BUILDING INFORMATION MODELLING FOR ASSET MANAGEMENT (BIM-AM) STANDARDS

Ref. No. : --

(Version 1.0)

Mar 2020

Amendment History			
Version Number	**Version Description**	**Pages Affected**	**Date**
1.0	<mark>First Release (For Taskforce circulation)</mark>	All	17 March 2020

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1. Introduction

1.1. Purpose

-- intends to manage all the as-built drawings in the form of Building Information Modelling (BIM) format for future improvement in drawings filing system, efficient drawings update and Asset Management functions, etc.

This BIM-AM standards aims to achieve the goals:

1. Standardize systems, sub-systems and object coding
2. Specify the information requirement for object to be inputted in the BIM
3. Specify the modelling requirement, project settings, architectural settings, structural settings, E&M settings and presentation style.
4. Enable asset data in BIM models to transfer to the Asset Management (AM) and Facility Management (FM) systems.

1.2. Reference Software

Standards and guidelines set in this document take Autodesk Revit and Navisworks as examples for illustration. Other software fulfilling the requirements may be used for openness. The exact version of BIM authoring software needs to be agreed by the project team.

If other software platform is proposed in a project, it shall comply with:

- Most current version of Industry Foundation Classes (IFC) file format, and
- Commercially available collaborative software that provides interoperability between different software applications (e.g. Navisworks or equivalent)
- Able to carry and export all E&M asset information described in Chapter 5.

1.3. Reference Standards and Specifications

Below listed standards or guidelines have been used as reference document for this Standards:

1. BS 1192:2007+A1:2015: Collaborative production of architectural, engineering and construction information. Code of practice.
2. BS 8536-1:2015: Briefing for design and construction. Code of practice for facilities management (Buildings infrastructure).
3. PAS 1192-2:2013: Specification for information management for the capital/delivery phase of construction projects using building information modelling. Pioneering the Building Information Modelling Standard.
4. PAS 1192-3:2014: Specification for information management for the operational phase of assets using Building Information Modelling.
5. PAS 1192-5:2015: Specification for security-minded Building Information Modelling, digital built environments and smart asset management.

6. Singapore BIM Guide. (May 2012)

7. Singapore BIM Essential Guide for Contractors (2013)

8. Singapore BIM Essential Guide for MEP Consultants (2013)

9. AEC (UK) BIM Protocol for Autodesk Revit: additional detail and enhancements for implementation of the AEC (UK) BIM Protocol for Autodesk Revit users. (September 2012)

10. AEC (UK) BIM Standard: A practical & pragmatic BIM Standard for the Architectural Engineering and Construction industry in the UK. (November 2009)

11. AEC (UK) BIM Technology Protocol: Practical implementation of BIM for the UK Architectural, Engineering and Construction (AEC) industry. (June 2015)

12. Computer-Aided-Drafting Standard for Works Projects (CSWP), Development Bureau, HKSARG

13. Buildings Department - Guidelines for Using Building Information Modelling in General Building Plans Submission 2019

14. CIC BIM Standards - General (August 2019)

15. CIC BIM Standards for Underground Utilities (August 2019)

16. CIC BIM Standards for Mechanical Electrical and Plumbing (August 2019)

17. Production of BIM Object Guide - General Requirements (August 2019)

18. Building Information Modelling Standards (Phase One) (September 2015)

19. Project Client Summit: Development of BIM Implementation Strategies Summit Report for Project Clients from Government Sector (November 2015)

20. Electrical & Mechanical Services Department - BIM-AM Standards and Guidelines

2. Project Data Folder

A folder area should be created for each project. All files in PDF format shall be searchable and flattened.
Folder structures are set as following:

∨ 📁 [Project Name]
    📁 10_Project Admin
∨ 📁 20_As-built
  ∨ 📁 201_BIM (Landlord)
    📁 2011_Arch
    📁 2012_Stru
    📁 2013_MVAC
    📁 2014_FS
    📁 2015_PL
    📁 2016_DR
    📁 2017_EL
    📁 2018_L&E
  ∨ 📁 202_CAD (Landlord)
    📁 2021_Arch
    📁 2022_Stru
    📁 2023_MVAC
    📁 2024_FS
    📁 2025_PL
    📁 2026_DR
    📁 2027_EL
    📁 2028_L&E
  📁 203_Objects (Landlord)
  > 📁 204_BIM (Tenant)
  > 📁 205_CAD (Tenant)
  📁 206_Objects (Tenant)
	Project Name	A unique top-level folder will be assigned for each project which will be named using the project reference. e.g. project number

	10_Project Admin	Store all documents for project management including contract, project execution plan, etc.
	20_As-built	Separate into **"Landlord"** & **"Tenant"**. Sub-folder should be created as required for each category. Examples: ARC for Architectural STR for Structural MVAC for Mechanical Ventilation and Air-conditioning Installation **201_BIM** Stores as-built BIM models from all disciplines. Models should be in native format (e.g. *.rvt) and viewer format (e.g. *.nwd) *Federated model file named as "master" shall be created to link all the architectural, structural and BS models. Naviswork version shall be agreed.* **202_CAD** Stores as-built CAD drawings for all disciplines. **203_Objects** Stores resources files such as Templates, Title Blocks, Line Styles, Fonts, Material Image and Specific Objects.

Folder Tree	Folder Name	Description
30_O&M Documentation 　301_Arch 　302_Stru 　303_MVAC 　　3031_Chiller 　　　30311_Equipment Schedule 　　　30312_Catalogue 　　　30313_T&C Record 　　　30314_O&M Manual 　　　30315_Other 　　3032_Heat Pump 　　3033_Boiler 　　3034_Cooling Tower 　　3035_Hx 　　3036_ABS 　　3037_Pump 　　3038_PAU & AHU 　　3039_FCU 　　30310_VAV & CAV 　　30311_SAC 　　30312_VRV 　　30313_Gilles 　304_FS 　305_PL 　306_DR 　307_EL 　308_L&E 40_Statutory 99_Others	**30_O&M Documentation**	Store all documents related to O&M, e.g. Equipment Schedule, Catalogue, Computer Selection Printout, T&C report and certificates, test report, handover document, etc.
	40_Statutory	Stores all the statutory record, e.g. WR1, Ventilation Certificate, FS215, WWO046 etc.
	90_Others	Stores all other documents which are not classified under the above folder

3. Coding and Numbering System

Unified conventions in BIM model file naming are essential to standardize model file structure for coordination of modelling activity in project life cycle. The naming convention as stated in this Standards is for the implementation of BIM-AM System.

3.1. Asset Coding

Object/Equipment number (i.e. Asset Code) consists of 7 parts, it shall be in the form as shown below and separated by a hyphen "-" between fields.

Asset Code consists of all 6 parts as stated below with maximum **29** characters, including hyphen. It is used for the user to know the district, building, level, type of system and object/equipment by reading the asset code.

Requirement of Asset Coding					
1	2	3	4	5	6
District Code (refer to Section 3.2)	Building Code (refer to Section 3.3)	Discipline Code (refer to Section 3.4)	Building Level Code (refer to Section 3.5)	Object/ Equipment Code (refer to Section 3.6)	Number
≤3 characters	≤3 characters	≤3 characters	≤3 characters	≤3 characters	≤3 characters
SP TKO TP YL IC	5E 12W AMC INC	ARC STR FO AC FS PL DR EL LE ITC ITS SDF	B1 B G 1 30	WIN DO B (Beam) C (Column) FL (Floor tile) CP (Carpet) AHU FCU LVS AP (Access Panel)	001 002 003 004

Example:
1. Air Handling Unit on 5/F in 5E STP's Head Office:

   Asset Code: **SP-HQ-AC-5-AHU-001**
2. Window on 2/F in 12W:

   Asset Code: **SP-12W-ARC-2-WIN-001**
3. Access Panel on 10/F in AMC, TKOIR

   Asset Code: **TKO-AMC-EL-10-AP-001**

3.2. District Code

All districts related to -- and their corresponding district codes are listed as follows:

District		District Code
New Territories	--	SP
	--	TKO
	--	TP
	--	YL
Kowloon	--	IC

3.3. Building Code

District	Building	Building Code
--	--	INC
--	--	AMC

3.4. Discipline Code

Discipline	Discipline Code
Architecture	ARC
Structure	STR
Fitting Out	FO
Landscape	LAN
Building Services - Mechanical Ventilation & Air-conditioning	AC
Building Services - Fire Services	FS
Building Services - Plumbing	PL
Building Services - Drainage	DR
Building Services - Electrical	EL
Building Services - ELV	ELV
Building Services - Lift & Escalator	LE
Information Technology Cabling Works	ITC
Information Technology System	ITS
Smart Design Feature	SDF

