發展局
Development Bureau

BIM HARMONISATION GUIDELINES FOR WORKS DEPARTMENTS

Version: 3.0

December 2025

Distribution	
Copy No.	Holder
1	Development Bureau (DEVB)
2	Architectural Services Department
3	Civil Engineering and Development Department
4	Drainage Services Department
5	Electrical and Mechanical Services Department
6	Highways Department
7	Water Supplies Department
8	Lands Department

Prepared By: _____
Secretary
DEVB BIM Working
Group, DEVB(WB)

Date: 31.12.2025

Amendment History		
Change Number	Version Number	Date
1	1.0	15.10.2021
2	2.0	31.5.2023
3	2.1	10.12.2024
4	3.0	31.12.2025

TABLE OF CONTENTS

1. Introduction 1
1.1. Background 1
1.2. Objectives 1
1.3. Reference Documents 1

2. Information Requirements and Exchange 3
2.1. Information Ownership 3
2.2. IT Environment 3
2.3. BIM File Size 4
2.4. Information Exchange Formats and Mechanism 4
2.5. Data Security Classification 5

3. BIM Object Files 6
3.1. Principles 6
3.2. CIC Production of BIM Object Guide and Portal 6
3.3. Process of Adopting CIC BIM Objects 8
3.4. Naming of BIM Object File 9
3.5. Guidelines for BIM Object Authoring 12
3.6. BIM Object Management 14
3.7. Workflow for Sharing BIM Object 15

4. Federation and BIM Model Naming 17
4.1. BIM Model Naming Principle 17
4.2. Information Container Identification Fields 18
4.3. Federation Strategy 22
4.4. BIM Model Naming 23
4.5. Naming of Drawings Generated from BIM model 23

5. LOIN Implementation 24
5.1. Aligned BIM Standards 24
5.2. BEP 24
5.3. BIM Modelling Setting 24
5.4. LOD-G 25
5.5. LOD-I 27
5.6. Appearance 27

6. The Way Forward 29
6.1. Regular Review and Update 29
6.2. Codification Management 29
6.3. Project Close-out Protocols 29
6.4. BIM / GIS Integration 30
6.5. Departmental Transition 30
6.6. Information Management 30

List of Tables

Table 3-1 Descriptions and Guidelines for the BIM Object Naming Fields 10
Table 3-2 Folder Structure of BIM Object Library 15
Table 4-1 Information Container ID Fields 19
Table 5-1 LOD-G Definition 26
Table 5-2 Colour Appearance by Discipline for Underground Utilities 28
Table 5-3 Colour Appearance by Discipline for Above-grade 28

List of Figures

Figure 3-1 CIC BIM Portal 7
Figure 3-2 BIM Object Sheet 7
Figure 3-3 An Example of BIM object found on CIC BIM Portal 8
Figure 3-4 BIM Object Adoption Scenarios 9
Figure 3-5 Sample Simplified BIM Object based on Detailed BIM Object 13
Figure 3-6 Sample Lamp Post BIM Object Division 14

List of Appendices

Appendix I – ISO 19650 Terminologies
Appendix II – Information Responsibility Assignment Matrix
Appendix III – Data Filtering Rule Table
Appendix IV – Master Type List
Appendix V – Examples of BIM Object Authoring and Importing Civil 3D BIM Objects into BIM Models
Appendix VI – LOD-I Requirements, Creation and Extraction
Appendix VII – Sample BIM Object Check Form
Appendix VIII – Federation Strategy Diagrams and Naming Examples
Appendix IX – Sample Project-Specific Codes for Naming
Appendix X – Common Codes for Naming
Appendix XI – Sample Spreadsheet for BIM File Name Validation
Appendix XII – Sample Project Close-out Checklist
Appendix XIII – Example of Project Boundary Authoring and Model File List
Appendix XIV – Guidelines for Submission of Design and As-built BIM Models to LandsD

Abbreviation	Definition
ArchSD	Architectural Services Department
BEP	BIM Execution Plan, which is the document explaining how the information modelling aspects of a project will be carried out throughout the project life cycle
BIM	Building Information Modelling
BIM attribute	A piece of data forming a partial description of an object or entity, where entities and objects are synonyms, meaning items having a state, behaviour and unique identity, that is, a thing that can think or talk about, such as a wall. (source from PAS 1192-2:2013: Specification for information management for the capital/delivery phase of construction projects using building information modelling (now replaced by BS EN ISO 19650 Parts 1 and 2) defines the requirements for achieving building information modelling (BIM) Level 2.)
BIM CDCP	Common Data Collaboration Platform for BIM (Source: Paragraph 25 of the Development Bureau Technical Circular (Works) No. 1/2025)
CDE	Common Data Environment: agreed source of information for any given project or asset, for collecting, managing and disseminating each information container through a managed process. A CDE workflow describes the processes to be used and a CDE solution can provide the technology to support those processes. (Source: ISO 19650-1:2018)
CEDD	Civil Engineering and Development Department
CIC	Construction Industry Council
CityGML	An open data model and XML-based format for the storage and exchange of virtual 3D city models
COBie	Construction Operations Building Information Exchange Subset of BS ISO 16739 documented as a buildingSMART model view definition (MVD) which includes operational information used to supply data to the organisation to populate decision-making tools and asset management systems. (Source: CIC BIM Dictionary December 2020)
DEVB	Development Bureau
DEVB (PLB)	Development Bureau – Planning and Lands Branch
DEVB (WB)	Development Bureau – Works Branch
DSD	Drainage Services Department
EMSD	Electrical and Mechanical Services Department
EPD	Environmental Protection Department
FME	Feature Manipulation Engine
GBDR	Government BIM Data Repository
GIS	Geographic Information System

Abbreviation	Definition
HKSAR	Hong Kong Special Administrative Region of the People's Republic of China
HyD	Highways Department
IFC	Industry Foundation Classes
ITB	Information Technology Bureau
LandsD	Lands Department
LOD	Level of Development
LOD-G	Level of Graphics
LOD-I	Level of Information
LOIN	Level of Information Need
MEP	Mechanical, Electrical and Plumbing
N/A	Not Applicable
NDA	New Development Area
DPO	Digital Policy Office
OFCA	Office of the Communications Authority
TIDP	Task Information Delivery Plan
UAT	user acceptance test
UU	Underground Utilities
WB	Works Branch
WBS	Work Breakdown Structure
WDs	Works Departments under Development Bureau
WSD	Water Supplies Department

Foreword

The Development Bureau (DEVB) is pleased to announce the publication of DEVB BIM Harmonisation Guidelines for Work Departments (the Guidelines) with the goal to align BIM implementation, delivery and management for capital works projects. Using the Guidelines for information exchange between Works Departments (WDs) and Lands Department (LandsD), it would support the Smart City planning. The industry would also benefit from the use of BIM, GIS and 3D data for more efficient design, construction, operation and asset management workflows in the project lifecycle.

At the onset of this harmonisation initiative, a consultancy study (the Study) on BIM Harmonisation for BIM/GIS Integration under First Phase Development of KTN and FLN NDA was commissioned by the Civil Engineering and Development Department (CEDD). As one of the key deliverables, it formulated a BIM Harmonisation Guidelines for WDs for the assets under the study. This harmonisation initiative was then taken further to cover capital works projects outside the scope of the study. With concerted efforts of the WDs and LandsD, the Guidelines is formulated.

The Guidelines shall be adhered to for upcoming BIM adopting capital works projects to ensure consistency when authoring, reviewing and managing BIM files, BIM models and BIM objects. The adoption of the Guidelines would facilitate the sharing and maintenance of BIM models and information exchange among WDs and LandsD. The Guidelines is to be reviewed regularly under the DEVB BIM Working Group so as to upkeep with technological advancements and industry developments.

DEVB would like to thank everyone who has contributed to the success of the Publication, in particular the Project Steering Group and Project Working Group members of the Study:

- Architectural Services Department
- Civil Engineering and Development Department
- Construction Industry Council
- Development Bureau – Planning and Lands Branch
- Development Bureau – Works Branch
- Drainage Services Department
- Electrical and Mechanical Services Department
- Highways Department
- Lands Department
- Water Supplies Department

Finally, contributions and efforts given by the consultant of the Study, AECOM Asia Company Limited, is also highly appreciated.

1. Introduction

1.1. Background

1.1.1. Subsequent to the completion of the BIM harmonisation study for the First Phase Development of KTN and FLN NDA, DEVB formulated the DEVB BIM Harmonisation Guidelines for WDs (this document, thereafter referred to as the Guidelines). WDs shall adopt the Guidelines as stipulated in the DEVB TC(W) No. 8/2021.

1.1.2. The harmonization components of the Guidelines include:

a) Information requirements and exchange (Section 2)

b) BIM object files (Section 3)

c) Federation and BIM model naming (Section 4)

d) LOIN implementation (Section 5)

1.1.3. The Guidelines addresses the standardisation of the digital models comprising BIM models, objects, and attributes:

a) BIM Models, which include native and shareable models;

b) BIM Objects, which are parametric elements used to author BIM models. They are usually resided on the CIC BIM Portal or authored in accordance with principles of the Guidelines; and

c) BIM Attributes, which could facilitate BIM model and object management.

1.2. Objectives

1.2.1. The objectives of the Guidelines are:

a) To enable sharing, dissemination and maintenance of BIM models and BIM attributes across the WDs and LandsD;

b) To support sharing of BIM object files with CIC;

c) To form the standards to support the Government BIM Data Repository (GBDR), 3D digital map initiatives, and the forthcoming 3D Land Information System;

d) To provide aligned BIM standards horizontally across WDs for adoption in projects with emphasis on consistent modelling approaches.

1.3. Reference Documents

1.3.1. The Guidelines makes reference to the following documents:

a) The BIM Harmonization Guidelines for the First Phase Development of KTN and FLN NDA of the CEDD;

b) Parts 1 and 2 (2018 version) of BS EN ISO 19650 (ISO 19650): to adopt a common approach for collaborative production of information and information exchange requirements;

c) ISO 19650 terminologies (refer to Appendix I);

d) WDs' BIM development, standards, documents, practice notes, guidelines, regulations and legislations, including data owners' graphical and non-graphical information (geometrical and non-geometrical information in ISO 19650 terms) requirements;

e) DEVB's Technical Circular (Works) No. 1/2025 – Adopting of Building Information Modelling for Capital Works Projects in Hong Kong;

f) CIC BIM Standards - General: Version 2024, and

g) CIC Production of BIM Object Guide - General Requirements (Version 2 - 2021)

2. Information Requirements and Exchange

2.1. Information Ownership

2.1.1. Information ownership shall be defined at onset of a project.

2.1.2. As soon as the asset owner is identified, asset owner-specific requirements, including departmental BIM documents, should be followed and incorporated to the BIM Execution Plan (BEP).

2.1.3. WDs should adhere to the Guidelines when preparing the BIM models (in native and open format) and object files for sharing with others.

2.1.4. WDs should provide the design BIM models (after tender award) and as-built models (after completion of construction works) to LandsD to facilitate the development of the GBDR as per stipulated in paragraph 19 of the Technical Circular (Works) No. 1/2025. The circular will be updated from time to time.

2.1.5. WDs are suggested to review the BIM models for project which is sensitive in nature. The BIM models might be modified/ simplified for sharing.

2.1.6. To facilitate information exchange, the GBDR has been launched in May 2022. The GBDR serves to host native BIM models (developed in accordance with the Guidelines), shareable BIM models (IFC) and 3D GIS Open Format (CityGML).

2.2. IT Environment

Hardware, software and internet speed should meet minimum operability requirements to optimize interdepartmental information exchange through the GBDR.

2.2.1. Software

2.2.1.1. A single, common or interoperable BIM modelling software that is able to generate open format files should be used for a project (composing of several contracts) as far as practicable. This is to enable seamless flow and sharing of information within the project.

2.2.1.2. When selecting software, project information requirements and support of open format such as IFC should be considered.

2.2.1.3. Segregation of BIM models and software for modelling should be practised to balance modelling efficiency, drawing generation needs and non-geometrical information interoperability. For example, the following principles could be adopted for design stage:

a) Stormwater drainage and sewerage were demarcated at the agreed connection point between building drainage and civil drainage.

b) Water supply, electrical power supply, gas supply, telecommunications were demarcated at the agreed interface point between building works and civil works.

2.2.1.4. The software and software version adopted should be properly documented in the BEP.

2.2.1.5. For the shareable BIM format, IFC v4 will be used.

2.3. BIM File Size

2.3.1. For WDs without departmental BIM model file size limits, the maximum file size for each BIM model should be capped at 500MB. WDs should avoid, as far as practicable, large file sizes which would require substantial amount of storage, thereby unnecessarily increasing the time and cost to operate the GBDR.

2.3.2. To help control the BIM model file size, the maximum size of each BIM object file used should be kept at the minimum, preferably under 5MB.

2.4. Information Exchange Formats and Mechanism

2.4.1. To facilitate the data exchange and extraction needs of WDs, a clear set of criteria had been established. The sharing of commonly used BIM data across WDs in a self-service manner via a centrally managed GBDR is efficient with fast turnaround time. It facilitates site selection, site analysis, planning of location of services with a view to achieve design quality and efficiency, and minimise risks of clashes and time for reworks. Appendix XIV – Guidelines for Submission of Design and As-built BIM Models to LandsD outlines the BIM submission requirements such as project boundary, model file list and project specific code and procedures to the GBDR.

2.4.2. Appendix III – Data Filtering Rule Table shows the data required from specific departments. LandsD prefers having a full set of BIM models in native format or open format in IFC, while other WDs have certain department-specific data extraction rules.

2.4.3. To enable interoperability, open formats, such as IFC, shall be adopted to facilitate geometrical and non-geometrical information exchange. Geometrical information exchange aims to export BIM models to open BIM formats. Non-geometrical information exchange aims to export BIM attributes to tabular format such as COBie (Construction Operations Building Information Exchange). COBie is an international standard for data exchange, and it is the most commonly used standard for data handover from construction to operations. Through a conversion engine, the open format CityGML will be made available and stored in the GBDR.

2.4.4. Information exchange mechanism relies on the followings:

a) Information container ID, which entails consistent ID field definitions and abbreviation codes to facilitate file-based data filtering;

b) Data filtering rules, which outlines the key criteria for data exchange and extraction; and

c) WDs' BIM files, which shall be in compliance with the defined naming convention of the Guidelines.

2.4.5. Appendix XIII – Example of Project Boundary Authoring and Model File List shows the settings required for provision of project boundary and model file list of the works project when submitting BIM models to the GBDR.

2.5. Data Security Classification

2.5.1. Data security considerations include user access level and data classification.

2.5.2. WDs' users are allowed to access the GBDR based on WDs' information needs. Departmental users are assigned with appropriate access rights. No restricted, sensitive or confidential data should be shared. Therefore, WDs are suggested to review the data contained in BIM models before sharing them at the GBDR.

3. BIM Object Files

3.1. Principles

3.1.1. The principles of authoring BIM objects should follow the latest version of the CIC Production of BIM Object Guide, which contains LOD-G (graphical) and LOD-I (non-graphical) requirements. In addition, Appendix V and Appendix VI provide further examples for handling BIM objects' LOD-G and LOD-I.

3.1.2. CIC BIM Portal has provided an industry-wide, centralised and publicly accessible platform for sharing of BIM object files. BIM objects authored by the WDs or from capital works projects should be incorporated into the CIC BIM Portal upon certification by CIC. WDs should follow Section 3.7 to provide BIM object files to CIC. WDs should notify project awardees to utilise BIM object files shared at CIC BIM Portal as far as practicable and make reference to WDs' BIM object files that have been internally certified for use.

3.1.3. BIM object files' naming convention should follow Section 3.4, which is in line with the CIC Production of BIM Object Guide.

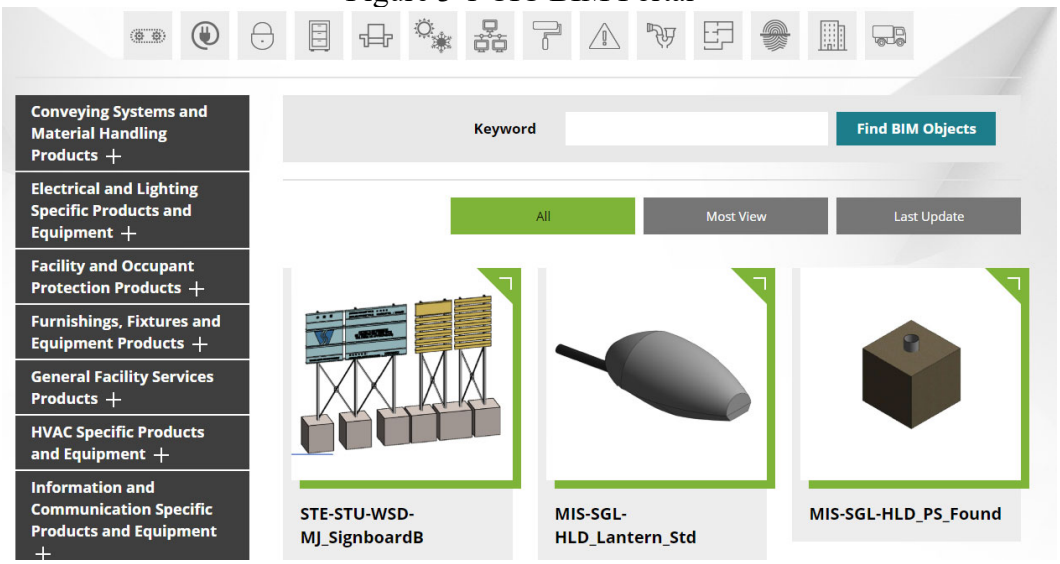
3.1.4. To minimise information loss during conversion, the appropriate category type for the BIM objects should be defined. The use of generic model for BIM object authoring should be minimised as far as practicable.

3.1.5. To optimise information management within BIM models, replicable BIM objects (e.g. windows, doors, signage, fittings) should be used to compose BIM models as far as practicable.

3.2. CIC Production of BIM Object Guide and Portal

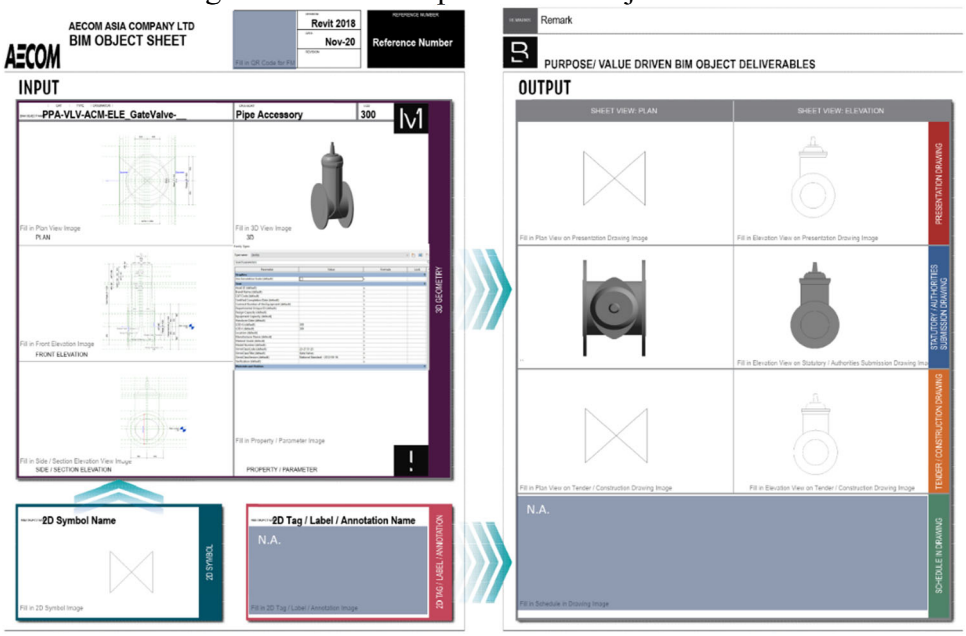
3.2.1. Since 2019, CIC has set up a BIM portal for public to access the BIM object files. A BIM objects library has been established on the CIC BIM Portal, and it contains BIM object files under OmniClass classifications. Refer to Figure 3-1 for CIC BIM Portal (located at https://www.bim.cic.hk/en/resources/bim_objects).

