02 m²	
Aluminium-50mm	0.616 m²	0.03 m²	
Aluminium-50mm	0.204 m²	0.01 m²	
Non Slip, Resilient & Hardwearing vinyl sheet - 3mm	42.471 m²	2.12 m²	
Non Slip, Resilient & Hardwearing vinyl sheet (For Ward) - 3mm	54.048 m²	2.70 m²	

Bed Schedule

Type	Type Mark	Count	Cost
IBED0269	E3101	4	

TV Schedule

Type	Type Mark	Count	Cost
TV_CEILING	F2501	4	

Curtain Schedule

Type	Type Mark	Count	Cost
Curtain		4	

Air Terminal Schedule

Type	Type Mark	Count	Cost
400 x 200		1	
400 x 400		2	
600 x 100		3	
700 x 200		4	
1200 x 100		9	
Exhaust Air Grille		2	
Return Air Grille		5	
Supply Air Grille		2	
Transfer Grille		4	

Curtain Panel Schedule

TYPE	Type Mark	Count	AREA
CTP-CWP-ACD-Double_Glazing			
CTP-CWP-ACD-Double_Glazing		1	2.267 m²
CTP-CWP-ACD-Double_Glazing		1	2.267 m²
CTP-CWP-ACD-Double_Glazing		1	2.267 m²
CTP-CWP-ACD-Double_Glazing		1	2.267 m²
CTP-CWP-ACD-Double_Glazing		1	2.267 m²
CTP-CWP-ACD-Single_Glazing_with_Aluminium_Back_Panel			
CTP-CWP-ACD-Single_Glazing_with_Aluminium_Back_Panel		1	2.267 m²
CTP-CWP-ACD-Single_Glazing_with_Aluminium_Back_Panel		1	2.267 m²
CTP-CWP-ACD-Single_Glazing_with_Aluminium_Back_Panel		1	2.267 m²
CTP-CWP-ACD-Single_Glazing_with_Aluminium_Back_Panel		1	2.267 m²
CTP-CWP-ACD-Single_Glazing_with_Aluminium_Back_Panel		1	2.267 m²
CTP-CWP-ACD-Window			
CTP-CWP-ACD-Window		1	1.133 m²
CTP-CWP-ACD-Window		1	1.133 m²
CTP-CWP-ACD-Window		1	1.133 m²
CTP-CWP-ACD-Window		1	1.133 m²
CTP-CWP-ACD-Window		1	1.133 m²