3.5. Building Level Coding

Building Level	Code
B2/F	B2
B1/F	B1
B/F	B
G/F	G
1/F	1
Mezzanine Floor	M
18/F	18
R/F	R

3.6. Object/Equipment Code

The principles for asset abbreviation convention is not more than 4 characters

***   (* = Capitalized Alphabet)

1. The 1st Three Letters of the name of the equipment will be used if it contains 1 word;

e.g.:   Monitor   ->   "MON"

The 1st, 2nd and the Last letters will be used if the abbreviation is already adopted for another equipment;

e.g.:   Monitor   ->   "MON"

           Monopod   ->   "MOD"

2. The 1st and 2nd Letters of the First part and the 1st Letter of the Second Part of the name of the equipment will be used if it contains 2 words;

e.g.:   Extractor Fan   ->   "EXF"

The 1st, 3rd (or (2+n)th) Letters of the First part and the 1st letter of the Second part of the name of the equipment will be used if the abbreviation is already adopted for another equipment;

e.g.:   Extraction Fan   ->   "EXF"

           Exhaust Fan   ->   "EHF"

3. The 1st Letter of each of the first three parts of the name of the equipment will be used if it contains 3 words;

e.g.:   Smoke Extraction Fan   ->   "SEF"

           Chilled Water Return Pipe ->   "CWR"

           Photo Voltaic Panel   ->   "PVP"

The 1st and 2nd (or (1+n)th) Letters of the First part and the 1st letter of the third part of the name of the equipment will be used if the abbreviation is already adopted for another equipment;

e.g.:   Smoke Extraction Fan   ->   "SEF"

           Solar Energy Fan   ->   "SOF"

           Chilled Water Return Pipe ->   "CWR"

           Condensing Water Return Pipe ->   "COR"

Where n >= 1

No.	Discipline	Object / Equipment	Code
1	Architecture	Building Management Unit	BMU
		Turntable	TUR
		Lifting Platform	LIP
		Door	DOO
		Wall	WAL
		Ceiling	CEI
		Floor	FLO
2	Structure	Beam	BEA
		Column	COL
		Slab	SLA
3	Façade	Insulating Glass Unit	IGU
		Tempered Clear Glass	TCG
		Laminated Glass	LAG
		Cladding	CLA
		Panel	PAN
		Louvre	LOU
4	Landscape	Tree	TRE
		Shrub	SHR
		Granite	GRA
		Tile	TIL
		Floodlight	FOT
		Bollard	BOL
5	Civil & Utilities	Power Supply	POS
		Street Lighting	STL
		Automatic Traffic Control	ATC
		Gas Main	GAM
		Telecommunication	TEL
		Fire Main	FIM
		District Cooling System	DCS
		Fresh Water Main	FWM
		Salt Water Main	SWM
		Sewage Drainage	SWD
		Storm Drainage	STD
6	Building Services - Mechanical Ventilation & Air-conditioning	Primary Air Duct	PAD
		Exhaust Air Duct	EAD
		Fresh Air Duct	FAD
		Supply Air Duct	SAD
		Return Air Duct	RAD
		Transfer Air Duct	TAD
		Smoke Extraction Duct	SED
		Makeup Air Duct	MAD
		Staircase Pressurization Duct	SPD
		Pressure Relief Duct	PRD
		Condensate Drain Pipe	CDP
		Chilled Water Return Pipe	CWR
		Chilled Water Supply Pipe	CWS
		Condensing Water Supply Pipe	COS
		Condensing Water Return Pipe	COR
		Chemical Dosing Pipe	CHP

No.	Discipline	Object / Equipment	Code
		Makeup Water Pipe	MAP
		Hot Water Return Pipe	HWR
		Hot Water Supply Pipe	HWS
		Refrigerant Pipe	REP
		Air Cooled Chiller	ACC
		Water Cooled Chiller	WCC
		Heat Pump	HEP
		Cooling Tower	COT
		Heat Exchanger	HEE
		Pump	PUM
		Air Handling Unit	AHU
		Primary Air Handling Unit	PAH
		Heat Wheel	HEW
		Fan Coil Unit	FCU
		VAV Box	VAB
		CAV Box	CAB
		Fresh Air Fan	FAF
		Exhaust Air Fan	EAF
		Air Filter	AIF
		Auto Roll Filter	ARF
		Silencer	SIL
		Free Cooling Fan	FCF
		Split-type Indoor Unit (Evaporation Unit)	SIU
		Split-type Outdoor Unit (Condensing Unit)	SOU
		VRV Indoor Unit (Evaporation Unit)	VIU
		VRV Outdoor Unit (Condensing Unit)	VOU
		Smoke Extraction Fan	SEF
		Temperature Sensor	TES
		Humidity Sensor	HUS
		Carbon Dioxide Sensor	CDS
		Pressure Switch	PRS
		Air Curtain Fan	ACF
		EP Panel	EPP
		Staircase Pressurisation Fan	SPF
		Motorised Damper	MOD
		Motorised Fire Damper	MFD
		Motorised Smoke&fire Damper	MSD
		Makeup Water Tank	MWT
		Feed&expansion Water Tank	FET
		Chilled Water Pump	CWP
		Differential Pressure Bypass Valve	DPB
		Motorized Valve	MOV
		Chemical Dosing Unit	CDU
		Condensing Water Pump	COP
		Makeup Water Pump	MWP
		Bleeding Water Tank (Retention)	BWT
		Seawater Pump	SEP
		Kilo Joule Meter	KJM
7	Building Services - Fire Services	Sprinkler	SPR
		Hose Reel	HOR
		Fire Hydrant	FIH

No.	Discipline	Object / Equipment	Code
		Street Fire Hydrant	SFH
		Automatic Fire Alarm System	AFA
		Pressure Reducing Valve	PRV
		Fire Service Inlet	FSI
		Sprinkler Inlet	SPI
		Audio/Visual Advisory System	AVA
		Gas Suppression System	GSS
		Gas Cylinder & Equipment	GCE
		Portable Equipment	POE
		Portable Fire Extinguisher	PFE
		Gas Detection System	GDS
		Gas Detector	GAD
		Exit Sign	EXS
		Directional Sign	DIS
		Fixed Fire Pump	FFP
		FS Jockey Pump	FJP
		FS Water Tank	FWT
		Motorised Isolating Valve	MIV
		Sprinkler Pump	SPP
		Sprinkler Jockey Pump	SJP
		Sprinkler Water Tank	SWT
		SFH Pump	SFP
		SFH Jockey Pump	SHP
		SFH Water Tank	SFT
		Flow Switch	FLS
		Subsidiary Valve	SUV
		Pre-action Sprinkler Valve	PSV
		Automatic Smoke Curtain	ASC
		FM200 control Panel	FCP
		Pre-action Sprinkler Panel	PSP
		Breakglass Unit	BRU
		Fire Alarm Panel	FAP
		Fire Shutter	FIS
		Smoke Detector	SMD
		Heat Detector	HED
		Linear Heat Detector	LHD
8	Building Services - Plumbing	Cleansing Water (CW) Pump	CLP
		CW Booster Pump	CBP
		Potable Water (PW) Pump	PWP
		PW Booster Pump	PBP
		FL (Flushing Water) Pump	FLP
		FW Booster Pump	FBP
		Cleansing Water Tank	CWT
		Potable Water Tank	PWT
		FL (Flushing Water) Tank	FLT
		Pressure Vessel	PEV
		Irrigation Water Pump	IWP
		Irrigation Water Tank	IWT
		Calorifier	CAL
		Instantaneous Electric Water Heater	IEW
		Storage Electric Water Heater	SEW

No.	Discipline	Object / Equipment	Code
		Water Meter	WAM
		Gas Meter	GSM
9	Building Services - Drainage	Sewage Ejector	SEE
		Wastewater Sump Pump	WSP
		Stormwater Sump Pump	SSP
		Sump Pump	SUP
		Sump Pit	SMP
		Sewage Tank	SET
10	Building Services - Electrical	Emergency Lighting	EML
		Normal Lighting	NOL
		Photo Sensor	PHS
		Occupancy Sensor	OCS
		Uninterruptible Power Supply	UPS
		LV Switch Board	LSB
		Air Circuit Breaker	ACB
		Motor Control Panel	MCP
		Miniature Circuit Breaker	MCB
		MCB Board	MBB
		Busbar Chamber	BUC
		Moulded Case Circuit Breaker Board	MOC
		MCCB board	MOB
		Motor Control Centre	MCC
		Photo Voltaic Panel	PVP
		Digital Power Analyzer	DPA
11	Building Services - ELV	Direct Digital Controller	DDC
		Network Control Unit	NCU
		Programmable Logic Controller	PLC
		Remote Input/Output Unit	PIU
12	Building Services - Lift & Escalator	Passenger Lift	PAL
		Services Lift	SEL
		Fireman Lift	FIL
		Escalator	ESC
13	IT	Core Switch	CRS
		Access Switch	ACS
		Wireless AP	WIA
14	Smart	Robot	ROB
		Greenwall	GRE