Figure 3-1 CIC BIM Portal



3.2.2. Each BIM object file is accompanied by a BIM object sheet which contained 3D geometry and 2D presentation. To fulfil drawing generation needs, 2D presentation may be in the form of layout, elevation view, sectional view, 2D symbols, and tag / label / annotations. The BIM object sheet serves to indicate that the BIM object has been completed and satisfied all requirements and functions for drawing production (refer to Figure 3-2).

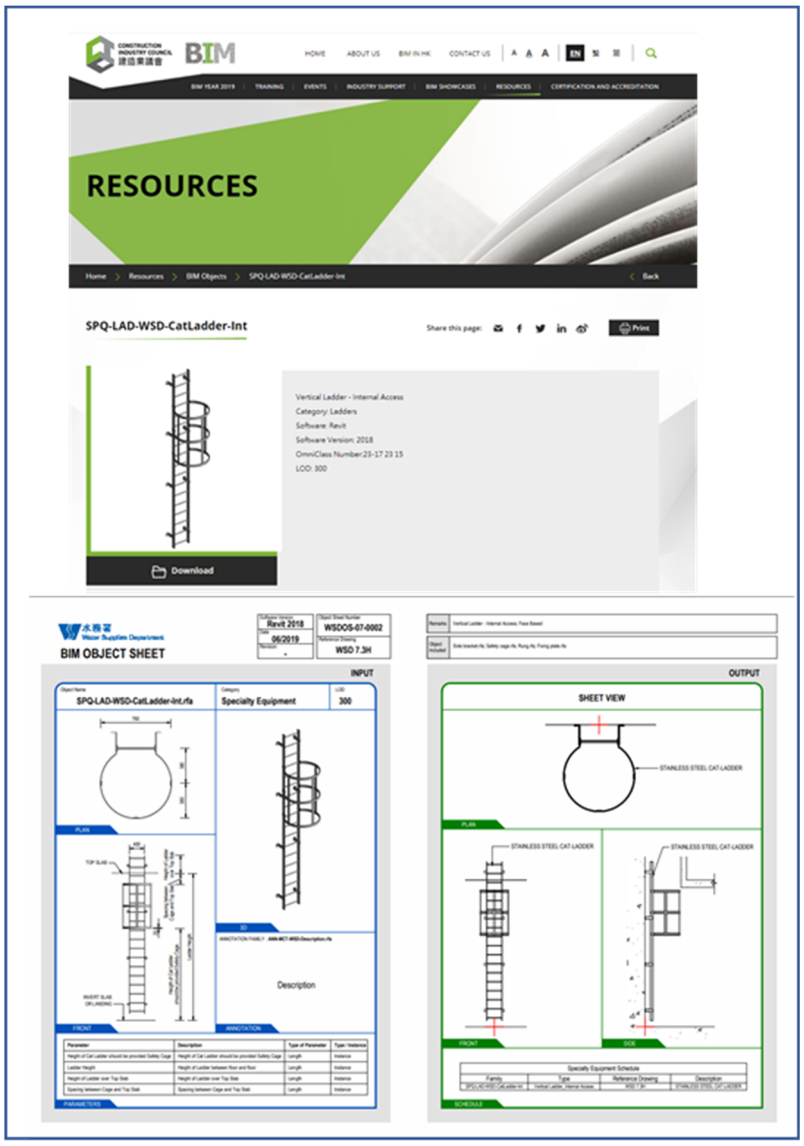
Figure 3-2 An example of BIM Object Sheet



3.3. Process of Adopting CIC BIM Objects

3.3.1. In order to utilise the CIC BIM objects as far as practicable, a process has been developed to adopt CIC BIM objects. Refer to Figure 3-3 below for an example of BIM object found on CIC BIM Portal.

Figure 3-3 An Example of BIM object found on CIC BIM Portal



3.3.2. There are three scenarios for adopting CIC BIM objects, which depend on whether the four criteria, including appearance, 2D presentation, attributes (LOD-I) and naming convention, are fulfilled:

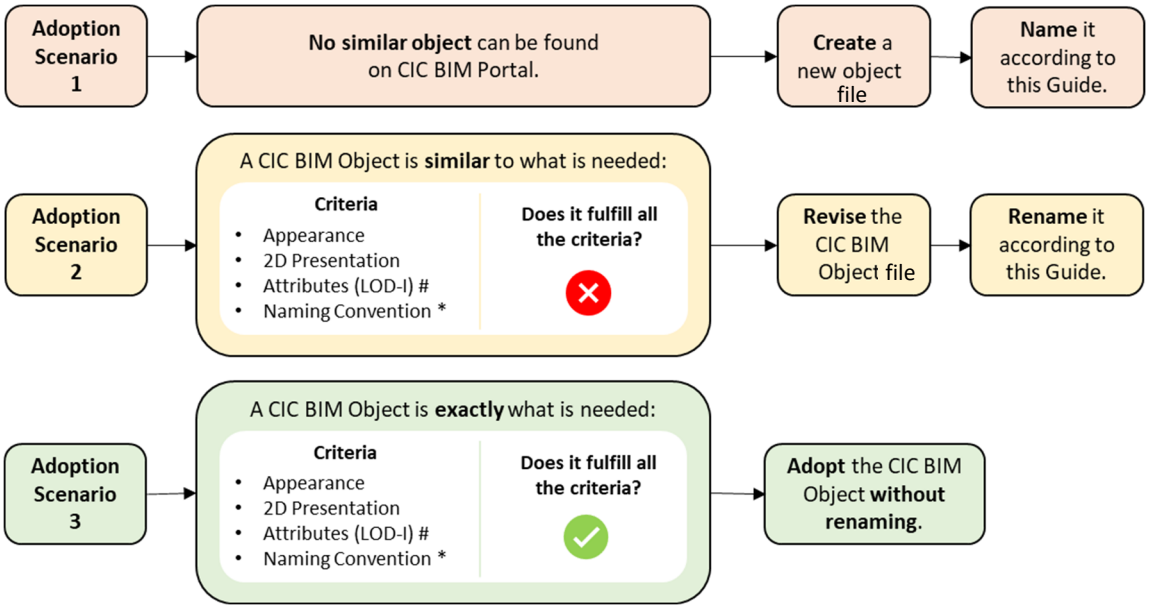
Adoption Scenario 1: If no similar CIC BIM object is found, a new object file shall be created and named according to the Guidelines.

Adoption Scenario 2: If a CIC BIM object is similar to what is needed but does not fulfil all the four criteria, it shall be revised and the file shall be renamed according to the Guidelines.

Adoption Scenario 3: If a CIC BIM object is exactly what is needed and fulfils all the four criteria, it shall be adopted without renaming.

Refer to Figure 3-4 below for BIM object adoption scenarios.

Figure 3-4 BIM Object Adoption Scenarios



Remarks:

- Refer to Appendix VI

* - Refer to Section 3.4

3.4. Naming of BIM Object File

3.4.1. BIM objects shall be modelled for a specific purpose and assigned with the most appropriate and representative category. BIM object files shall be named systematically and logically for the understanding of users and for easy BIM object management.

In accordance with the CIC Production of BIM Object Guide (Version 2 -2021), BIM object naming should be in the format as shown below.

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

3.4.2. Based on the CIC Production of BIM Object Guide, the following principles are set:

Table 3-1 Descriptions and Guidelines for the BIM Object Naming Fields

Field No.	BIM Object Naming Fields	Obligation	Field Length and Format	Guidelines
1	Category	Required	3 alpha-numeric	These two fields shall follow CIC Master Type List. (https://www.bim.cic.hk/en/resources/master_list). a) Field 1 shall be kept unique in value and meaning (e.g. ECD, SCH) b) Value of Field 2 could be the same for different meaning (e.g. 3PH means three phase isolator when it is under Field 1 "EIS". 3PH means 16A 3 phase 5 pin switched socket outlet when it is under Field 1 "ESO"). c) Fields 2 can have the same value as Field 1 if Field 2 has different meaning and is necessary to describe the BIM object at the second level. d) When Field 2 is not necessary to describe at the second level, three underscores (__) should be used.
2	Functional Type	Required	3 alpha-numeric	
3	Originator	Required	3 alpha-numeric	For BIM objects originating from WDs, corresponding department names should be used as originator names. However, other consultant or contractors who create the new BIM objects should follow Agent Responsible Code (ARC) list for originator. For those consultant or contractors, this field shall follow the up-to-date version of the ARC published by DEVB under the CAD Standard for Works Projects (ARC full list can be found at:

Field No.	BIM Object Naming Fields	Obligation	Field Length and Format	Guidelines
				https://www.devb.gov.hk/en/construction_sector_matters/electronic_services/cad_standard/computer_aided_drafting/cad/index.html) If a BIM object is fully adopted without change, its name should be maintained. However, if the BIM object is modified, its originator code should be updated and saved as another BIM object file.
4	Descriptor 1	Required	1-15 alpha-numeric	Descriptor 1 contains information about primary use and material when applicable. a) Duplicate information with the Category and Functional Type should be avoided. For example, if category is "WDW" (means window), "window" should not be used in this field. If functional type is "DBL" (means double), then "double" should not be used in this field. b) Capital letters should be used for first letter of each word (e.g. WallMounted, GlobalValve). c) All-capital short forms should be used to indicate materials when applicable (e.g. CONC for concrete, WD for Wood). If Descriptor 1 starts with all-capital short form, an underscore (_) should be used to separate the short form and the following word (e.g. CONC_Kerb, WD_Slash). d) If Descriptor 1 is blank, three nos. of underscores (___) should be used in place of

Field No.	BIM Object Naming Fields	Obligation	Field Length and Format	Guidelines
				Descriptor 1 (e.g. SFM-RCB-ACM-___-01.rfa). e) Descriptor 1 should be kept as concise as practicable with the maximum length of 15 characters in order to reserve space for 2 digit sequential number in Descriptor 2 for potential future expansion.
5	Descriptor 2	Required	2 alpha-numeric	Descriptor 2 is a 2-digit sequential number (e.g. 01 to 99) to distinguish different types that cannot be sufficiently identified by preceding fields. (e.g. STE-STA-ACM-NB_Pier-01.rfa) If Descriptor 2 is blank, two underscores (__) should be used in place of Descriptor 2. (e.g. PPF-UPV-ACM-BendSocket-__.rfa)

3.4.3. The file name length of BIM objects should be 30 characters maximum, including delimiters but excluding the file extension. BIM object file name is expected to be as short as possible and should comply with the CIC Production of BIM Object Guide.

3.4.4. Only alphanumeric characters, hyphen (-) and underscore (_) are allowed. Hyphens should be used as the delimiter between each naming field.

3.4.5. Space, special symbols and invalid characters (including ~ " # % * : < > ? / \ { | }.) shall not be used within BIM object file names.

3.5. Guidelines for BIM Object Authoring

While the principles of authoring BIM object should follow the CIC Production of BIM Object Guide, this section provides further guidelines for handling BIM objects.

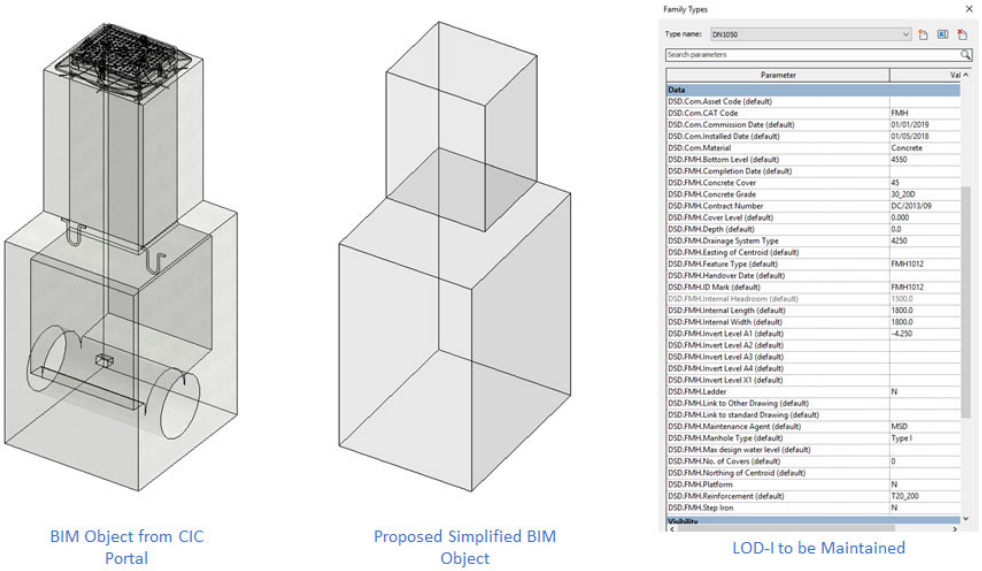
3.5.1. Simplifying and Enhancing BIM Objects

Before using a BIM object, BIM authors should check if it could be simplified or modified to meet the project requirements. The basic principle when using the BIM objects should be as follows:

a) At the same LOD-G, utilising the same BIM object without change as far as practicable.

b) When the LOD-G is too detailed for the project, simplifying the BIM object should be considered while ensuring that the same LOD-I is maintained. The naming of the simplified object should follow Section 3.4 for details and Field 3 of the BIM object file naming shall be renamed after the Originator who altered the BIM object. Refer to Figure 3-5 below for a sample simplified BIM object.

Figure 3-5 Sample Simplified BIM Object based on Detailed BIM Object

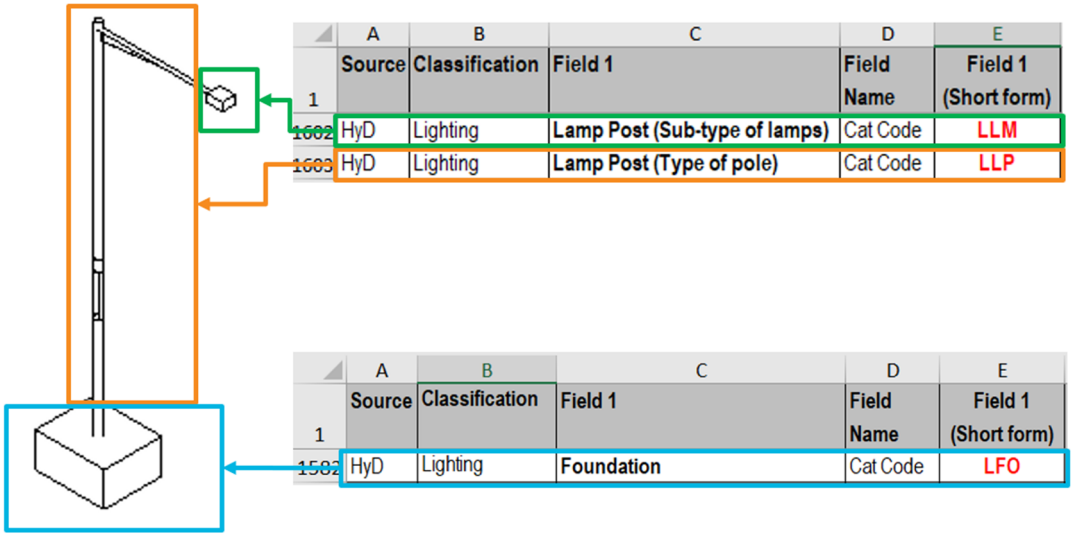


c) When the LOD-G is insufficient to meet the project requirement, a new BIM object should be developed based on original BIM object file.

3.5.2. BIM Object Division

The CIC Master Type List shows the current set of classification and codifications. A model element may be authored using more than one BIM object. For example, a lamp post may contain three BIM objects: type of pole, sub type of lamps and foundation (refer to Figure 3-6).

Figure 3-6 Sample Lamp Post BIM Object Division



3.5.3. LOD-G and LOD-I for different model elements may vary but should ultimately facilitate project needs. The attributes "LOD-G" and "LOD-I" should be added to the newly created BIM objects to indicate the LOD level number. Refer to Appendix VI for details.

3.5.4. Common BIM software have built-in templates or tools to facilitate the authoring of BIM objects. These templates or tools have the capability to embed 2D presentation, but the methods may vary. After inserting BIM objects into BIM models, project-specific attributes should be added and populated. Refer to Appendix V for examples of BIM object authoring.

3.6. BIM Object Management

3.6.1. CIC BIM Portal supports OmniClass classification. To facilitate logical BIM object organisation and searching, BIM objects could be organised in a folder structure as the first level of OmniClass according to "OmniClass version 2012 Table 23" (https://www.csiresources.org/standards/omniclass/standards-omniclass-about). Table 3-2 below shows an example for the corresponding Level 1 title with OmniClass numbers as folder names.

Table 3-2 Folder Structure of BIM Object Library

OmniClass Table 23	Products
Folder Name	Level 1 Title
23-11	Site Products
23-13	Structural and Exterior Enclosure Products
23-15	Interior and Finish Products
23-17	Openings, Passages, and Protection Products
23-19	Specialty Products
23-21	Furnishings, Fixtures and Equipment Products
23-23	Conveying Systems and Material Handling Products
23-25	Medical and Laboratory Equipment
23-27	General Facility Services Products
23-29	Facility and Occupant Protection Products
23-31	Plumbing Specific Products and Equipment
23-33	HVAC Specific Products and Equipment
23-35	Electrical and Lighting Specific Products and Equipment
23-37	Information and Communication Specific Products and Equipment
23-39	Utility and Transportation Products

3.6.2. In addition to managing the folder structure, OmniClass classification information should also be inputted in BIM objects' classification attributes, in accordance with OmniClass version 2012 Table 23. Refer to Appendix VI for details.

3.6.3. WDs are recommended to adopt and customise Appendix VII – Sample BIM Object Check Form for departmental use. The corresponding BIM Support Team should upkeep their own check forms in the future.

3.7. Workflow for Sharing BIM Object

3.7.1. WD's BIM Support Team should collect, review and register BIM object packages (BIM object files, CIC BIM Object Sheets and CIC BIM Object Check Forms) for submission to CIC.

3.7.2. If CIC deems the BIM object file not ready to be accepted, comments would be provided to the BIM Support Team concerned for following up. After CIC certifies and accepts the BIM objects, the BIM object files would be made available on CIC BIM Portal. Feedback regarding the acceptance status would be provided to the respective BIM Support Team within three months after receiving the BIM object packages.