Cabinet Schedule

Type	Type Mark	Count	Cost
Standard	F2006	4	1100.00

Shower Cubicle Schedule

Type	Type Mark	Count	Cost
PF-SH4	SHOWER	1	

Water Closet Schedule

Type	Type Mark	Count	Cost
WCA-01	F2004	1	

Water Basin Schedule

Type	Type Mark	Count	Cost
BAS	F2003	3	

Sprinkler Schedule

Type	Type Mark	Count	Cost
Exposed Sprinkler Head		13	

Lighting Fixture Schedule

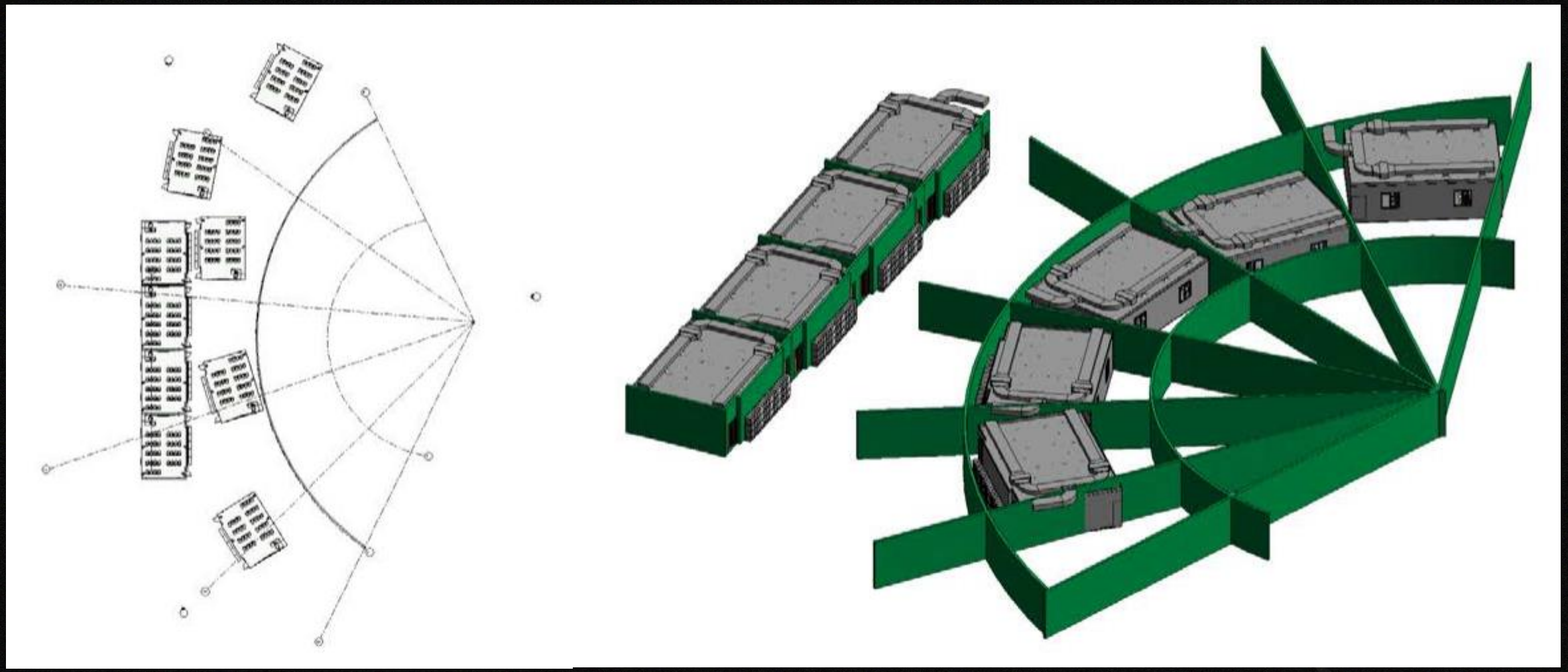
FAMILY	TYPE	MARK	Count
M_Downlight - Recessed Can			
M_Downlight - Recessed Can	152mm Incandescent - 120V		10
PB_LTG_INT_Fluorescent_Non-Rested			
PB_LTG_INT_Fluorescent_Non-Rested	230V 1 x 40W LED		15
T5 Fluorescent			
T5 Fluorescent			9

Door Schedule

Family	Mark	Type	Door Rating	Count	Cost
Flush_UneqDbl	118	Type A3_1400mm x 2100mm	-	1	
Flush_Single1	119	Type A1_900mm x 2100mm	-	1	
Flush_Single1	120	Type A1_900mm x 2100mm	-	1	

