Advanced
Construction
Information
Development Ltd.

BIM Management Course

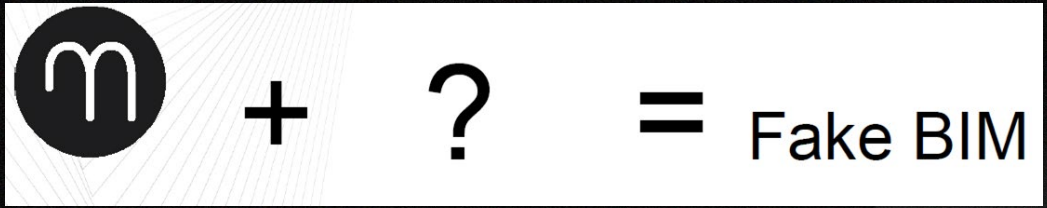
Session 4

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed

Introducing concept of M-I-B

M = Modelling
I = Essential Parameters
B = Drawing Production, and other purposes

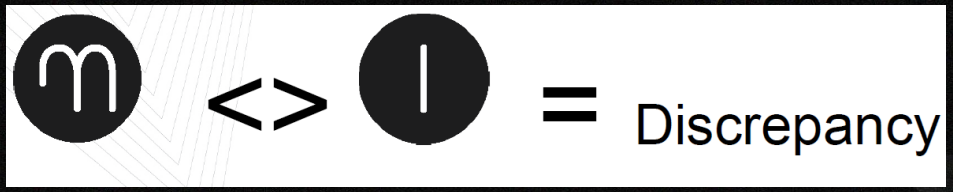


Fake BIM: M only, no I, that is for visualisation only, no significance use

L2

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed



Half BIM: when M < > I, that is only treating BIM as a supplementary information only. Only creates double handling and discrepancies.

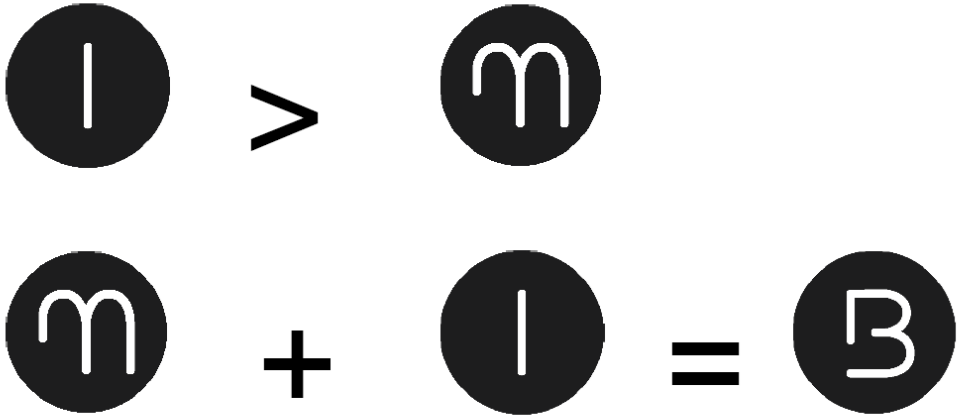
L2

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed

True BIM: M + I = Business

(M = Modelling, I = Information and B = Business, I.e. purpose). Every BIM Project must have M, I and purpose driven B

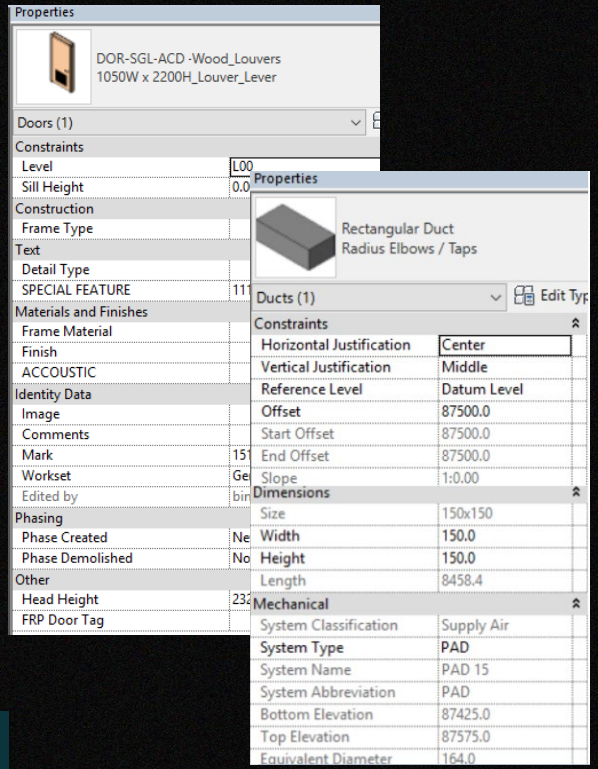


For true BIM, the performance of BIM can be measured by evaluating if BIM can fulfil the purposes. For example, production of professional deliverables such as MEP tender drawings, performing analysis, cost reduction etc.

L2

4.1 Digital Information Management

4.1.1 Value of data & how it should be managed

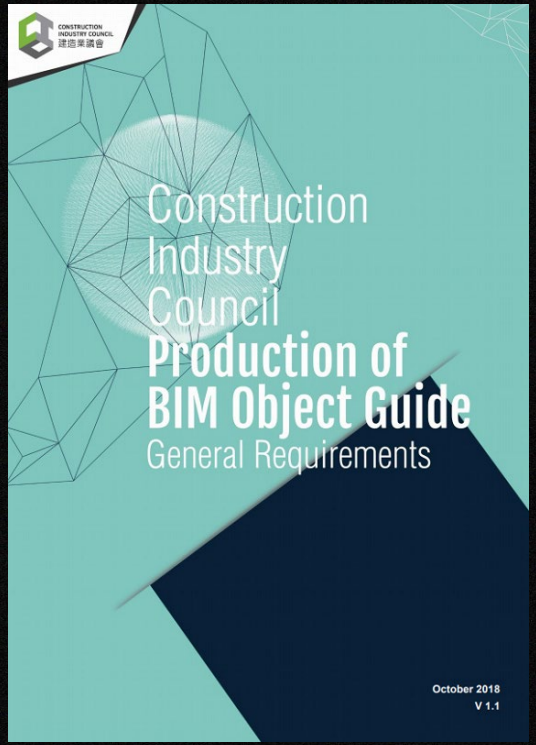


- Element/ Family Name
- Parameter Name

L2

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed



- Introduce LOD in object modelling
- Functional Requirement in BIM Object behaviour

L2

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed

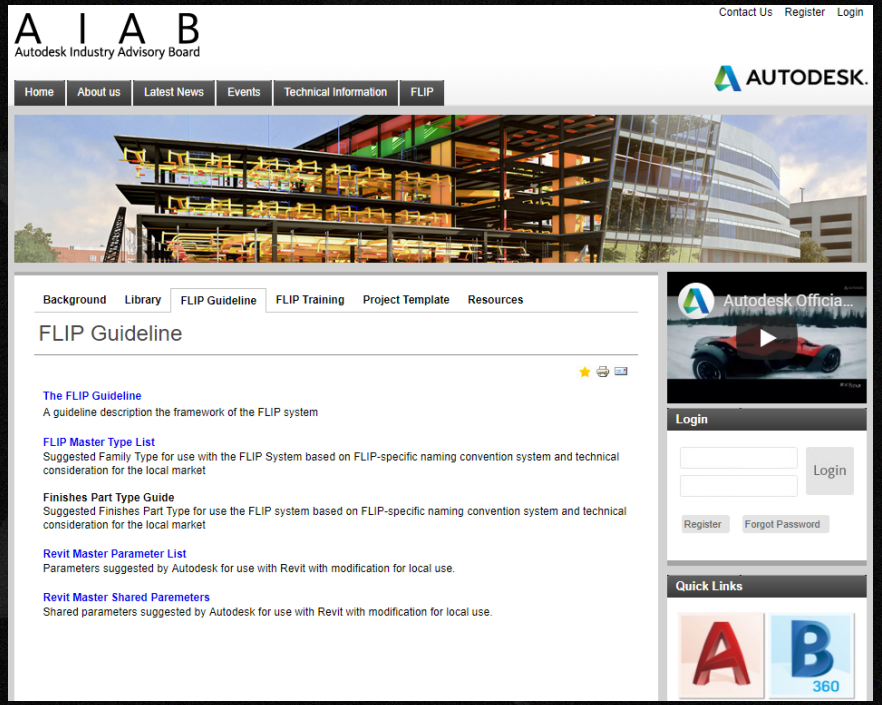
L2

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed
  - Family Name

Family Library interchange Program (F.L.I.P.) Guideline (http://www.aiab.org/index.php/flip-guideline)

*Most of the contents are reference from Autodesk's "Revit Model Content Style Guide (Ver.2.1)" with modification for the use in local market



L2

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed
  - Family Name

Format

<Category> - <Functional Type> - <Originator> - <Descriptor 1> - <Descriptor 2>.<File Format Extension>

Limitation on Number of Characters

- 3 characters for Category, Functional Type and Originator
- 25 characters for entire name including hyphen mark

Field	DOR-SGL-HAA-Wood-w_Louver.rfa	DESCRIPTIONS
Functional Type	**DOR**-SGL-AEC-Wood-w_Louver.rfa	A Door, DOR is the short form of the functional type "**door**"
Sub-Type	DOR-**SGL**-AEC-Wood-w_Louver.rfa	A Single Door, SGL is the short form of the sub-type "**single**"
Originator	DOR-SGL-**AEC**-Wood-w_Louver.rfa	AEC is the short form of the **Architecture, Engineering and Construction**. It is to represent a common standard of the industry. This can be replaced by the name of the creator in short form.
Descriptor 1	DOR-SGL-AEC-**Wood**-w_Louver.rfa	A door is made of **Wood** (Material). An optional descriptive text.
Descriptor 2	DOR-SGL-AEC-Wood-**w_Louver**.rfa	A door is built **with Louver**. This text further describes the Family
File Extension	DOR-SGL-AEC-Wood-w_Louver.**rfa**	**R**evit **F**amily File Extension

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4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed

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
Cable Tray Fittings				E		CTF	Ladder	LDR	RVT	Vertical_OutBend			Metric Electrical Fixture.rft

L2

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed
  - Parameters

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

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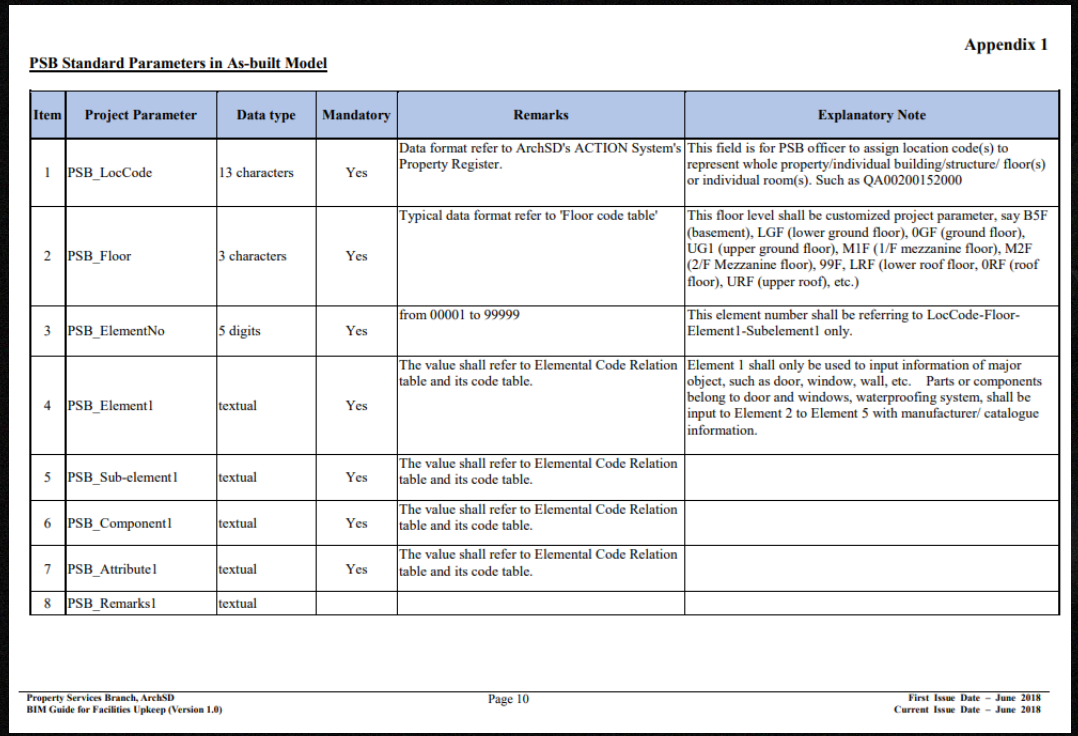
The Architectural Services Department reserves the right to omit, edit or update the Guide at any time in its absolute discretion without any prior notice.

L2

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed
  - Parameters



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			

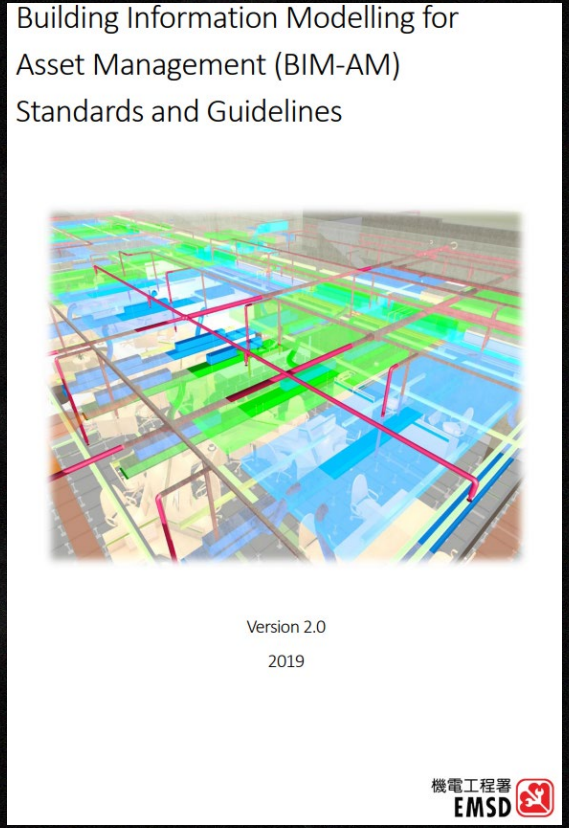
L2

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed
  - Parameters

Electrical & Mechanical Services Department -
Building Information Modelling for Asset Management (BIM-AM)
Standards and Guidelines

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



L2

4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed
  - Parameters

Asset	Attributes Type	Attributes	Parameters Naming in BIM Model	Examples
PAU	Part 1: **Common Parameters** applicable to all equipment as specified in Section 4.2 (a)	Asset Code	EMSD.Common.Asset Code	KT-EMSDN-NA-001-HVAC-AHU-0001
		Functional Location	EMSD.Common.Functional Location	CHB-LF
		Asset Relationship	EMSD.Common.Asset Relationship	To be filled using Asset Information Input Tool
		Grouped Equipment ID	EMSD.Common.Grouped Equipment ID	To be filled using Asset Information Input Tool
		Asset Tag No	EMSD.Common.Asset Tag No.	EMSDN-0000000001
		Zone Tag No	EMSD.Common.Zone Tag No.	
		Onsite Verified Date	EMSD.Common.Onsite Verified Date	01.12.2000
		Authorization Group	EMSD.Common.Authorization Group	TS04
		Division	EMSD.Common.Division	05 PD
		Equipment No	EMSD.Common.Equipment No.	19876000
		Main Work Centre	EMSD.Common.Main Work Centre	MK14E80
		Partner ID	EMSD.Common.Partner ID	CSD
		Technical ID No	EMSD.Common.Technical ID No.	TEQ-150430-02
		Acquisition Value	EMSD.Common.Acquisition Value	
		CCS Equipment ID	EMSD.Common.CCS Equipment ID Superior	19999999
		Customer Warranty End	EMSD.Common.Customer Warranty End	01.12.2000
		Customer Warranty Start	EMSD.Common.Customer Warranty Start	01.12.1999
		Floor	EMSD.Common.Floor	1st Floor
		Inventory No	EMSD.Common.Inventory No.	B12345678

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4.1 Digital Information Management

- 4.1.1 Value of data & how it should be managed
  - Parameters

PAU	**Part 1: Common Parameters** are applicable to all equipment as specified in Section 4.2 (a)	Equipment Photo	EMSD.Common.Photo	..... "Project Name"\Photo\ HVAC-PAU
		Plant Section	EMSD.Common.Plant Section	01.12.1999
		Serial No	EMSD.Common.Serial No.	TECHID-999999
		Start-up Date	EMSD.Common.Start-up Date	01.12.2000
		Technical ID No	EMSD.Common.Technical ID No. Superior	01.12.1999
		Vendor Warranty End	EMSD.Common.Vendor Warranty End	B12345678
		Vendor Warranty Start	EMSD.Common.Vendor Warranty Start	01.12.1999
		Documentation	EMSD.Common.Documentation	..... "Project Name"\30_O&M Documentation\304 HVAC System\O&M\AHU.pdf
		Catalog Profile	EMSD.Common.Catalog Profile	AC0000001
		Equipment Description	EMSD.Common.Equipment Description	
		Planner Group	EMSD.Common.Planner Group	T00
		Construction Type	EMSD.Common.Construction Type	
		Currency	EMSD.Common.Currency	
		Manufacturer	EMSD.Common.Manufacturer	ABC Company
		Manufacturer Country	EMSD.Common.Manufacturer Country	China
		Model No	EMSD.Common.Model No.	A1234
		Weight	EMSD.Common.Weight	50kg
	Part 2: Specific Parameters for particular equipment as specified in Section 4.2(b)	Equipment Location	EMSD.HVAC.Equipment Location	AHUR
		First filter	EMSD.HVAC.1st Filter	Gas Filter
		Second filter	EMSD.HVAC.2nd Filter	NONE
		Equipment Type	EMSD.HVAC.Equipment Type	Air Handling Unit
		Made by which company	EMSD.HVAC.Make	ABC Company
		Contain UV Sterilizing	EMSD.HVAC.UV Sterilizing Light	Y
		Contain VSD or not	EMSD.HVAC.VSD	Y
		Air Flow	EMSD.HVAC.Air Flow	6100
		Cooling Capacity	EMSD.HVAC.Cooling Capacity	214.6
		Rated Power Input	EMSD.HVAC.Rated Power Input	30

L2

4.1 Digital Information Management

- 4.1.2 Interoperate data/information to facilitate cross-disciplinary and cross-BIM platform collaboration
  - Common Collaboration Platform

Single Source Of Truth (SSOT)

Once any data element in a selected BIM model is changed, that all places where the model is available for download point to one source.