3.7.3. WDs should notify project awardees to utilise BIM objects shared at CIC BIM Portal as far as practicable and make reference to WDs' BIM objects that have been internally accepted for use.

4. Federation and BIM Model Naming

4.1. BIM Model Naming Principle

4.1.1. This section provides the principle to set out the BIM model naming (information container ID) and federation strategy to achieve consistent BIM model federation. A hierarchical and logical model organisation can serve to facilitate BIM management and subsequent LOIN implementation such as LOD-I management and colour appearance.

4.1.2. ISO 19650-2:2018 Part 2 Section 5.1.7(a) states that each information container shall have a unique ID, based upon agreed and documented convention comprising fields separated by a delimiter, within a project Common Data Environment (CDE). Unique ID should be consistent among WDs to facilitate interdepartmental information exchange via the GBDR. The hierarchy should include the following descriptions:

a) What asset is the BIM model related to;

b) Who is the originator of information;

c) Which geospatial zone and system(s) it belongs to;

d) Where it is located;

e) Which discipline it is related to;

f) What type of information the model contains; and

g) What unique information is necessary to further distinguish the model from others.

4.1.3. ISO 19650-2:2018 Part 2 Section 5.1.7(b) states that the project's common data environment shall enable each field to be assigned a value from an agreed and documented codification standard. The codification standard for model file naming would set out:

a) Field sequence;

b) Information container ID fields (and sub-fields if applicable);

c) Description of each information container ID field and sub-field;

d) Whether the field is required or optional;

e) Format which defines length and alphabetic, numeric or alphanumeric;

f) Whether the codification is common or project-specific; and

g) Where the detailed list of codification information can be located.

4.1.4. Information container ID, model division, federation and corresponding abbreviation codes should be sustainable and consider the future potential use of metadata.

4.2. Information Container Identification Fields

4.2.1. Model naming shall follow the information container ID fields sequence and corresponding abbreviation codes. The arrangement of information container ID fields is primarily derived from the principles in ISO 19650 to suit the common practices within WDs. Naming convention should follow Section 4 of the Guidelines.

4.2.1.1. The maximum total length of model names is 43 characters (including delimiters and information dividers; excluding file extension). Appendix VIII – Federation Strategy Diagrams and Naming Examples shows examples for reference.

4.2.1.2. Information container ID fields are reserved for information pertinent to information exchange between WDs. To ensure that the total length of model naming is manageable, metadata should only be used when:

a) The information container ID field is only relevant to individual WDs;

b) The identification does not facilitate work breakdown structure;

c) The length of the information container ID field is relatively long; or

d) The detailed descriptions would lose the meaning and adversely affect information exchange if abbreviated.

The input format for metadata that facilitate data filtering (e.g. security code) should be consistent. Flexibility on the input format is allowed for other cases.

4.2.2. Table 4-1 describes the Information Container ID Fields.

Table 4-1 Information Container ID Fields

Field No.	Information Container ID Field	Sub-field No.	Information Container ID Field Description	Obligation	Field Length and Format	Nature of Codification
1	Project	N/A	A unique identifier should be used to serve as the project code (e.g. agreement, contract, future asset categorisation). A unique code should be assigned to each project stage (e.g. design, construction and operations) to determine the relationship with a particular asset.	Required	1-8 alphanumeric	Project-specific (Appendix IX, Table App IX-1)
2	Originator	N/A	A unique identifier based on Agent Responsible Code (ARC) should be used to indicate the model's responsible authoring party. The ARC is updated from time to time, which could be found at https://www.devb.gov.hk/en/construction_sector_matters/electronic_services/cad_standard/computer_aided_drafting/cad/index.html	Required	3 alphanumeric	Common (Agent Responsible Codes)
3	Volume (and System when applicable)	3.1	A unique identifier should be used to indicate specific geospatial zone or volume within a project.	Required	1-3 alphanumeric	Project-specific (Appendix IX, Table App IX-2)

Field No.	Information Container ID Field	Sub-field No.	Information Container ID Field Description	Obligation	Field Length and Format	Nature of Codification
		3.2	An identifier should be used to indicate a collection of interconnected model elements across main disciplines under a system (e.g. sewerage system, water supply system, highway). System is used to facilitate data sharing instead of creating multiple interdisciplinary data sets.	Optional	1-3 alphanumeric	Common (Appendix X, Table App X-1)
4	Location (and Sub-location when applicable)	4.1	An identifier should be used to indicate a specific location (e.g. slope number, feature code, building code) for geospatial coordination and future asset management. Common abbreviation codes should be used as far as practicable.	Required	1-4 alphanumeric	Common (Appendix X, Table App X-2) and Project-specific (Appendix IX, Table App IX-3)
		4.2	An identifier should be used to indicate a sub-location (e.g. level) within the same location. Additional sub-locations, if any, should be defined in the project information standard. This field's value should not duplicate that of Field 4.1.	Optional	1-4 alphanumeric	Common (Appendix X, Table App X-3 and X-4)
5	Discipline (and Sub-discipline when applicable)	5.1	An identifier should be defined for each primary discipline to facilitate appearance settings and information filtering for interdepartmental coordination. In the case that data filtering and collaboration is required, BIM models should be authored separately for each sub-discipline.	Required	1-2 alphabetic	Common (Appendix X, Table App X-5)
		5.2	An identifier should be used to indicate each sub-discipline appointment. Additional sub-disciplines, if any, should be defined in the project information standard.	Optional	1-2 alphabetic	Common (Appendix X, Table App X-6)

Field No.	Information Container ID Field	Sub-field No.	Information Container ID Field Description	Obligation	Field Length and Format	Nature of Codification
			Additional abbreviations should be based on those currently used by WDs as far as practicable.			
6	Type (and Characteristic when applicable)	6.1	An identifier should be used to indicate the information held within the container. As ISO 19650 states "this list can be expanded with project-specific codes," Type is not limited to information unique to BIM models.	Required	1-2 alphanumeric	Common (Appendix X, Table App X-7)
		6.2	An identifier should be used to indicate the model's characteristic when relevant.	Optional	1 alphabetic	Common (Appendix X, Table App X-8)
7	Sequential Number	7	A sequential number should be assigned when it is necessary to further distinguish the model from the others. It can also be used to distinguish other documents such as drawings. Refer to Appendix VIII for details.	Optional	3 numeric	Project-specific

4.2.3. Required and Optional Information Container ID Fields

The column "Obligation" in Table 4-1 indicates whether the field is required or optional. Optional information container ID could be omitted at the discretion of the WDs.

4.2.4. Abbreviation Codes

4.2.4.1. The column "Nature of Codification" in Table 4-1 indicates whether the field is project-specific pertaining to individual projects, or common which could be applicable universally to all projects.

4.2.4.2. Abbreviation codes serve to facilitate information container ID generation and BIM model upload validation for the GBDR. WDs should utilise these codes for model naming. Note that these codes are case sensitive. There are two types of abbreviation codes, including:

a) Refer to Appendix X for details about the list of common codes for Information Container ID Fields.

b) Project-specific codes should be documented in BEP. Refer to Appendix IX which contains examples of project-specific codes.

4.2.4.3. The universal codes of ZZ and XX for information container ID fields shall be used when the conditions below exist. Appendix X for applying the universal codes in different information container ID fields for details.

a) ZZ – multiple exist within a BIM model.

b) XX – none or not applicable.

4.2.5. Delimiter and Information Divider

4.2.5.1. Hyphen (-, also known as minus) should be used as the delimiter to separate information container ID fields.

4.2.5.2. Underscore (_) should be used as an information divider between the sub-fields within each field when applicable.

4.2.5.3. When optional field is not required, it should be left empty, and the preceding delimiter "-" (hyphen) or information divider "_" (underscore) should be eliminated.

4.2.6. Space and Special Symbols

Space, special symbols and invalid characters (including ~ " # % * : < > ? / \ { | }.) shall not be used within information container IDs.

4.3. Federation Strategy

4.3.1. In coherence with the sequence of information container ID fields, federation diagrams are established to describe the federation structure in a WBS as shown in Appendix VIII.

4.3.2. In accordance with principles stated in Sections 4.1 and 4.2, federation strategy should ensure:

a) The information container breakdown (model division) conforms to requirements from departmental information owners (if known);

b) The breakdown is sufficient to facilitate data filtering for information sharing according to Appendix III for details;

c) File size limitation conforms to the maximum as stated in Section 2.3.1; and

d) The information is clearly grouped.

4.4. BIM Model Naming

In accordance with Sections 4.1 – 4.3, model naming should be in the format as shown below.

<project code> **-** <originator> **-** <volume_system> **-** <location_sub-location> **-** <discipline_subdiscipline> **-** <type_characteristic> - <sequential number> . <file extension>

Refer to Appendix VIII for examples.

4.5. Naming of Drawings Generated from BIM model

WDs should consider adopting the model naming format for drawing file naming. Refer to Appendix VIII for an example.

5. LOIN Implementation

To enable information exchange using the GBDR, WDs shall follow the subsequent principles when authoring BIM files.

5.1. Aligned BIM Standards

5.1.1. The Guidelines should serve as the aligned standards for information exchange.

5.2. BEP

5.2.1. Referring to Section 2.1.2, BEP should incorporate requirements from asset owner. BEP should specify the BIM standards, guidelines and their applicable version for the project, .

5.2.2. BEP should be authored in accordance with departmental BEP templates or DEVB's BEP reference template (if the former is unavailable). In addition, BEP should document the following:

a) Information owner's identification;

b) Project information requirements (e.g. element-specific LOD-I attributes in table or list formats);

c) Project-specific federation strategy; and

d) Project-specific codes for BIM model naming (e.g. project code(s), location codes).

5.3. BIM Modelling Setting

5.3.1. Coordinate System

All BIM files shall be authored and annotated directly with reference to the Hong Kong 1980 Grid (HK 1980 Grid) and Hong Kong Principal Datum (HKPD).

5.3.2. Model Unit

The model unit in all BIM files should be metric (e.g., in millimetres (mm) for buildings or in metres (m) for infrastructure projects) and based on a decimal system.

5.3.3. BIM Template

Project-specific BIM template could be prepared for the software commonly used. The template could include:

a) Coordinate system and unit setting;

b) Setting for drawing generation; and

c) Common attributes.

5.3.4. Mandatory Requirements for BIM modelling

a) Use the object at the CIC BIM Objects library, instead of creating own object, as far as practicable to maintain the consistency, such as inserting point and BIM attributes of the object.

b) If new object is developed, register the object file in the CIC BIM objects library timely.

c) Do not add user defined parameter with the same name as the system built-in parameters. Use a prefix such as departmental abbreviation code to differentiate the system built-in parameters from the user-defined parameters.

d) Linked files will not be exported to IFC by default, keep them in the native file format for conversion, if needed.

e) Use the common object types for modelling. For example, object type as listed below could be used when modelling in Civil 3D:

Item no.	Recommended object type	Remark
1	Tin surface	- These object types can be exported to IFC - Technical details of these types can be maintained when exporting to IFC
2	Pipe	
3	Structure	
4	Pressure pipe	
5	Fitting	
6	Appurtenance	
7	3D solid (Extracted from corridor)	

f) Do not add IFC classes in the user defined attribute as this will mix up the mapping to IFC conversion.

g) Only objects exist in the last phase will be exported to IFC by default. Do not set the Properties - “Phase Created” and “Phase Demolished” to the same value, otherwise it would be treated as temporary or not exist feature and will not be exported to IFC.

h) When preparing IFC for submission to the GBDR, Reference View v1.2 in ArchiCAD, OpenBuildings Designer, and Revit; or Coordination View v2.0 in Civil 3D should be set as Model View Definitions.

5.4. LOD-G

5.4.1. LOD-G Requirements

The table below describes LOD-G requirements of LOD 100 to 500 which are consistent with the principles of CIC BIM Standards (the latest version). LOD-G refers to the graphical representation which deals with geometric representation, symbology, and visualisation. This is generally related to the deliverable (scale of documentation) which controls the graphical precision of the elements represented. This in turn enables identification of which parts of the objects can be disregarded or simplified while keeping the object functional to meet the BIM Uses.

Table 5-1 LOD-G Definition

LOD-G	Description
100	The model element is graphically represented within the model by a symbol or generic representation or rough 3D shape.
200	The model element is graphically represented within the model as a generic system, object or assembly with approximate quantities, assumed size, shape, location, and orientation. The assumed spaces required for access and maintenance shall be indicated.
300	The model element is graphically represented within the model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. The model shall include details of the spaces required for handling installation, operation and maintenance, and the interface details for checking and coordinating with other models / objects.
400	The model element is graphically represented within the model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation with detailing for fabrication, assembly, and installation.
500	Not used. Refer to the latest version of CIC BIM Standards - General for details.

5.4.2. Overlapping Elements

Overlapping elements should be avoided and minimised. When overlapping elements cannot be eliminated, the reason and associated parameter for filtering should be documented in the BEP.

5.4.3. Large Spanning Continuous Elements

Model elements spanning over one level (e.g. walls spanning over 1 storey high) or across buildings (e.g. floor plates spanning between buildings through connection bridges) should be split into separate model elements, unless otherwise specified in the BEP.

5.4.4. Complex Geometry

For constructability, especially for design-stage considerations, complex geometries such as two-way curves and non-uniform rational basis spline surfaces shall be avoided whenever possible. When complex geometries cannot be eliminated, its modelling method shall be documented in BEP.

5.4.5. Room

To facilitate spatial identification, drawing generation and subsequent mapping works for spatial data (e.g. display of room tags), room should be modelled as far as practicable for spaces bounded by architectural and structural elements, such as public access area of Government buildings. It may also be modelled by either manually assigning the centre point or drawing an enclosed boundary.

5.4.6. Operation and Maintenance Space

For building services and mechanical type of BIM elements, the operation and maintenance space are concerned information for asset owner. It is suggested to model the operation and maintenance space for these kinds of BIM elements, such as control panel/switch box with panel door, vent relief valve (VRV) unit with control valve set, etc.

5.5. LOD-I

5.5.1. LOD-I Grouping

Attributes (LOD-I) could be grouped by general properties, design properties, classification properties (e.g. OmniClass), manufacturer's equipment properties, condition properties and verification property. Under each grouping, the list of attributes may differ due to WDs' LOD-I requirements. The creation methods of attributes for BIM objects would vary by software. Refer to Appendix VI for details.

5.5.2. Project Information

To facilitate conversion engine's processes, all relevant project information (such as Organisation Name, Project Issue Date, Client Name, Project Address, Project Name and Project Number) should be inputted in all BIM files as part of the LOD-I for metadata extraction and geolocation. Refer to Appendix VI which shows the project information input methods of Revit and Civil 3D.

5.5.3. BIM Attributes (Attributes)

BIM models and BIM objects should be authored with required general properties and attributes. Refer to Appendix VI for details.

5.5.4. Language

Unless specifically required by the BEP, all project information and attributes should be in the English language.

5.6. Appearance

5.6.1. Within each WD, model elements' shading colours shall follow RGB codes specified based on the prevailing systems in WDs' guidelines for design authoring. For 3D coordination, WDs' own colour standards may be adopted. Deviations, if any, should be documented in BEP.

5.6.2. For interdepartmental 3D coordination between WDs, colour appearance should be based on Discipline (Field 5.1 of the naming convention) as specified in Section 4.2.

GBDR will be capable of setting the colour appearance of various Disciplines in accordance with Tables 5-2 and 5-3.

Table 5-2 Colour Appearance by Discipline for Underground Utilities

Codes	Discipline	Colour (RGB)	Reference	Colour Appearance
CD	Chilled Water Distribution	0-255-0	ArchSD, EMSD	
FO	Sewerage	255-0-0	DSD	
FW	Fresh Water System	228-232-225	WSD	
GS	Gas Supply	255-0-255	N/A	
IR	Irrigation	0-255-255	ArchSD, EMSD	
PS	Electrical Power Supply	93-173-115	DSD, WSD	
RW	Raw Water System	77-166-190	WSD	
SD	Stormwater Drainage	0-0-255	DSD	
SW	Salt Water System	106-108-60	WSD	
TC	Telecommunication	230-205-255	N/A	
WR	Recycled Water System	0-128-255	ArchSD, EMSD	

Table 5-3 Colour Appearance by Discipline for Above-grade

Codes	Discipline	Colour (RGB)	Reference	Colour Appearance
AR	Architectural	255-255-255	N/A	
BS	Building Services	255-128-0	N/A	
EL	Electrical	93-173-115	DSD, WSD	
FS	Fire Services	255-0-0	ArchSD, EMSD	
LA	Landscape	0-255-0	N/A	
ME	Mechanical	233-193-0	DSD	
RD	Road	191-191-191	N/A	
SF	Site Formation	226-183-120	N/A	
SL	Slope	143-91-63	N/A	
ST	Structural	119-104-93	DSD	

6. The Way Forward

The Guidelines provides harmonised BIM standards for the use by WDs in capital works projects adopting BIM. The Guidelines and its appendices may be subject to change and adaptation to be applicable across all WDs' projects. It is therefore important to set out the recommended upkeeping and project close-out protocols.

6.1. Regular Review and Update

6.1.1. DEVB(WB) is the responsible party of the Guidelines. Corresponding BIM Support Teams of the WDs shall coordinate any departmental comments and recommendations for necessary discussion at the DEVB BIM Work Group Meeting.

6.1.2. The Guidelines should be up kept and updated periodically. The appendices that would need updating include:

a) Appendix III – Data Filtering Rule Table should be reviewed when the WDs' data requirements have been changed.

b) Appendix X – Common Codes for Naming should be centrally managed and updated. Additional codes should be added to the list when commonly used. WDs should arrange to submit additional codes via the e-Common Code Register of the GBDR for circulation and approval by the DEVB BIM Working Group, normally three months before BIM submission. Obsolete codes should be removed from active use but kept reference for back tracing, if and when needed.

c) Appendix VIII – Federation Strategy Diagrams and Naming Examples should be reviewed and updated as necessary to support proper data filtering.

d) Appendix VI – LOD-I Requirements, Creation and Extraction may be subject to update if more LOD-I is required in the future (especially for asset management), or if information creation and extraction are changed due to technological advancement.

6.2. Codification Management

6.2.1. Each project would have its project specific codes, which, together with the common codes listed in Appendix X, could be used to facilitate validation of the BIM file names. It is recommended to conduct validation processes through BIM CDCPs, GBDR or other relevant systematic methods. Appendix XI contains a Sample Spreadsheet for BIM File Name Validation of the Guidelines for a sample spreadsheet to validate BIM file names.

6.3. Project Close-out Protocols

In accordance with Section 5.8.3 of ISO 19650-2:2018, project close-out activities include "archiving the project information model" and "compiling lessons learned

for future projects". This section contains recommended project close-out protocols for WDs' consideration.

6.3.1. A project-specific checklist could be authored and included in each project's BEP, with reference to:

a) Asset owners' checklists of BIM attributes (which may have detailed LOD-I requirements);

b) WDs' and project awardees' own checklists;

c) Sample BIM Object Check Form (refer to Appendix VII); and

d) Sample Project Close-out Checklist (refer to Appendix XII).