4.   Modelling Standard

4.1.   Model Management

For ease of file management and optimal model loading and display performance, it is a good practice to maintain models according to the following criteria:

1. BIM models shall be separately constructed by disciplines as specified in Section 3.4 and by systems as specified in Section 3.6.
2. BIM models for mega building complex with several buildings shall be separately constructed per individual building blocks.
3. A model file size shall be controlled not more than 400MB.
4. Federated model file named as "master" shall be created to link all the architectural, structural and MEP models for the operation of BIM-AM system. Binding models shall NOT be adopted.
5. All worksets shall be removed for the handover of as-built BIM models.
6. Due to the limitation of maximum file path in windows system being less than 256 characters, it is a good practice to keep folders name in tidy and neat manner. Too many folder levels shall be avoided.
7. Before model submission, all irrelevant parameters of the objects shall be deleted and unused BIM objects in the as-built BIM models shall be also purged.
8. Before model submission, all irrelevant objects, views, schedules and linkages in the as-built BIM models shall be purged.
9. In addition to the BIM project files for the BIM models, all loadable objects (e.g. *rfa) that are used in the BIM models shall be separately submitted and saved in the "model" folder as specified in Section 2. The requirement of object can be referred to the latest "BIM Objects Creation Standard and Guidelines".
10. Hangers for E&M services are NOT necessary to be modelled for BIM-AM system. However, the table showing the hanger size and spacing and the hanger detail drawing shall be popped up when the corresponding E&M services (e.g. air duct, water pipe, trunking, tray, etc.) were clicked.
11. Equipment cost shall be displayed when the corresponding equipment (e.g. FCU, Fluorescent Lamp, etc.) were clicked.

4.2. Naming Convention

4.2.1. Model File Naming

Model names consist of 5 parts, it shell be in the form as shown below and separated by a hyphen "-" between fields. Object/Equipment number (i.e. Asset Code) consists of 7 parts, it shall be in the form as shown below and separated by a hyphen "-" between fields. Please refer to Section XXX for coding definition for District code, Building code, Discipline and System code:

Requirement of Mode File Naming				
1	2	3	4	5
District Code (refer to Section 3.2)	Building Code (refer to Section 3.3)	Discipline Code (refer to Section 3.4)	Building Level Code (refer to Section 3.5)	Description (Optional)
≤3 characters	≤5 characters	≤3 characters	≤3 characters	≤8 characters
SP TKO TP YL IC INC	5E 12W AMC	ARC STR FO AC FS PL DR EL LE ITC ITS SDF	B1 B G 1 30	Landlord Tenant

Example:

1. MVAC model on 5/F in 5E STP's Head Office:

   BIM File Name: **--.rvt**

2. Architectural model on G/F in -- :

3. BIM File Name: **--.rvt**

4.2.2. Master Model File Naming

A federated "master" model shall be created for submission and coordination.

Example:

1. Master model on 5/F in 5E STP's Head Office:

   Master File Name: **--.rvt**

2. Master model on G/F in --:

    Master File Name: **--.rvt**

4.2.3. Object Naming Convention

Object names consist of 4 parts, it shall be in the form as shown below and separated by a hyphen "-" between fields.

1	2	3	4
Category	Sub-Type	Originator	Descriptor
(Refers to System Code) as specified in Section 3.4	(Refers to System Code) as specified in Section 3.6	Name of the creator in short form	Description (Optional)

Example:

1. Object of AHU created by STP:

    Object Name: **--.rfa**

4.2.4. Dates for Folder and File naming

The format should be comply with the latest ISO 8601 Data Elements and Interchange Formats Information Interchange, i.e. **YYYYMMDD**.

4.2.5. Location and Geo-Coordination

In order to properly link cross-disciplines BIM models such as architectural, structural and E&M BIM models, the base point and orientation in all relevant BIM models should be properly aligned to ensure the geo-locations are consistent. The origin and orientation of the project and model shall be based on project location with reference to the Hong Kong 1980 Grid and Principal Datum (mPD).

4.2.6. Cross-Disciplinary Model Coordination

To link cross-disciplinary BIM models, e.g. Architecture, Structure and MEP models, Project Base Point should be set in every BIM models to ensure the geo-locations are aligned.

The Project Base Point should be managed by BIM Manager, the setting should be agreed and documented in the BIM Project Execution Plan.

A federated model shall be created for submission and cross-disciplinary coordination.

4.3. Level of Development (LOD) of BIM

The BIM-AM shall be at least LOD 500 AM according to the CIC BIM Standards (Phase Two) and EMSD Guideline. Services with outer diameter larger than 50mm (or a brunch of services) and all the exposed devices such as lighting switches, socket outlet, etc shall be reflected in the model. All the necessary information for asset management shall be input into the model element.

4.4. E&M Systems Colour Coding

The colour coding shall be assigned for the system types below. For system types not listed, the consultants or contractors are advised to propose new colour coding with substantiation, where deemed necessary.

Elements	Colour		RGB
Architectural elements	White		255-255-255
Structural elements	Grey		128-128-128
Road elements	Dark salmon		233-150-122
Mechanical / HVAC elements	Green		0-255-0
Electrical elements	Yellow		255-255-0
Fire protection elements	Red		255-0-0
Drainage elements	Blue		0-0-255
Plumbing elements	Cyan		0-255-255
Gas elements	Magenta		255-0-255
ELV / Security Systems	Orange		255-128-64
Telecommunication	Light purple		230-205-255
ICT elements	Purple		128-0-255
Existing elements	Light grey		192-192-192
(Underground Utilities)			
Power supply	Dark yellow		204-204-0
Street lighting	Rosy brown		188-143-143
Automatic traffic control	Saddle brown		139-69-19
Gas main	Magenta		255-0-255
ELV / Security systems	Orange		255-128-64
Telecommunication	Light purple		230-205-255
ICT elements	Purple		128-0-255
Fire services / Street hydrant	Red		255-0-0
Water cooling main / DCS	Deep skyblue		0-191-255
Fresh water main	Cyan		0-255-255
Salt water main	Aquamarine		127-255-255
Sewage drainage	Blue		0-0-255
Storm drainage	Dark blue		0-0-139
Existing elements	Light grey		192-192-192

4.5. Operability & Maintainability

The equipment objects are created with clearance space in BIM model. The clearance space should be reflected in the BIM model for operation and maintenance purpose.

Clearance space is modelled in BIM equipment objects, so that it will be taken into consideration during the design, construction and maintenance of the equipment.

Examples of clearance space with visibility on and off are shown in Fig. 4.1 and 4.2.
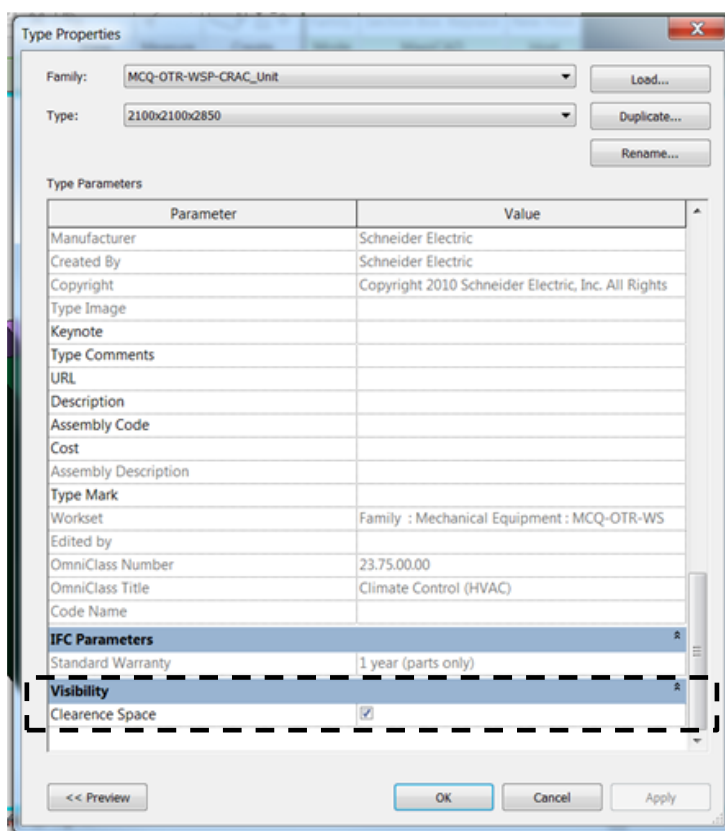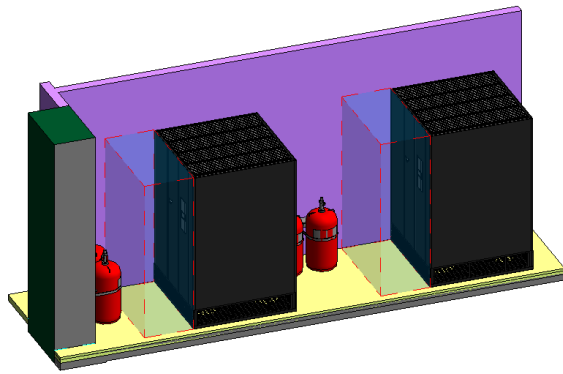
Fig. 4.1 Clearance space with visibility "ON"   Fig. 4.2 Clearance space with visibility "OFF"
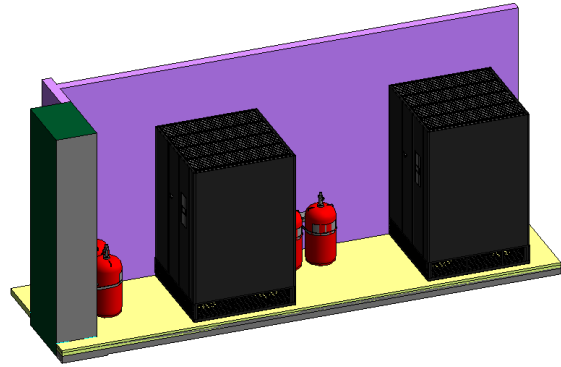
Objects required to show the clearance/maintenance space:

1. Chiller & Heat Pump

2. Cooling Tower

3. Heat Exchanger

4. Pump

5. AHU & PAU

6. FCU, VAV & CAV Terminals

7. Low Voltage Switchboard

8. MCP, LMCP & Distribution Board

9. Water Tank

10. Calorifier & Water Heater

11. AFA Panel

12. Access Panel on suspended ceiling

13. All equipment require operating or maintenance space

5.   Asset Information

This section describe the asset information required to input into the BIM models.

5.1.   Particular Requirement for BIM-AM System

To streamline the data exchange between BIM and asset management system, the asset parameters shall follow the asset information requirement in Appendix A. Irrelevant parameters shall be purged before submission. Apart from the basic / technical information of the equipment, the reference link in zip format of the documents (Drawings, O&M Manual, Catalogues, T&C Records, certificates, etc...) of all the equipment should also be inputted under the Level 1 System. The folder path of the documents under that zip should be inputted into the corresponding parameters of BIM objects (Level 2 asset) refer to the example as below.

E.g. basic asset information shall be shown when the object is selected. An icon can be clicked to link to the asset details and associated documents. Take PAU as an example: when the PAU in the BIM-AM is selected, the following basic asset information shall be popped up.

Asset	Attributes	Examples
PAU	Asset Code	SP-5E-AC-3-PAU-001
	Location	3/F
	Equipment Photo	... "Project Name"\90_Others\Photo\HVAC-PAU
	Model	A1234
	Type	Floor standing
	Start-up Date	01.12.2000
	Vendor Warranty Start	01.09.2000
	Vendor Warranty End	01.09.2010
	Documentation	... "Project Name"\30_O&M Documentation\303 MVAC\3038_PAU & AHU
	Dimension (L x W x H)	2200mm x 1200mm x 1500mm
	Operating Weight	50kg
	2D Drawing	... "Project Name"\20_As-built\202_CAD (Landlord)\2023_MVAC\
(Started from here following appendix)	Make	China
	Cooling Capacity (kW)	30
	Air Flow (L/s)	4000

Asset	Attributes	Examples
	Rated Power Input (kW)	15
	1st Filter	Beg filter
	2nd Filter	HEPA filter
	UV Sterilizing Light	Y
	VSD	Y
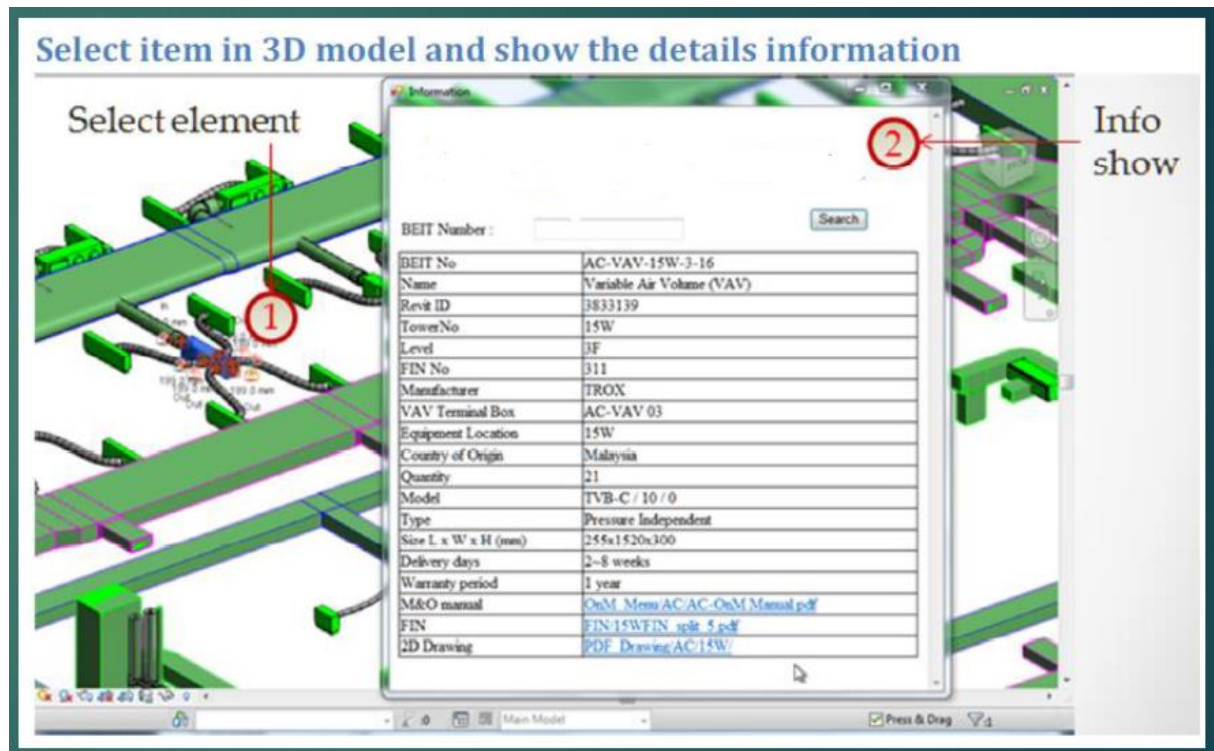
5.2. Interfacing / Integrating BIM-AM System with Other Systems

The BIM-AM model shall be capable to interface or integrate with other FM/AM system such as Planon / Maximo by COBie data import. It is vital to have these integration for 3D BIM viewer and mining the date from the as-built BIM model which can significantly reduces the time it takes to populate the asset register.

6.   Schedule of Submission

Item	Deliverables	Submission Time
	1st draft BIM information	6 Month before Practical Completion Certificate (PC)
	1st draft as-built BIM	6 Month before Practical Completion Certificate (PC)
	2nd draft BIM information	4 Month before Practical Completion Certificate (PC)
	2nd draft as-built BIM	4 Month before Practical Completion Certificate (PC)
	3rd draft BIM information	2 Month before Practical Completion Certificate (PC)
	3rd draft BIM information	2 Month before Practical Completion Certificate (PC)
	Final as-built BIM c/w all information	1 Month before Practical Completion Certificate (PC)

7.   BIM-AM Deliverable Checklist

To ensure the completeness of BIM model submission and streamline the handover process, the deliverable checklist serves to assist contractors to check and provide necessary information as specified in this Standards.