Information Modeling enhance the consistency of the project

Time saving for project operation

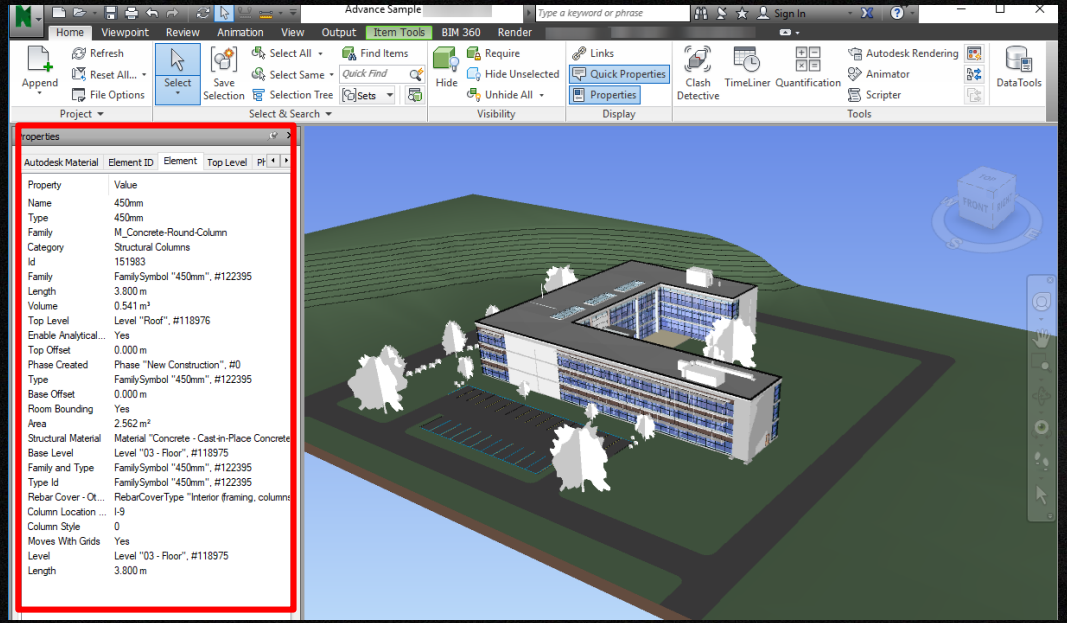
Plugin software to simulate the virtual environment

Different discipline can involve and revise the design at the same time

L2

4.1 Digital Information Management

- 4.1.2 Interoperate data/information to facilitate cross-disciplinary and cross-BIM platform collaboration
  - Common Collaboration Platform



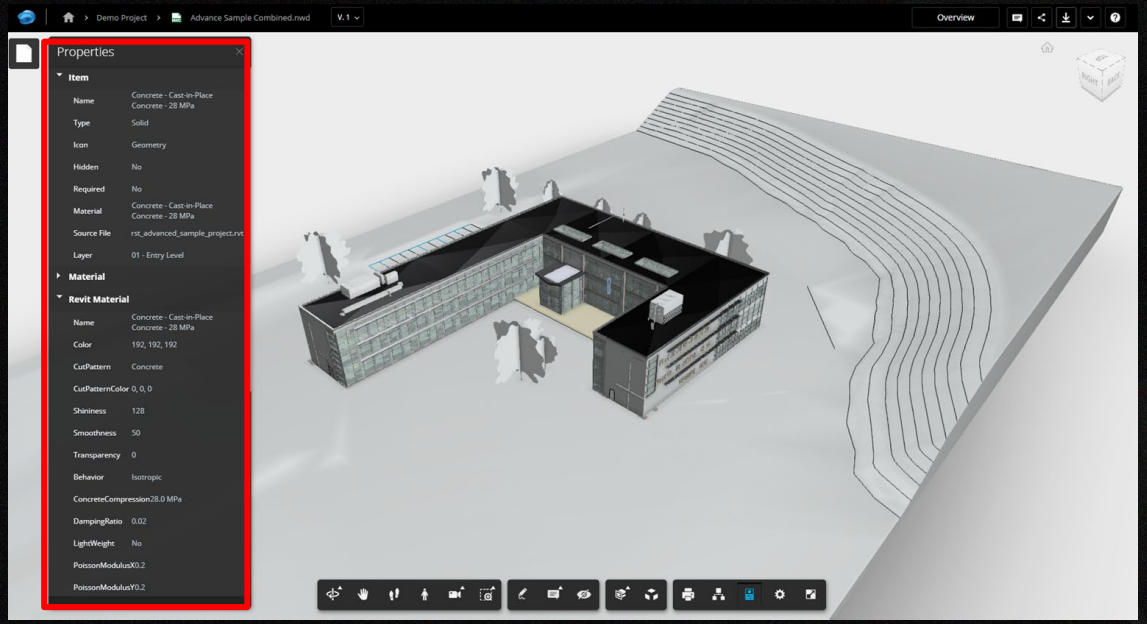
L2

https://www.youtube.com/watch?v=ZIMTAk1SFqE

Navisworks

4.1 Digital Information Management

- 4.1.2 Interoperate data/information to facilitate cross-disciplinary and cross-BIM platform collaboration
  - Common Collaboration Platform



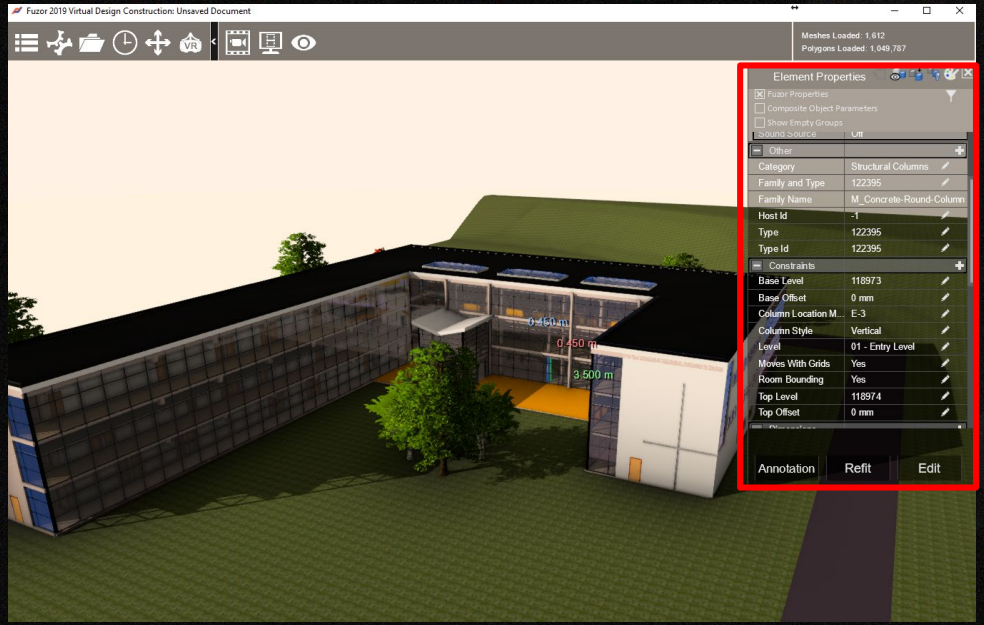
L2

https://www.youtube.com/watch?v=XnyQj9EjjHU

BIM360

4.1 Digital Information Management

- 4.1.2 Interoperate data/information to facilitate cross-disciplinary and cross-BIM platform collaboration
  - Common Collaboration Platform

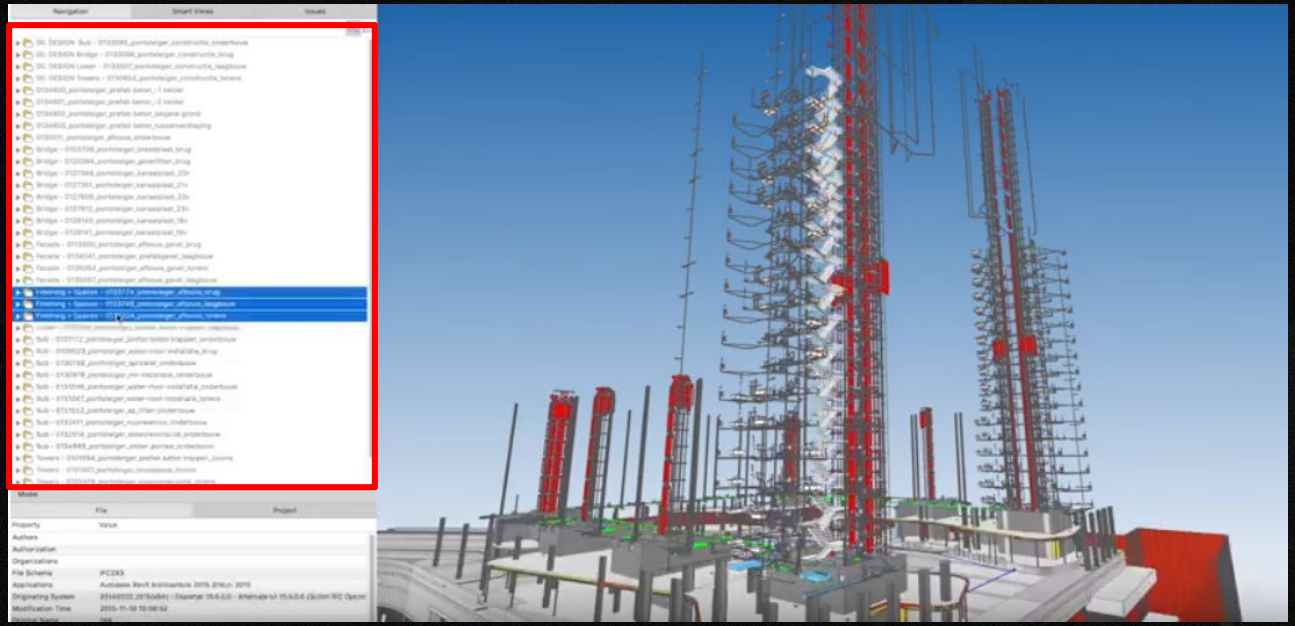


Fuzor

https://www.youtube.com/watch?v=BdiCM0BXws0&list=PLcfi2twSmE9KkClQOSlPznkj9vsJZPmiQ

4.1 Digital Information Management

- 4.1.2 Interoperate data/information to facilitate cross-disciplinary and cross-BIM platform collaboration
  - Common Collaboration Platform



https://www.youtube.com/watch?v=dMQAnlvJ5ps

BIMcollab Zoom

L2

4.1 Digital Information Management

- 4.1.2 Interoperate data/information to facilitate cross-disciplinary and cross-BIM platform collaboration
  - Common Collaboration Platform
    - Common Workflow in the industry
      - Preparation (FM)

\+

COBie

*Extension plugin for Revit

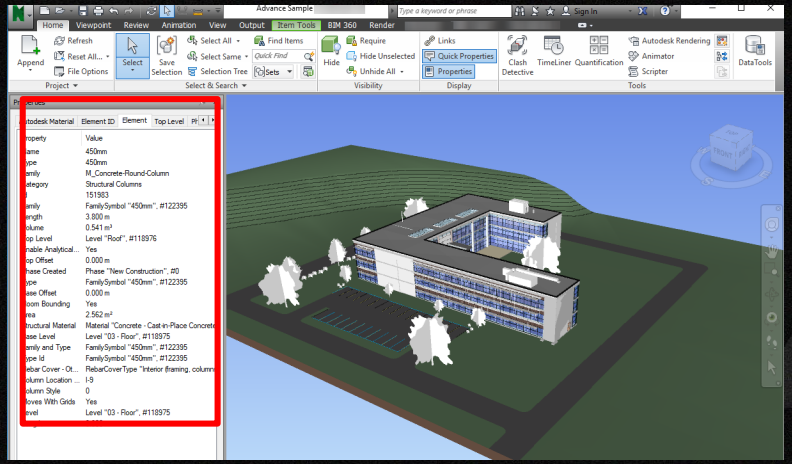
Data
COBie
COBie.ExternalIdentifier
COBie.CreatedBy
COBie.CreatedOn
COBie.Component.Name
COBie.Component.Space
COBie.Component.Description
COBie.Component.SerialNumber
COBie.Component.InstallationDate
COBie.Component.WarrantyStartDate
COBie.Component.TagNumber
COBie.Component.BarCode
COBie.Component.AssetIdentifier
COBie.Component.Area
COBie.Component.Length

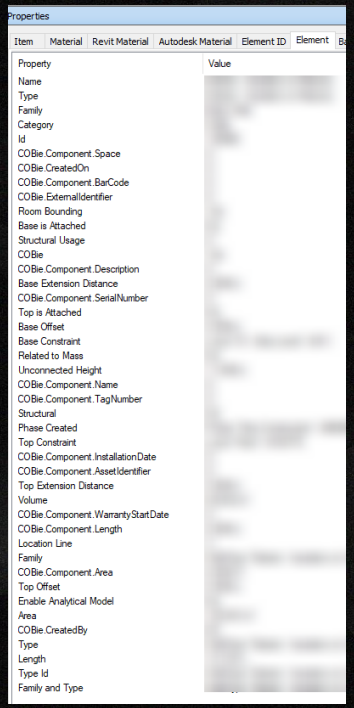
Data
COBie.Type.ExternalIdentifier
COBie.Type
COBie.Type.CreatedBy
COBie.Type.CreatedOn
COBie.Type.Name
COBie.Type.Category
COBie.Type.Description
COBie.Type.AssetType
COBie.Type.Manufacturer
COBie.Type.ModelNumber
COBie.Type.WarrantyGuarantorParts
COBie.Type.WarrantyDurationParts
COBie.Type.WarrantyGuarantorLabor
COBie.Type.WarrantyDurationLabor
COBie.Type.WarrantyDurationUnit
COBie.Type.ReplacementCost
COBie.Type.ExpectedLife
COBie.Type.DurationUnit
COBie.Type.WarrantyDescription
COBie.Type.NominalLength
COBie.Type.NominalWidth
COBie.Type.NominalHeight
COBie.Type.ModelReference
COBie.Type.Shape
COBie.Type.Size
COBie.Type.Color
COBie.Type.Finish
COBie.Type.Grade
COBie.Type.Material
COBie.Type.Constituents
COBie.Type.Features
COBie.Type.AccessibilityPerformance
COBie.Type.CodePerformance
COBie.Type.SustainabilityPerformance
COBie.Type.Area
COBie.Type.Length

L2

4.1 Digital Information Management

- 4.1.2 Interoperate data/information to facilitate cross-disciplinary and cross-BIM platform collaboration
  - Common Collaboration Platform
    - Common Workflow in the industry
      - Viewer (During coordination stage)





L2

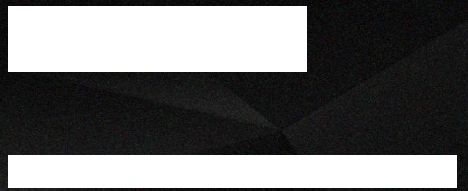
4.1 Digital Information Management

- 4.1.2 Interoperate data/information to facilitate cross-disciplinary and cross-BIM platform collaboration
  - Common Collaboration Platform
    - Common Workflow in the industry
      - Viewer (FM)

COBie

Information extraction

Input



L2

4.1 Digital Information Management

4.1.3 Limitation of BIM software in relation to information management

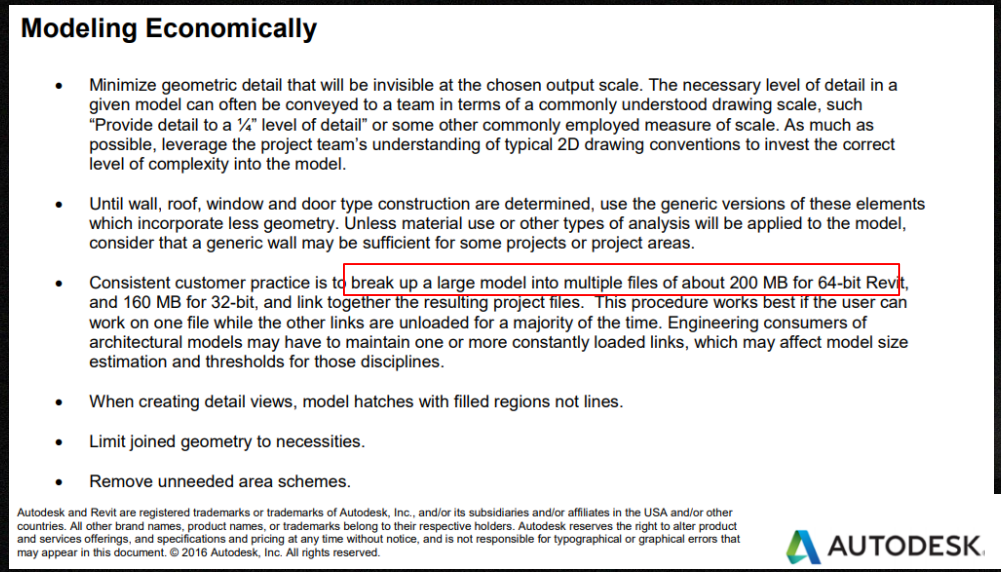
- Should we input all the information into the model?
- What information should be input?
- How to input all the information/ data? (Will be discussed in 4.1.5)

L2

4.1 Digital Information Management

4.1.3 Limitation of BIM software in relation to information management

- Should we input all the information into the model?
  - The more information the model contains, the bigger file size the model has.
  - Too big model file will cause file corruption easily.



Modeling Economically

- Minimize geometric detail that will be invisible at the chosen output scale. The necessary level of detail in a given model can often be conveyed to a team in terms of a commonly understood drawing scale, such "Provide detail to a ¼" level of detail" or some other commonly employed measure of scale. As much as possible, leverage the project team's understanding of typical 2D drawing conventions to invest the correct level of complexity into the model.
- Until wall, roof, window and door type construction are determined, use the generic versions of these elements which incorporate less geometry. Unless material use or other types of analysis will be applied to the model, consider that a generic wall may be sufficient for some projects or project areas.
- Consistent customer practice is to break up a large model into multiple files of about 200 MB for 64-bit Revit, and 160 MB for 32-bit, and link together the resulting project files. This procedure works best if the user can work on one file while the other links are unloaded for a majority of the time. Engineering consumers of architectural models may have to maintain one or more constantly loaded links, which may affect model size estimation and thresholds for those disciplines.
- When creating detail views, model hatches with filled regions not lines.
- Limit joined geometry to necessities.
- Remove unneeded area schemes.

AUTODESK.

Extracted from Autodesk
Model Performance Technical Note for Autodesk Revit 2016

L2

4.1 Digital Information Management

- 4.1.3 Limitation of BIM software in relation to information management

  - What information should be input?
    - BIM software cannot input appropriate information automatically
    - All data entries are carried manually in these stage (unless A.I. takes place)
    - Which data is suitable and useful FM use?

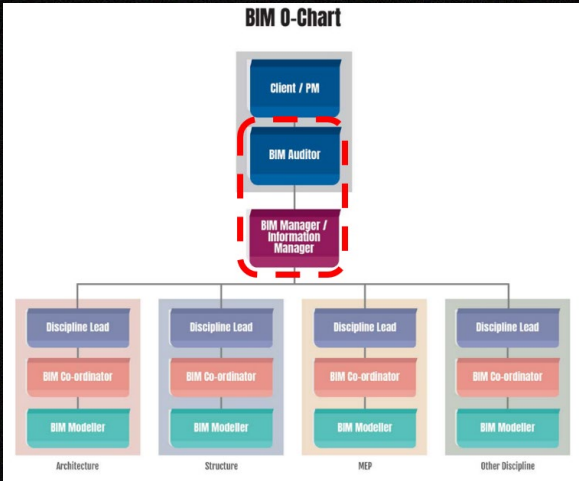
1. What if there is only parameters for sound power level and temperature?
2. Which value should be input?

Fresh Air Flow Rate (m3/s)	Supply Air Flow Rate (m3/s)	Static	Max Sound Power Level At The Operating Point (dB)							Net WEIGHT (kg)	Cooling Coil Performance Data										Fan and Fan Motor							
											Chilled Water				Max. Air P. Drop (Pa)	Cooling Load (kW)		Water Flow Velocity (m/s)	Air Temperature				Fan Type	Total ST. Press. (Pa)	Internal ST. Press. (Pa)	External ST. Press. (Pa)	Fan Speed	Motor Data (kW)			
											Flow (L/s)	Max. P. D. (kPa)	Temp. (Celcius)			Sens.	Total		On Coil		Off Coil						rpm	Oper. kW	Nom. kW	Effi.(%)	V/ph/Hz
		Pa	125	250	500	1K	2K	4K	8K	A			Ent.	Leav.					DB	WB	DB	WB									
0.96	1.8	616	70	58	55	61	51	40	35	63.5	802	3.05	42.75	7	12.5	152	35.1	70.2	1.43	27.5	22.4	11.98		EC	1047	431	616	2110	2.83	5.25		380/3/50
0.54	0.75	850	65	65	54	54	48	42	36	60.3	654	0.95	34.92	7	12.5	40	12.8	21.8	0.98	25	19.6	11.37		EC	1157	307	850	3152	1.5	2.95		380/3/50
6.65	6.65	850	82	70	65	62	50	39	36	70	1385	17.72	47.26	7	12.5	163	161	408	17.72	35	29	15.83		DIDW Cent	1272	422	850	1497	11.09	15	90.6	380/3/50
2	2	850	71	62	57	65	53	43	38	66.9	641	5.28	38.14	7	12.5	146	48	121.5	1.6	35	29	15.99		EC	1285	435	850	2337	3.81	5.25		380/3/50
2.6	2.6	850	67	63	59	64	55	46	43	66.5	724	6.86	36.18	7	12.5	169	62.4	157.8	1.54	35	29	16		EC	1312	462	850	2567	5.17	5.25		380/3/50
1.45	1.45	850	84	67	59	56	48	38	31	69.1	653	3.83	33.62	7	12.5	113	34.8	88.1	1.41	35	29	16		DIDW Cent	1218	368	850	2468	2.57	4	86.6	380/3/50
2.5	2.5	850	76	62	60	59	53	40	33	64.6	781	6.6	38.95	7	12.5	148	60.1	151.9	1.62	35	29	15.99		DIDW Cent	1271	421	850	2368	4.39	5.5	87.7	380/3/50

L2

4.1 Digital Information Management

- 4.1.4 Determine level of development in the context of graphics and information in different stages



MEETING TYPE	PROJECT STAGE	FREQUENCY	PARTICIPANTS	LOCATION
BIM REQUIREMENTS KICK-OFF				
BIM EXECUTION PLAN DEMONSTRATION				
DESIGN COORDINATION				
CONSTRUCTION OVER-THE-SHOULDER PROGRESS REVIEWS				
ANY OTHER BIM MEETINGS THAT OCCURS WITH MULTIPLE PARTIES				

MODEL DELIVERY SCHEDULE OF INFORMATION EXCHANGE FOR SUBMISSION AND APPROVAL:
Document the information exchanges and file transfers that will occur on the project.