6.4. BIM / GIS Integration

6.4.1. A geospatial-based federation strategy and open format should be adopted to ensure coherence amongst BIM models. These BIM models should conform to requirements outlined in previous sections to facilitate open format conversion for the GBDR, as well as BIM / GIS integration amongst WDs and LandsD.

6.4.2. Going forward, consistent BIM data could facilitate interdepartmental and intradepartmental BIM / GIS integration and applications via a standard approach. The success of such integration would be contingent upon consistent approaches, including the adoption of:

a) Information container sequence and code;

b) Availability to share more information to the extent that it does not conflict with restricted or confidential information; and

c) Support of open format use.

6.5. Departmental Transition

6.5.1. The Guidelines aims to facilitate information exchange between WDs and LandsD. WDs are suggested to reconcile the differences within their respective departmental standards.

6.6. Information Management

6.6.1. As BIM maturity increases among WDs, information management conforming to ISO 19650 will become more relevant.

6.6.2. It is suggested to dedicate a section in the BEP on Project Information Standard, which sets out the standards and protocols that the project should be followed. It should contain the following:

a) A list of the standards that are to be followed;

b) Naming conventions that are to be used or any specific project codes;

c) Method(s) to generate applicable 2D / CAD drawings from the relevant BIM object / models;

d) Define what classification of WBS and Task Information Delivery Plan (TIDP) should be used in detail, which relates to information container breakdown structure on project-specific basis; and

e) How LOIN should be described.

6.6.3. Information Delivery Plan

6.6.3.1. While BEPs have already been prevalently used by most WDs as one of the information management tools in BIM projects, in accordance with ISO 19650, an information delivery plan is required in addition to BEP to manage information in the lifecycle of a project. Information delivery plan should not only outline the principles of information management using BIM, but also be applicable to other information management aspects of a project, such as drawings, data files, visualisation and simulations.

6.6.3.2. The conversion engine utilises a common key approach to link attributes and geometries. This could facilitate LandsD's 3D digital map development and allow single query for 3D models. To maintain the attributes in tabular format in the long term, the common key approach should be regularly reviewed.

6.6.4. Data Security Classification

6.6.4.1. There are three security tiers, namely unclassified, restricted and confidential. If GBDR access expands beyond WDs, additional security definitions may be created by adding abbreviation codes to the "Security" metadata field or BIM CDCP folder management.

6.6.5. BIM CDCP

6.6.5.1. Establishment of project-BIM CDCP, as an overarching BIM CDCP for its constituent consultancy studies and works contracts, if appropriate, should take into consideration of information security issues. As per ISO19650, CDE is an "agreed source of information for any given project or asset, for collecting, managing and disseminating each information container through a managed process". BIM CDCP may serve more functions than data repositories. BIM CDCP capabilities could ultimately surpass the "CDE" defined in ISO 19650 to fulfil project needs as the single source of truth (e.g. central information depository and lifecycle management for documents, contracts, reports, bids and model information).

End of the Guidelines

Appendix I – ISO 19650 Terminologies

For ISO Terminologies Adoption, according to Transition guidance to BS EN ISO 19650, the following terms pertaining to ISO 19650 deviates from previous ISO 1192 terms. ISO 19650 terms be adopted for ISO 19650 when applicable.

Item No.	1192 Term	19650 Term	Comment & Interpretation
1	BIM execution plan	Information delivery plan (BS EN ISO 19650-1) BIM execution plan (BS EN ISO 19650-2)	BS EN ISO 19650-1 uses information delivery plan as the generic term for any plan in support of information delivery not limited to BIM. BIM execution plan shall be used to refer to project-specific plans only.
2	Container/ file / document	Information container	ISO 19650 standardizes on the term Information container "information container" is about a named persistent set of information retrievable from within a file, system or application storage hierarchy.
3	Employer	Appointing party/ lead appointed party/ appointed party	ISO 19650 term depends on where in the hierarchy the employer is located. Lead appointed party is not the same as design lead or construction lead in PAS 1192-2. Refer Appendix II for details.
4	Employer's information requirements (EIR)	Exchange information requirements (EIR)	These are synonymous. "EIR" is about information requirements in relation to an appointment.
5	Graphical / non-graphical	Geometrical /non-geometrical	Geometrical is more appropriate to describe spatial positioning and relationships.
6	Level of model definition/ level of detail (LOD) / level of information (LOI)	Level of information need (no acronym)	Level of information need is a more generic term than any of the existing "Level of …" terms used in 1192. It is not supposed to be shortened to an acronym.

Item No.	1192 Term	19650 Term	Comment & Interpretation
7	N/A	Metadata	A set of data embedded in the file that describes and gives information about other data.
8	N/A	Information management standard*	Information management standard governs the creation, management and sharing of enterprise information.
9	Plain language questions (PLQ)	Project information requirements (PIR)	PLQ and PIR are both expressions of the high-level information needed by the client and/or their stakeholders to make key decisions concerning the project. The PIR, like the PLQ, are used to develop the detailed and contractual EIR. However, PIR can also include non-technical requirements and therefore can be broader than PLQ.
10	Responsibility matrix	Responsibility matrix / Assignment matrix	There is a principle to develop responsibility matrices to cover information management activities and information delivery. The former is illustrated as the assignment matrix in BS EN ISO 19650-2:2019, Annex A.
11	Roles	Function	Information management roles are not included within BS EN ISO 19650-2. Instead, all activities within the information management process are to be undertaken by a single "information management function". BS EN ISO 19650-2:2019, Annex A provides a template for an information management function assignment matrix, which can be used by the appointing party to assign each activity (requirement) to themselves, to an appointed party or a third-party. Once an activity has been assigned, it is for the relevant party to identify the role that is responsible for the activity.

Item No.	1192 Term	19650 Term	Comment & Interpretation
12	WIP/ Shared/ Published/ Archived #	WIP/ Shared/ Published/ Archived #	The WIP (work in progress), SHARED and PUBLISHED states (areas) of the CDE are unchanged from BS 1192:2007+A2:2016. The ARCHIVED state is used to record all transitions (gates) from one state to another and all changes of status (suitability) or revision that take place during the CDE workflow (process).
13	Volume strategy	Federation strategy	The concept of volumes for sub-division of an information model is now described in terms of the reasons for which separate information models might need to be federated. This was an easier concept for non-UK countries to understand.

Note – * indicates not part of ISO19650 terminology; # indicates unchanged terminology

Appendix II – Information Responsibility Assignment Matrix

WDs can use the table below to define project-specific responsibilities.

To align with ISO 19650 terminologies, the definition for the following members of the project team shall be adopted:

a) **Appointing Party** refers to the party 'owning' the appointment/project, such as a client or are managing information on behalf of a client.

b) **Appointed Party** refers to team member tendering for or appointed to a project generally. Appointed party is a member of both the project team and a delivery team.

c) **Lead Appointed Party** is an appointed party that is responsible for coordinating information between this delivery team and the appointing party.

d) **Third Party** refers to a member of the project team or delivery team that is neither an appointing party or any appointed party.

ISO Sec. Ref.	Task	Appointing Party	Third Party	Lead Appointed Party / Leading Team	Appointed Party	
		[Name of Appointing Party]	[Name of Third Party	[Name of Lead Appoint. Party / Leading Team]	[Name of Appointed Party]	[Name of Appointed Party]
5.1.1	Appoint individuals to undertake the information management function	[R; A]	N/A	[I]	[I]	[I]
5.1.2	Establish the project's information requirements	[R; A]	N/A	[I]	[I]	[I]
5.1.3	Establish the project's information delivery milestones	[R; A]	N/A	[I]	[I]	[I]
5.1.4	Establish the project's information standard	[R; A]	N/A	[I]	[I]	[I]
5.1.5	Establish the project's information production methods and procedures	[I]	N/A	[R; A]	[C]	[C]
5.1.6	Establish the project's reference information and shared resources	[I]	N/A	[R; A]	[C]	[C]
5.1.7	Establish the project's common data environment	[I]	N/A	[R; A]	[C]	[C]
5.1.8	Establish the project's information protocol	[I]	N/A	[R; A]	[C]	[C]

ISO Sec. Ref.	Task	Appointing Party	Third Party	Lead Appointed Party / Leading Team	Appointed Party	
		[Name of Appointing Party]	[Name of Third Party	[Name of Lead Appoint. Party / Leading Team]	[Name of Appointed Party]	[Name of Appointed Party]
5.2.1	Establish the appointing party's exchange information requirements	[C]	[C]	[R; A]	[I]	[I]
5.2.2	Assemble reference information and shared resources	[I]	[C]	[R; A]	[I]	[I]
5.2.3	Establish tender response requirements and evaluation criteria	[I]	N/A	[R; A]	[I]	[I]
5.2.4	Compile invitation to tender information	[I]	N/A	[R; A]	[I]	[I]
5.3.1	Nominate individuals to undertake the information management function	[I]	N/A	[R; A]	[R; A]	[R; A]
5.3.2	Establish the delivery team's (pre-appointment) BIM execution plan	[I]	N/A	[R; A]	[I]	[I]
5.3.3	Assess each task team capability and capacity	[I]	N/A	[R; A]	[I]	[I]
5.3.4	Establish the delivery team's capability and capacity	[I]	N/A	[R; A]	[I]	[I]
5.3.5	Establish the delivery team's mobilization plan	[I]	N/A	[R; A]	[I]	[I]
5.3.6	Establish the delivery team's risk register	[I]	N/A	[R; A]	[I]	[I]
5.3.7	Compile the delivery team's tender response	[I]	N/A	[R; A]	[I]	[I]
5.4.1	Confirm the delivery team's BIM execution plan	[I]	N/A	[R; A]	[I]	[I]
5.4.2	Establish the delivery team's detailed responsibility matrix	[I]	N/A	[R; A]	[R; A]	[R; A]

ISO Sec. Ref.	Task	Appointing Party	Third Party	Lead Appointed Party / Leading Team	Appointed Party	
		[Name of Appointing Party]	[Name of Third Party	[Name of Lead Appoint. Party / Leading Team]	[Name of Appointed Party]	[Name of Appointed Party]
5.4.3	Establish the lead appointed party's exchange information requirements	[I]	[C]	[R; A]	[I]	[I]
5.4.4	Establish the task information delivery plan(s)	[I]	[I]	[R; A]	[C]	[C]
5.4.5	Establish the master information delivery plan	[I]	[I]	[R; A]	[C]	[C]
5.4.6	Complete lead appointed party's appointment documents	[R; A]	N/A	[I]	[I]	[I]
5.4.7	Complete appointed party's appointment documents	[R; A]	N/A	[R; A]	[I]	[I]
5.5.1	Mobilize resources	[I]	N/A	[R; A]	[R; A]	[R; A]
5.5.2	Mobilize information technology	[I]	N/A	[R; A]	[R; A]	[R; A]
5.5.3	Test the project's information production methods and procedures	[C]	N/A	[R; A]	[R; A]	[R; A]
5.6.1	Check availability of reference information and shared resources	[C]	N/A	[R; A]	[R; A]	[R; A]
5.6.2	Generate information	[I]	N/A	[R; A]	[R; A]	[R; A]
5.6.3	Undertake quality assurance check	[I]	N/A	[R; A]	[R; A]	[R; A]
5.6.4	Review information and approve for sharing	[I]	[I]	[R; A]	[R; A]	[R; A]
5.6.5	Conduct information model review	[I]	N/A	[R; A]	[R; A]	[R; A]
5.7.1	Submit information model for lead appointed party authorisation	[I]	N/A	[I]	[R; A]	[R; A]
5.7.2	Review and authorise the information model	[C]	N/A	[R; A]	[]	[I]

ISO Sec. Ref.	Task	Appointing Party	Third Party	Lead Appointed Party / Leading Team	Appointed Party	
		[Name of Appointing Party]	[Name of Third Party	[Name of Lead Appoint. Party / Leading Team]	[Name of Appointed Party]	[Name of Appointed Party]
5.7.3	Submit information model for appointing party acceptance	[I]	N/A	[R; A; I]	[R; A; I]	[R; A; I]
5.7.4	Review and accept the information model	[R; A]	N/A	[R; A]	[I]	[I]
5.8.1	Archive the project information model	[I]	[I]	[R; A]	[R; A]	[R; A]
5.8.2	Capture lessons learned for future projects	[R; A]	[I]	[R; A]	[I]	[I]

Note: RACI are defined as followed:

R - Responsible for undertaking activity
A - Accountable for activity completion
C - Consulted during activity
I - Informed following activity completion

Appendix III – Data Filtering Rule Table

Data Provider / Data Receiver	ArchSD	CEDD	DSD	EMSD	HyD	LandsD	WSD
ArchSD		Site terrain and feature, slope, bridge, road, tunnel, cavern, foundation, utilities, tree	Plant, mains, pipes, manhole, drainage-related underground structure e.g. box culvert, tunnel, stormwater storage structure, etc.	E&M installations, utilities	Road, bridge, railway structure and substructure, street lighting, traffic light, noise barrier, tree	Site boundary, existing buildings, registered slope and site features	Plant, reservoir, mains, pipes, manholes
CEDD	External features and outlines of structures		Drainage and Sewage system, Pump room and Treatment plant	E&M Installations and Utilities	Road, Bridge, Railway structure, Street furniture, Drain, Noise barrier, Slope and Tree	Land status information, 3D spatial data, Digital aerial photos, and Slope	Water Supply system
DSD	Terminal manhole and pipework			DCS Pipe and associated structures	Terminal manhole and pipework	3D topographical and photogrammetry data and images	Terminal manhole and pipework
	Project boundaries			Project boundaries		Land lot boundaries and land status plans	Project boundaries
	General external configuration and appearance of structures			General external configuration and appearance of structures		N/A	General external configuration and appearance of structures
	Full set of BIM Models in Native Format for works to be handed over to DSD			N/A	Full set of BIM Models in Native Format for works to be handed over to DSD	N/A	Full set of BIM Models in Native Format for works to be handed over to DSD
	N/A			N/A	Underground utilities	N/A	Underground assets
EMSD	General building plans/ E&M Installation	Building plans for plant building/ E&M Installation/ Utilities for DCS pipe laying	Utilities for DCS pipe laying		Street Furniture / Footbridge lift / Lighting / MEP Installation	N/A	Utilities for DCS pipe laying
HyD	Building, Bridge, Foundation, Road, Slope, Tree	Bridge, Foundation, Road, Slope, Tree, Tunnel, Utilities	Drainage, Road, Slope, Tree, Utilities	E&M Installation, Utilities		Existing Ground Condition, Road, Slope, Tree	Road, Slope, Tree, Utilities, Waterworks
LandsD	● Full set of As-built BIM and Shareable BIM						ditto
WSD	BIM models of underground structures and features (especially within unallocated land and waterworks reserve, e.g. bridge foundations, subways, box culvert, etc.) and underground utilities						
	Only external features and outlines/appearance of buildings for above ground structures						

● Full Set of As-built BIM Models in Native Format

Appendix IV – Master Type List

Remarks: Please refer to the latest CIC Master Type List at the link below:

https://www.bim.cic.hk/en/resources/master_list

Appendix V – Examples of BIM Object Authoring and Importing Civil 3D BIM Objects into BIM Models

TABLE OF CONTENTS

1. Introduction V-1

2. Revit BIM Objects V-1
2.1. Revit Family Templates for BIM Object V-1

3. Civil 3D BIM Objects V-2
3.1. Name of Civil 3D Tool for BIM Object V-2
3.2. Use of Civil 3D Object Style for 2D Presentation V-2
3.3. Use of Civil 3D Object Style for 3D Presentation V-4

4. Insertion of Civil 3D BIM Objects into BIM Models V-5
4.1. Subassemblies V-5
4.2. Pipes Catalog V-7
4.3. Pressure Pipes Catalog V-9

List of Tables

Table 2-1 Revit Family Template to be Used for the Types of BIM Objects V-1
Table 3-1 Civil 3D Tools to be Used for the Types of BIM Objects V-2

List of Figures

Figure 3-1 Setting of Structure Style for 2D Symbol V-3
Figure 3-2 Setting of Component Display V-3
Figure 3-3 Setting of Structure Style for 3D Presentation V-4
Figure 4-1 “Import Subassemblies” Panel V-5
Figure 4-2 Input Source File for “Import Subassemblies” V-5
Figure 4-3 "Tool Palettes" Panel V-6
Figure 4-4 Files for "Pipes Catalog" V-7
Figure 4-5 Set "Pipe Network Catalog" V-7
Figure 4-6 Pipe Network Catalog Settings V-8
Figure 4-7 Edit Network Parts List V-8
Figure 4-8 Properties of Part Size Creator V-9
Figure 4-9 Default Catalog V-9
Figure 4-10 Each Folder stored with below Two Folders V-9
Figure 4-11 Default Names of the Drawings in the DWG Folder V-10
Figure 4-12 Images in IMG Folder V-10
Figure 4-13 Panel of “Content Catalog Editor” V-25
Figure 4-14 Configure General Information for Importing a Part V-25
Figure 4-15 Configure Part Type Information V-26
Figure 4-16 Configure Model Properties V-27

Figure 4-17 Review and Update Connection Point Information V-28
Figure 4-18 Save the Content Catalog file..... V-29

1. Introduction

BIM object authoring and insertion methods into BIM models may vary between software. In this Appendix, Revit and Civil 3D are used as examples to outline the creation methods. If software other than the two software is adopted, the methods for creating BIM object should be properly documented in the BEP.

Irrespective of software used, built-in templates, functions and built-in attributes within the authoring software should be used as far as practicable.

2. Revit BIM Objects

2.1. Revit Family Templates for BIM Object

Revit provides family templates for creating BIM object. The table below shows the Revit family templates that would be used for the types of revamped BIM object.

Table 2-1 Revit Family Template to be Used for the Types of BIM Objects

Item No.	Type of BIM Object	Revit Family Template to be Used
1.	Electrical switch, socket outlet, control box, sensor	Electrical Fixture
2.	LV switch board, genset, motor	Electrical Equipment
3.	Lighting, lamp	Lighting Fixture
4.	Pump, air-conditioning	Mechanical Equipment
5.	Manhole, gully, U-channel	Plumbing Fixture
6.	Road sign, sign gantry, road furniture, noise barrier	Site
7.	Pipe accessories such as valve, water meter, fire hydrant	Pipe Accessories
8.	Louvre	Window
9.	Silencer, damper	Duct Accessories
10.	Diffuser	Air Terminal
11.	Sign, symbol	Detail Item

3. Civil 3D BIM Objects

3.1. Name of Civil 3D Tool for BIM Object

Civil 3D provides tools for creating BIM object. The table below shows the tools that would be used for the types of BIM objects.