Deliverables	Item		Comments/Remarks
1. BIM Project Model	**1.1 Model Management**		
	a. Separated Models by disciplines and systems as specified in Section 4.2.1.	☐	
	b. Each model file size less than 400Mb.	☐	
	c. "Master" federated model with link to all architectural, structural and system models.	☐	
	d. Handover the file structure as specified in Section 2 Project Data Folder.	☐	
	e. Central models instead of local models shall be submitted.	☐	
	1.2 Naming Convention	☐	
	a. Model naming as specified in Section 4.2.	☐	
	b. Object naming as specified in Section 3.6	☐	
	1.3 Model Setup	☐	
	a. Editable BIM project files in native formats.	☐	
	b. Unit and symbol.	☐	
	c. Location and Geo-coordination.	☐	
	d. Delete all the worksets for handover.	☐	
	e. Set "Fine" view and "Consistent Colour" for handover.	☐	
	1.4 E&M System	☐	
	a. Modelling with system standard	☐	
	b. Create "Panel Schedules" for all electrical distribution boards.	☐	
	1.5 Architectural & Structural Model	☐	
	a. Architectural model with reflected ceiling plan and access panels	☐	
	b. Space should be created in architectural model for zone tagging.	☐	
	c. Structural BIM modelling per CIC standard	☐	

Deliverables	Item		Comments/Remarks
	1.6 Presentation Style	☐	
	a. System colouring.	☐	
	b. Object texture or surface colour.	☐	
	1.7 Maintainability	☐	
	a. Clearance and maintenance spacing.	☐	
	b. Editable BIM object files in native formats	☐	
2. BIM viewing software for multi-disciplinary coordination	a. Model naming.	☐	
	b. One federated model with linked models.	☐	
	c. Clash checking reports, if applicable.	☐	
		☐	
3. Asset Information	a. Asset parameters input as per Asset Information Requirement in Appendices.	☐	
	b. Asset Parameter input for those E&M equipment NOT listed on the asset templates	☐	

8. Abbreviation

8.1. Abbreviation for Architectural Drawing

A

A.A.V.	Automatic air vent
A/C	Air conditioning
A.H.U.	Air-handling unit Anti-
A.S.P.	syphonage
A.V.V.	pipe Anti-vacuum valve
ALUM.	Aluminium
APPROX.	Approximate

B

BCF	Bromochlorodifluoromethane
B.I.T.G.	Back inlet trapped gully
BLDG.	Building
BLK	Block
BRK	Brick
BRZ.	Bronze
B.S.	British standard
B.T.	Bath tub
BTM	Bromotrifluoromethane

C

C/C	Centre to centre
C.E.	Cleaning eye
C.I.	Cast iron
C.L.	Cover level
CONC.	Concrete
C.P.	Chromium plated
C/S	Cement and sand
C.W.P.	Cold water pipe

D

D.	Depth/ deep
D.G.	Dangerous goods l
D.I.	Ductile iron
DIA.	Diameter
D.T.	Disconnecting trap
D.T.L.	Disconnecting trap level
DWG.	Drawing

E

E.P.	Expansion pipe
EQ.	Equal
E.V.A.	Emergency vehicular access
EXTG.	Existing

F

F/A	From above
F.A.I.	Fresh air inlet
F/B	From below
F.B.	Fire blanket
F.D.	Floor drain
F.E.	Fire extinguisher
F.F.L.	Finished floor level
F.H.	Fire hydrant
FIG.	Figure
F.R.P.	Fire resisting period
F.S.	Fire services
F.S.I.	Fire services inlet
F.W.	Foul water
F.W.P.	Flushing water pipe

G

GALV.	Galvanized
GRANO	Granolithic
GRC	Glass reinforced concrete
GRD.	Ground
G.S.	Galvanized steel
G.V.	Gate valve

H

H	Height/ high
H/L	High level
HT	Height
H.R.	Hose reel
H.W.	Hardwood
H.W.P.	Hot water pipe
H.W.R.	Hot water return pipe
H.W.S.	Hot water supply pipe

I

I.C.	Inspection chamber
I.L.	Invert level

L

L.	Length/ long
LJSC	Loose jumper type stop cock
L/L	Low level

M			**V**	
MAX.	Maximum		V.C.	Vitreous china
MH	Manhole		V.P.	Vent pipe
MIN.	Minimum			
M.S.	Mild steel		**W**	
			W.	Width/ wide
N			W.B.	Wash basin
No.	Number		W.C.	Water closet
N.R.V.	Non-return valve		W.H.	Water heater
N.T.S.	Not to scale		W.P.	Waste pipe

P
P.R.V.   Pressure reducing valve

R
R.   Radius
R.C.   Reinforced concrete
REF.   Reference
R.W.O.   Rain water outlet
R.W.P.   Rain water pipe

S
S.   Sink
S.&W.P.   Soil & waste pipe
S.A.A.   Satin anodized aluminium
S.B.   Sand bucket
S.F.L.   Structural floor level
Sh.   Shower
S.P.   Soil pipe
SPR.   Sprinkler
SQ.   Square
S.S.   Stainless steel
S.V.   Stop valve
S.W.   Storm water/ surface water

T
T.   Tap
T/A   To above
T/B   To below
T.G.   Trapped gully
THK.   Thick

U
U/G   Underground
UPVC   Unplasticised polyvinyl chloride
UR.   Urinal

8.2. Abbreviation for Building Services Drawing

AB	Above bench	F	
A/C	Air conditioning	FA	Fire alarm
AC	Alternating current	F/A	From above
ACB	Air circuit breaker	F/B	From below
AFFL	Above finished floor level	FE	Fire extinguisher
AI	All insulated	FFL	Finished floor level
AL	Aluminum	FH	Fire hydrant
		FHC	Fire hose cabinet
B		FS	Fire service
B	Blue phase	F/SW	Fuse switch
BD	Board		
BLDG	Building	G	
BLK	Block	GI	Galvanised iron
BRI	Broadcast reception installation		
		H	
C		H/L	High level
CB	Circuit breaker	HOR	Horizontal
C/C	Centre to centre, e.g. 16 mm C/C	HR	Hour
CCT	Circuit	HRC	High rupturing capacity (fuse)
CI	Cast iron	HT	High tension
CO'S CT	Company's Current transformer		
CUC/W	Copper Complete with	I	
		IC	Intercommunicator
D		INC	Incinerator
DC	Direct current	IND	Indicator
DIA	Diameter		
DIST. BD	Distribution board	J	
DN	Down	JNT	Joint
DP	Double pole		
		L	
E		L	Live or line
E	Earth	L/L	Low level
EFF	Efficiency	LP	Low pressure
ELEC	Electric or electrical	LV	Low voltage
ELV	Extra low voltage		
ENCL	Enclosure	M	
ENGR	Engineer	MAX	Maximum
EQUIP	Equipment	MCB	Miniature circuit breaker
EX	Existing	MECH	Mechanical
EXH. FAN	Exhaust fan	MFR	Manufacturer
EXP. JNT	Expansion joint	MH	Man hole
		MICC	Mineral insulated copper conductor
		MIN	Minimum or minute

N			**T**	
N	Neutral		T/A	To above
N/C	Normally closed		T.B	To below
NEG	Negative		TEL	Telephone
N/O	Normally opened		TP&N	Triple pole and neutral
NR	Non return		TRANS	Transformer
			TS	Time switch
O			TV	Television
OCB	Oil circuit breaker			
OPP	Opposite		**U**	
			U/G	Underground
P				
P	Pendent		**V**	
PABX	Private automatic branch exchange		VERT	Vertical
PB	Push button			
PC	Pull cord or pull chain		**W**	
PD	Potential difference		W/	With
PL	Pilot light		W/O	Without
PNL	Panel			
POS	Positive		**Y**	
			Y	Yellow phase
R				
R	Red phase			
RC	Reinforced concrete			
RD	Roof drain			
REF	Refrigerator			
REQD	Required			
RET	Return			
RM	Room			
RSJ	Rolled steel joint			
S				
S. SINK	Service sink			
SEC	Second			
SECT	Section			
SECTL	Sectional			
SHT. MET	Sheet metal			
SP	Single pole			
SP&N	Single pole and neutral			
SPEC	Specification			
SPKR	Speaker			
SS	Stainless steel			
STD	Standard			
STER	Steriliser			
SW	Switch			
SW BD	Switch board			
SW/F	Switch fuse			
SYM	Symmetrical			

8.3. Abbreviation for Structural Drawing

A

ALT.	Alternate
APPROX.	Approximate
ARCH.	Architectural/ architect's

B

B	Beam
B	Bottom
B.F.	Both faces
BLK.	Block
BLK.WRK.	Blockwork
BM	Bench mark
BRK.	Brick
BS	British standard
B.W.	Both ways
B.W.	Butt weld
BWK.	Brickwork

C

C.A.L.	Compression anchorage length
C/C	Centre to centre
CHS	Circular hollow section
C.I.	Cast iron
CIR.	Circular
CL	Centreline
C.L.L.	Compression lap length
CN	Caisson
COL	Column
CONC.	Concrete
CP	Catch pit
CUL.	Culvert

D

D	Depth
DIA.	Diameter
DN	Down
D.P.C	Damp proof course
D.P.M.	Damp proof membrane
DRG.	Drawing

E

E.F.	Each face
E.L.	Existing level
ELEV.	Elevation
ETC.	Etceteras
E.W.	Each way
EXG.	Existing
EXT.	External/ exterior

F

FF	Fair face
FFL	Finished floor level
F.L.	Floor level
F.S.	Full size
F.W.	Fillet weld