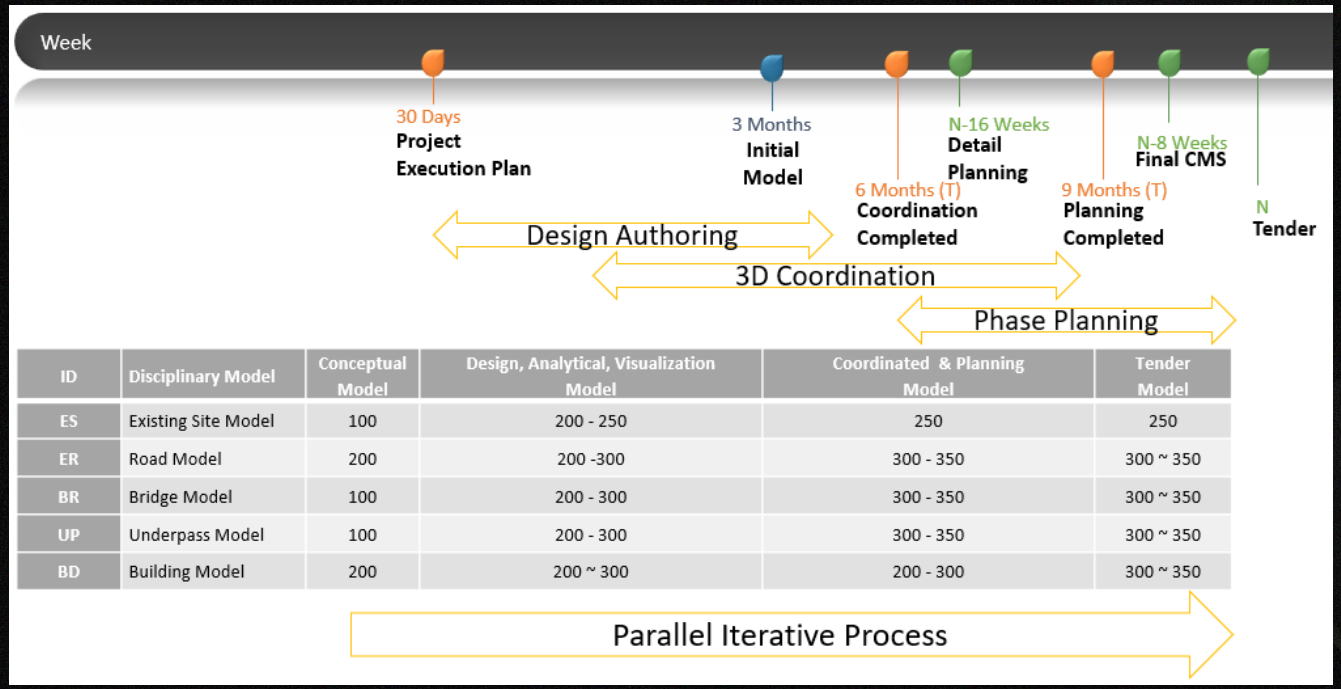
INFORMATION EXCHANGE	FILE SENDER	FILE RECEIVER	ONE-TIME or FREQUENCY	DUE DATE or START DATE	MODEL FILE	MODEL SOFTWARE	NATIVE FILE TYPE	FILE EXCHANGE TYPE
DESIGN AUTHORING - 3D COORDINATION	STRUCTURAL ENGINEER	(FTP POST) (COORDINATION LEAD)	WEEKLY	[DATE]	STRUCT	DESIGN APP	.XYZ	.XYZ .ABC
	MECHANICAL ENGINEER	(FTP POST) (COORDINATION LEAD)	WEEKLY	[DATE]	MECH	DESIGN APP	.XYZ	.XYZ .ABC

- The LOD Standard shall be specified and executed in different stages during the project
- Each stages of LOD Standard delivery to be agreed in the PXP
- The use of CIC Standard / LOD Specification by BIM Forum shall be agreed in PXP
- Each discipline shall achieved their own LOD Standard according to the PXP
- BIM Manager / Auditor to review each discipline model to ensure the LOD Standard can be transferred from one stage to another

L4

4.1 Digital Information Management

- 4.1.4 Determine level of development in the context of graphics and information in different stages
  - Design Stage



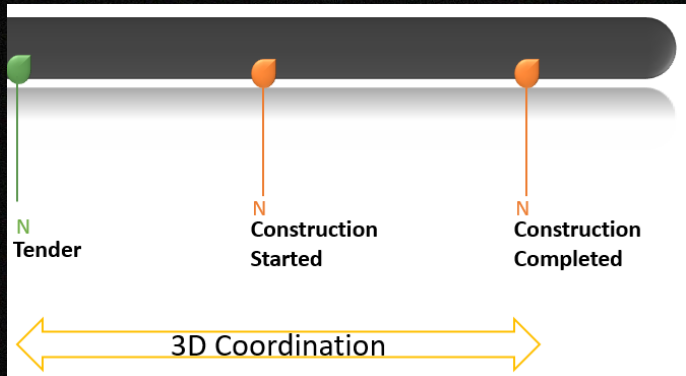
ID	Disciplinary Model	Conceptual Model	Design, Analytical, Visualization Model	Coordinated & Planning Model	Tender Model
ES	Existing Site Model	100	200 - 250	250	250
ER	Road Model	200	200 -300	300 - 350	300 ~ 350
BR	Bridge Model	100	200 - 300	300 - 350	300 ~ 350
UP	Underpass Model	100	200 - 300	300 - 350	300 ~ 350
BD	Building Model	200	200 ~ 300	200 - 300	300 ~ 350

Parallel Iterative Process

L4

4.1 Digital Information Management

- 4.1.4 Determine level of development in the context of graphics and information in different stages
  - Construction Stage



ID	Disciplinary Model	Construction Model	As-Built
ES	Existing Site Model	300*	300*
ER	Road Model	300 ~ 400	500*
BR	Bridge Model	300 ~ 400	500*
UP	Underpass Model	300 ~ 400	500*
BD	Building Model	300 ~ 400	500*

* Subject to PXP definition

L4

4.1 Digital Information Management

- 4.1.4 Determine level of development in the context of graphics and information in different stages
  - As-Built Stage

2.2 Definition of LOD for As-built Model

The LOD requirements are referred to the CIC Building Information Modelling Standard. Apart from the CIC requirements, supplementary definition and interpretation of the LOD requirements, if applicable, are listed below. The as-built model shall follow the definition and interpretation as shown in this Guide in order to achieve the required purpose of the as-built model in facilities upkeep.

LOD 350

CIC Building Information Modelling Standard's Definition

The model element is graphically represented within the model as a specific system, object, or assembly in terms of quantity, size, shape, orientation, and interfaces with other building systems.

Interpretations in this Guide

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

LOD 400

CIC Building Information Modelling Standard's Definition

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

Interpretations in this Guide

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

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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L4

4.1 Digital Information Management

- 4.1.4 Determine level of development in the context of graphics and information in different stages
  - As-Built Stage

LOD 500

CIC Building Information Modelling Standard's Definition

The model element is a field verified representation in terms of size, shape, location, quantity, and orientation.

Interpretations in this Guide

The existence, exact quantity, exact physical dimension, exact shape, approximate orientation, approximate spatial location of the element / object in the model was verified on site. Accuracy of the element / object's setting-out location and its spatial location should be within ± 50mm between the model and the actual verified site installation. The 3D geometry details of the element / object is not less than LOD400 and the shape should be modelled for easy identification. Essential information, such as data of fittings, manufacturer, model number, etc. and other as specified in Appendix 1 and Appendix 3, should be embedded in the model element / object for facilities upkeep use.

2.3.3 3D Animation

The as-built model shall be provided with video clip files with 3D animation showing the assembly, disassembly, repair and replacement method for special component or special building system such as curtain wall system, etc. as specified in the contract and Appendix 3 for viewing in the AIS. The objective of the 3D animation is to illustrate how the special component or special building system can be maintained.

In general, the 3D animation shall be generated with LOD ranged from LOD350 to LOD500 following Appendix 3. The 3D animation converted from the as-built model shall be in mp4 format with resolution not lower than 1080p HD 30 fps or alternative format requested by PSB. As the extent of the 3D animation required is depended on the actual design of the building, proposal of the 3D animation shall be subject to PSB's approval.

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L4

4.1 Digital Information Management

- 4.1.4 Determine level of development in the context of graphics and information in different stages
  - As-Built Stage

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
6.3	Acoustic door, panel, fixtures	350	500	×	✓ (if available)	✓	1) Showing fixing details including all accessories, ironmongeries, etc.	1) Ditto (to Item 6.1). 2) Warranty and certificate. 3) Specification of the acoustic properties.
7.0	**Ironmongery**							
7.1	Elements under this trade	350	500	×	✓ (if available)	×		1) Brand name and model information. 2) Technical literature. 3) O&M manual.
8.0	**Steel and Metal Work**							
8.1	Elements under this trade (unless otherwise specified below)	350	500	×	✓ (if available)	×		1) Brand name and model information. 2) Technical literature.
8.2	Fall arrest system	350	500	×	✓ (if available)	×		1) Ditto (to Item 8.1). 2) Contractor / Specialist Contractor information. 3) O&M manual. 4) Particular specification for examination, testing and operation training.
8.3	Steel sheet / composite aluminium cladding	350	500	×	✓ (if available)	✓	1) Showing fixing details including joints, supporting frames, insulation layer, etc.	1) Ditto (to Item 8.1). 2) Contractor / Specialist Contractor information. 3) Guarantee and warranty. 4) O&M manual.
8.4	Proprietary shutter, swing and sliding door	350	500	×	✓ (if available)	✓	1) Showing fixing details including joints, supporting frames, rail / track, etc.	1) Ditto (to Item 8.1). 2) Contractor / Specialist Contractor information. 3) Guarantee and warranty. 4) O&M manual.
8.5	Aluminium windows and doors	350	500	×	✓ (if available)	×		1) Ditto (to Item 8.1).
9.0	**Plastering and Finishes**							
9.1	Elements under this trade (unless otherwise specified below)	350	500	×	✓ (if available)	×		1) Brand name and model information. 2) Technical literature.

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L4

4.1 Digital Information Management

- 4.1.5 Determine level of integration of digital information into asset & facility management

  - Which FM/AM BIM standard should be followed?
  - How to input all the information/ data?
  - Who should input the information/ data?
  - Who should check the accuracy of the information/ data?

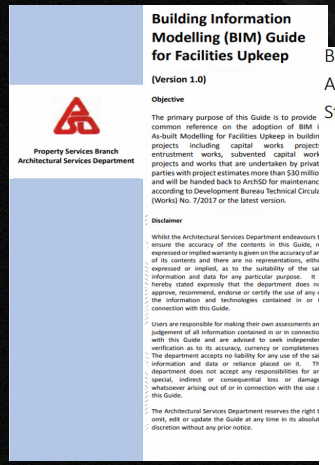
L4

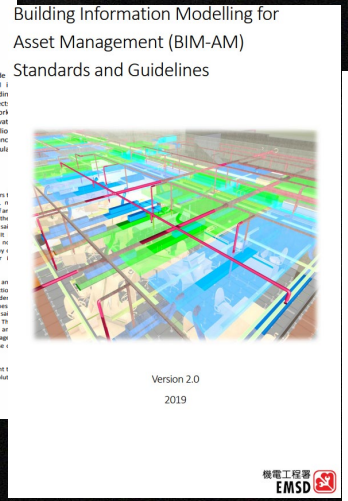
4.1 Digital Information Management

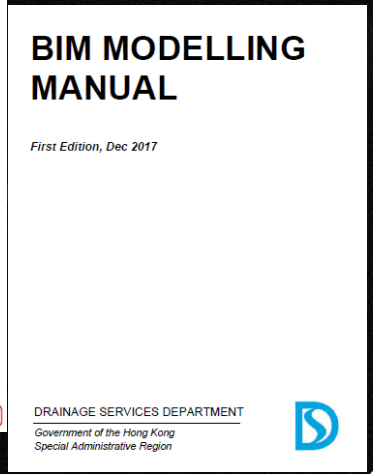
- 4.1.5 Determine level of integration of digital information into asset & facility management

- Which FM/AM BIM standard should be followed?
  (Define which is essential element for Facilities Upkeeping/ Define some optional item shall contain information / manual for Facilities Up keeping)

  - Clients' BIM Standard/ Requirements
  - Government BIM Standards





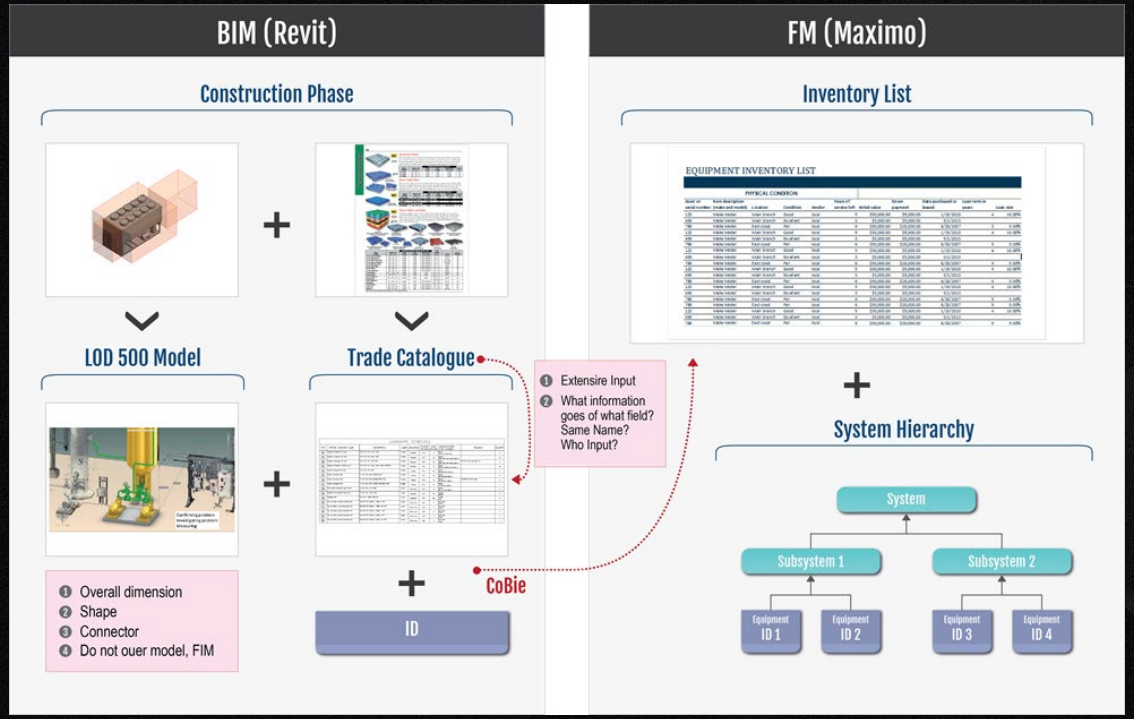


L4

4.1 Digital Information Management

- 4.1.5 Determine level of integration of digital information into asset & facility management

  - How to input all the information/ data?

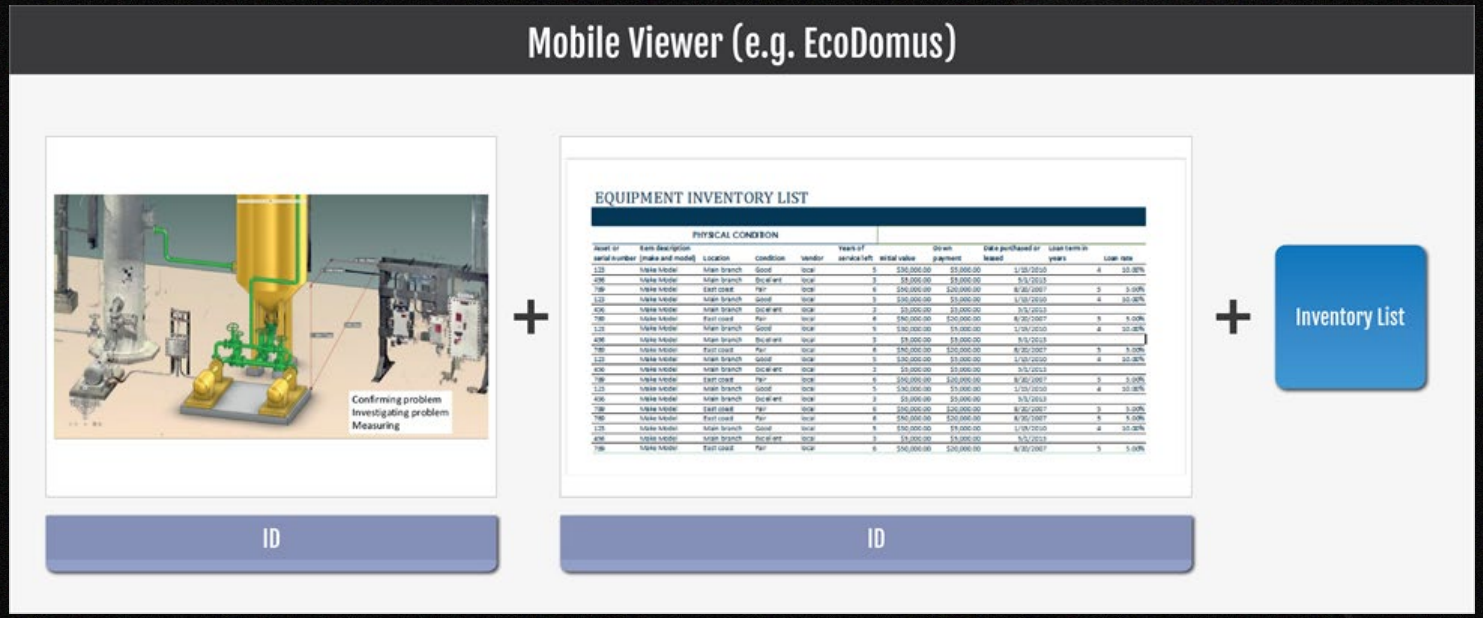


L4

4.1 Digital Information Management

- 4.1.5 Determine level of integration of digital information into asset & facility management

  - How to input all the information/ data?
    (~~Direct input via BIM authoring tools~~/ Mapping through middleware



L4

4.1 Digital Information Management

- 4.1.5 Determine level of integration of digital information into asset & facility management

  - Who should input the information/ data?
    (~~BIM modellers~~ Sub-contractors/ FM Operator)

  - Who should check the accuracy of the information/ data?

Fresh Air Flow Rate (m3/s)	Supply Air Flow Rate (m3/s)	Static	Max Sound Power Level At The Operating Point (dB)								Net WEIGHT (kg)	Cooling Coil Performance Data											Fan and Fan Motor							
												Chilled Water				Max. Air P. Drop (Pa)	Cooling Load (kW)		Water Flow Velocity (m/s)	Air Temperature					Fan Type	Total ST. Press. (Pa)	Internal ST. Press. (Pa)	External ST. Press. (Pa)	Fan Speed	Motor Data (kW)			
												Flow (L/s)	Max. P. D. (kPa)	Temp. (Celcius)			Sens.	Total		On Coil		Off Coil							rpm	Oper. kW	Nom. kW	Effi.(%)	V/ph/Hz
		Pa	125	250	500	1K	2K	4K	8K	A				Ent.	Leav.					DB	WB	DB	WB									
0.96	1.8	616	70	58	55	61	51	40	35	63.5	802	3.05	42.75	7	12.5	152	35.1	70.2	1.43	27.5	22.4	11.98		EC	1047	431	616	2110	2.83	5.25		380/3/50
0.54	0.75	850	65	65	54	54	48	42	36	60.3	654	0.95	34.92	7	12.5	40	12.8	21.8	0.98	25	19.6	11.37		EC	1157	307	850	3152	1.5	2.95		380/3/50
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2.6	2.6	850	67	63	59	64	55	46	43	66.5	724	6.86	36.18	7	12.5	169	62.4	157.8	1.54	35	29	16		EC	1312	462	850	2567	5.17	5.25		380/3/50
1.45	1.45	850	84	67	59	56	48	38	31	69.1	653	3.83	33.62	7	12.5	113	34.8	88.1	1.41	35	29	16		DIDW Cent	1218	368	850	2468	2.57	4	86.6	380/3/50
2.5	2.5	850	76	62	60	59	53	40	33	64.6	781	6.6	38.95	7	12.5	148	60.1	151.9	1.62	35	29	15.99		DIDW Cent	1271	421	850	2368	4.39	5.5	87.7	380/3/50

Who is familiar with the FM use and the equipment catalogues and specification?