Table 3-1 Civil 3D Tools to be Used for the Types of BIM Objects

Item No.	Type of BIM Object	Civil 3D Tool to be Used
1.	Manhole, gully, chamber, pit, outlet, etc.	Part Builder
2.	Gravity pipe and culvert	Part Builder
3.	Pressure pipe, fitting, valve, pipe accessory, etc.	Content Catalog Editor
4.	Channel, trench, pipe/culvert of irregular shape, etc.	Subassembly Composer
5.	Carriage way, footway, cycleway and other pavements	Subassembly Composer
6.	Kerb, edging, concrete backing, barrier, etc.	Subassembly Composer

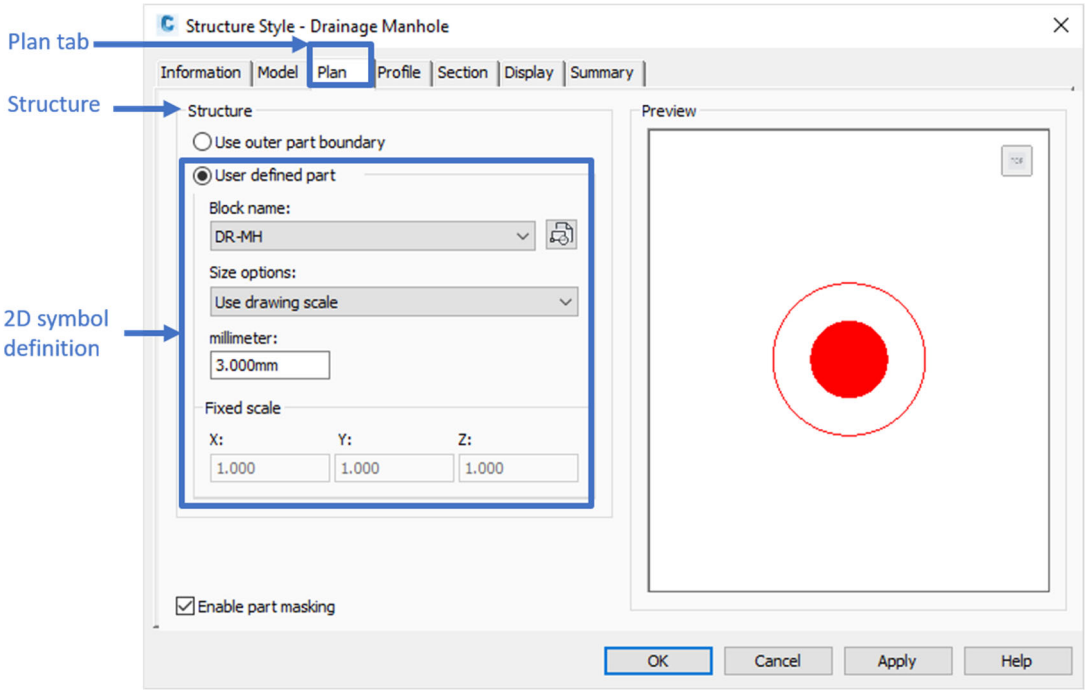
3.2. Use of Civil 3D Object Style for 2D Presentation

3.2.1. In Civil 3D, 2D symbols cannot be embedded in BIM objects. To handle 2D presentation, Civil 3D Object Style would be used for the types of Civil 3D BIM objects.

3.2.2. Civil 3D Object Style includes general attributes for handling 2D symbol for BIM object, object colour, visibility of object components, object fill patterns, etc. Below is an example of settings Object Style for a drainage manhole.

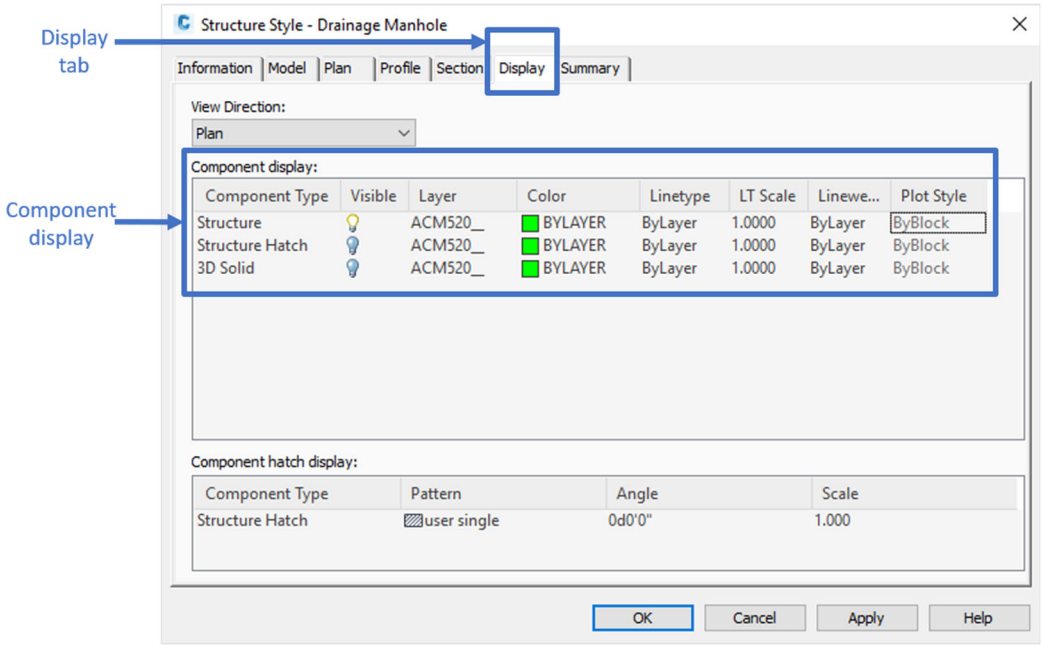
a) 2D presentation of drainage manhole could be set under tabs of "**Plan**", "**Profile**" and "**Section**". 2D symbol could be defined in the "**Structure**" under "**Plan**" tab as illustrated in the figure below.

Figure 3-1 Setting of Structure Style for 2D Symbol



b) Layer, color, line type, line scale, line weight and visibility of object components could be set in "**Component display**" under "**Display**" tab as illustrated in the figure below:

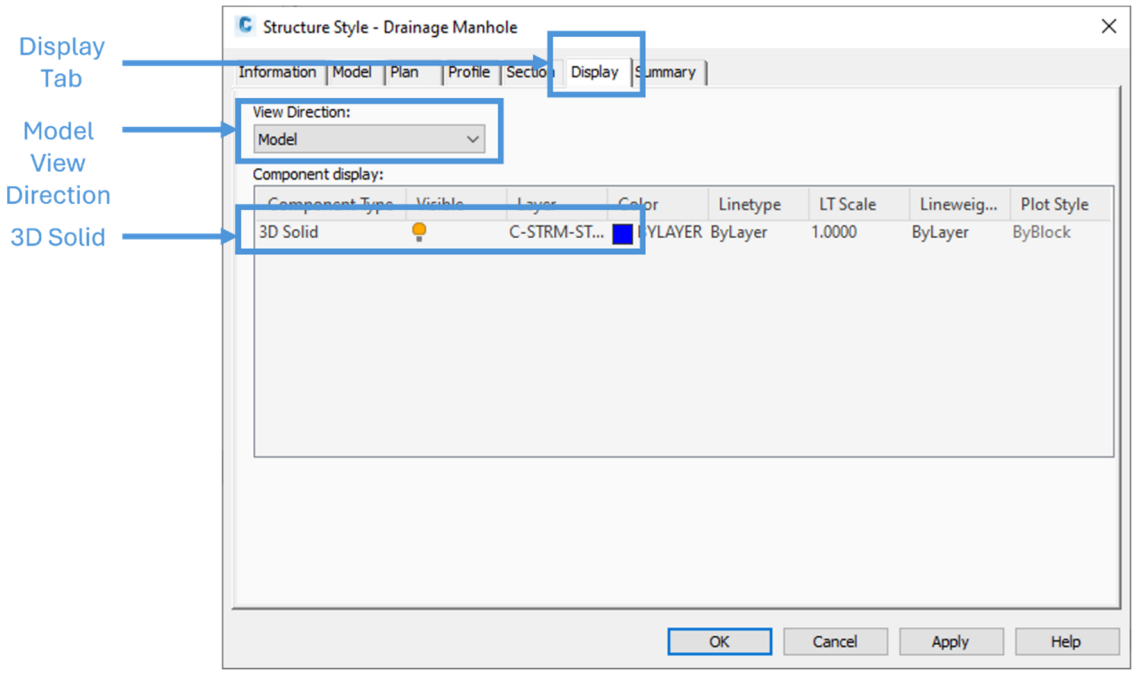
Figure 3-2 Setting of Component Display



3.3. Use of Civil 3D Object Style for 3D Presentation

3.3.1. In Civil 3D, Civil 3D Object Style would be used for setting the 3D presentation of Civil 3D BIM objects. To present the finalised 3D models, the visibility of finalised objects could be switched on. Reference data generated during modelling process could be switched off. Below is an example of switching on visibility for a drainage manhole.

Figure 3-3 Setting of Structure Style for 3D Presentation



4. Insertion of Civil 3D BIM Objects into BIM Models

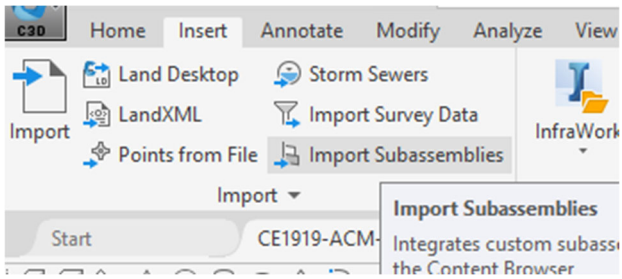
For the two types of Civil 3D BIM objects, subassemblies and pipes catalog, the steps for insertion of Civil 3D BIM objects into BIM model using the import function are described in the sections below.

4.1. Subassemblies

4.1.1. A .pkt file is a subassembly file for creating assemblies and corridor in Civil 3D. Autodesk Subassembly Composer should be used for creating subassemblies. Except the layout of the subassemblies, the super elevation, target and component parameters can be set when creating a subassembly. All parameters can be exported to Civil 3D.

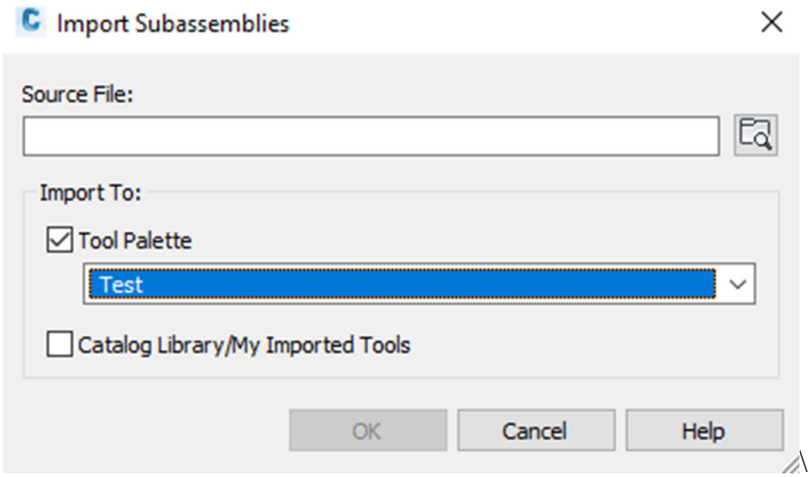
4.1.2. In Civil 3D, "Import Subassemblies" button can be found in "Insert" tab to import the .pkt file.

Figure 4-1 "Import Subassemblies" Panel



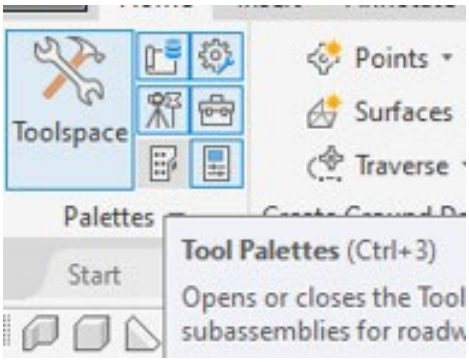
4.1.3. Search the .pkt file which needs to be imported via "Source File". New tool palette can be created in "Tool Palette" to organise those subassemblies by project.

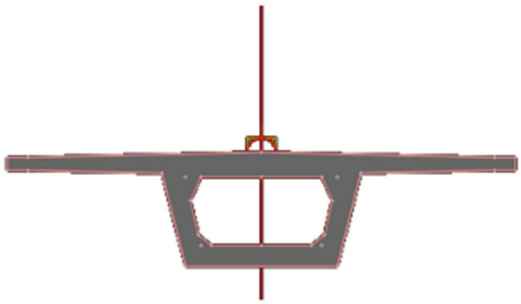
Figure 4-2 Input Source File for "Import Subassemblies"



4.1.4. To utilise the subassemblies file, turn on the “Tool Palettes” after creating an assembly. Drag the subassemblies into assembly. Then create a corridor by using the same assembly.

Figure 4-3 "Tool Palettes" Panel



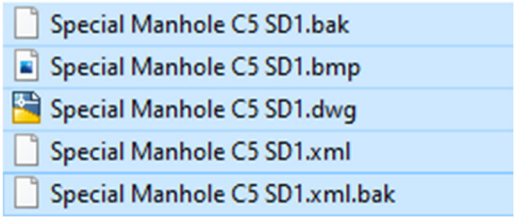


4.2. Pipes Catalog

4.2.1. "Pipes Catalog" is stored in a folder which contains all required structures and pipes. The required structures and pipes should be created by Part Builder, a built-in creator in Civil 3D that generates five types of file (.bak, .bmp, .xml, .dwg, .xml.bak) for one component. The component with all structure and pipes should be saved at the folder path below or (similar):

Figure 4-4 Files for "Pipes Catalog"

C:\ProgramData\Autodesk\C3D 20XX\enu\Pipes Catalog

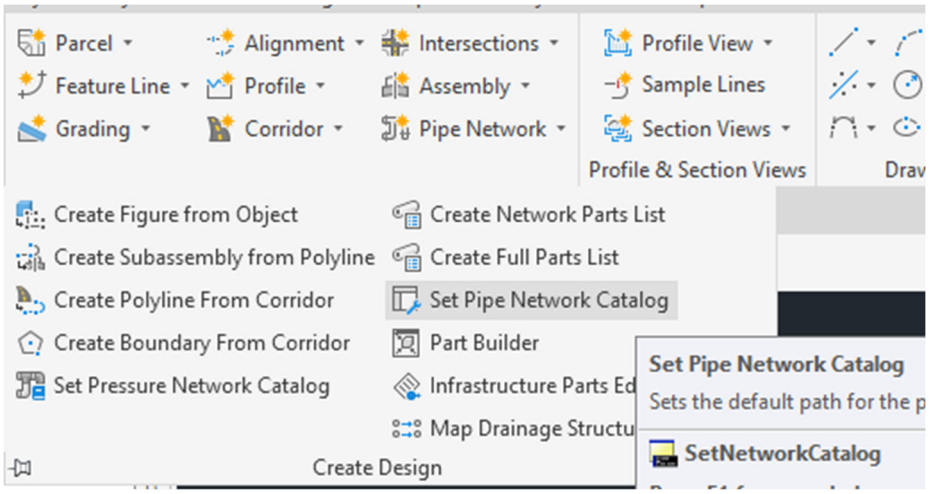


4.2.2. To importing pipes catalog into Civil 3D:

a) Move the customized pipe/structure folder into "Pipes Catalog" or into "Metric Pipe/Structure Catalog". The five file types should be moved into the same folder.

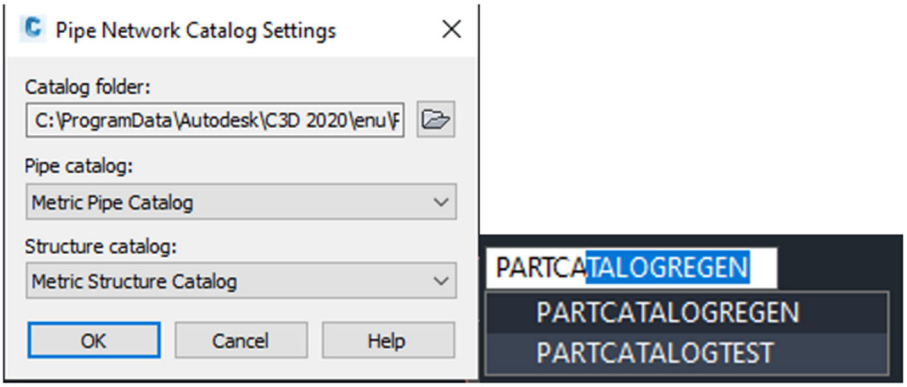
b) Set the "Pipe Network Catalog" to the folder which stored the five file types.

Figure 4-5 Set "Pipe Network Catalog"



c) Regenerate the pipes catalog by using the command "PARTCATALOGREGEN".

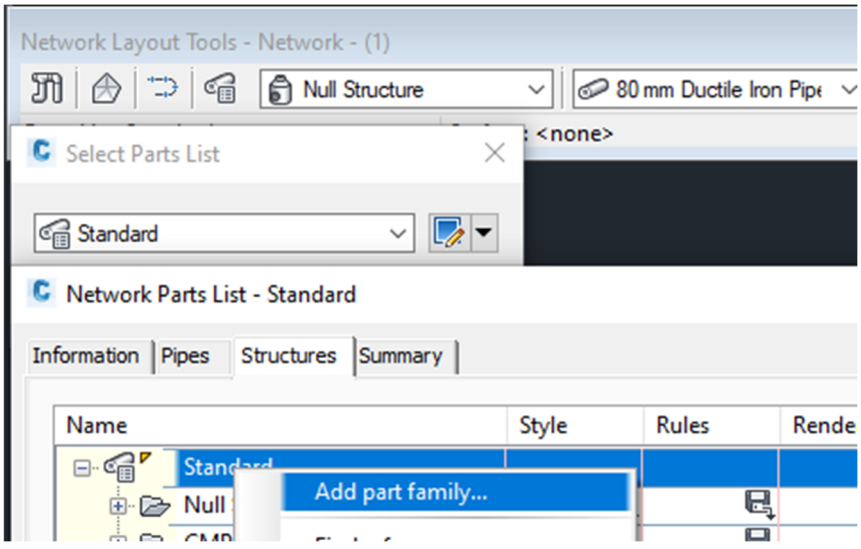
Figure 4-6 Pipe Network Catalog Settings



d) The structures and pipes should be added to Pipe Network after importing the pipe catalog using the following commands:

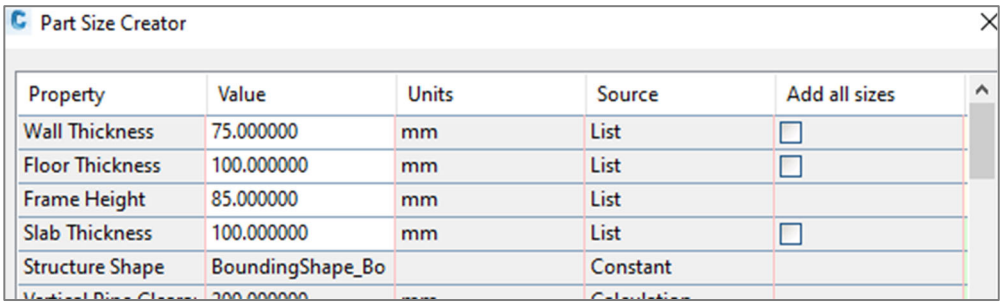
"Edit Network" > "Select Parts List" > "Add part family" in both Pipe and Structures tab. Right click the part just added into the list >"Add part size" > tick "Add all sizes".