G

GEN.	General
G.F.	Ground floor
G.F.L.	Ground floor level
G.I.	Ground investigation
G.I.	Galvanised iron
G.M.S..	Galvanised mild steel
G.T.	Gully trap

H

HOR.	Horizontal
HT.	Height

I

I.L.	Invert level
INT.	Internal/ interior

J

JC	J-shaed channel
JT.	Joint

K

kg	Kilogram
kg/m	Kilogram per metre
KN	Kilonewton
kN-m	Kilonewton metre
KPa	Kilopascal

L

L	Length
LEV	Level
L.V.	Length varies

M

MAC.	Macadam
MAX.	Maximum
ME	Manhole
MIN.	Minimum
MISC.	Miscellaneous
MPa	Megapascal
MS	Mild steel

N		U	
NF	Near face	UB	Universal beam
No.	Number	UC	U-shaped channel
Nos.	Numbers	UC	Universal column
NTS	Not to scale	U/G	Underground

O		V	
OL	Outlet level	VERT.	Vertical
		VOL.	Volume

P		W	
PD	Principal datum	W	Width
PH.	Phase	W.T.	Water table
PVC	Polyvinyl chloride	WT.	Weight

R	
RAD.	Radius
RC	Reinforced concrete
RCP	Refuse collection point
RD	Round
REF.	Reference
RHS	Rectangular hollow section
RSJ	Rolled steel joint
RW	Retaining wall
RWO.	Rain water outlet
RWP.	Rain water pipe

S	
S	Slab
SEC.	Section
SFL.	Structural floor level
S.I.	Site instruction
SK	Sketch
SMH	Storm water manhole
SPEC.	Specification
SQ.	Square
SS	Stainless steel
SS	Staircase slab
ST	Sand trap
STD.	Standard
STG.	Staggered

9. Appendices

Appendix A – Asset Information Requirement

(Generic attribute following section 5.1. This is specific attribute for different trade)

1) Lift and Escalator

Electric Lifts	Location (Address) on Use Permit	Location ID on Use Permit	Lift No.	Year of Installation	Application	Length of Travel [m]	Levels Served	Rated Load [kg]	Rated Speed [m/s]	Type of Drive	Control	Motor Rating [kW]	No. of Suspension Rope	Construction of Suspension Rope (No. of Strand in each Rope x No. of Wire in each Strand)	Nominal Diameter of Suspension Rope [mm]	Date of Last Suspension Rope Replacement	Car Floor Area [sq.m]	Machine Room Location	Door Type	Fireman's Lift (Y/N)

Hydraulic Lifts	Location (Address) on Use Permit	Location ID on Use Permit	Lift No.	Year of Installation	Application	Length of Travel [m]	Levels Served	Rated Load [kg]	Rated Speed Up [m/s]	Diameter of Ram [mm]	Type of Ram	Car Floor Area [sq.m]	Machine Room Location	Door Type	Fireman's Lift (Y/N)

Escalators / Passenger Conveyors	Location (Address) on Use Permit	Location ID on Use Permit	Escalator No.	Year of Installation	Environment	Angle of Inclination [degree]	Rated Speed [m/s]	Vertical Rise [m] (<99m)	Capacity [persons/hour]	Width of Step [mm]	Type of Drive	Motor Rating [kW]	Type of Balustrade	Machinery Location

2) LV Switchboards

Battery	Make					
Harmonic	Make					
Switchgear	Switchgear No.	Type of Circuit	Rating (A)	Make	Nos. of Pole(s)	Outgoing Circuit
Relay	Associated Switchgear No.	Make				
Capacitor	Capacitor Bank No.	Rating (kVA)	Make			
LV Switchboard	Switchboard Type	Date of Last PITC - If there are more than one dates, the last one should be recorded - PITC hse not been performed	Switchboard No.	Largest Rating (A)	Cubicle Make	

For Switchgear row continued: Type, Size, Rating, Length (per piece) (mm), Make(optional)

3) Emergency Generator

Diesel Engine	Make	Rating (kVA)			
Alternator	Make				
Controller	Make				
Undervolt Relay	Make				
Fuel Tank	Capacity (Litre)				
Fuel Pump	Make	Capacity (l/s)			
Battery Charger	Make	Quantity			
Battery	Make	Capacity (Ah)	Type of Battery	Open Type / Sealed Type	Voltage of Battery System	Quantity
Generator	Rating (kVA)	Make			

4) HVAC System

Air Side

AHU	Make	Cooling Capacity (kW)	Air Flow (L/s)	Rated Power Input (kW)	1st Filter	2nd Filter	UV Sterilizing Light	VSD
PAU	Make	Cooling Capacity (kW)	Air Flow (L/s)	Rated Power Input (kW)	1st Filter	2nd Filter	UV Sterilizing Light	VSD
Heat Wheel	Make	Fuel Type					
FCU	Make	Quantity	Motor				
Fire Damper	Make	Quantity					
VAV Box	Make	Quantity					
DX Unit	Make	Cooling Capacity (kW)	Refrigerant	Rated Power Input (kW)			
Fresh Air Fan	Make	Air Flow (L/s)	Rated Power Input (kW)				
Exhaust Air Fan	Make	Air Flow (L/s)	Rated Power Input (kW)				
VRV-IDU	Make	Quantity					

Cold Room

Cold Room/Store	Make	Cooling Capacity (kW)	Compressor	Refrigerant	Storage Function	Temperature Range

Miscellaneous

CCMS	Make				
Room Cooler	Make	Cooling Capacity (kW)	Refrigerant	Rated Power Input (kW)	Quantity
Refrigerator (other than DA)	Storage Function	Make	Refrigerant	Rated Power Input (kW)	Quantity

Water Side

Pressurised Water Sys	Make	Quantity			
Water Treatment Sys	Chemical Type				
Water Side					
Chiller	Configuration	Make	Cooling Capacity (kW)	Compressor	Refrigerant	Rated Power Input (kW)
Heat Pump Type Chiller	Make	Heating Capacity (kW)	Compressor	Refrigerant	Rated Power Input (kW)
Cooling Tower	Make	Fan Motor (kW)	Water Flow (L/s)	Configuration	
Heat Exchanger	Make	Water Flow (L/s)	Capacity (kW)		
Pump	Make	Motor Power (kW)	Head (m)	Water Flow (L/s)	VSD
Auto-strainer	Make	Water Flow (L/s)	Rated Power Input (kW)		
Travelling Band Screen	Make	Water Flow (L/s)	Rated Power Input (kW)		

5) Boiler

	Location (Address) on Use Permit	Location ID on Use Permit	No.	Year of Installation							
Hot water boiler	Location (Address) on Use Permit	Location ID on Use Permit	Boiler No.	Year of Installation	Fuel	Output Capacity (kW)					
Steam boiler	Location (Address) on Use Permit	Location ID on Use Permit	Boiler No.	Year of Installation	Fuel	Output Capacity (kg/hr.)	Output Steam Pressure (kPa)				
Calorifier	Location (Address) on Use Permit	Location ID on Use Permit	Calorifier No.	Year of Installation	Primary Heat Source	Secondary Heat Source	Territory Heat Source	Output Capacity (kW)			
Heat exchanger	Location (Address) on Use Permit	Location ID on Use Permit	Heat Exchanger No.	Year of Installation	Type	Output Capacity (kW)					
Pump	Location (Address) on Use Permit	Location ID on Use Permit	Pump No.	Year of Installation	Usage	Type	Pressure (kPa)	Flow (l/s)	Speed (rpm)	Motor Brand	Motor Model	Motor Power (kW)