L4

4.1 Digital Information Management

- 4.1.6 Oversee the process and quality of information exchange
  - 4.1.6.1 openBIM
    - Enable BIM-workflow communication between different software tools

5 Types of format developed by buildingSMART for OpenBIM environment

- Industry Foundation Classes (IFC)
  Not the product of /favouring any particular vendor and non-proprietary
  Pros: Transport information & data
- BIM Collaboration Format (BCF)
  Open file XML format "bcfXML" that supports workflow communication in BIM processes
  Addition of textual comments, screenshots and more on top of the IFC model layer
  Pros: Change Coordination
- Information Delivery Manual (IDM)
  Identifies the series of processes undertaken during a built asset's lifecycle together with the information that is required in order for these processes to be carried out
  Pros: Describe Process
- Information Delivery Manual (IDM)
  The bSDD is a reference library based on the IFD standard and intended to support improved interoperability in the building and construction industry.
  Pros: Mapping of Terms
- Model View Definition (MVD)
  define the subset of the IFC data model that is necessary to support the specific data exchange requirements of the AEC industry during the life-cycle of a construction project
  Pros: Translate processes into technical requirements

L2

https://www.buildingsmart.org/about/what-is-openbim/ifc-introduction/

4.1 Digital Information Management

- 4.1.6 Oversee the process and quality of information exchange
  - 4.1.6.1 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

L2

4.1 Digital Information Management

- 4.1.6 Oversee the process and quality of information exchange
  - 4.1.6.2 COBie (Construction Operations Building Information Exchange)

	A	B	C
1	Title	COBie	
2	Version	2	
3	Release	4	
4	Status	IFC2x3	
5	Region	en-UK	
6	Purpose		This COBie spreadsheet is an example file that comes with the COBie Extension 1.0
7	Outline		Individual worksheets are organized by project phase as shown below
8			
9	All Phases	Sheet	Contents
10		Contact	People and Companies
11			
12	Early Design Worksheets	Sheet	Contents
13		Facility	Project, Site, and Facility
14		Floor	Vertical levels and exterior areas
15		Space	Spaces
16		Zone	Sets of spaces sharing a specific attribute
17		Type	Types of equipment, products, and materials
18			
19	Detailed Design Worksheets	Sheet	Contents
20		Component	Individually named or schedule items
21		System	Sets of components providing a service
22		Assembly	Constituents for Types, Components and others

L2

4.1 Digital Information Management

- 4.1.6 Oversee the process and quality of information exchange
  - 4.1.6.2 COBie (Construction Operations Building Information Exchange)

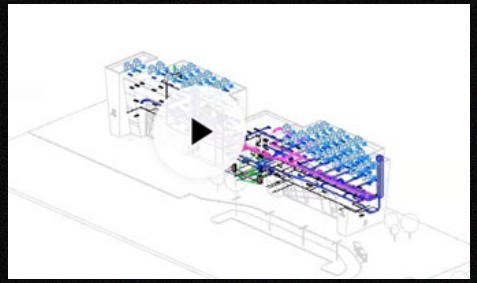
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Name	CreatedBy	CreatedOn	TypeName	Space	Description	ExtSystem	ExtObject	ExtIdentifier	SerialNumber	InstallationDate	WarrantyStartDate	TagNumber	BarCode	AssetIdentifier	Area	Length
22	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	2bf19293-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	2bf19293-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	2bf19293-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
25	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	2bf19293-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
26	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	2bf19293-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
27	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	2bf19293-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
28	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	2bf19293-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
29	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	44772ab3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
30	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	e895d30d	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
31	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	e895d30d	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
32	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	d6d1a613	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
33	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	b1d85879	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
34	Lighting D	dave@aut	2016-03-1	Lighting D	n/a	n/a	Autodesk	Lighting D	b1d85879	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
35	Lighting F	dave@aut	2016-03-1	Lighting F	Spaces_2	n/a	Autodesk	Lighting F	badde294	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
36	Lighting F	dave@aut	2016-03-1	Lighting F	Spaces_2	n/a	Autodesk	Lighting F	badde294	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
37	Lighting F	dave@aut	2016-03-1	Lighting F	Spaces_2	n/a	Autodesk	Lighting F	29d80c5d	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38	Lighting F	dave@aut	2016-03-1	Lighting F	Spaces_2	n/a	Autodesk	Lighting F	29d80c5d	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
39	Lighting F	dave@aut	2016-03-1	Lighting F	Spaces_2	n/a	Autodesk	Lighting F	49433253	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
40	Lighting F	dave@aut	2016-03-1	Lighting F	Spaces_2	n/a	Autodesk	Lighting F	49433253	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
41	Lighting F	dave@aut	2016-03-1	Lighting F	Spaces_2	n/a	Autodesk	Lighting F	49433253	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
42	Lighting F	dave@aut	2016-03-1	Lighting F	Spaces_2	n/a	Autodesk	Lighting F	49433253	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
43	Lighting F	dave@aut	2016-03-1	Lighting F	Spaces_2	n/a	Autodesk	Lighting F	49433253	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Instruction | Contact | Facility | Floor | Space | Zone | Type | Component | System | Assembly | Connection | Spare | Re

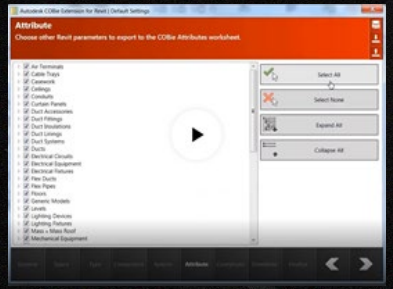
L2

4.1 Digital Information Management

- 4.1.6 Oversee the process and quality of information exchange
  - 4.1.6.2 COBie (Construction Operations Building Information Exchange)



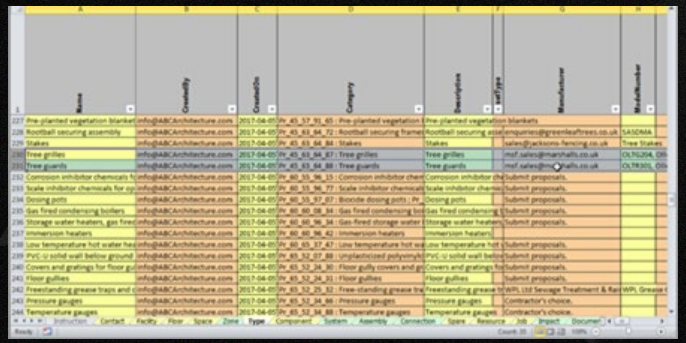
1. Selected attribute in BIM



2. Convert in COBie

Export Selected Information for Facility Management

Facility Management team can use the information to check / access for further maintenance



3. Information in Excel format

L2

4.1 Digital Information Management

4.1.6 Oversee the process and quality of information exchange

- Site Verification

  With the SSOT and BIM information, site inspector and clients can visit the site and compare the actual condition with the BIM model to inspect the quality of the construction and lodge defects.

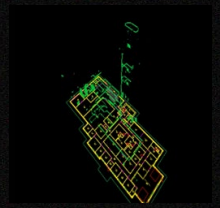
  Sub-Contractors submit applications & report (Request for Inspection)
  QA, QC, RTO … Approval/ Reject the Inspection application, Lodge defects
  Clients, Management & Project team can generate all the reports and review the application through BIM software

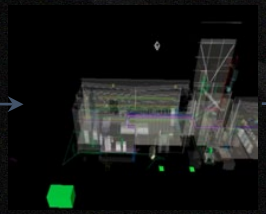
L2

4.1 Digital Information Management

4.1.6 Oversee the process and quality of information exchange

- FM Operation
  - BIM allow the information can be trackable in 3D virtual world
  - Information contained in the model can be referred as a record for FM
  - Any replacement of component can be scheduled in FM operator





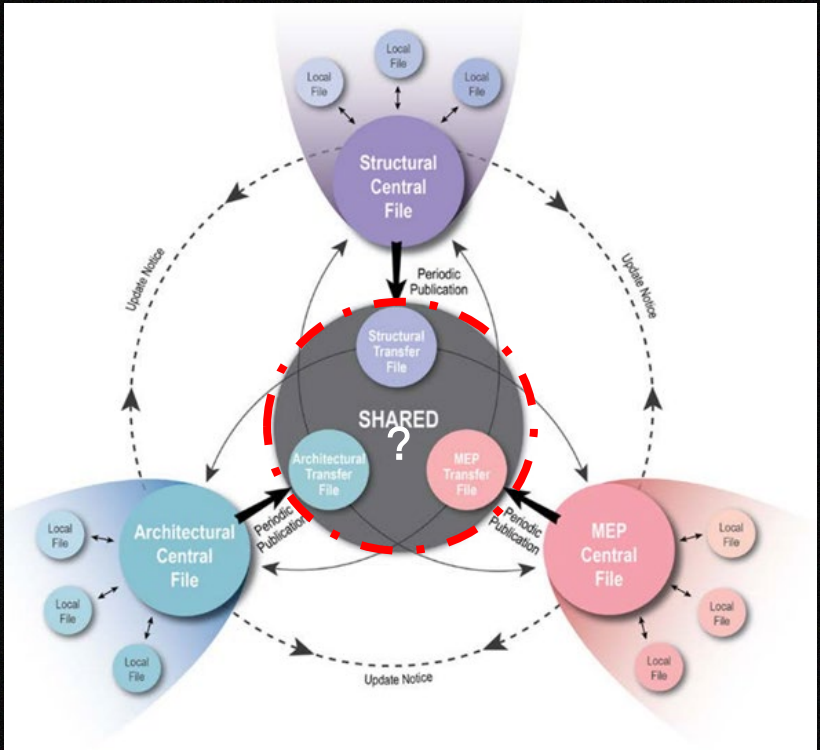
1. Filter to select the area 2. Locate the problem area 3. Check the data 4. Find the source 5. Information of the model 6. Place the order

L2

4.2 Common Data Environment (CDE)

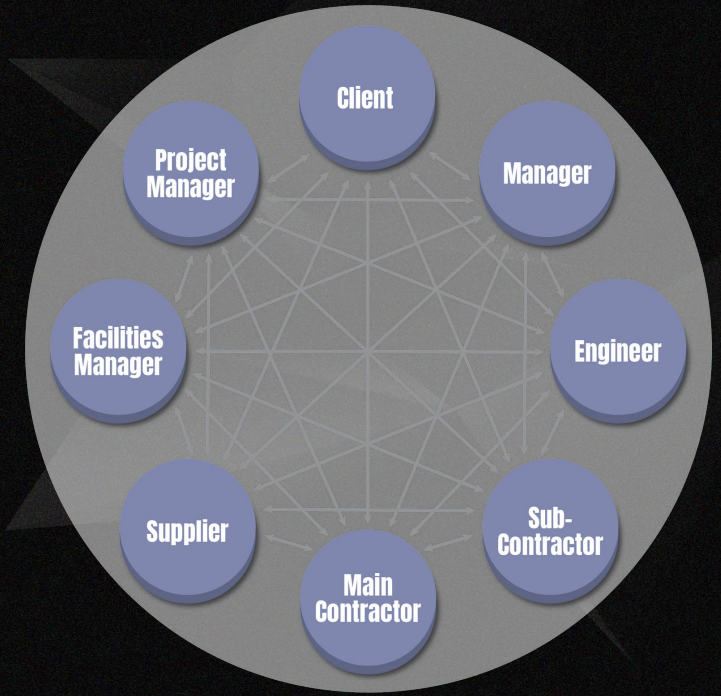
- 4.2.1 Overview of CDE

How to share information for collaboration?



Common Data Environment (CDE)

Traditional Information Sharing

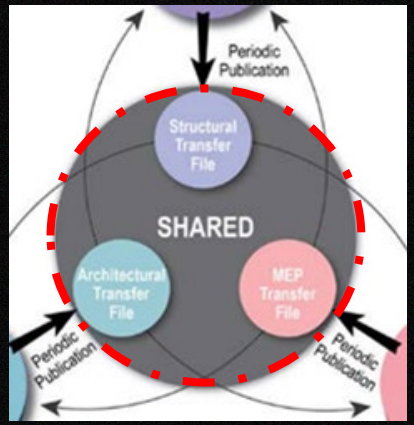


L2

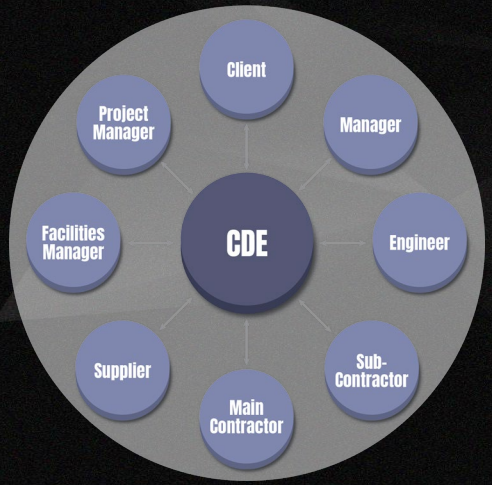
4.2 Common Data Environment (CDE)

4.2.1 Overview of CDE

- WIP (Work in progress) to share with other discipline / to construction phase
- Publish Information for all discipline to review
- SSOT with record of date and author
- Archive of information from design to completion of project



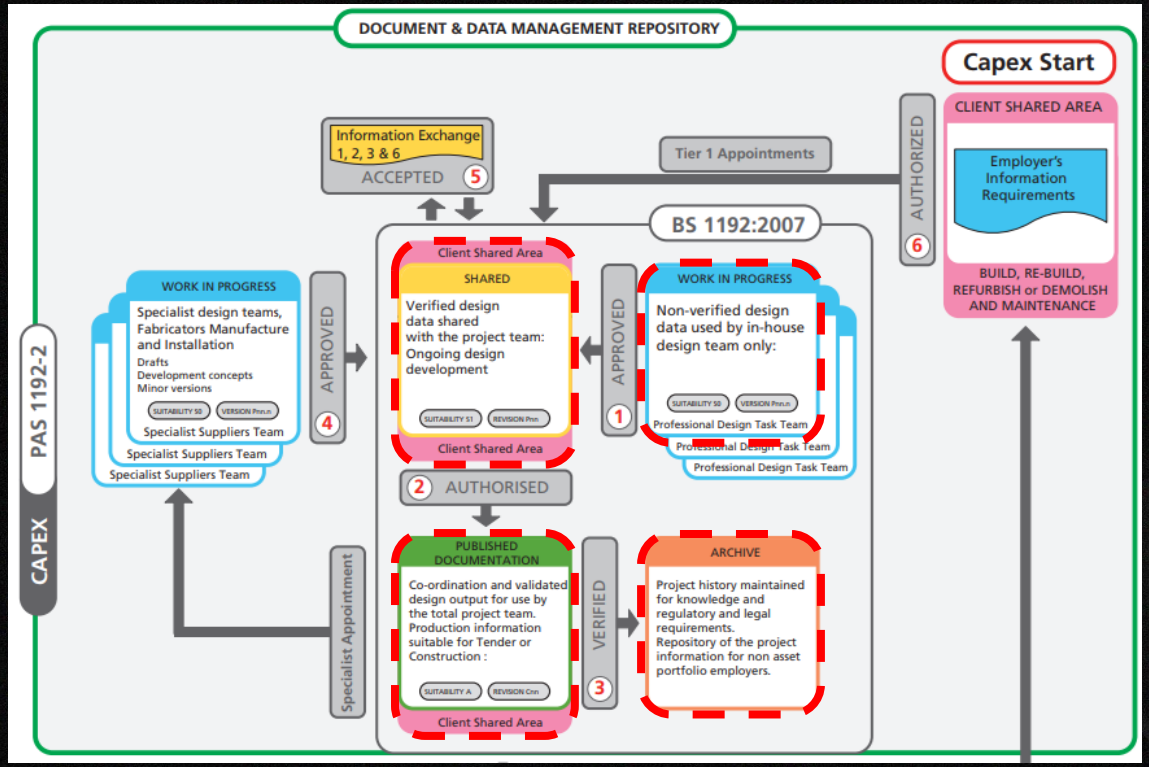
Common Data Environment (CDE)



L2

4.2 Common Data Environment (CDE)

- 4.2.1 Overview of CDE

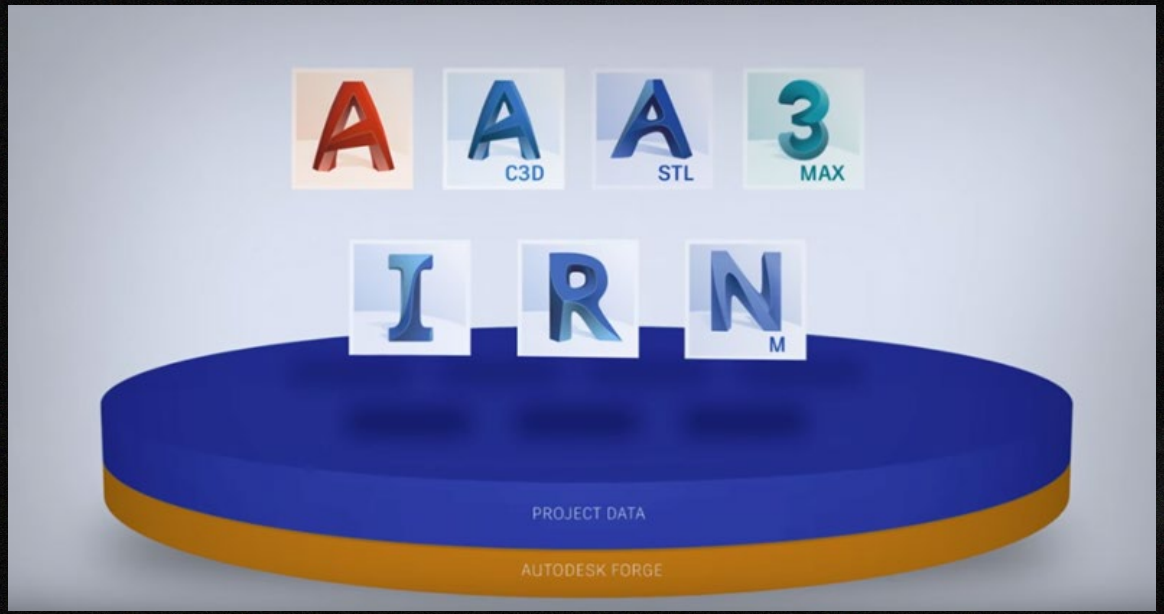


The CDE also served as a shared platform for ongoing design with record.