Figure 4-7 Edit Network Parts List



e) The properties of Part Size Creator are as follows:

Figure 4-8 Properties of Part Size Creator



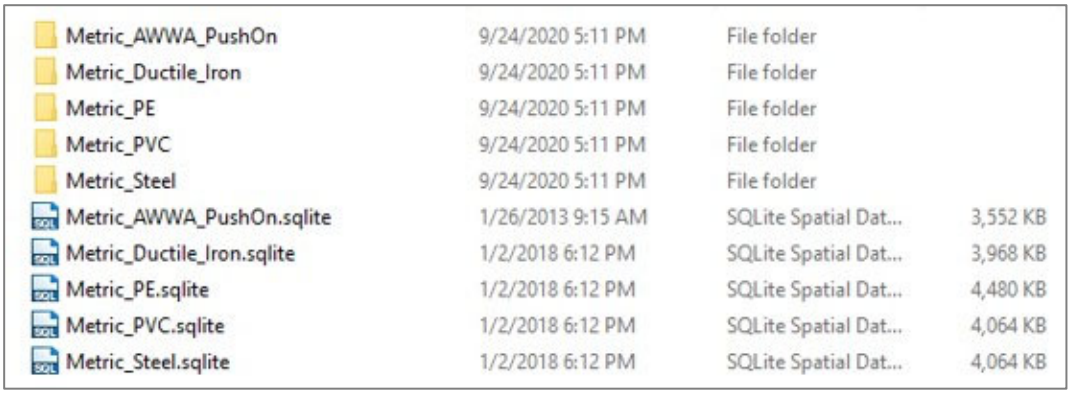
4.3. Pressure Pipes Catalog

4.3.1. Different from pipes catalog, pressure pipes catalog should be created using .sqlite format with different creation procedures.

4.3.2. The "Pressure Pipes Catalog" is stored in "C:\ProgramData\Autodesk\C3D 2020\enu\Pressure Pipes Catalog\Metric".

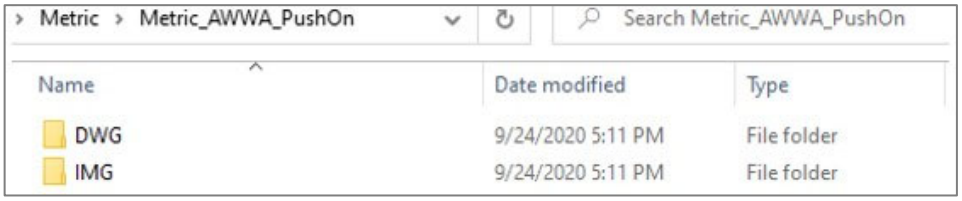
The default catalog includes:

Figure 4-9 Default Catalog



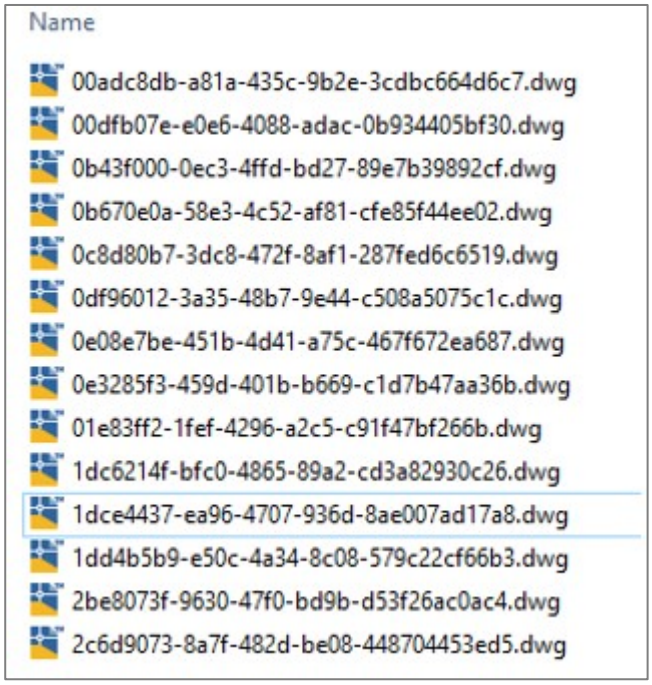
4.3.3. Inside a folder, the parts stored in two folders: DWG and IMG.

Figure 4-10 Each Folder stored with below Two Folders



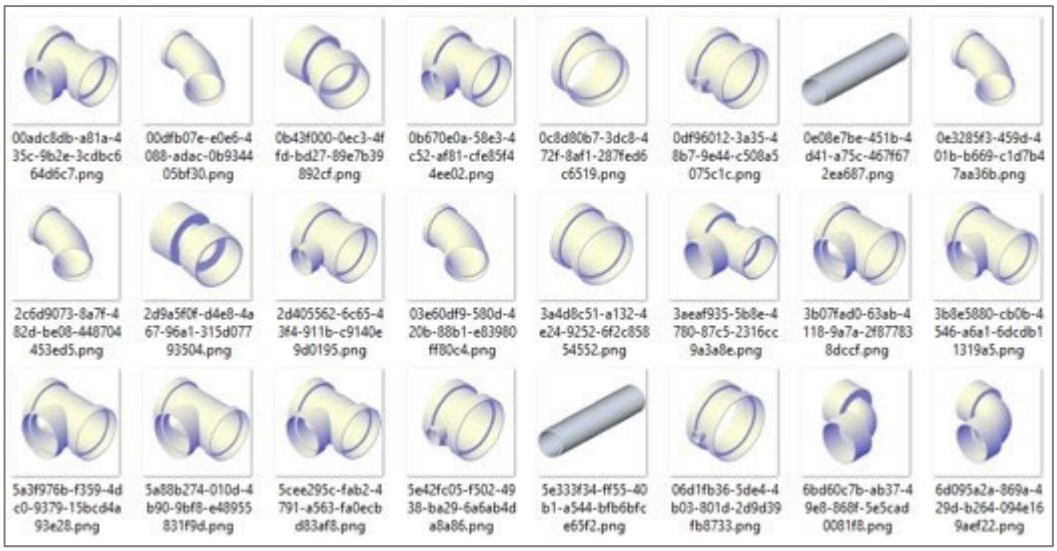
4.3.4. In DWG folder, the .dwg drawings are typically not identifiable by default names.

Figure 4-11 Default Names of the Drawings in the DWG Folder



4.3.5. The IMG folder contains images (in .png formats) whose names match the corresponding .dwg files.

Figure 4-12 Images in IMG Folder



4.3.6. Creating a Pressure Pipe Fitting in Civil 3D

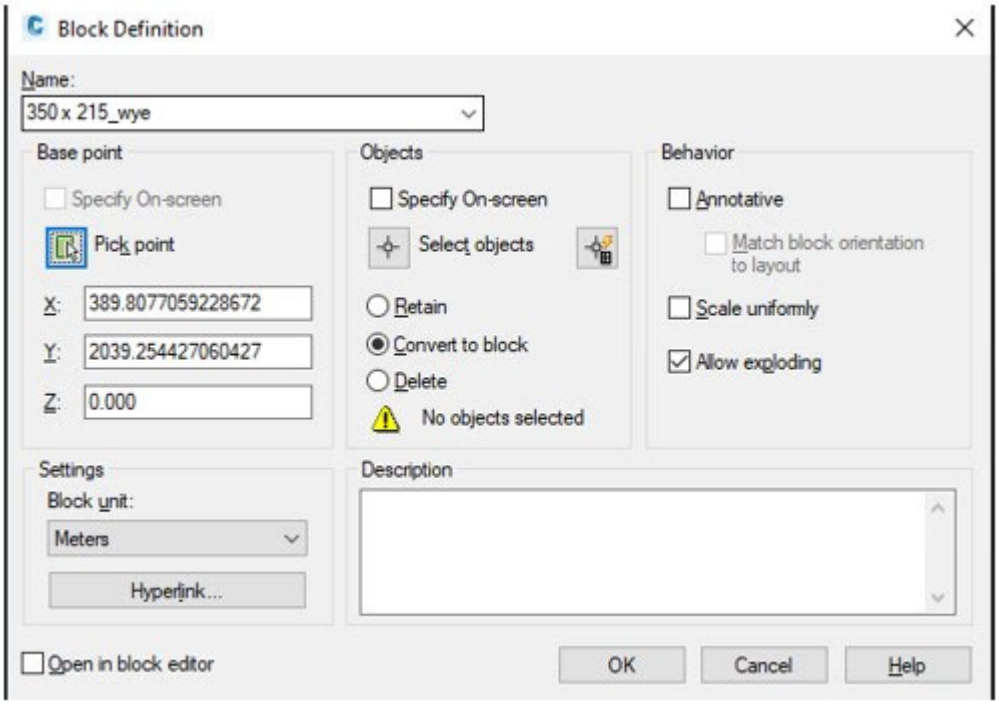
To create a new part, Civil 3D's "Content Catalog Editor" could be used to create a database. "Content Catalog Editor" is a plug-in for Civil 3D, it is not a function or a panel in Civil 3D. To open the "Content Catalog Editor", type "Content Catalog Editor" in the Window Search panel. Refer to below steps (a to p) for details.

a) Draw lines to represent the run and branch.

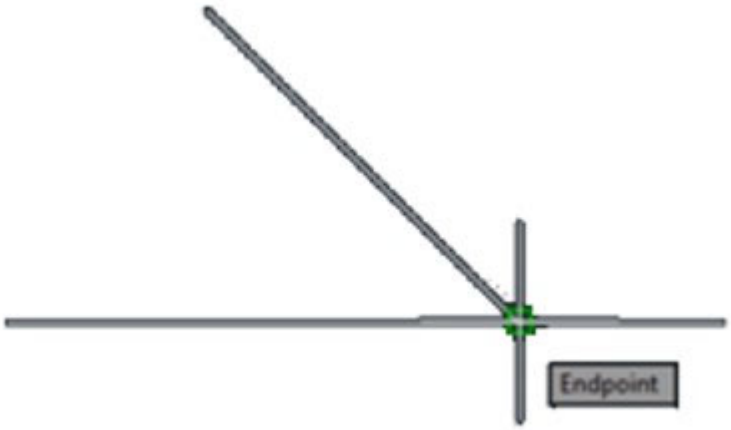
b) Copy lines to prepare for 3D model creation.

c) Convert the original lines into a block to display a single line fitting.

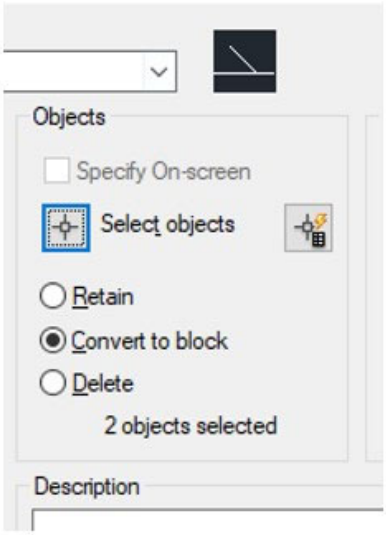
d) Type “BLOCK”. When block definition window pops up, define the part’s name.



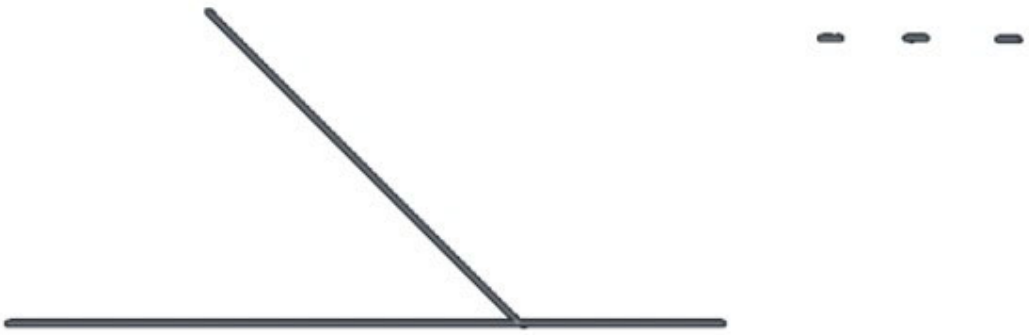
e) Pick the intersection point for the base point.



f) Select the original lines as Objects and click “convert to block”.

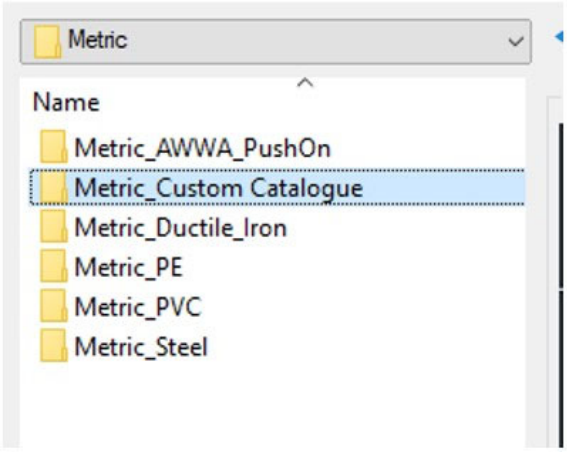


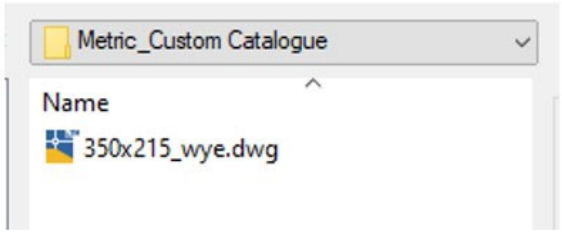
g) After the block is created, return to the copied lines and draw few lines to represent the thickness of the flanges.



h) Create circles with inner diameter and outer diameter for the body. Then, create three more circles for the flanges.

i) Before forming the model, save the drawing as a .dwg into the "Pressure Pipes Catalog" first. It is suggested to create a new custom catalog instead of saving into the default catalog.





j) Back in the drawing, right click on the panel (as shown in Figure j-1) to choose the "Modelling" function (Figure j-2), and use "Sweep" function (Figure j-3) to create the 3D model.

Figure j-1

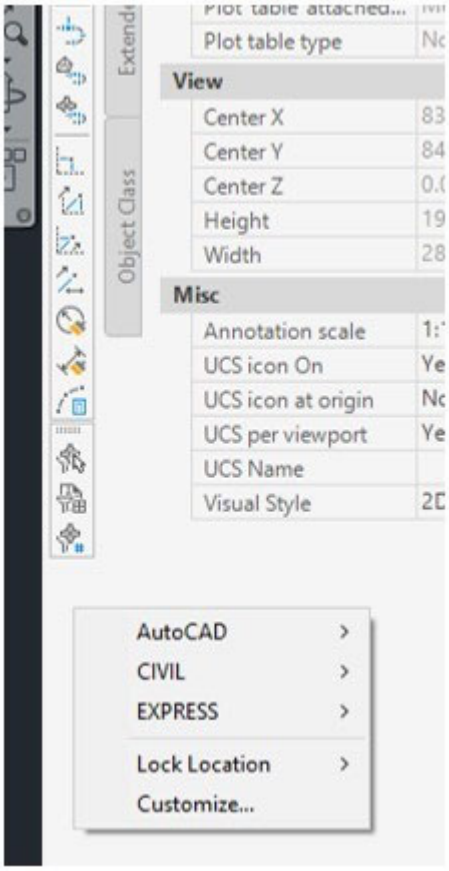


Figure j-2

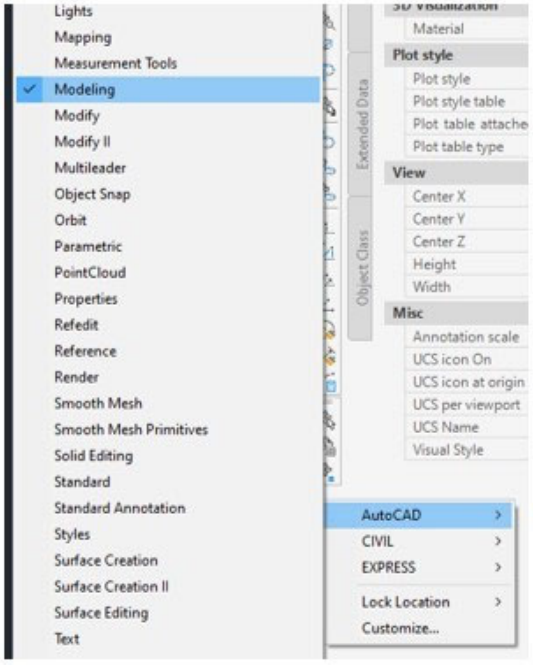
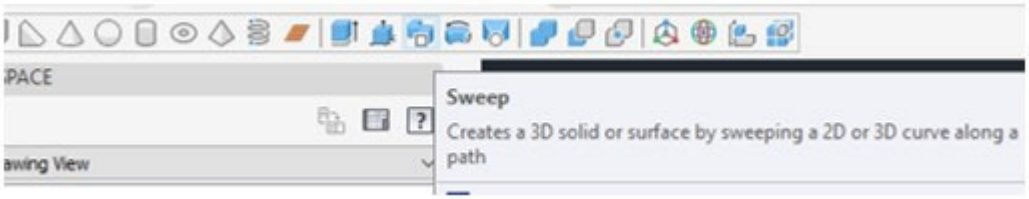
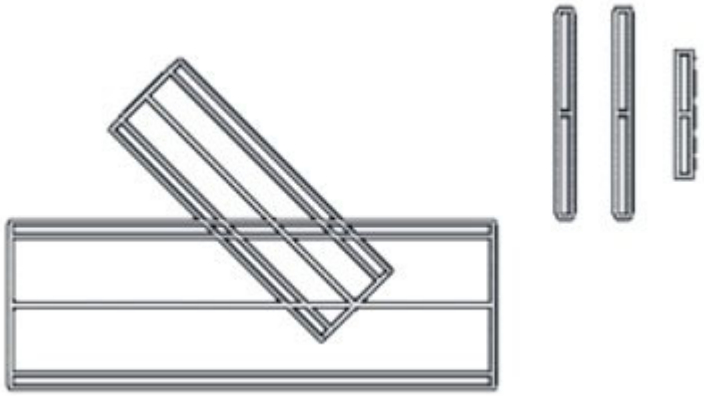


Figure j-3 for the Sweep function toolbar:

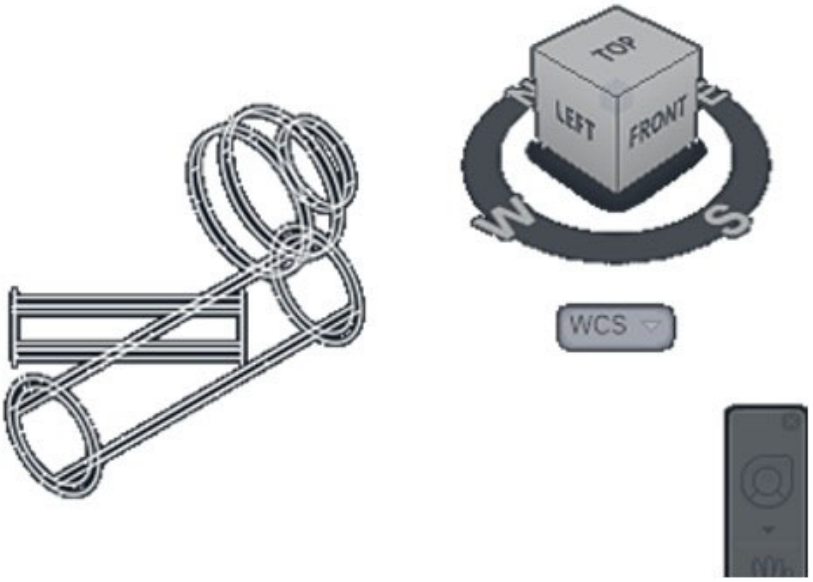


k) Select the sweep objects (circles) first; then select the sweep path (lines).