Design modularization and optimization in BIM

11. Good Industry Practice

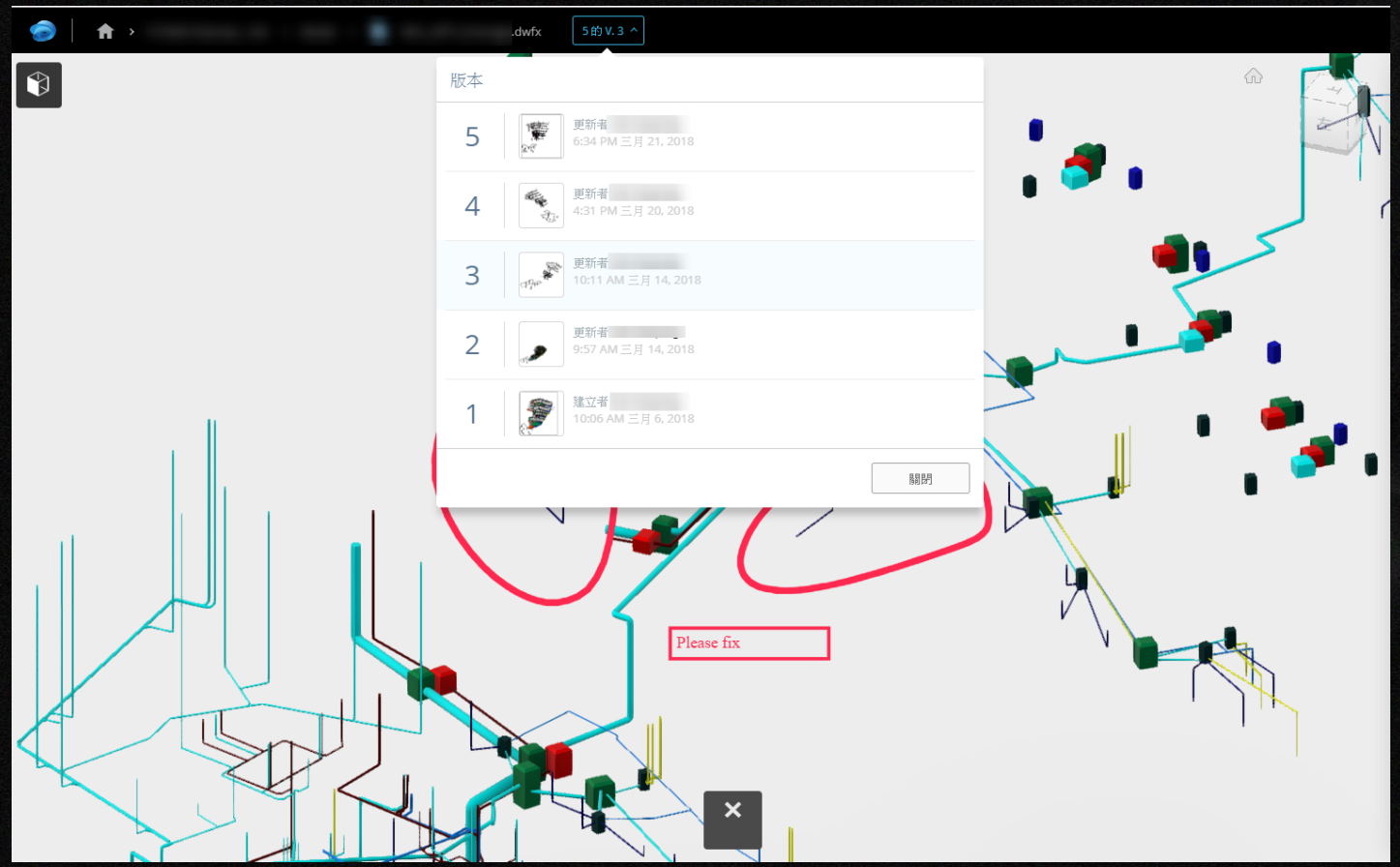


Design modularization and optimization in BIM

12. Update and Change Management

12.1 Versioning

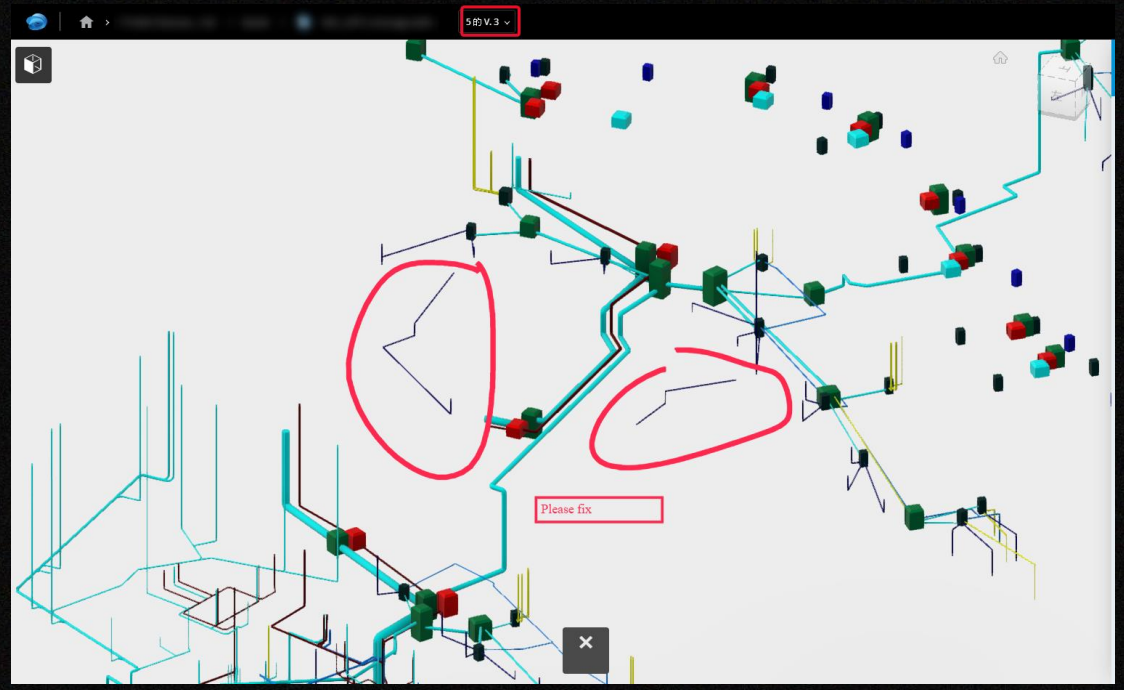
In design stage, BIM model with non-verified design data used by in-house design team is in “WIP” folder. Each discipline BIM team shall upload their model or .dwf to Common Data Environment (A360) for collaboration and mark up. A360 shows the person who upload the model and the version of model. When someone mark up in the model, A360 will show when did the person mark up, mark up issue and the location of the issue.