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Commercial Platform – BIM360



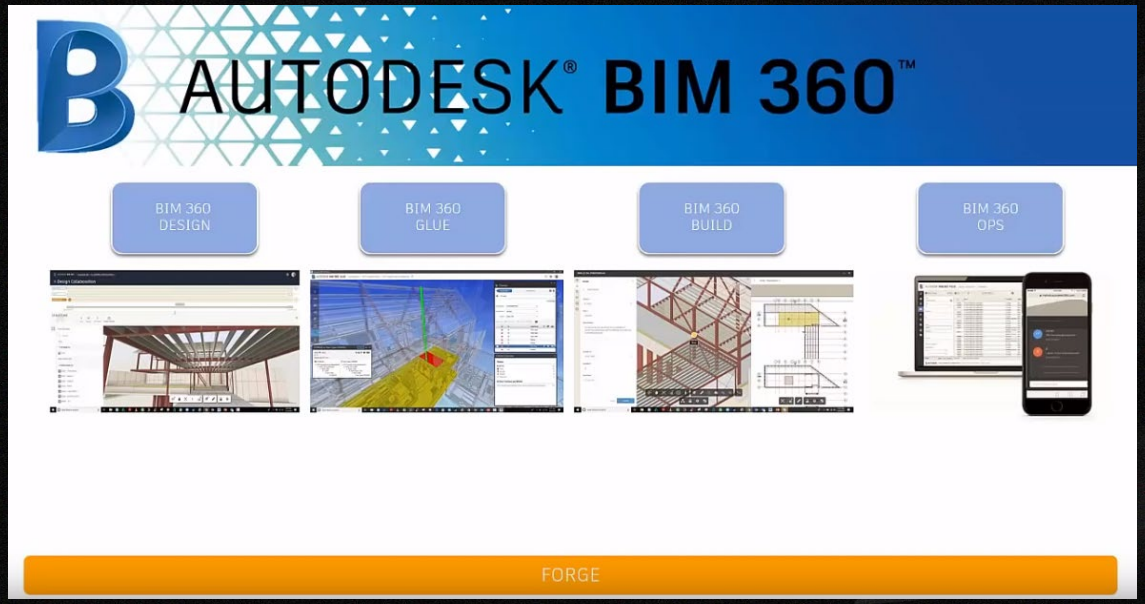
- Common share platform for multi-disciplines to exchange information
- Can access by different devices online

https://www.youtube.com/watch?v=MO9RRELydCQ

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Commercial Platform – BIM360



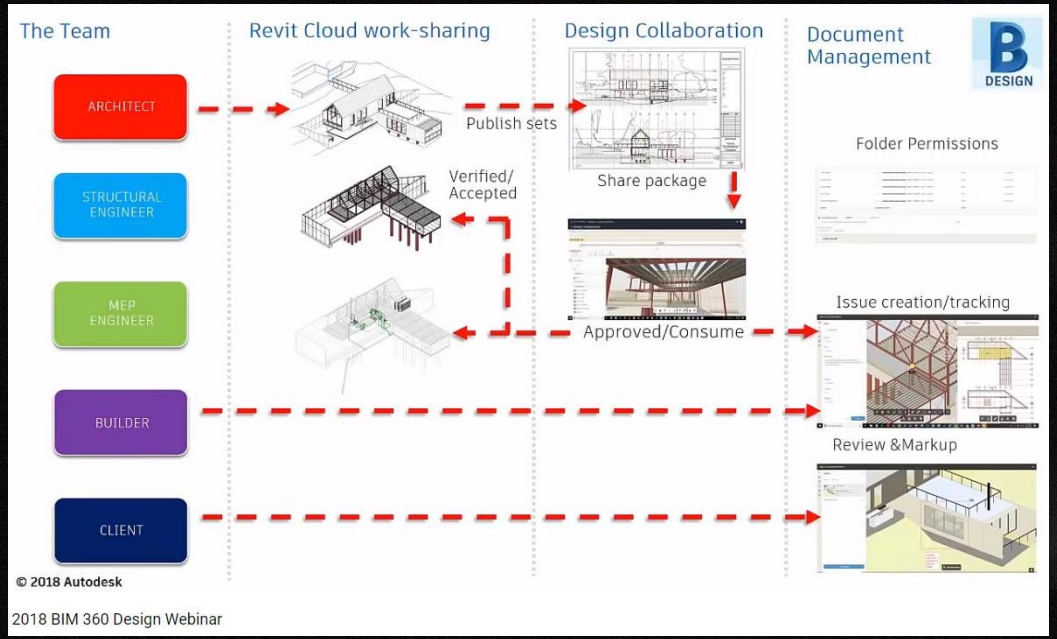
- Data Management
- Maintain SSOT (Single Source of Truth) to ensure information is distributed to each party with the same version
- Review Drawings/ Model base on online platform

https://www.youtube.com/watch?v=MO9RRELydCQ

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Commercial Platform – BIM360



https://www.youtube.com/watch?v=MO9RRELydCQ

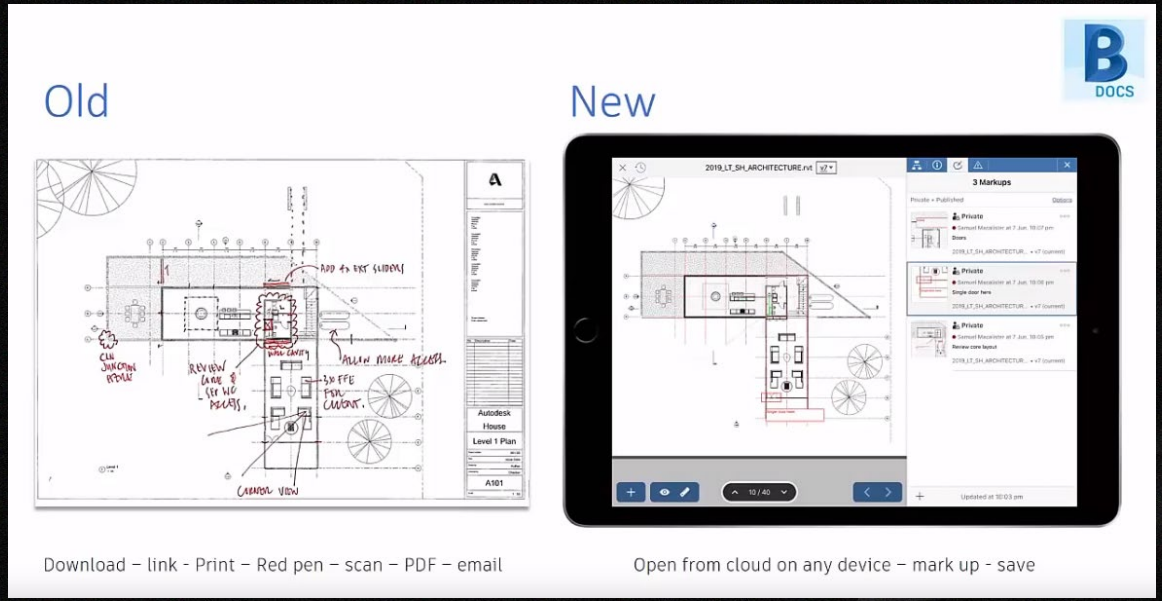
- Data Management
- Maintain SSOT (Single Source of Truth) to ensure information is distributed to each party with the same version
- Review Drawings/ Model base on online platform

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform

Commercial Platform – BIM360



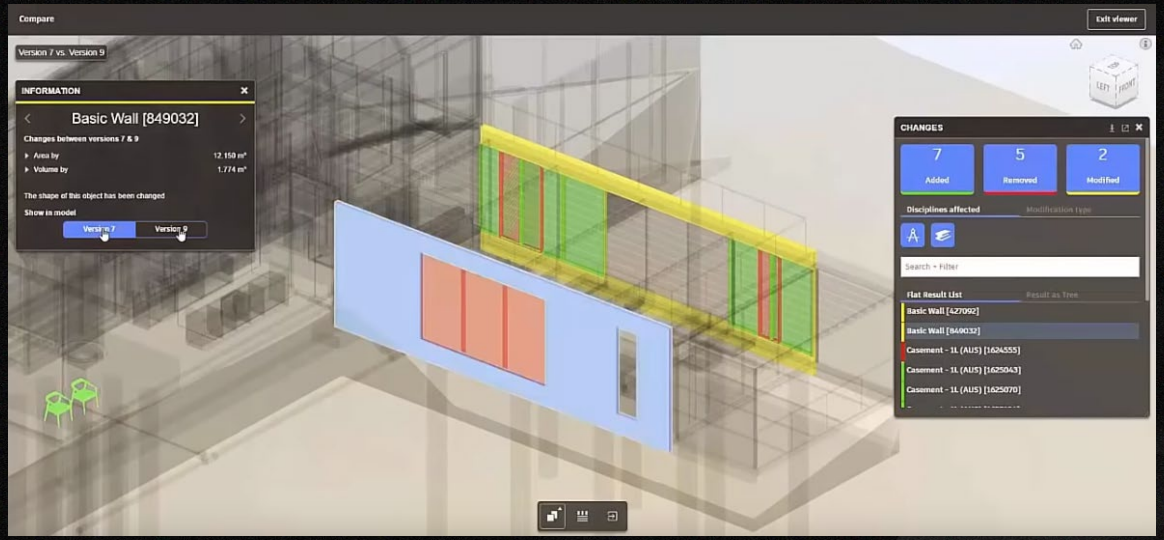
- Markup and comments can be recorded on the platform
- Different devices can access the BIM360 platform to review the project

https://www.youtube.com/watch?v=MO9RRELydCQ

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
  Commercial Platform – BIM360



- Different version of model, sheet and information can be checked on the BIM 360 platform
- Change of design can be reviewed by online platform

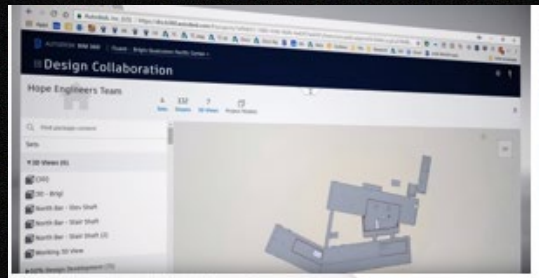
https://www.youtube.com/watch?v=MO9RRELydCQ

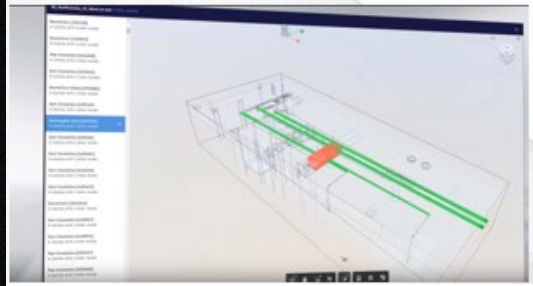
L2

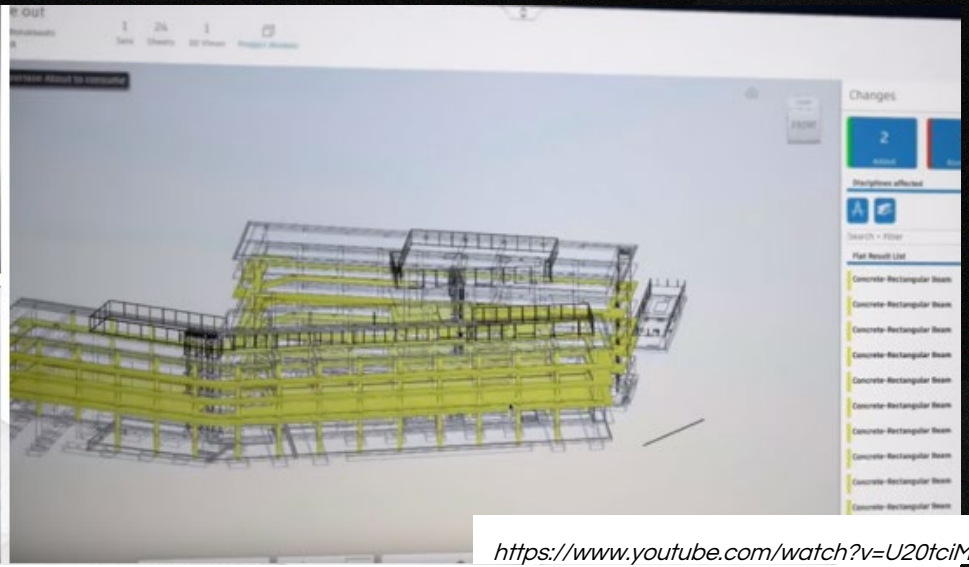
4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform

Commercial Platform – BIM360







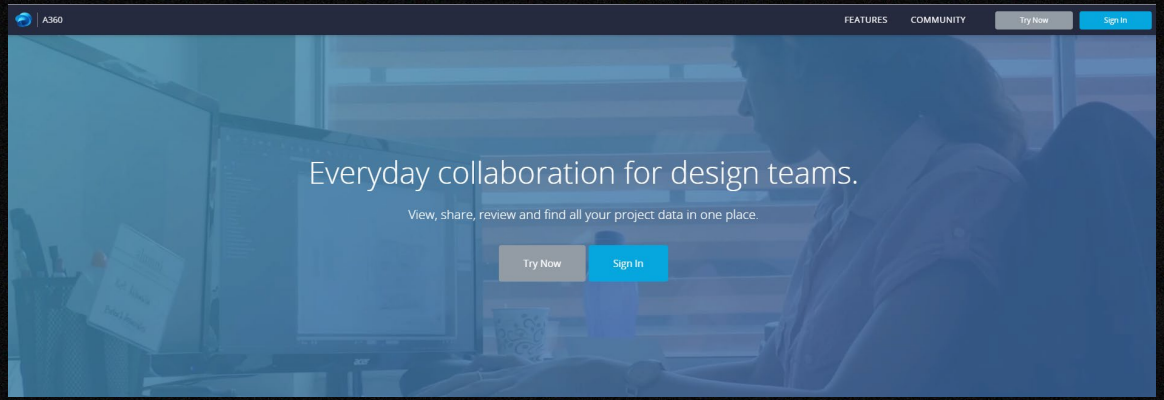
https://www.youtube.com/watch?v=U20tciM4gBk

- Change of Model / Information can be recorded with time and author
- Model / Information can be reviewed directly online
- No limit in time and location

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Free Platform – A360



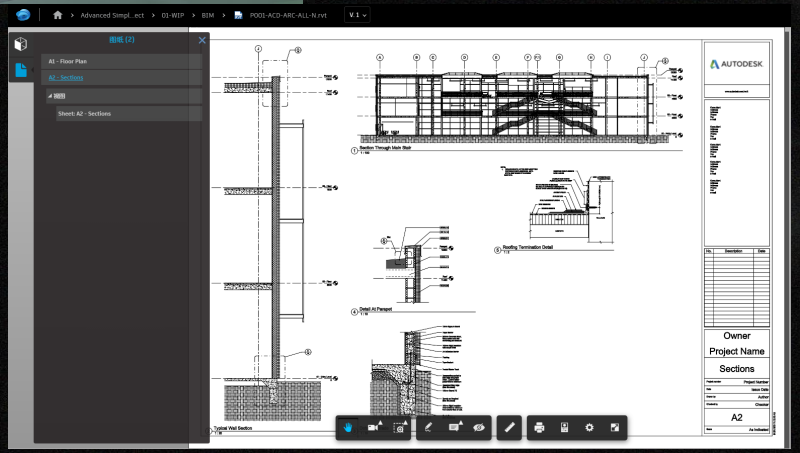
- Maximum up to 5BG storage
- 3D Model and 2D Drawings can be reviewed online

https://a360.autodesk.com/

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Free Platform – A360



- *Maximum up to 5BG storage*
- 3D Model and 2D Drawings can be reviewed online

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Commercial Platform – Projectwise

- Deliverables Management
- Office Integration with PDF review

https://www.bentley.com/en/products/brands/projectwise

https://www.youtube.com/watch?v=TO0IwwzFaT4&list=PLr0VhGCcjH2qDKV-Bgdl5jRYi0bX_7pxl

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Commercial Platform – Projectwise

- Deliverables Management
- Office Integration with PDF review

https://www.bentley.com/en/products/brands/projectwise

https://www.youtube.com/watch?v=TO0IwwzFaT4&list=PLr0VhGCcjH2qDKV-Bgdl5jRYi0bX_7pxl

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Commercial Platform – Projectwise

- Reduce other software cost
- Reduce recovery costs and works

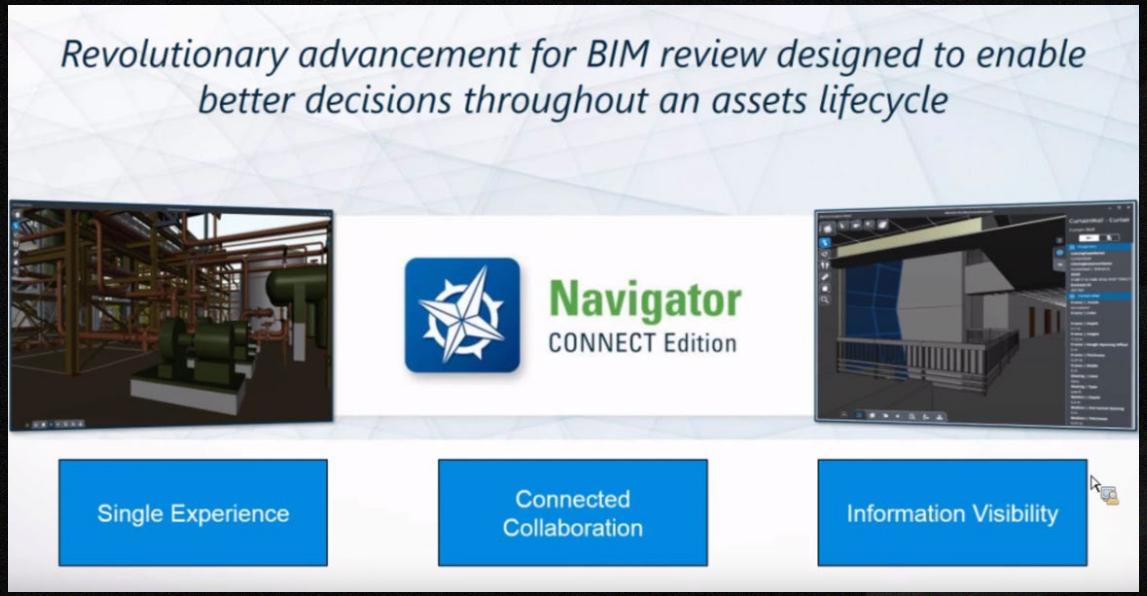
https://www.bentley.com/en/products/brands/projectwise

https://www.youtube.com/watch?v=TO0IwwzFaT4&list=PLr0VhGCcjH2qDKV-Bgdl5jRYi0bX_7pxl

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Commercial Platform – Projectwise



- Online Navigator function
- Control of Information Visibility

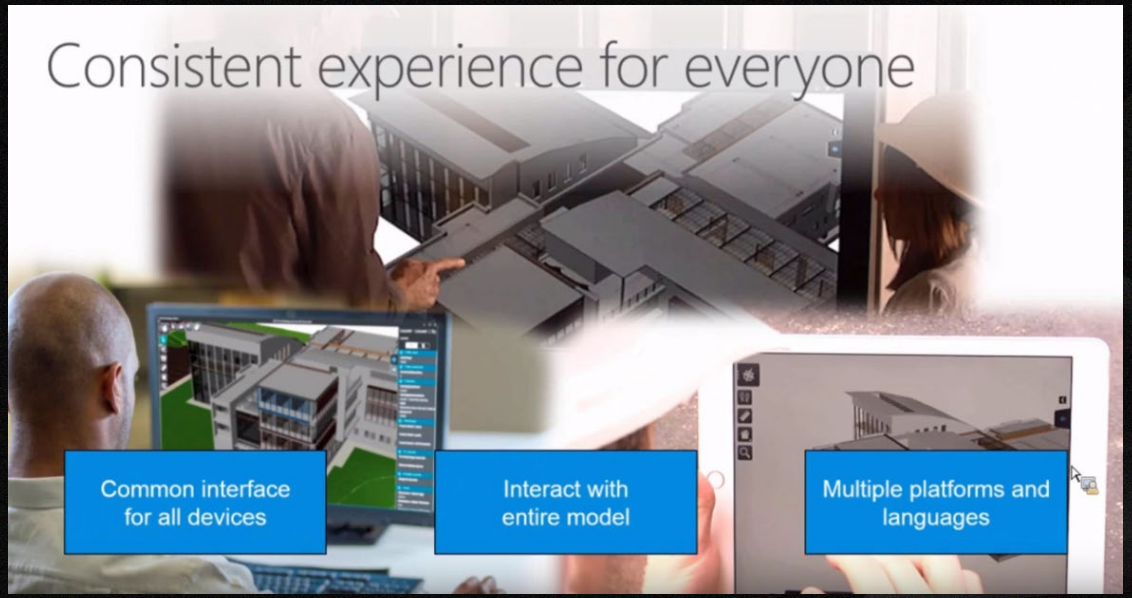
https://www.bentley.com/en/products/brands/projectwise

https://www.youtube.com/watch?v=TO0IwwzFaT4&list=PLr0VhGCcjH2qDKV-Bgdl5jRYi0bX_7pxl

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Commercial Platform – Projectwise



- Online Navigator function
- Control of Information Visibility

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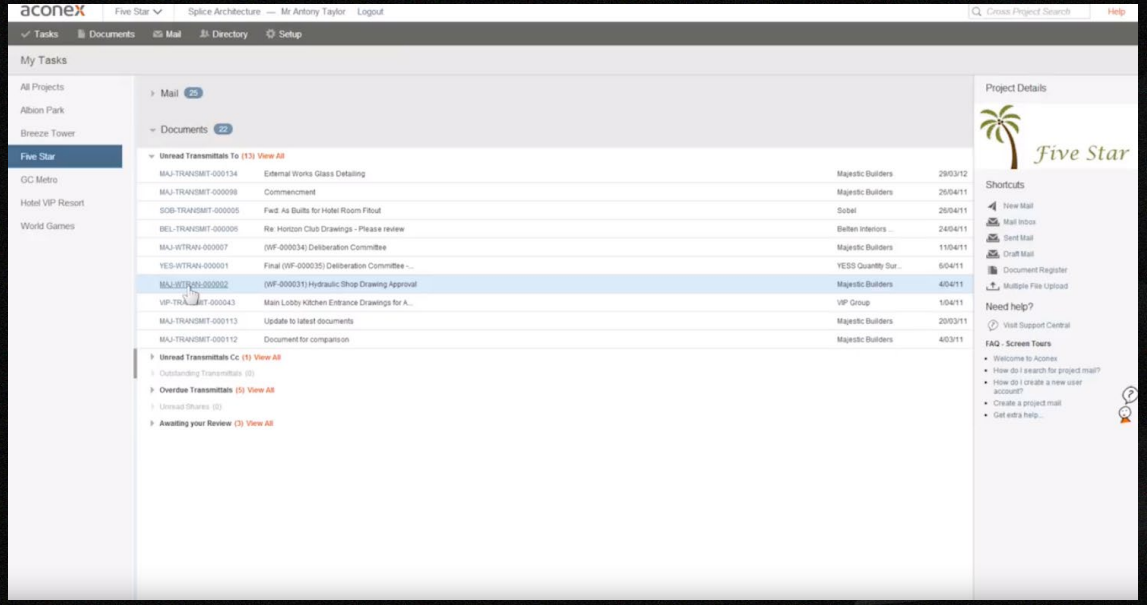
https://www.youtube.com/watch?v=TO0IwwzFaT4&list=PLr0VhGCcjH2qDKV-Bgdl5jRYi0bX_7pxl