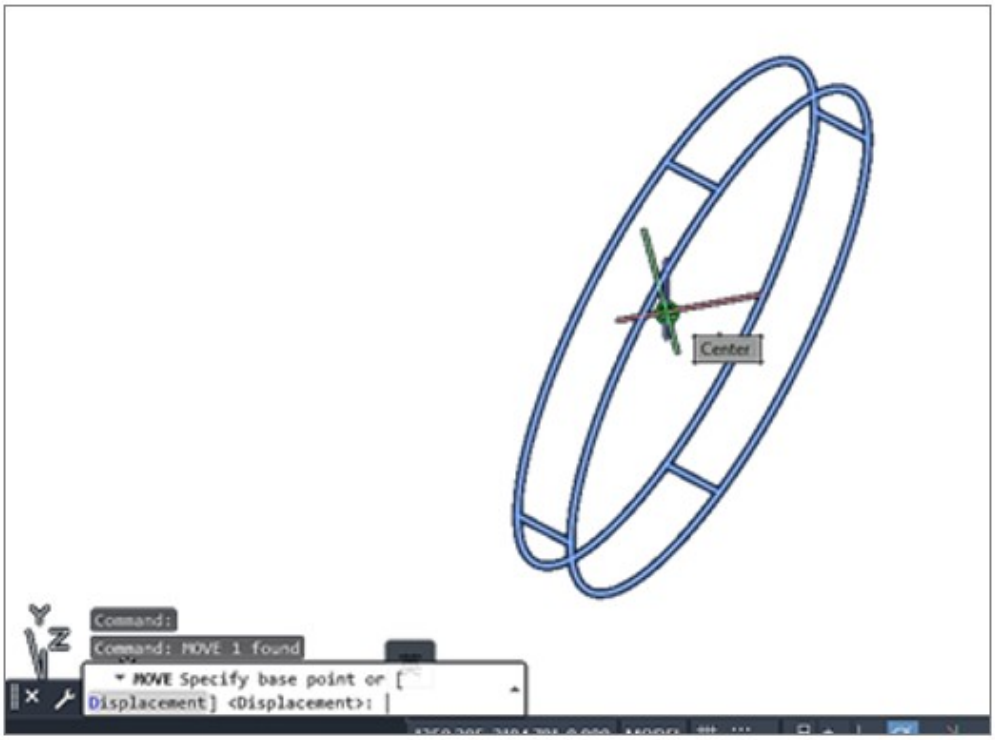


l) Change to 3D view (Screen l-1). For easier modelling, type “MOVE”, set the base point center to the flange object (Screen l-2), and move the flanges center to the end of the wye (Screen l-3).

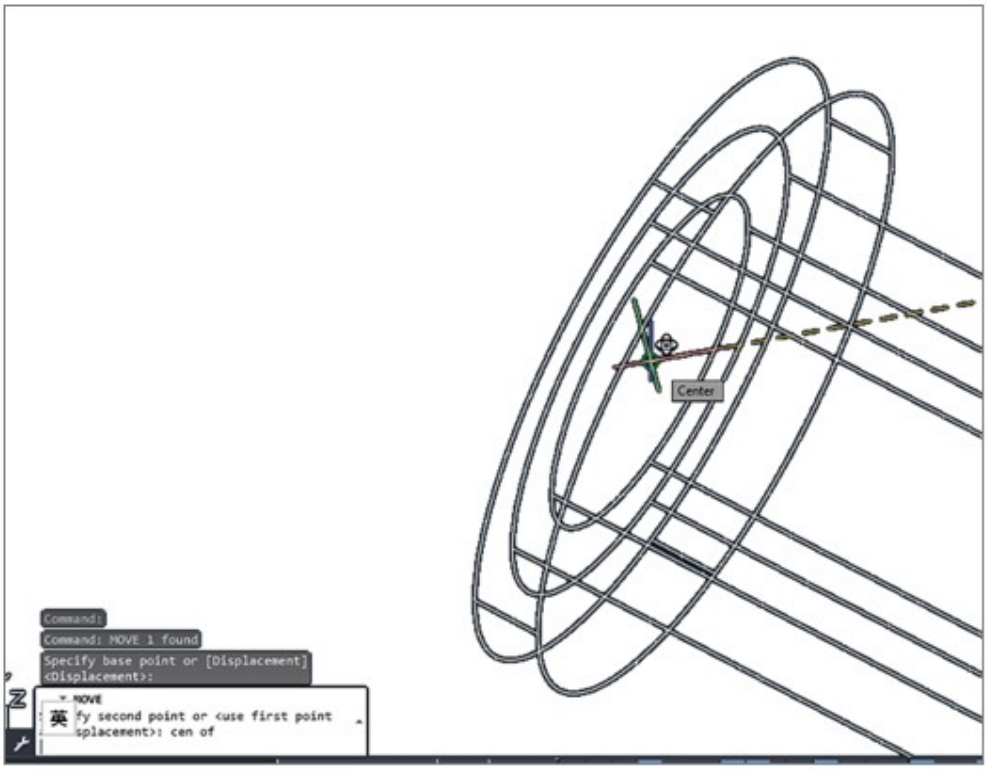
Screen l-1



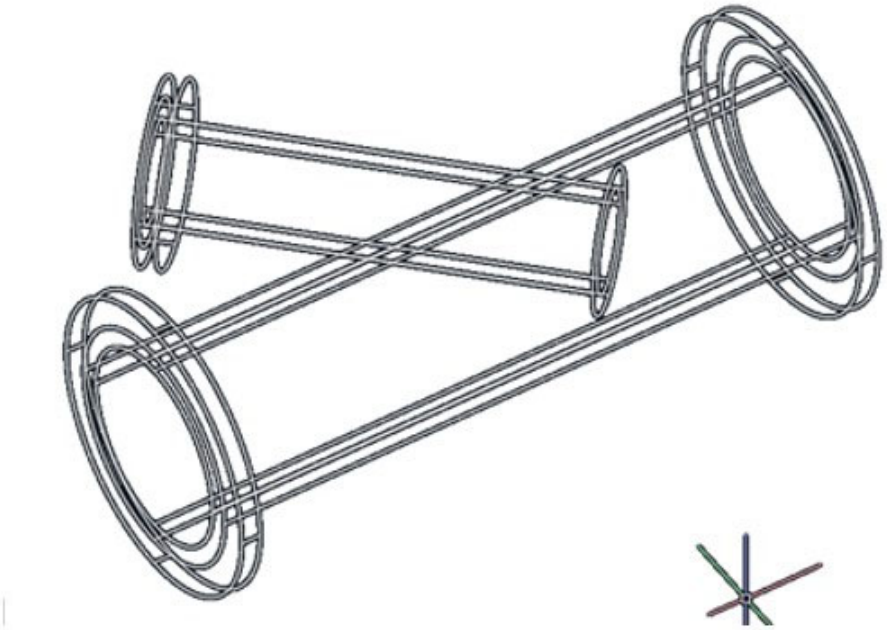
Screen l-2



Screen l-3

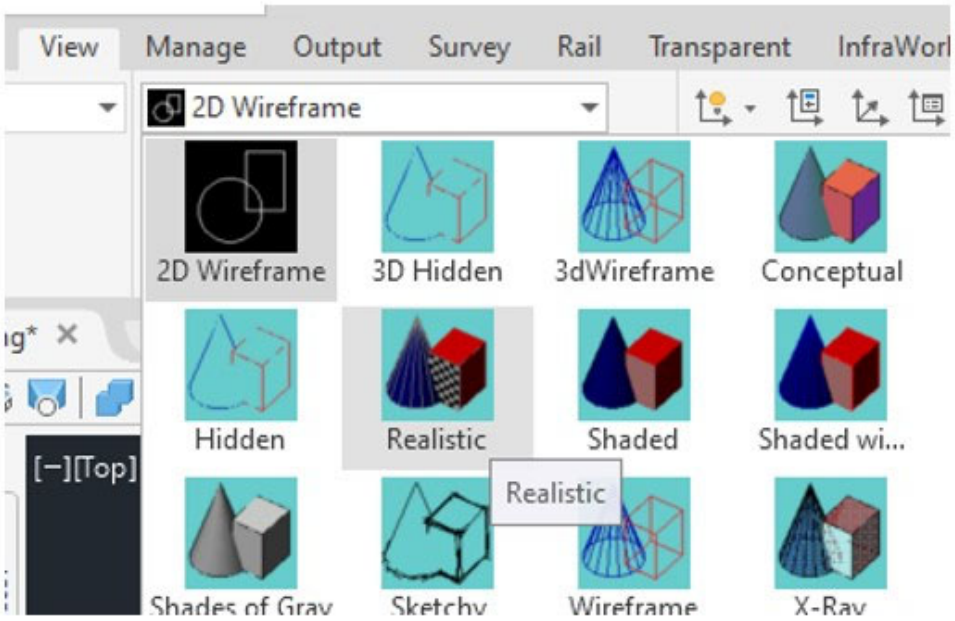


The result after moving the flanges to the object is as follows:

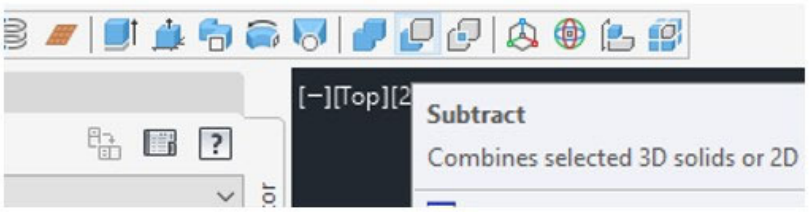


m) Change the view to “Realistic”, and use the “Subtract” function to connect all the parts. Select all outer cylinder first (Figure m-1) then select the inner cylinder for subtraction (Figure m-2).

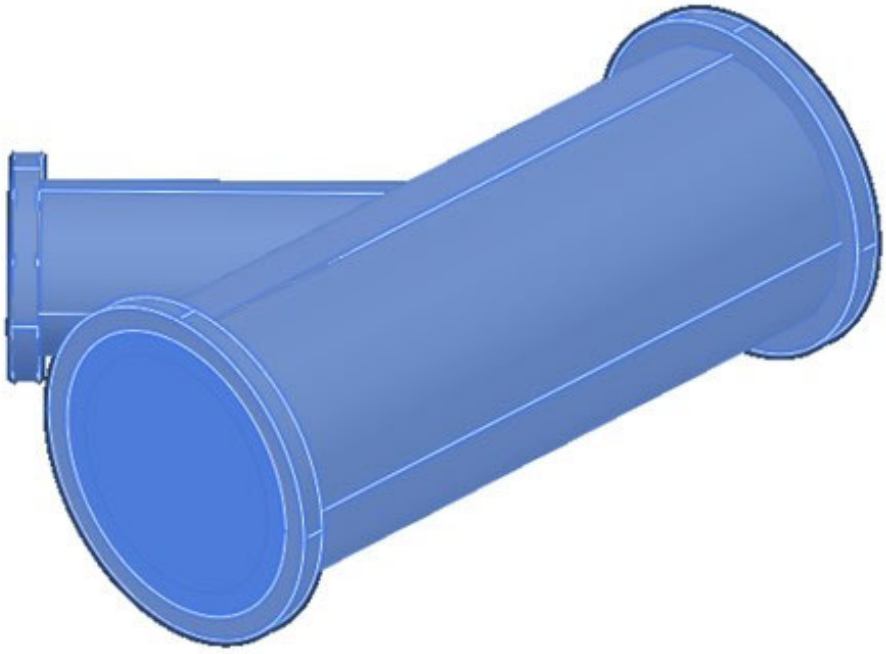
The display panel view is as follows:



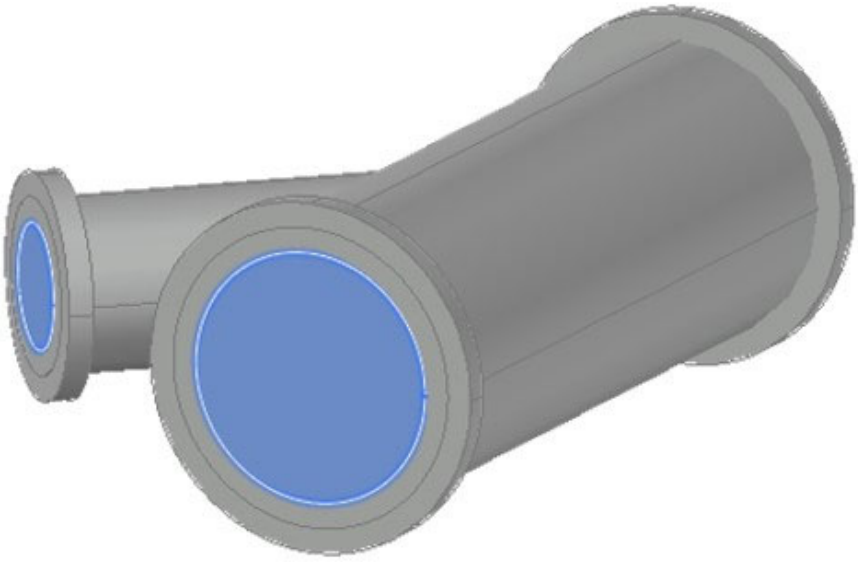
The subtract toolbar is as follows:



Screen m-1

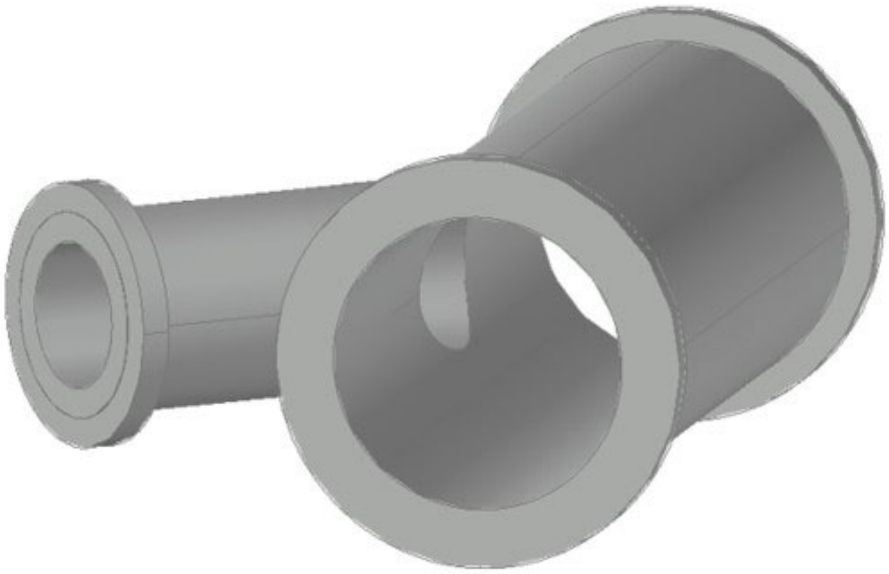


Screen m-2

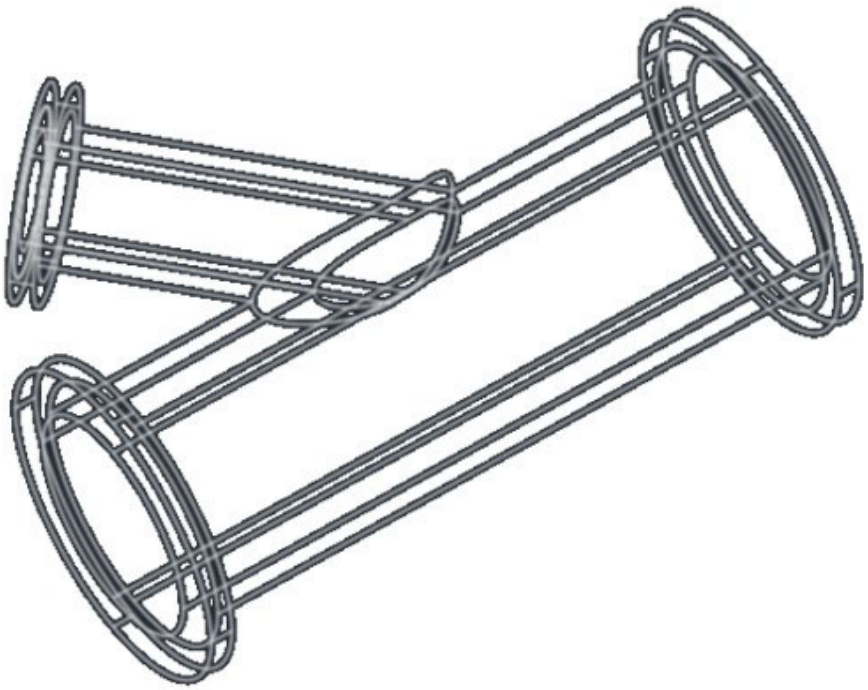


The result after subtracting the inner cylinder is as follows:

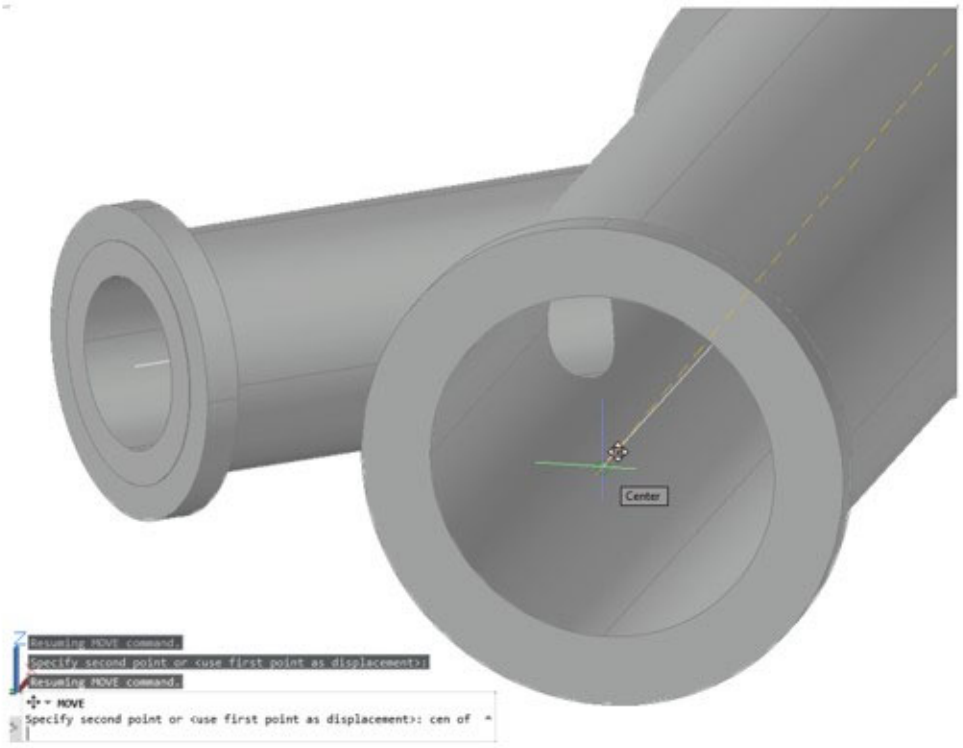
Realistic:



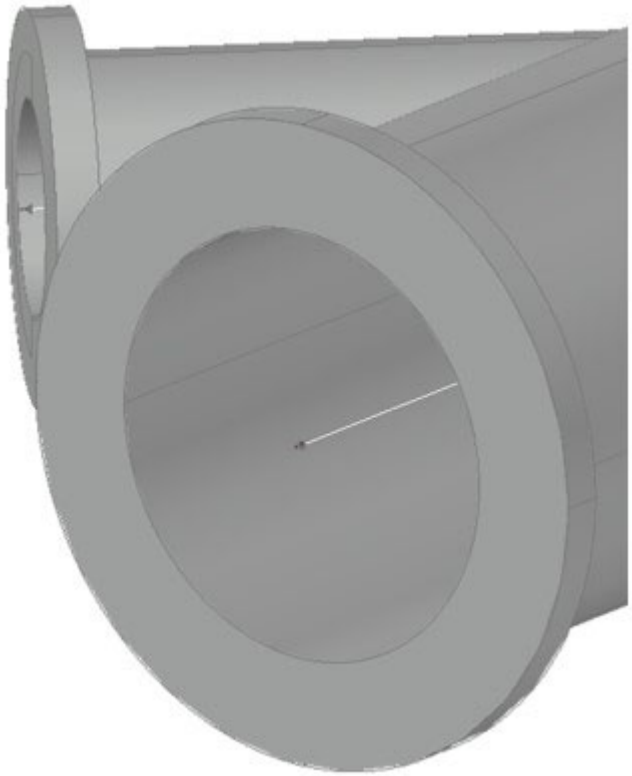
Wireframe:



n) Move the block (Created in Step f) center to the 3D object.