6) Filtration Plant

Equipment	Col1	Col2	Col3	Col4	Col5	Col6	Col7	Col8	Col9	Col10	Col11	Col12	Col13	Col14	Col15
Electric Boiler (SP)	Boiler No.	Capacity (kg/hr)	Working Pressure (kPa)	Rated Power (kW)	Phase	Input Voltage (V)	Input Current (Amp)	Pool							
Diesel Boiler (SP)	Boiler No.	Capacity	Working	Pool											
Electro-Chlorinator System (SP)	E-Cl No.	Cell Manufacturer	Cell Model No.	Transformer Manufacturer	Transformer Model No.	Capacity (kg/hr)	Rated Power (kW)	Phase	Input Voltage (V)	Input Current (Amp)	DC Output Voltage (V)	DC Output Current (Amp)			
Filtration Tank (SP)	Tank No.	Capacity (m3)	Tank	Tank Type	Pool										
Pump (SP)	Pump No.	Flow Rate (m3/hr)	Pump Head (m)	Working Pressure (kPa)	Application	Pool									
Motor (SP)	Pump No.	Rated Power (kW)	Phase	Input Voltage (V)	Input Current (Amp)	Speed (rpm)	NEMA Insulation Class	Pool							
MCC Panel (SP)	Phase	Input Voltage (V)	Input Rating (Amp)												
Ozone Generator System (SP)	OG No.	Ozone Production (g/hr)	Working Pressure (kPa)	Gas Flow (m3/hr)	Pool										
Ultraviolet Sterilizer (Filtration)	UV No.	Rated Power (kW)	Phase	Input Voltage (V)	Input Current (Amp)	Flow Rate (m3/hr)	Pool								
Building Management System (SP)	Remark														
Controller Analyser and Sensor (SP)	Analyser No.	Analyser Manufacturer	Analyser Model No.	Phase	Voltage (V)	Output Ampere (mA)	Sensor Manufacturer	Sensor Model No.	Range	Range Unit	Pool				
Chemical Dosing Pump (SP)	Dosing Pump No.	Pump Manufacturer	Pump Model No.	Capacity (m3/hr)	Pressure (kPA)	Motor Manufacturer	Motor Model No.	Rated Power (kW)	Phase	Input Voltage (V)	Input Current (Amp)	NEMA Insulation Class	Speed (rpm)	Application	Pool
Air Blower (SP)	Blower No.	Rated Power (kW)	Phase	Input Voltage (V)	Input Current (Amp)	Flow Rate (m3/hr)	Working Pressure (kPa)	Tank	Pool						
Piping System (SP)	Pipe Size (mm)	Material	Pool	Start-up Date	Pipe Size	Material	Pool								
Air Release Valve (Filtration Tank)	ARV No.	Operating Pressure (kPA)	Flow Rate (m3/hr)	Tank	Pool										
Variable Speed Drives / Soft Starter (SP)	Drive Type	Drive No.	Rated Power (kW)	Phase	Input Voltage (V)	Input Current (Amp)	Pool								
Misc. Swimming Pool Equipment	Details	Size (mm)	Tank Size (m3)	Rated Power (kW)	Phase	Input Voltage (V)	Input Current (Amp)	Class	Frame						
Heat Exchanger (SP)	Heat Exchanager No.	Design / Working Pressure (kPa)	Design / Working Max Temp. (Deg C)	Material - tube	Material - plate	Material - casing	Pool								

7) FS Installation

System	Item	Make			Quantity
Wet System	Pump	Make	Motor Power (kW)	Head (m)	Water Flow (L/s)	Quantity
	Sprinkler control valve set & accessories	Make	Quantity		
Automatic Fire Detection and Alarm System	Fire Alarm equipment	Make	Quantity		
	Audio/ Visual Advisory System	Make	Quantity		
Gas Supression System	Gas cylinder and equipment	Make	Total capacity (kg)	Quantity	
Portable Equipment	Portable fire extinguisher	Make	Quantity		
Gas Detection System	Gas detector and equipment	Make	Quantity		
Exit sign & Directional sign	Exit sign & Directional sign	Make	Quantity		

8) UPS

System	Col1	Col2	Col3	Col4	Col5	Col6	Col7	Col8
UPS System	Redundancy (Y/N)	Division	Client	Make	Backup Time under Full Load (min)	Rating (kVA)	Three-Phase/Single-Phase Sys	Gen-set Backup
Battery System	Voltage of a Battery Block (V)	Capacity of Battery Blk (Ah)	Make	Battery Type	No. of battery bank(s)	No. of battery blk in a bank	Battery Monitoring System	
Static Transfer Switch	Make	Three-Phase/Single-Phase Sys	No. of UPS input	No. of output	Rating (A)	Remote Monitoring Panel		

9) Burglar Alarm

Access Control System

Component	Col1	Col2	Col3
Panel	Vender	Quantity	
Lock/Button/Switch	Vender	Quantity	
Emergency Breakglass	Vender	Quantity	
Lock Control Unit	Vender	Quantity	
Smart Card Reader	Quantity		
Card Reader Control	Quantity		
Remote Rel. But. Receiver	Vender	Quantity	
Intercom	Vender	Quantity	
Computer	Quantity		
Turnstiles	Vender	Quantity	
Accessories	Vender	Quantity	

Burglar Alarm System

Component	Col1	Col2	Col3
Panel	Vender	Quantity	
Lock/Button/Switch	Vender	Quantity	
Intrusion Detector	Vender	Quantity	
Power Mgt Unit	Vender	Quantity	
Amplifier	Vender	Quantity	
Controller	Vender	Quantity	
Camera	Quantity		
Audio / Video Product	Vender	Quantity	
Projectoring Product	Quantity		
Screen/Monitor	Quantity		
Accessories	Vender	Quantity	

CCTV and Intercom

Component	Col1	Col2	Col3
Intercom	Vender	Quantity	
Camera	Quantity		
Video Switcher	Quantity		
Multi Channel DVR / NVR	Quantity		
Duplex Multiplexer	Quantity		
Computer	Quantity		
Accessories	Vender	Quantity	

Smart Card System

Component	Col1	Col2	Col3
Security Computer	Quantity		
Printer	Quantity		
Access Controller	Quantity		
Card Reader	Quantity		
Keypad	Vender	Quantity	
Lock/Button/Switch	Vender	Quantity	
Control Unit	Vender	Quantity	
Power Mgt Unit	Vender	Quantity	
Accessories	Vender	Quantity	

Call Alarm System

Component	Model	Vender	Quantity
Control Panel	Model	Vender	Quantity
Alarm Siren/Bell	Model	Vender	Quantity
Button	Model	Vender	Quantity

Videophone System

Component	Col1	Col2	Col3
Extension Speaker	Vender	Quantity	
Station	Vender	Quantity	
Handset	Vender	Quantity	
Videophone Control	Vender	Quantity	

Keypad Lock System

Component	Col1	Col2	Col3
Keypad	Vender	Quantity	
Backup Battery	Make	Quantity	
Door Release Button	Make	Quantity	

Drop-arm Barrier

Component	Col1	Col2	Col3
Control Panel	Vender	Quantity	
Barrier Gate	Vender	Quantity	
Detector	Vender	Quantity	
Card Acc. Controller	Quantity		
Proximity Card	Quantity		
Intercom	Make	Quantity	
Recorder	Quantity		
Workstation Unit	Quantity		
Accessories	Vender	Quantity	

Electric Lock System

Component	Col1	Col2
	Vender	Quantity

10) Radar and Navigation System

Component	Make	Quantity	Col4	Col5	Col6	Col7
Antenna	Make	Quantity	Frequency Band			
Turning unit	Make	Quantity	Frequency Band	Rotation Speed	Peak Radiated Power	Oscillator
Display and processing unit	Make	Quantity	Screen Size	Minimum Detection Range		
Network Equipment	Make	Quantity				
Video camera	Make	Quantity	Imager Sensor	Optical Zoom		
Accessories	Make	Quantity				

11) Microwave Link System

Component	Make	Quantity	Col4
Antenna	Make	Quantity	Frequency Band
Transeciver	Make	Quantity	Frequency Band
RF Interface Unit	Make	Quantity	
Processing unit	Make	Quantity	
Network Equipment	Make	Quantity	
Accessories	Make	Quantity	

12) Timing & Display System

Component	Make	Quantity	Col4	Col5	Col6	Col7	Col8	Col9
Operator Control Console / Workstation, PC	Make	Quantity	Operating System	Special Purpose Software	Remark			
Control Unit / Server	Make	Quantity	Operating System	Special Purpose Software	Remark			
Sensing Unit	Make	Quantity	Remark					
Master Clock Unit	Make	Quantity	Synchronization Method	Remark				
Video Display Unit	Make	Quantity	Type	Size				
Video & Audio Equipment	Make	Quantity	Remark					
Network Equipment	Make	Quantity	Remark					
Queue Management Unit	Make	Quantity	Remark					
Uninterruptible Power Supply	Make	Quantity	Rating (kVA)	Phase	Backup Time in Minutes	No. of battery banks	No. of battery cells in each bank	Rating (V) of each battery

13) Audio Video Electronics Installation

Equipment							
Player	Make	Quantity	Type				
Recorder	Make	Quantity	Type	Storage Size			
Console	PC & Monitor Make	PC & Monitor Model	Quantity	No. of Monitor	Operating System		
Miscellaneous	Make	Quantity	Type	Description			
Distribution Amplifier	Make	Quantity	No. of Input	No. of Output			
Switch	Make	Quantity	Type	No. of Input	No. of Output		
Splitter	Make	Quantity	Type	No. of Output			
Extender	Make	Quantity	Transmission Range (m)				
Matrix Switcher	Make	Quantity	Type	No. of Input	No. of Output		
Display Unit	Make	Quantity	Type	Configuration (m x n)	Diagonal Size in inch	Technology	Resolution (if applicable)
Audio Amplifier	Make	Quantity	Input Channel	Output Channel	Max Power	Line Voltage	
Audio Mixer	Make	Quantity	Input Channel	Output Channel			
Audio Equalizer	Make	Quantity	No. of Band				
Audio Loudspeaker	Make	Quantity	Mounting Method	Load Impedance	Max Power		
Audio Microphone	Make	Quantity	Type				
Audio Miscellaneous	Make	Quantity	Type				