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform

Commercial Platform – Projectwise



- Submission Tracking
- Submission/ Model / Information can be reviewed directly online
- No limit in time and location

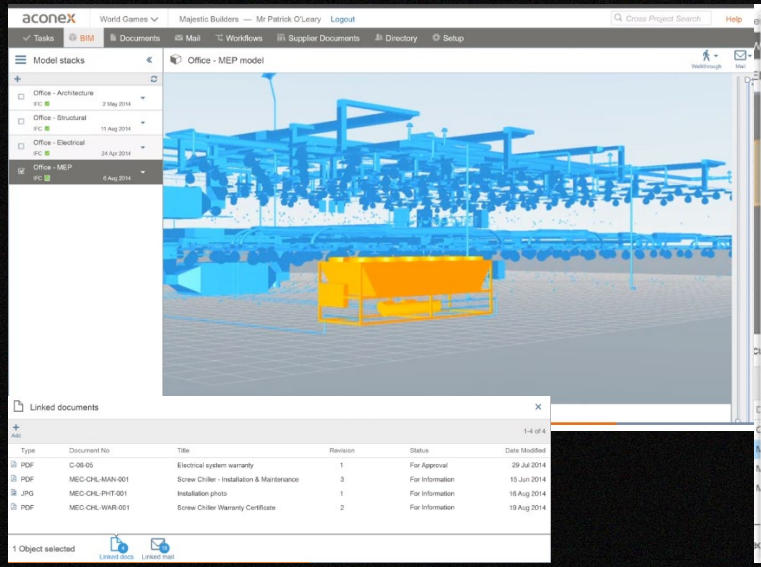
https://www.oracle.com/industries/construction-engineering/aconex-products.html

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform

Commercial Platform – Projectwise



- Change of Model / Information can be recorded with time and author
- Model / Information can be reviewed directly online
- No limit in time and location

https://www.oracle.com/industries/construction-engineering/aconex-products.html

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
  Commercial Platform – BIMCollab

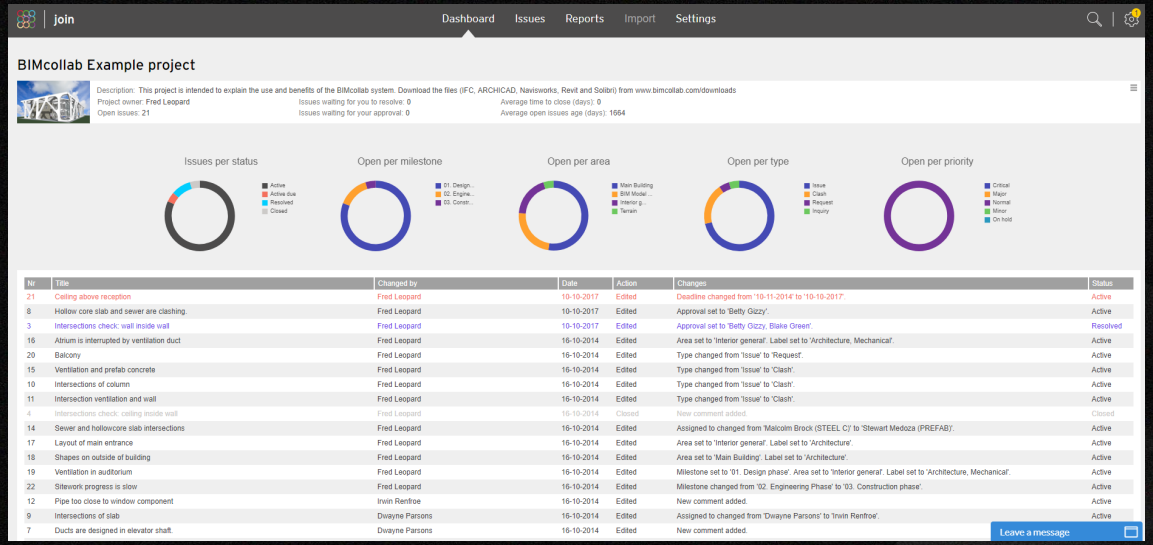
https://www.bimcollab.com/en/default

- Free for 10 person as a trial platform
- Model / Information can be reviewed directly online
- Different format in BIM model can be reviewed online: IFC & ArchiCAD

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
  Commercial Platform – BIMCollab



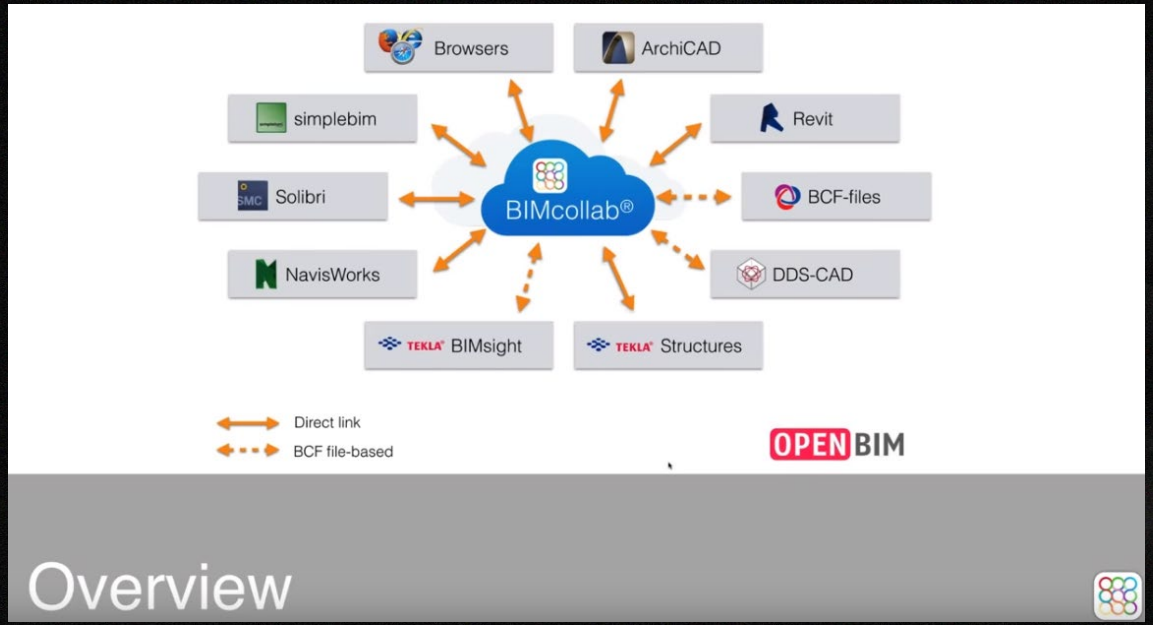
- Issues tracking with record
- Instruction and markup online
- With Data Analysis for review

https://www.bimcollab.com/en/default

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform
- Commercial Platform – BIMCollab



- Issues tracking with record
- Instruction and markup online
- With Data Analysis for review

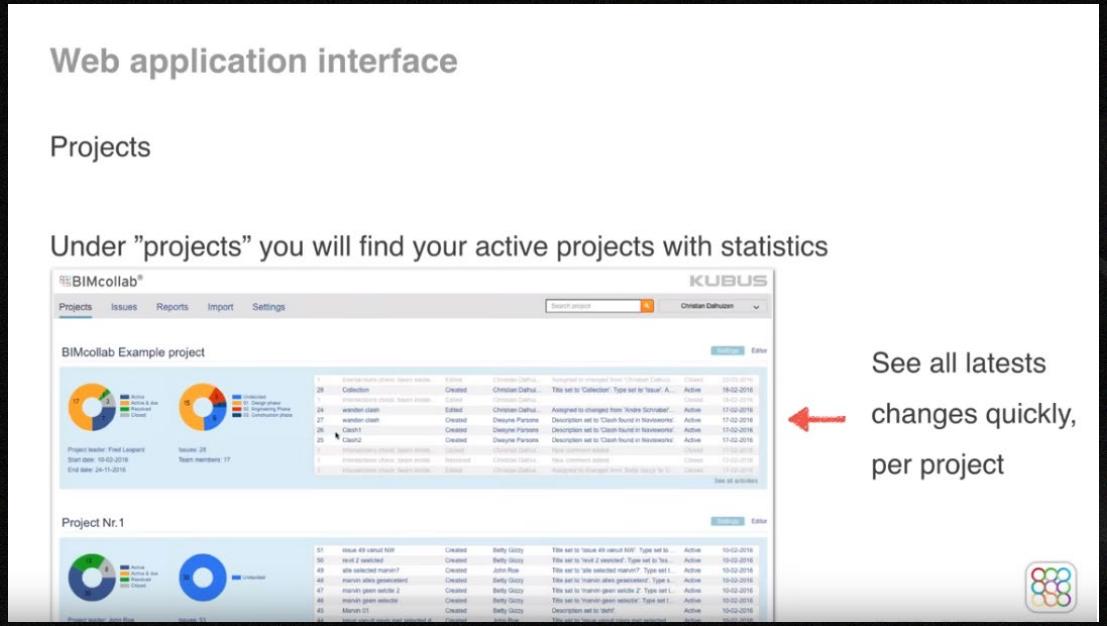
https://www.bimcollab.com/en/default

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform

Commercial Platform – BIMCollab



- Issues tracking with record
- Instruction and markup online
- With Data Analysis for review

https://www.bimcollab.com/en/default

L2

4.2 Common Data Environment (CDE)

- 4.2.2 Overview of various CDE platform

Online Multi Discipline Platform – Fuzor

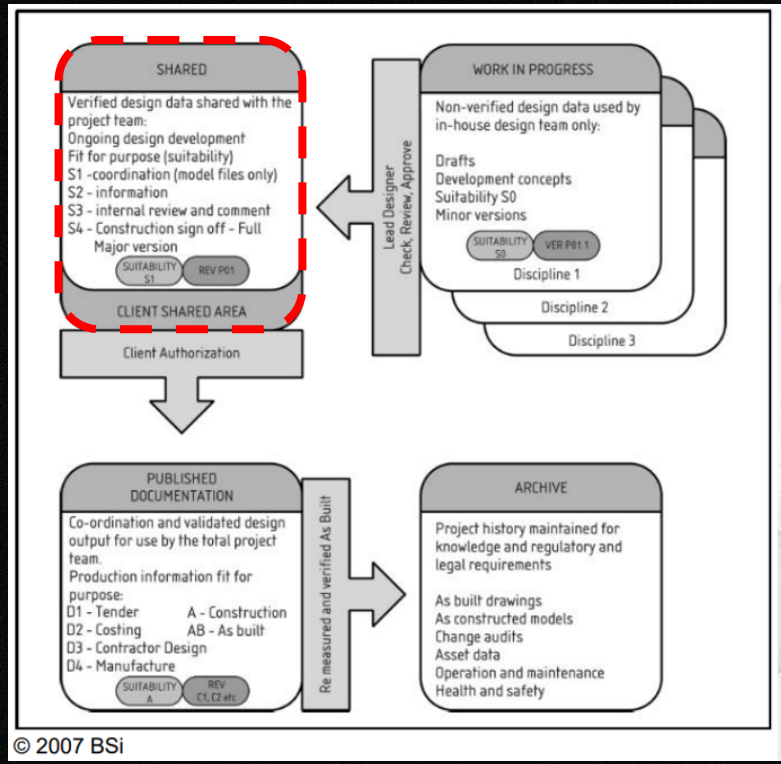
- Plugin software to simulate the virtual environment
- Different discipline can involve and revise the design at the same time

https://www.youtube.com/watch?v=DUwBQjjeVsQ

L2

4.2 Common Data Environment (CDE)

- 4.2.3 Setup of CDE



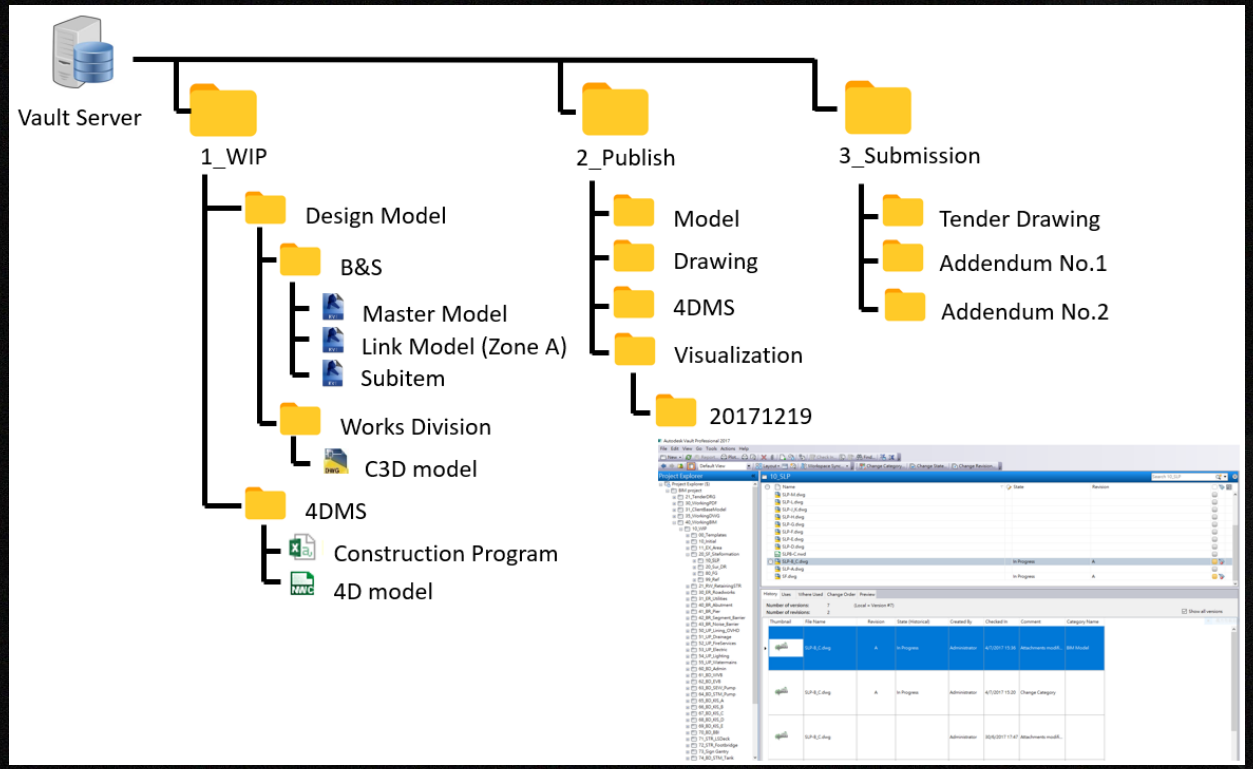
- ***[Project Folder]***
  - BIM — [BIM data repository]
    - **01-WIP** — **[WIP data repository]**
      - CAD — [CAD files (incl. 'Modified')]
      - BIM — [Design models (incl. 'Modified')]
      - SheetFiles — [Sheet/dwg files]
      - Export — [Export data e.g. IFC or images]
      - Families — [Components created during this project]
      - WIP_TSA — [WIP Temporary Shared Area (TSA)]
    - **02-Shared** — **[Verified Shared data]**
      - CAD — [CAD data/output files]
      - BIM — [Design models]
      - CoordModels — [Compilation models]
    - **03-Published** — ***[Published Data]***
      - + YYYYMMDD-Description — [Sample submission folder]
      - + YYYYMMDD-Description — [Sample submission folder]
    - **04-Archived** — **[Archived Data repository]**
      - + YYMMDD-Description — [Archive folder]
      - + YYMMDD-Description — [Archive folder]
    - **05-Incoming** — **[Incoming Data repository]**
      - Source — [Data originator]
        - + YYYYMMDD-Description — [Incoming folder]
      - + Source — [Data originator]
    - **06-Resource** — **[Project BIM Resources Library]**
      - + Titleblocks — [Drawing borders/titleblocks]
      - + Logos — [Project logos]
      - + Standards — [Project standards]

No spaces are to be used in the folder naming as this can potentially interfere with certain file management tools and collaboration across the internet.

L3

4.2 Common Data Environment (CDE)

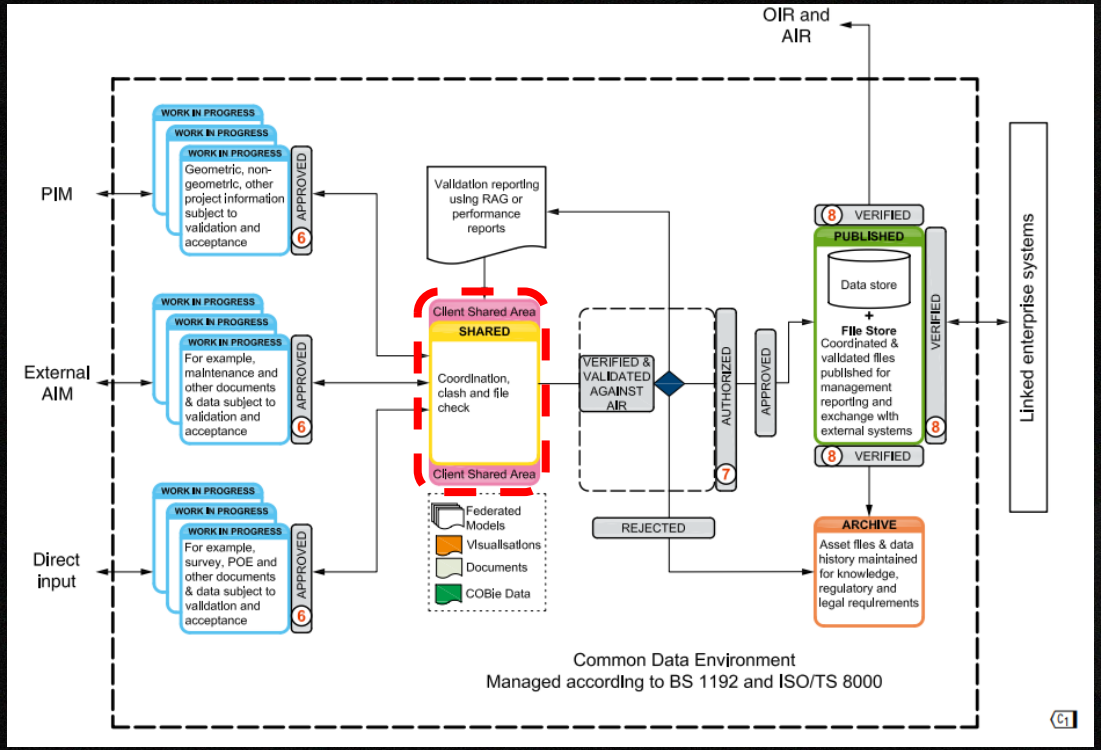
- 4.2.3 Setup of CDE



L3

4.2 Common Data Environment (CDE)

- 4.2.3 Setup of CDE



BIM, Asset Information Model & Geographic Information System (Refer to PAS 1192:3)

L3

4.2 Common Data Environment (CDE)

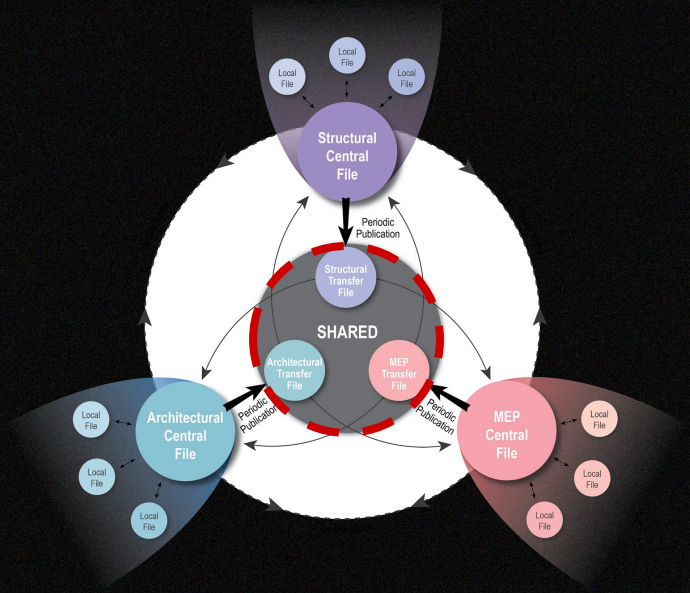
4.2.4 Assessment of CDE

- **Ability to access and edit a model's information within the CDE**
- Dashboarding
- Data Security
- End of the contract data extraction
- **Federated (Data & files merged from different sources)**
- Field use & mobile devices
- File synchronisation to work offline and sync back
- Flexibility & Automation
- History of transactions/audit trail
- Impact of use on users
- Integration potential
- Mobility
- Performance
- **Price**
- Query Engine
- **Reporting**
- Robustness
- **Simplicity**
- **Status, progress of information deliverables**
- **Storage**
- Transparency
- User experience (UX)
- User Interface (UI)
- **Workflows** …

L3

4.2 Common Data Environment (CDE)

- 4.2.4 Assessment of CDE



The CDE shall be terminated in the earlier development in the PXP.
The extent of CDE might be held by the Employer or Consultant with accessibility by all parties.