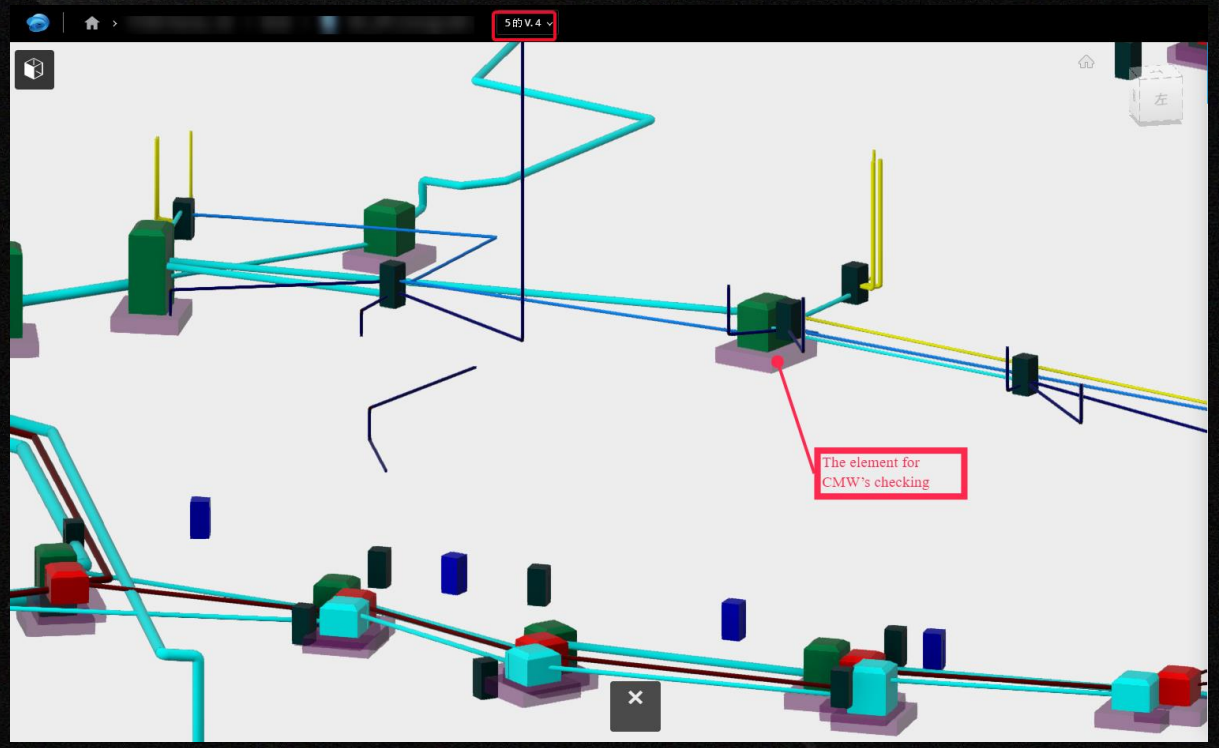
12. Update and Change Management

12.2 Change record

There is a versioning control in A360. The mark up in the previous model will not be shown in the latest model.