14) Audio Electronics Installation

Equipment						
Amplifier	Make	Quantity	Input Channel	Output Channel	Max Power	Line Voltage
Chairman Unit	Make	Quantity	Power Supply			
Controller	Make	Quantity	Supplier Voltage	No of Channel		
Delegate Unit	Make	Quantity	Power Supply			
Recorder	Make	Quantity	Input Channel	Recording type		
Mixer	Make	Quantity	Input Channel	Output Channel		
PC Workstation	Make	Quantity	Opertaing System			
Equalizer	Make	Quantity	No. of Band			
Loudspeaker	Make	Quantity	Mounting Method	Load Impedance	Max Power	
Loop Amplifier	Make	Quantity	Max Power			
T-coil (Hearing Aid)	Make	Quantity				
Microphone	Make	Quantity	Type			
Intercom Master Station	Make	Quantity				
Network Switch	Make	Quantity	POE	No. of Ports	Firmware	
Intercom Slave Station	Make	Quantity				
Annunciator	Make	Quantity	No. of Channels			
Matrix	Make	Quantity	Input Channel	Output Channel		
Interpreter Unit	Make	Quantity	Tech Unit			
Miscellaneous	Make	Quantity	Type			

15) Radio Electronics Installation

Equipment						
Base Radio/Repeater	Make	Quantity	Mounting	Nominal Output Power	Frequency Band	System Nature
RF Interface Unit	Make	Quantity	Mounting			
Antenna	Make	Quantity	Gain			
Power Supply	Make	Quantity	Mounting	Battery Back-up Time		
Console	PC & Monitor Make	PC & Monitor Model	Quantity	Operating System	Console Software	
Voice logger	Make	Quantity	Recording Media			
Network Equipment	Make	Quantity				
Radio Terminals	Make	Quantity	Transmitter power			
Accessories	Make	Quantity				

16) Closed Circuit TV System

Equipment							
Camera	Make	Quantity	Camera Position	Camera Housing	Type	Resolution	Optional Features (Multiple Entry)
Network Switch	Make	Quantity	Type	Data Speed	No. of Port	UPS Rating & Battery Retention Time	
Video Recorder	Make	Quantity	Number of Port	Type	Storage Size in TB	Storage Type	
Console	PC & Monitor Make	Quantity	No. of Monitor	Operating System			
Display Unit	Make	Quantity	Type	Configuration (m x n)	Size of Display Unit in inch	Technology	Rsolution
Video Matrix	PC & Monitor Make	Quantity	Number of Input Port	Number of ouput Port			
Miscellaneous	Make	Quantity	Type	Number of Channel			

17) Broadcast Reception Installations

System	Equipment			
UHF TV System	Antenna/Preamplifier	Equipment Category	Model	Quantity
	Ch Amplifier/Amplifier	Model	Quantity	
	Accessories	Equipment Category	Model	Quantity
Satellite TV System	Antenna / Amplifier	Equipment Category	Model	Quantity
	Receiver	Model	Quantity	
	Converter	Equipment Category	Model	Quantity
	Accessories	Equipment Category	Model	Quantity

18) Lighting System

Equipment	Indoor/ Outdoor	Lamp Type	Lamp Description	Make	Light Fitting	Luminaire Power	Quantity	Installation Date	Distribution Board Identification	Circuit
Luminaire	Indoor/ Outdoor	Lamp Type	Lamp Description	Make	Light Fitting	Luminaire Power	Quantity	Installation Date	Distribution Board Identification	Circuit
Lighting Control System	Make	Quantity								

19) Electrical Distribution System

Equipment							
Busbar Trunking / Main Distribution Cable	Material	Insulation Type	Rating (A)	Nos. of Poles / Cores	Dimensions : Cross Sectional Area	Outgoing Circuit	Rating of Outgoing Circuit
Isolating switch	Switchgear No.	Rating (A)	Nos. of Pole(s)	Outgoing Circuit	Rating of Outgoing Circuit	Make	
Distribution Board	Switchgear No.	Rating (A)	Nos. of ways	Nos. of Phase			
ACB / MCCB	Switchgear No.	Rating (A)	Nos. of Poles	Outgoing Circuit	Rating of Outgoing Circuit	Make	
Fuse switch & Switch fuse	Switchgear No.	Rating (A)	Nos. of Pole(s)	Outgoing Circuit	Rating of Outgoing Circuit	Make	
MCB	Switchgear No.	Rating (A)	Nos. of Poles	Make			
RCD / RCBO	Switchgear No.	Rating (A)	Nos. of Poles	Make			

1) Glass

		Floor	Location	Type	Frame Material	Frame Suface Finish	Nominal Size	Product ID	Product Name	Production Year	Manfacturer	Unit Size	Unit Height	Unit Width	Hinges	Glass Material	Glass Thickness	U Value	Low E Glazing	Colour Code	Order lead time	Made
1) Glass	Skylight	Floor	Location	Type	Frame Material	Frame Suface Finish	Nominal Size	Product ID	Product Name	Production Year	Manfacturer	Unit Size	Unit Height	Unit Width	Hinges	Glass Material	Glass Thickness	U Value	Low E Glazing	Colour Code	Order lead time	Made
	Glass Balustrade	Floor	Location	Type	Frame Material	Frame Suface Finish	Nominal Size	Product ID	Product Name	Production Year	Manfacturer	Unit Size	Unit Height	Unit Width	Hinges	Glass Material	Glass Thickness	U Value	Low E Glazing	Colour Code	Order lead time	Made
	Window	Floor	Location	Type	Frame Material	Frame Suface Finish	Nominal Size	Product ID	Product Name	Production Year	Manfacturer	Unit Size	Unit Height	Unit Width	Hinges	Glass Material	Glass Thickness	U Value	Low E Glazing	Colour Code	Order lead time	Made
	Curain Wall	Floor	Location	Type	Frame Material	Frame Suface Finish	Nominal Size	Product ID	Product Name	Production Year	Manfacturer	Unit Size	Unit Height	Unit Width	Hinges	Glass Material	Glass Thickness	U Value	Low E Glazing	Colour Code	Order lead time	Made

2) Door

		Floor	Location	Type	Material	Veneer Surface	Nominal Size	Product Name	Product ID	Production Year	Maufacturer	Unit Size	Unit Height	Unit Width	Hinges	Glazing	Total Glass Area	Glass Thickness	U Value	Low E Glazing	Availability of fire resistance certificate	Fire rated hour	Colour Code	Order lead time	Made
2) Door	Door	Floor	Location	Type	Material	Veneer Surface	Nominal Size	Product Name	Product ID	Production Year	Maufacturer	Unit Size	Unit Height	Unit Width	Hinges	Glazing	Total Glass Area	Glass Thickness	U Value	Low E Glazing	Availability of fire resistance certificate	Fire rated hour	Colour Code	Order lead time	Made

3) Wall

		Floor	Location	Mark	Finish ID	Type	Material	Nominal Size (MM)	Thickness (MM)	Brand Name	Model No.	Colour code	Maufactauer
3) Wall	Wall	Floor	Location	Mark	Finish ID	Type	Material	Nominal Size (MM)	Thickness (MM)	Brand Name	Model No.	Colour code	Maufactauer

4) Ceiling

		Floor	Location	Mark	Finish ID	Type	Material	Nominal Size (MM)	Thickness (MM)	Brand Name	Model No.	Colour code	Maufactauer	Strip Data	Keel / Hanger Type	Size	Made
4) Ceiling	Ceiling	Floor	Location	Mark	Finish ID	Type	Material	Nominal Size (MM)	Thickness (MM)	Brand Name	Model No.	Colour code	Maufactauer	Strip Data	Keel / Hanger Type	Size	Made

5) Floor

		Floor	Location	Mark	Finish ID	Type	Material	Nominal Size (MM)	Thickness (MM)	Brand Name	Model No.	Colour code	Maufactauer	Construction Type (i.e. Homogeneous)	Warranty	Performance Characteristics (Slip resistance, Static electrical discharge, chemical resistance, etc.)	Order lead time	Standard	Made
5) Floor	Floor	Floor	Location	Mark	Finish ID	Type	Material	Nominal Size (MM)	Thickness (MM)	Brand Name	Model No.	Colour code	Maufactauer	Construction Type (i.e. Homogeneous)	Warranty	Performance Characteristics (Slip resistance, Static electrical discharge, chemical resistance, etc.)	Order lead time	Standard	Made