Coordination Group Meetings is included as Appendix E.

Does Asite facilitate BIM collaboration?

4.1.2 Common Data Environment (CDE)

Information in the form of documents, drawings, models and RFIs are to be uploaded / logged via a CDE / Asite (see Section 5). This process will ensure consistent and accessible information is provided to the project team and also accountability can be determined.

An exploration of the use of electronic markups to ensure better communication and tracking of required changes to the design will be carried out and adopted using the DWFx file format as well as PDF. The Asite CDE should be used to exchange these files and to request due by dates.

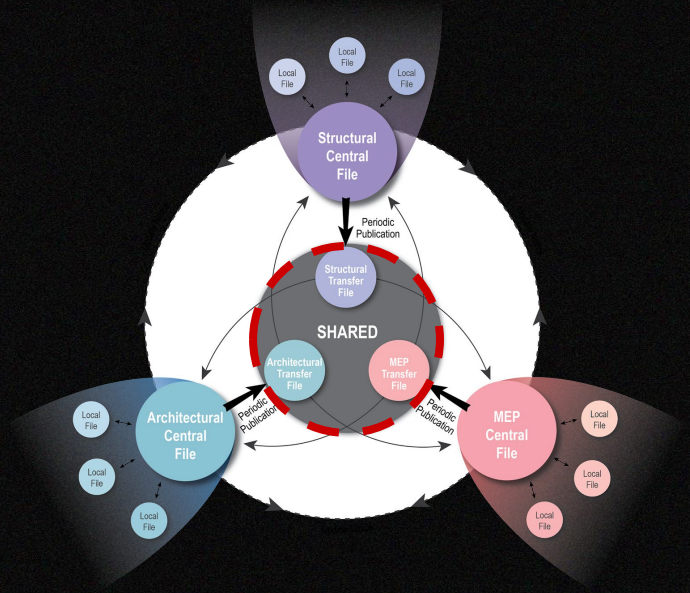
Lines of communication will be defined following production of the project quality plan. However, it is hoped that the BIM coordination team will show best practice leadership by utilising the Asite electronic mail system wherever possible to record general communications and requests / supply of information. An Asite BIM distribution group will be established and the Asite workflows will be explored for possible use in BIM activities.

Format and Share Data shall be confirmed in PXP.

L3

4.2 Common Data Environment (CDE)

- 4.2.4 Assessment of CDE



The CDE shall be terminated in the earlier development in the PXP.
The extent of CDE might be held by the Employer or Consultant with accessibility by all parties.

4.2.11 Data Exchange Protocols

As the regular exchange of BIM data is an essential part of a successful BIM project, the project data exchange protocol will be developed to include:

- Method of data exchange (CDE)
- Use of Work in Progress (WIP) data
- Agreed format of exchanged model data
- Model naming convention
- Distribution protocols and users lists (see Asite Project Protocols PIMS)
- User privileges for CDE / Asite folder structure (see Asite Project Protocols PIMS)
- Stakeholders responsible for information upload

The following table documents proposed information exchanges and file transfers that will / may occur on the project. A schedule showing frequency of distribution will be developed by the BIM manager in consultation with the project team.

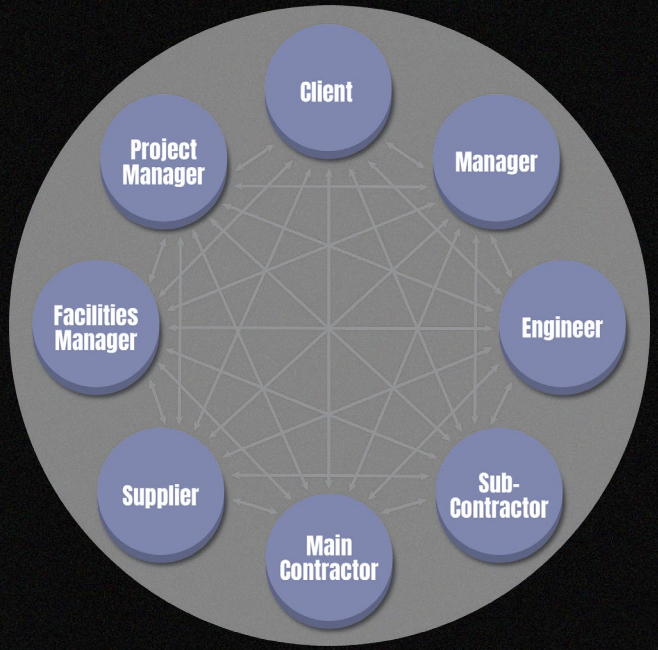
BIM Use	User	Model Software	Native File Type	Exchange File Type
Design Authoring	ARC/ STR/ CIV/ BSE/ FAC	Revit	.rvt	.ifc/.rvt
Spatial Planning	ARC	Revit	.rvt	.xls/.ifc

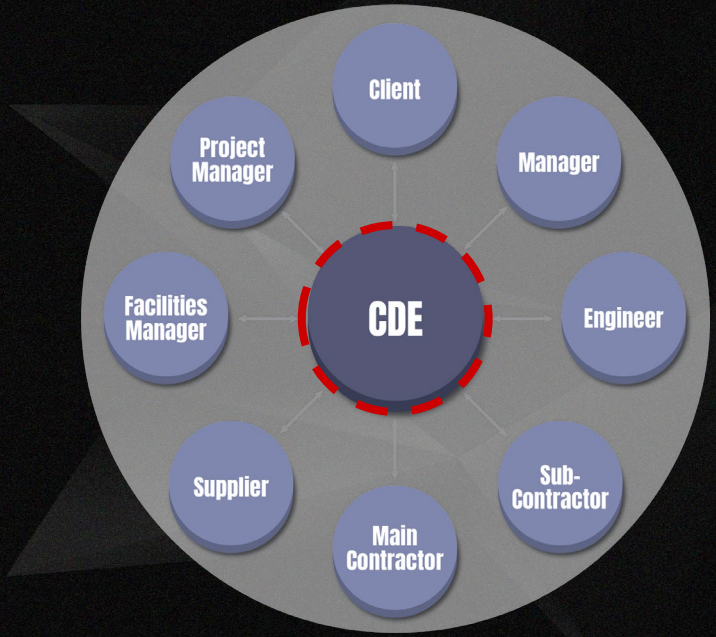
1. CDE method of data exchange
2. Naming convention
3. Right to access CDE
4. Format of file in CDE

L3

4.2 Common Data Environment (CDE)

- 4.2.5 Management of CDE
  - Common place for all stakeholders to access



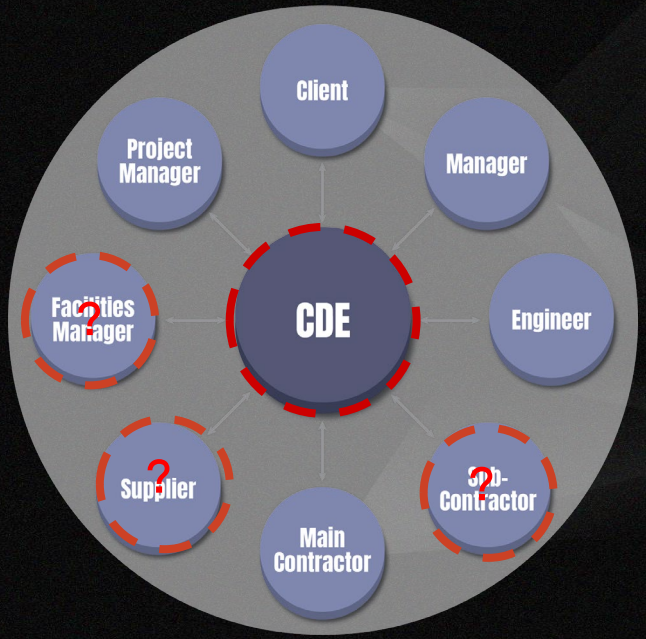


L4

4.2 Common Data Environment (CDE)

4.2.5 Management of CDE

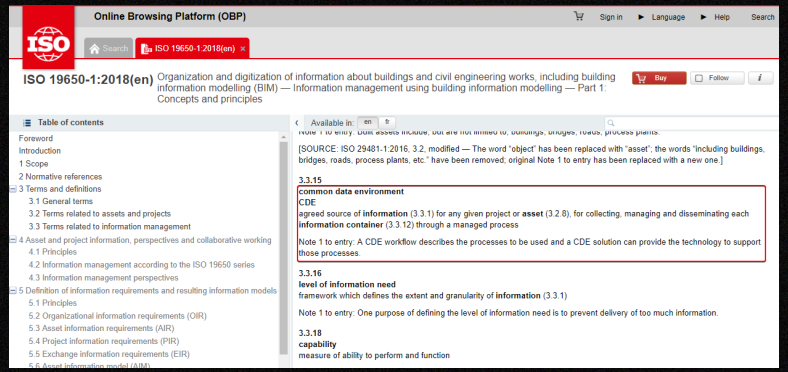
- Need collaborative effort
- Agreement of all parties to use the same system

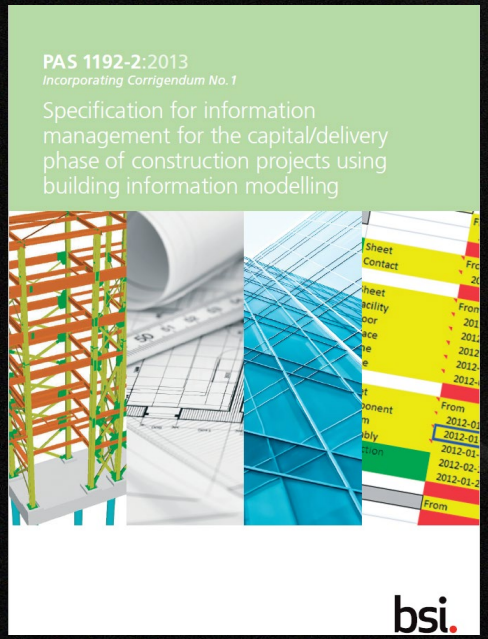


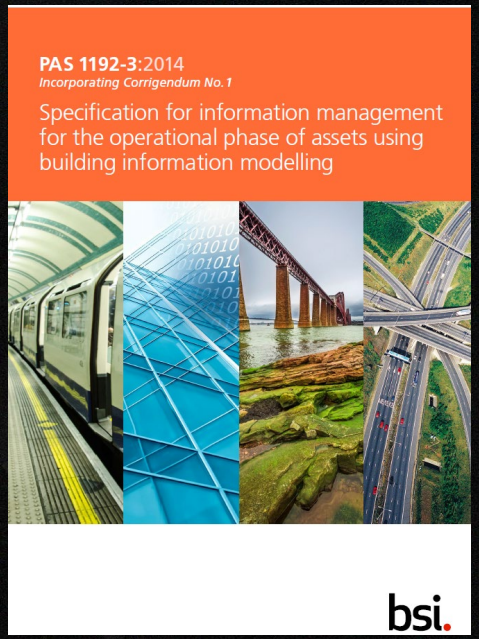
L4

4.2 Common Data Environment (CDE)

- 4.2.5 Management of CDE
  - Standard/ Protocol







L4

4.2 Common Data Environment (CDE)

4.2.6 Limitation of CDE

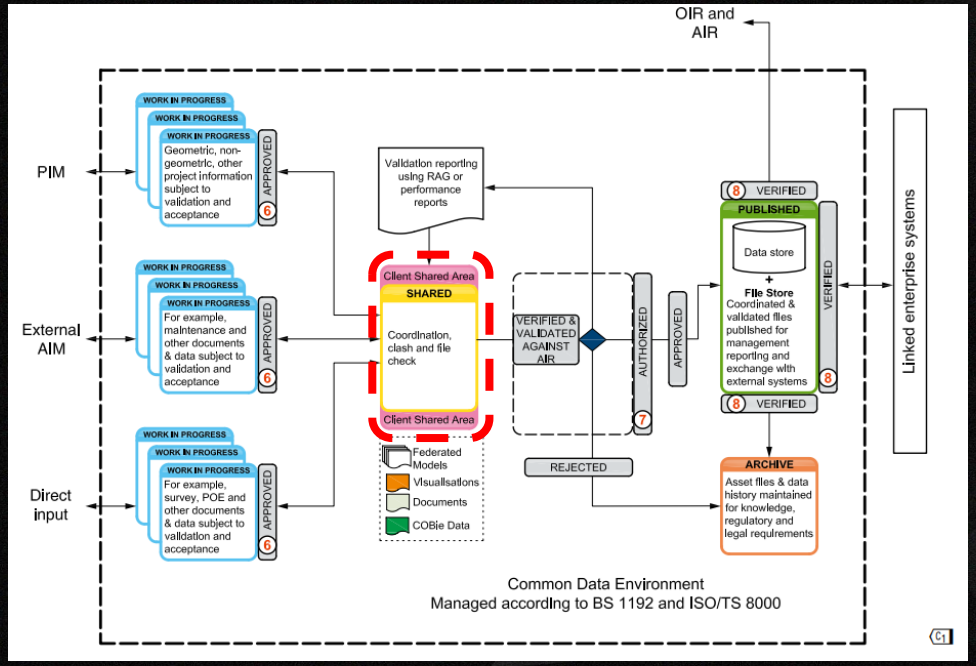
- Cloud Based CDE (Data security issue - Government projects)
- Accessibility to CDE (File Size, Internet speed, on-site conditions factors etc)
- Cost (Licence/ head/ year)

- **Change in CULTURE (From paper based to digital based & workflow etc.)**

L2

4.2 Common Data Environment (CDE)

- 4.2.6 Limitation of CDE



Accessibility to CDE and hardware support to be confirmed by PXP

L2

BIM, Asset Information Model & Geographic Information System
(Refer to PAS 1192:3)

4.3 Data Quality Control & Assurance across various stages

- 4.3.1 System checking
- Software Version
  - BIM Model Software (e.g. Revit, ArchiCAD, Microstation)
  - Federation BIM Model (e.g. Navisworks, Solibri)
  - 4D Simulation (Fuzor VDC, Navisworks)
  - Clash Report
  - Collaboration Platform and CDE (e.g. BIM 360, Revit Server, BIM Cloud, etc.)
  - CQMS system used in construction stage

BIM File(s) or File(s) generated from BIM	Discipline (if applicable)	Software	Version	File Format
BIM Model	All	Autodesk Revit (or equivalent)	2018 or latest version	/ Native file: .rvt Template file: .rte
	Civil	Autodesk AutoCAD Civil 3D (or equivalent)	2018 or latest version	Native file: .dwg Template file: .dwt
				/ Native file: .dgn Template file: .dgn Template library: .itl
Federated BIM model to review clash	All	Autodesk Navisworks	2018 or latest version	Native file: .nwc, .nwf, .nwd, .dwfx
		/ Fuzor		/ Native file: .che
4D Simulation Report	All	Fuzor VDC (or equivalent)	2018 or latest version	Native file: .nwc, .nwf, .nwd Programme scheduling file: .mpp, [or other format] Video: H.264 [or other format]
				/ Native file: .imodel, .dgn, .i.dgn Programme scheduling file: .xml (*from Primavera and MS Project*), .xlsx
Clash reports	All	Microsoft Word		Native file: .docx Output file: .pdf
Collaboration Platform	All	BIM 360 Docs with C4R (or equivalent)	Online	dwfx, nwc, nwd

L4

4.3 Data Quality Control & Assurance across various stages

- 4.3.1 System checking
- Hardware Requirement
  - Desktop Workstation
  - Mobile Workstation
  - Tablet for site stuff running CQMS system
  - 360 Camera with video capability with head-mount
  - Revit Server

Item	Hardware
1	The minimum hardware for BIM Workstation requirements for creating BIM models, families and assemblies: • One Intel Xeon E5-1650 processor 3.2GHz or equivalent performance • Microsoft® Windows 10 Pro 64-bit • 64GB RAM • 1TB free disk space • Nvidia Geforce GTX 1070 or above • Internal SATA DVD Writer • Integrated 10/100/1000 Ethernet Build-in Security Chip Trust Platform Module (TPM) • At least two USB 2.0 ports • At least eight USB 3.0 ports • Internet connection for communication with project team • Two-button mouse with scroll wheel • Microsoft® Internet Edge latest version Dual 27 inches 1980 x 1024 Monitors for each station
2	The minimum hardware for BIM Mobile Workstation requirements for creating BIM models, families and assemblies: • Intel Xeon E3-1535M v6 processor (Quad Cores 3.1GHz) or equivalent performance • At least 32GB SDRAM • One 500GB 2.5-inch SATA internal hard disk drive (HDD) • One 256GB internal SSD • NVIDIA Geforce GTX 1060 or above • One external DVD RW drive • Intel Dual-Band wireless-AC 8260 WiFi + BT 4.1 wireless driver • Integrated 10/100/1000 Ethernet • Build-in Security Chip Trust Platform Module (TPM) • At least two USB 2.0/3.0 ports
3	The minimum hardware for Mobile Tablet Devices: Minimum 9" mobile tablet device with minimum 4 GB Ram, 128 GB Storage, Camera, SIM card slot, Wifi, Bluetooth.

4	360 Camera Battery Capacity can support over 60 mins continuous video shooting, SD Card Support as external storage Bluetooth BLE4.0 support, Photo Spec: Standard 360 photos, timed 360 photos, resolution 20 megapixel or above Video Spec: Standard 360 video, time-lapse mode, bullet time, 360 live-streaming preferred, resolution 4K. With Wearable Head Strap Mount
5	• Revit Server: • Up to two Intel® Xeon® processors E5-2600 v3 series with up to 18 cores each / up to 45MB per processor – Up to 1.5 TB with SK Hynix 64 GB TruDDR4 Memory LRDIMMs; System supports RDIMM/LRDIMM – Up to 24 fronts and 2 rears 2.5-inch HDDs/SSDs; or up to 12 3.5-inch and 2 rear 3.5-inch HDDs + 2 rear 2.5-inch HDDs/SSDs; or up to 8 3.5-inch HDDs and 2 rear 3.5-inch or 2.5-inch HDDs/SSDs (model dependent) – 12 Gbps dedicated slot for the first RAID; support for up to four RAID adapters – Up to 1/2 redundant 550 W AC, 750 W AC, 900 W AC, 1500 W AC, 900 W DC 80 PLUS® Platinum, or 750 W AC 80 PLUS Titanium – Power supplies, fan modules, and HDDs/SSDs – 4 x 1 GbE (std) and 1 x IMM; optional 10/40 GbE ML2 or PCIe adapter; Trusted Platform Module built-in – 1 – 8 PCIe 3.0 slots (supports up to 2 x 300 W GPUs and up to 1 x ML2) and 1 dedicated RAID slot – Up to 3 front (1 x USB 3.0, 2 x USB 2.0) and 4 back (2 x USB 3.0, 2 x USB 2.0) and 1 internal (USB 3.0) for hypervisor/1 front and 1 back – Up to 100 TB storage space – 80 PLUS® Platinum, 80 PLUS Titanium; ENERGY STAR compliance (model dependent) – IMM2.1; one IMM dedicated port and one shared; optional remote presence; Predictive Failure Analysis; LEDs; optional next-gen light path diagnostics panel • Microsoft Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware vSphere (Optional USB Key or SD Media Adapter)
6.	Revit Server Accelerator

L4

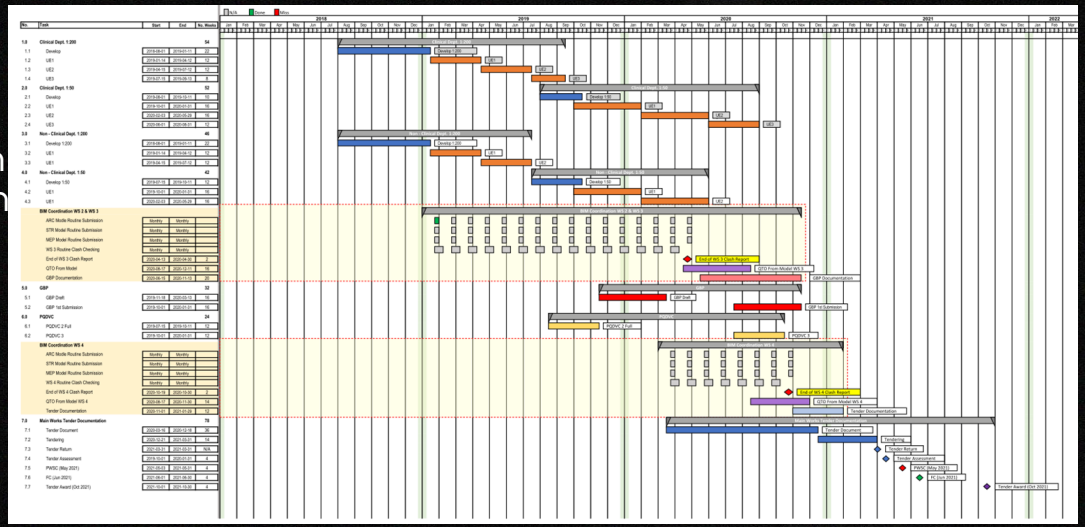
4.3 Data Quality Control & Assurance across various stages

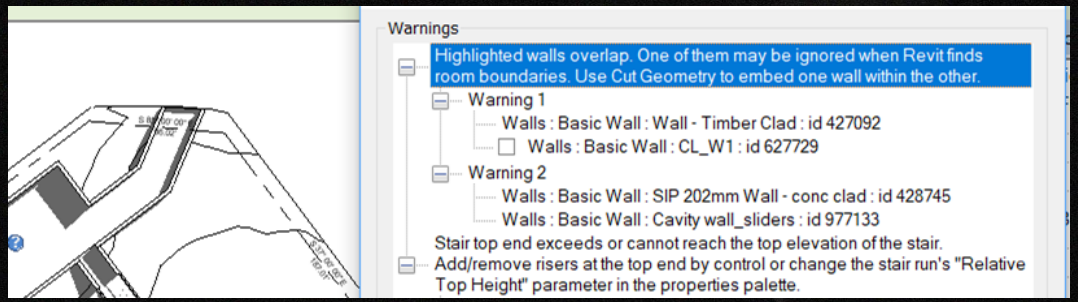
- 4.3.2 Model audit

BIM Auditor's responsibility to administer, lead and manage the BIM process as per the BIM Execution Plan and ensure BIM deliverable are met on time, on target.