Mark up in version 3



Mark up in version 4

12. Update and Change Management

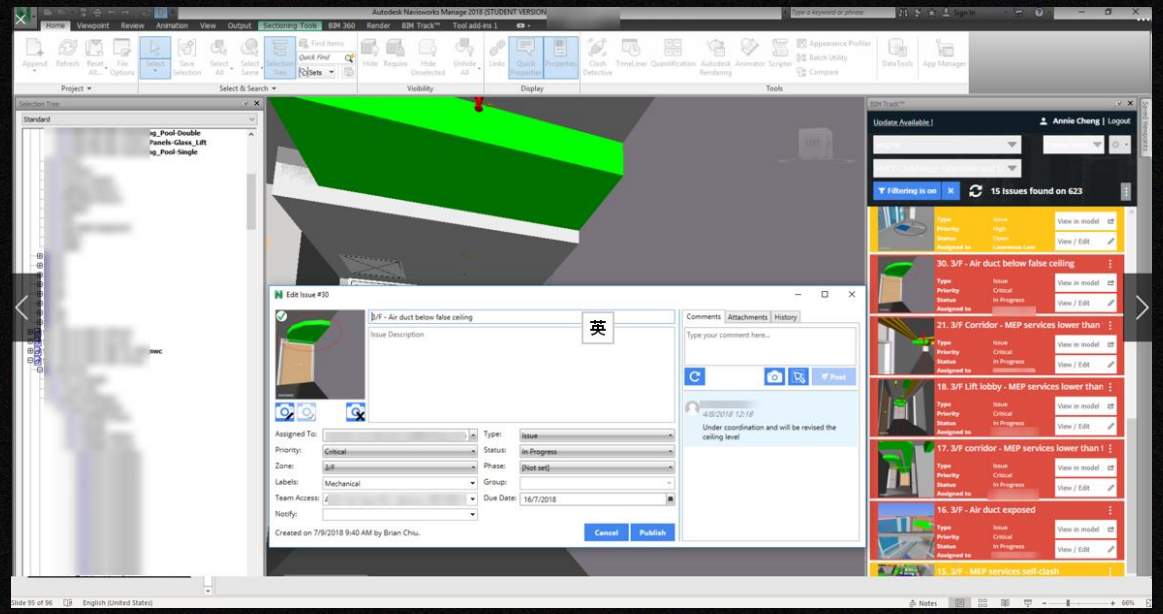
12.3 Record Comparison

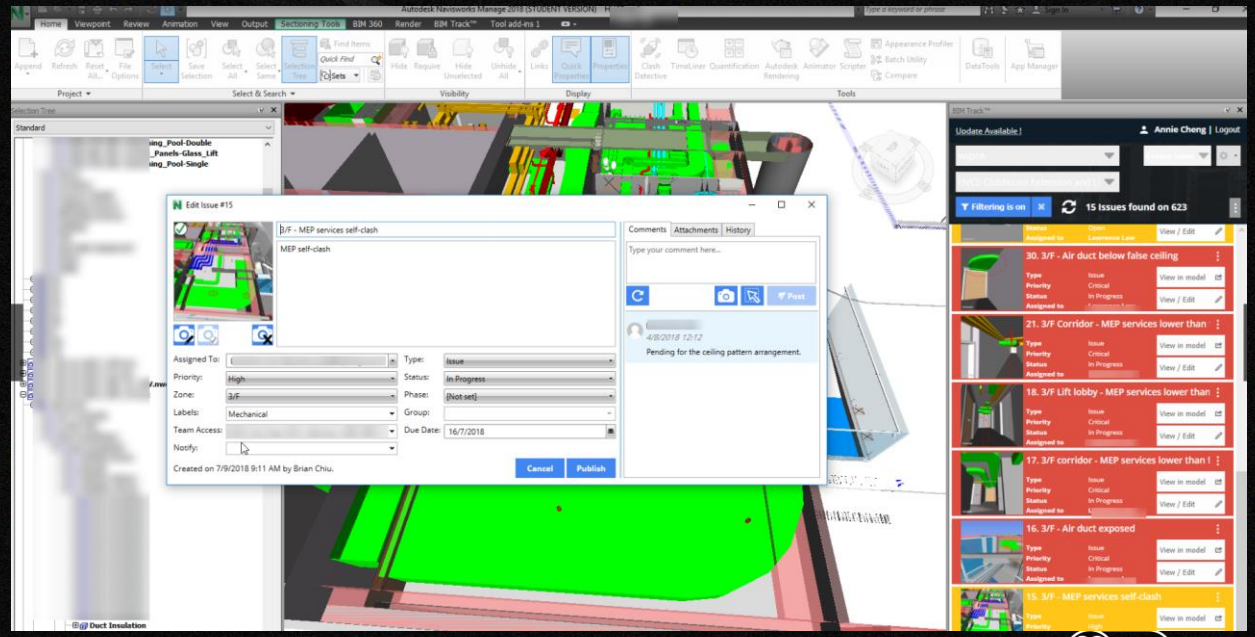
In Design stage, we used CAD drawing to mark up when design changes.

In BIM workflow, we can use A360 to collaborate with each other and version control can help the parties to identify the model version and its information.

In Construction stage, contractor and sub contractor used site sketch to do collaboration.

In BIM workflow, we can use BIM Collab and BIM Track to do collaboration that can control the version and review mark up.





THANK YOU !