General Model Status

- Project Summary
- Discipline Progress Summary
- Model Authors Comments
- Software version and plugins used
- Current model size (e.g. for Revit model file size < 400Mb,)
- To review BIM programme system warings





L4

4.3 Data Quality Control & Assurance across various stages

- 4.3.2 Model audit
- File Naming standard
  - File Naming
  - Building Components Naming
  - Sheet and View Naming

A file naming convention similar to the existing Works Departments CAD standard convention may be adopted. The file names may be of the form "AGENT-PROJECT-ZONE-ID-STATUS".

Definition	Code Format	Details
AGENT	3 alphanumeric	the list of agent responsible codes can be downloaded from the Development Bureau web site at www.devb-wb.gov.hk/cswp
PROJECT	1 to 8 alphanumeric	User definable project reference coding.
ZONE	3 alphanumeric	Required if project is subdivided by zones or levels
ID	2 alphabetic	Indicates the discipline. For list of ID's refer to table below.
STATUS	1 alphabetic	A = as-built E = existing, to remain M = maintenance or record N = New work R = Remove T = Temporary Work W = All Work

Example = CIC-BIMS2014-POD-AR-W

Format

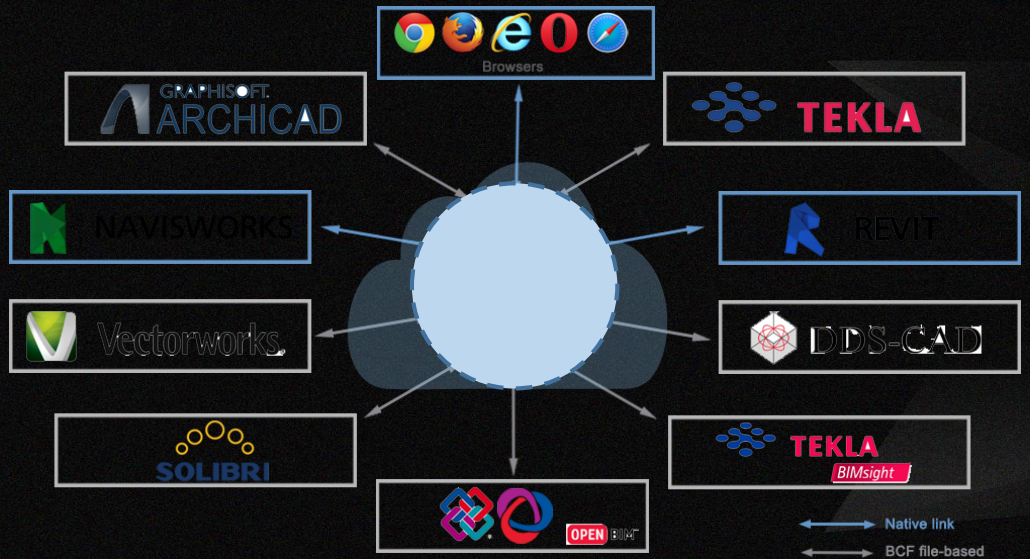
<Functional Type> - <Sub-type> - <Originator> - <Descriptor 1> - <Descriptor 2>

Family Name	DOR – SGL – AEC – Wood – w_Louver .rfa	Descriptions
Functional Type*	**DOR** – SGL – AEC – Wood – w_Louver .rfa	A Door, DOR is the short form of the functional type **"door"**
Sub-Type*	DOR – **SGL** – AEC – Wood – w_Louver .rfa	A Single Door, SGL is the short form of the sub-type **"single"**
Originator	DOR – SGL – **AEC** – Wood – w_Louver .rfa	AEC is the short form of the default **Architecture -Engineering -Construction Industry**. It can be replaced by the name of the creator in short form of three characters. (e.g. MTR, CLP, HKU)
Descriptor 1	DOR – SGL – AEC – **Wood** – w_Louver .rfa	A door is made of **Wood**. An optional descriptive text.
Descriptor 2	DOR – SGL – AEC – Wood – **w_Louver** .rfa	A door is built **with Louver** This text further describes the Family
File Extension	DOR – SGL – AEC – Wood – w_Louver **.rfa**	**R**evit **F**amily File Extension

L4

4.3 Data Quality Control & Assurance across various stages

- 4.3.3 Model checking
- Visual check and Audit
  to ensure there are no unintended model components and the design intent has been followed



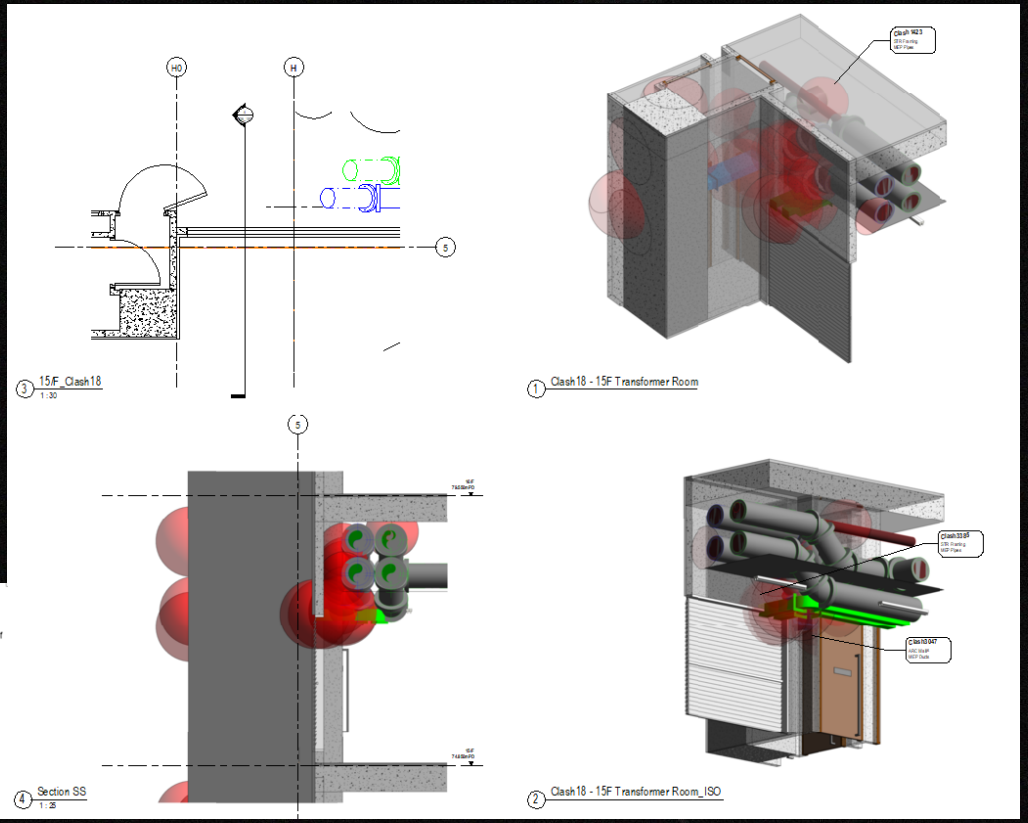
- Different format of BIM file may be used
- PXP shall agreed which software / platform of BIM will be implied
- BIM Manger shall check the input from consultants time to time
- Drawings on sheet to report shall be produced

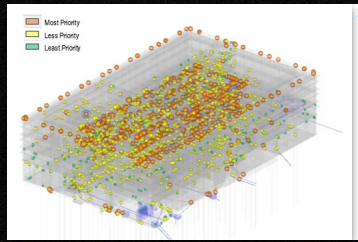
OPEN BIM™

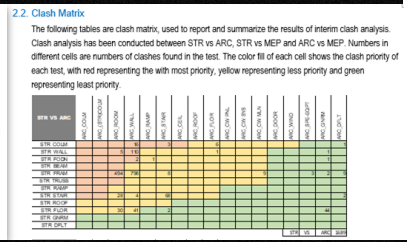
L4

4.3 Data Quality Control & Assurance across various stages

- 4.3.3 Model checking & Audit
- Interference Check and Clash Detection
  Detect problems in the model where two building components are clashing including soft and hard.
  - Single Discipline Clash check
  - Multi-Discipline Clash check
  - Clash Analysis
  - Clash Prioritization
  - Regular Clash Report
  - Clash issues tracking
  - Drawings to report Collaboration







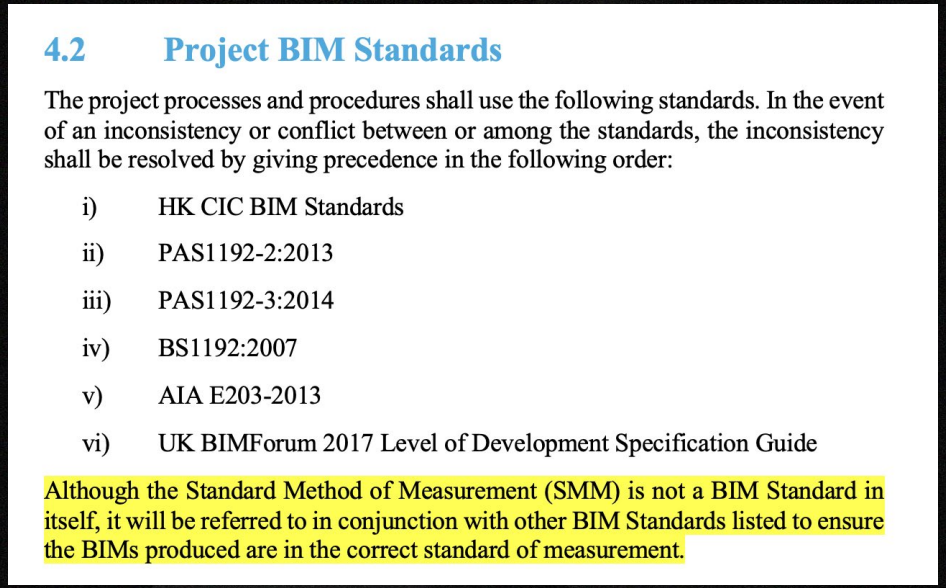
L4

4.3 Data Quality Control & Assurance across various stages

- 4.3.3 Model checking & Audit
- Standard Check

Ensure that the project BIM standards have been followed (e.g. fonts, dimensions, line styles, levels, file and object naming, classification, room numbering.Standards are to be included in aspects to be addressed include:

- Modelling methodology
- File and document naming convention
- Room and space planning
- LOD
- Data classification system
- Submission file formats



4.2 Project BIM Standards

The project processes and procedures shall use the following standards. In the event of an inconsistency or conflict between or among the standards, the inconsistency shall be resolved by giving precedence in the following order:

i) HK CIC BIM Standards

ii) PAS1192-2:2013

iii) PAS1192-3:2014

iv) BS1192:2007

v) AIA E203-2013

vi) UK BIMForum 2017 Level of Development Specification Guide

Although the Standard Method of Measurement (SMM) is not a BIM Standard in itself, it will be referred to in conjunction with other BIM Standards listed to ensure the BIMs produced are in the correct standard of measurement.

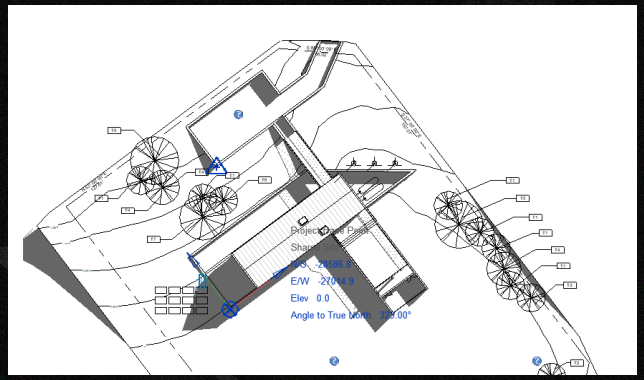
L4

4.3 Data Quality Control & Assurance across various stages

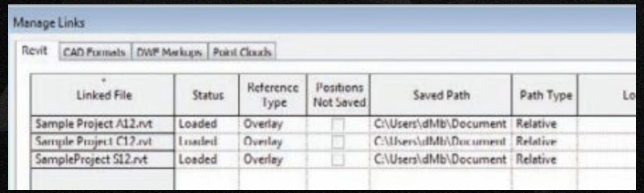
- 4.3.3 Model checking & Audit
- Model Data Check

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.

- 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



L4

4.3 Data Quality Control & Assurance across various stages

- 4.3.4 Audit reporting

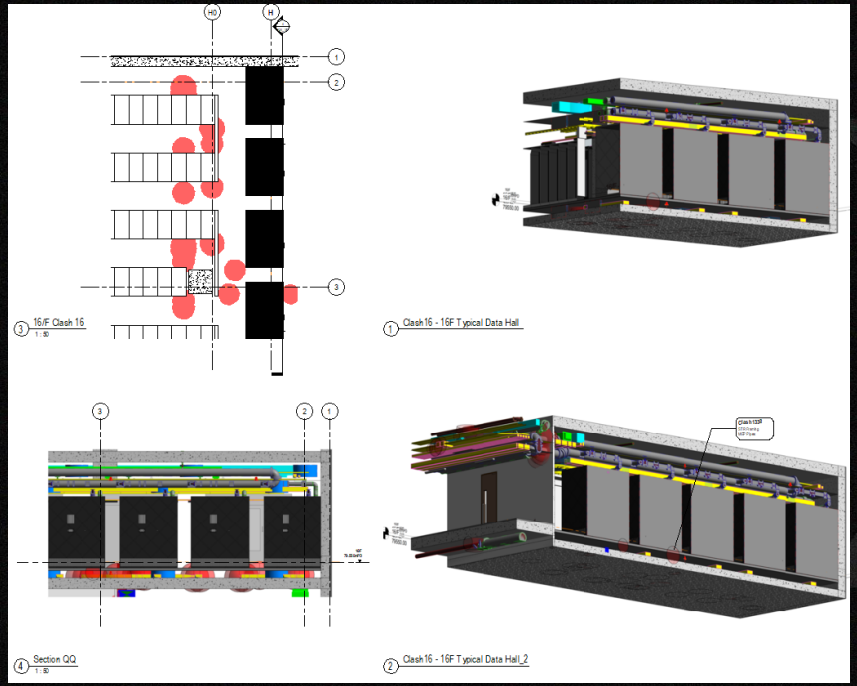
  It is BIM Manager / BIM Auditor's responsibility to administer, lead and manage the BIM process as per the BIM Execution Plan. Item in an audit report will usually cover items as:
  - General Model Status
  - Review model errors and warnings inside BIM model
  - Conformity to Naming Standards
  - Model 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.

L4

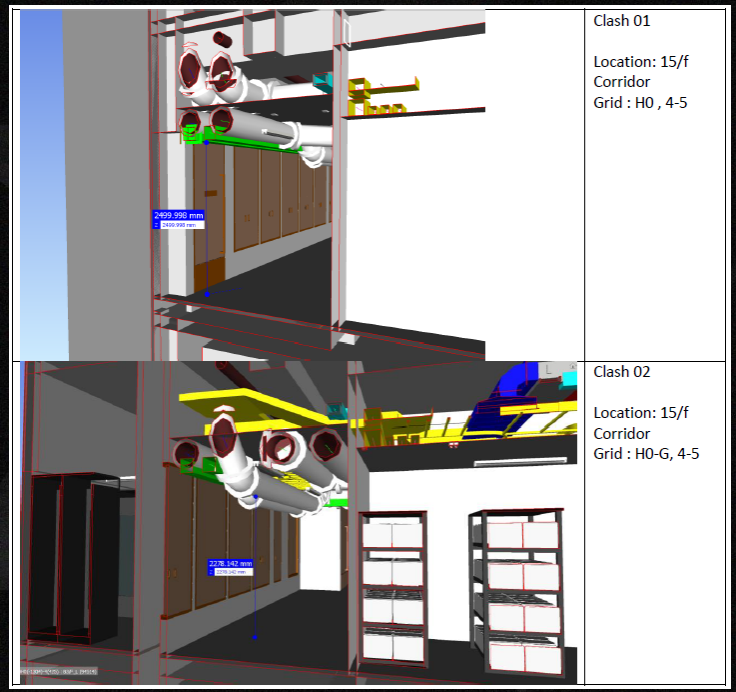
4.3 Data Quality Control & Assurance across various stages

- 4.3.4 Audit reporting

Drawings and Report shall be produced time to time in order to update the information input from different parties.



Example : Drawings to report (By Revit and link with other model)



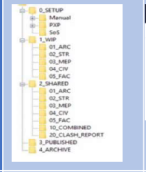
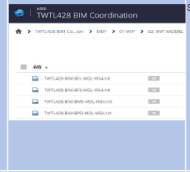
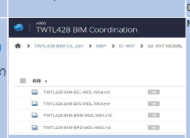
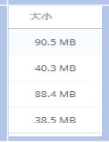
Example : Export to Naviswork for review

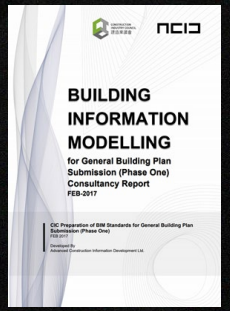
L4

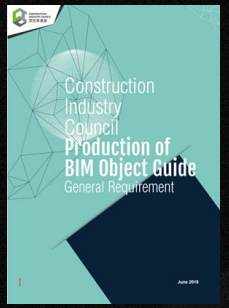
4.3 Data Quality Control & Assurance across various stages

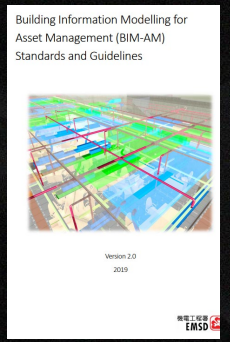
- 4.3.4 Audit reporting

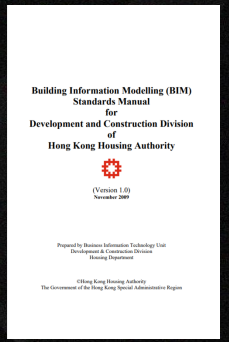
Drawings and Report shall be produced time to time in order to update the information input from different parties.

Number	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.	 	The Folder Structure Shall follow CIC BIM Standard Section 4.1 1_WIP & Sub-folder 2_Shared & Sub-folder 3_Published Shall be setup in A360 under MEP Discipline.	CIC BIM Standard Section 4.1	8/4/2019		
2	Consultant Incoming CAD files - Consultants in folder	No such setup in A360	WSP to archive incoming CAD under 05_Incoming Folder Structure	CIC BIM Standard Section 4.1	8/4/2019		
3	Revit Working File Naming - Refer to Revit naming protocols (CIC BIM Standard Section 1.5.4.3 "The BIM PXP shall define how models will be exchanged and in what software format")		No further comment				
4	File size - File size should not exceed 400MB		No further comment				









L4

Example : Items shall be checked for Audit in Sheet Format

Shall be referred to agreed standard in PXP