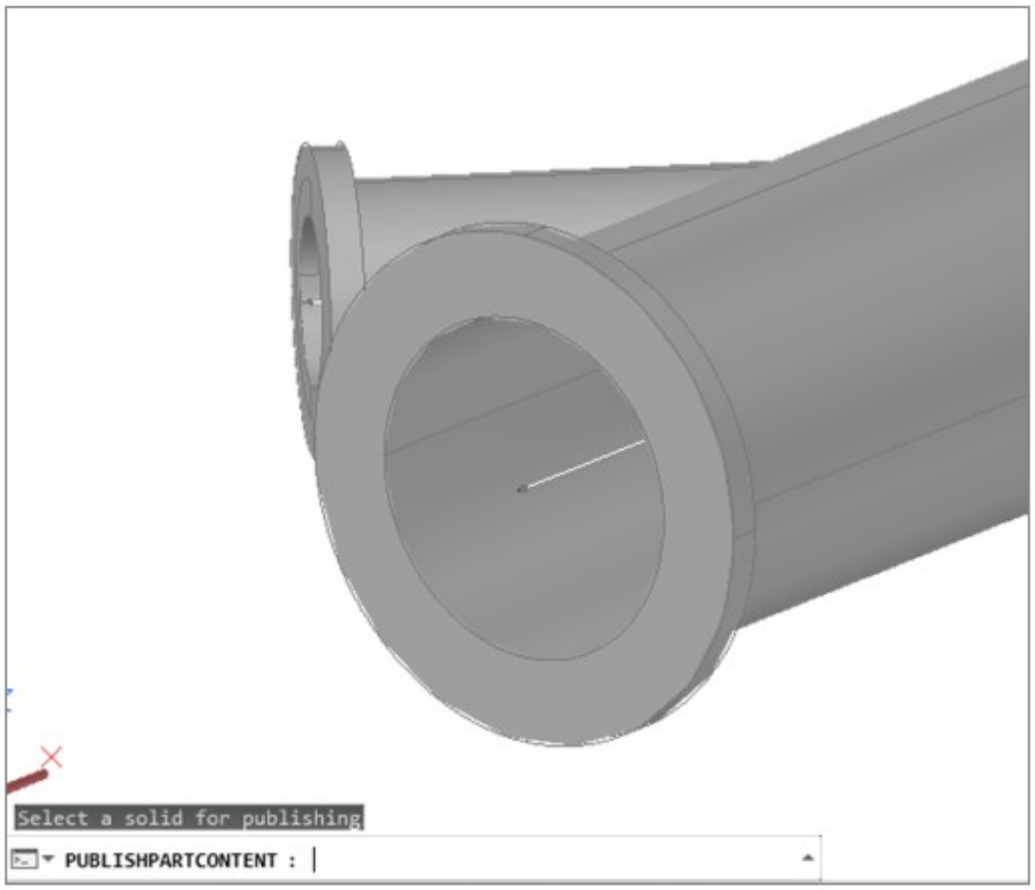


o) Under “Insert” Panel, select “Connection Point” tab, and insert the connection point into the objects.

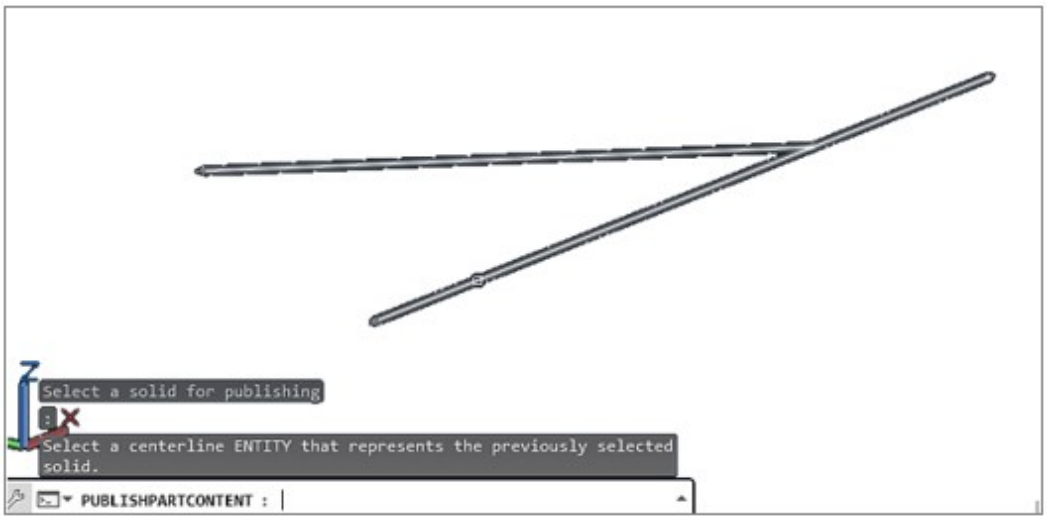


p) Type “PUBLISHPARTCONTENT” command and select the object (Figure p-1) and block (Figure p-2). Define the measuring unit (Figure p-3) and part type (Figure p-4). Save the content file in the same “Custom_Catalog” folder.

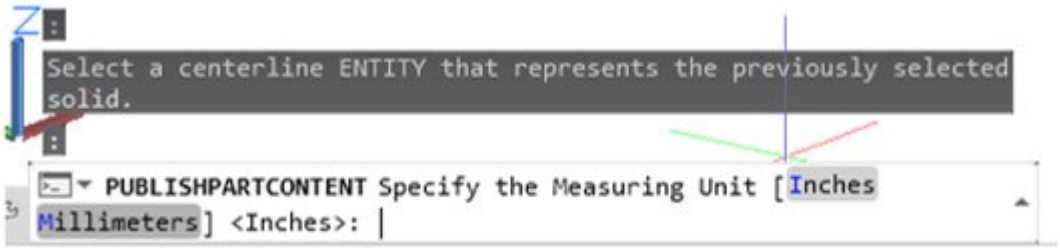
Screen p-1



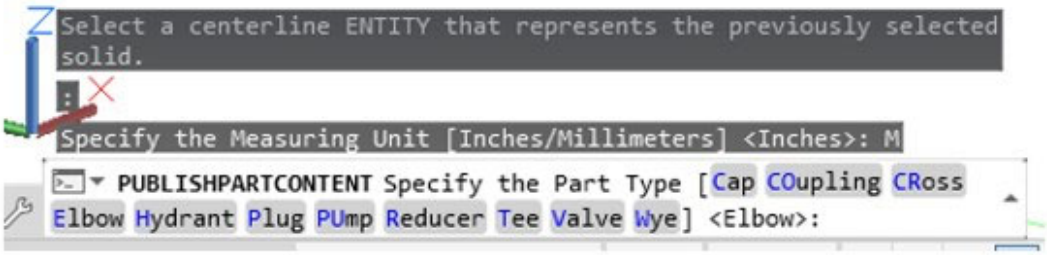
Screen p-2



Screen p-3



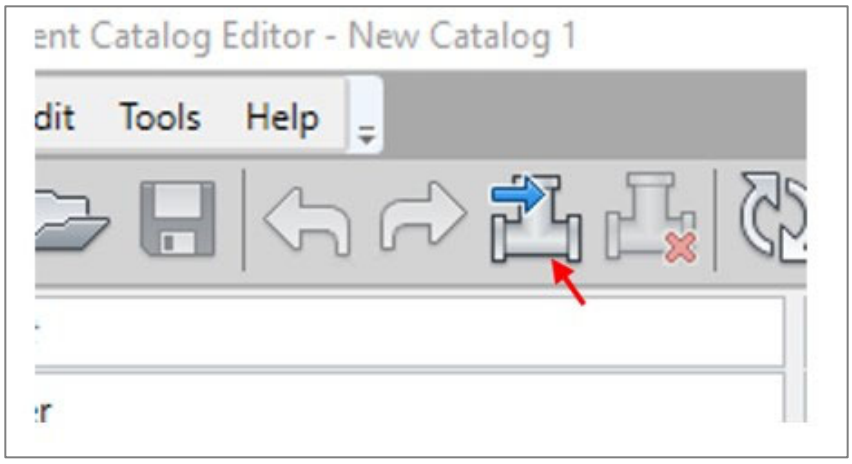
Screen p-4



4.3.7. Using “Content Catalog Editor” to Create .sqlite File.

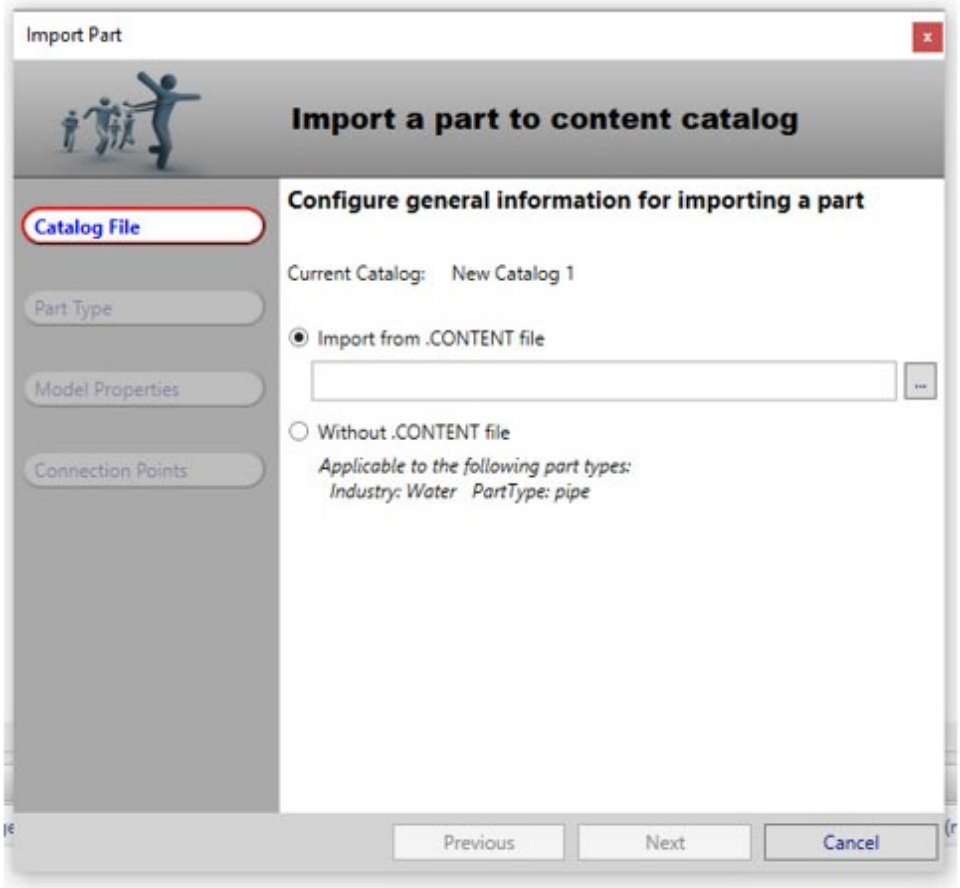
a) In “Content Catalog Editor”, create a new file and import the content file (Figure below). The attributes should be input properly to complete the importing.

Figure 4-13 Panel of “Content Catalog Editor”



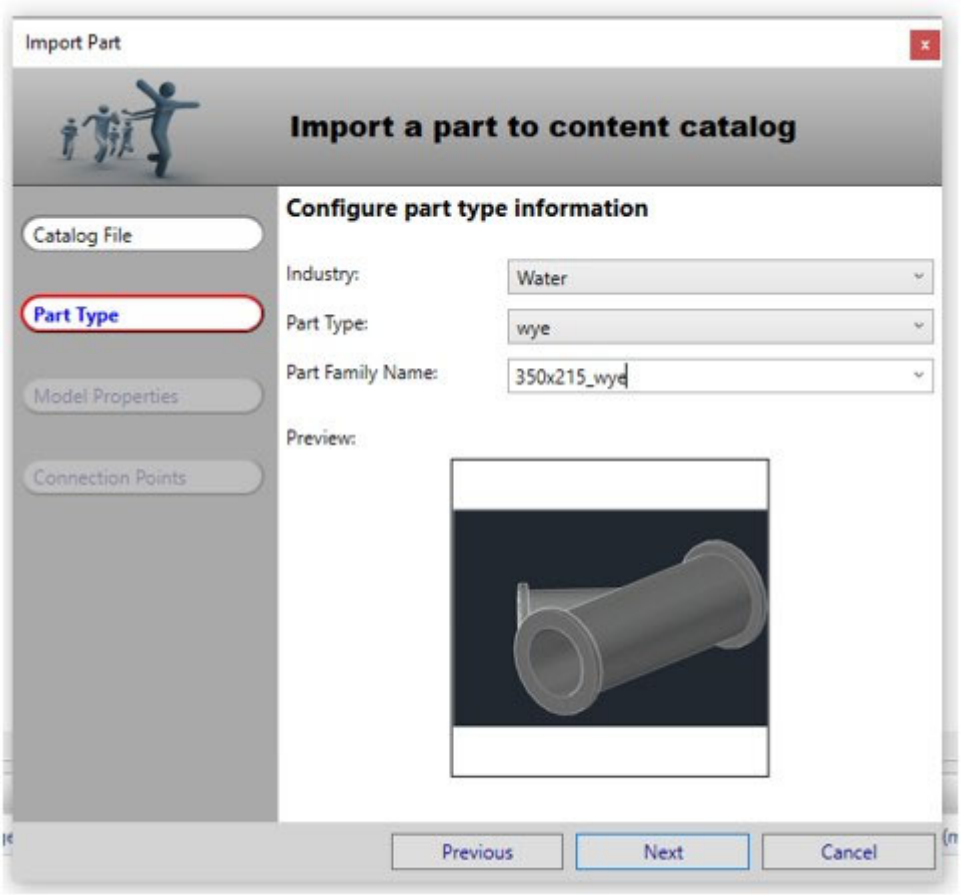
b) Import a part to content catalog under Catalog File:

Figure 4-14 Configure General Information for Importing a Part



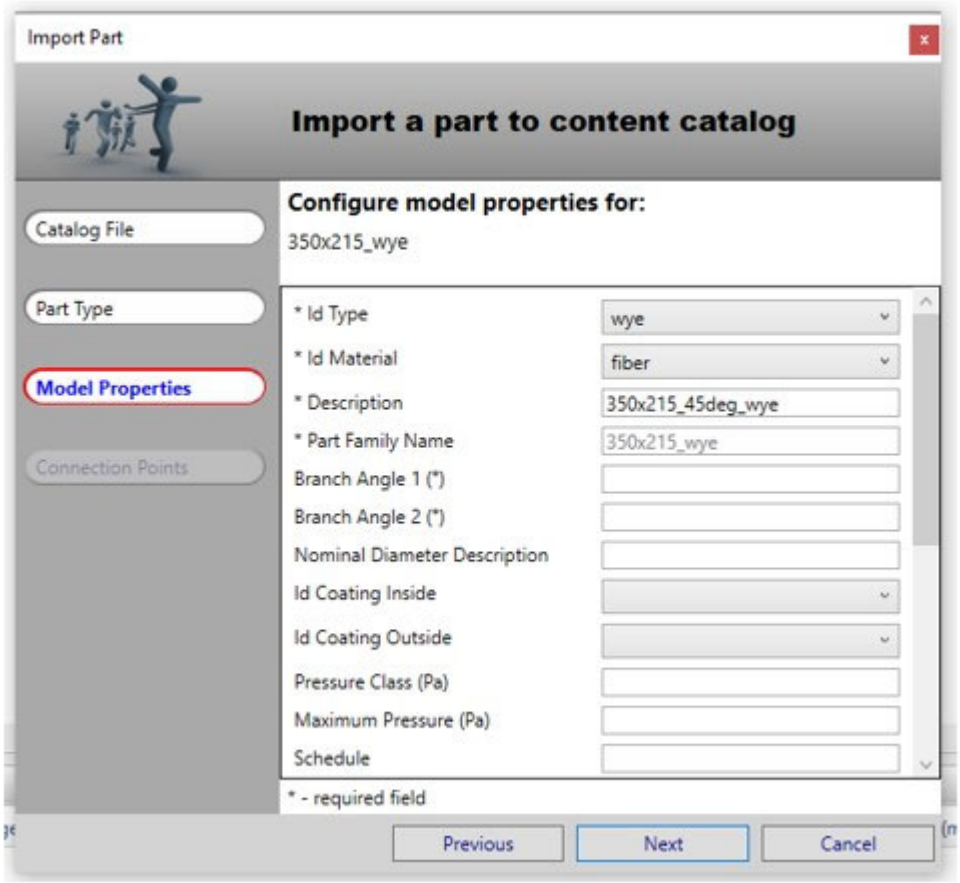
c) Configure part type information:

Figure 4-15 Configure Part Type Information



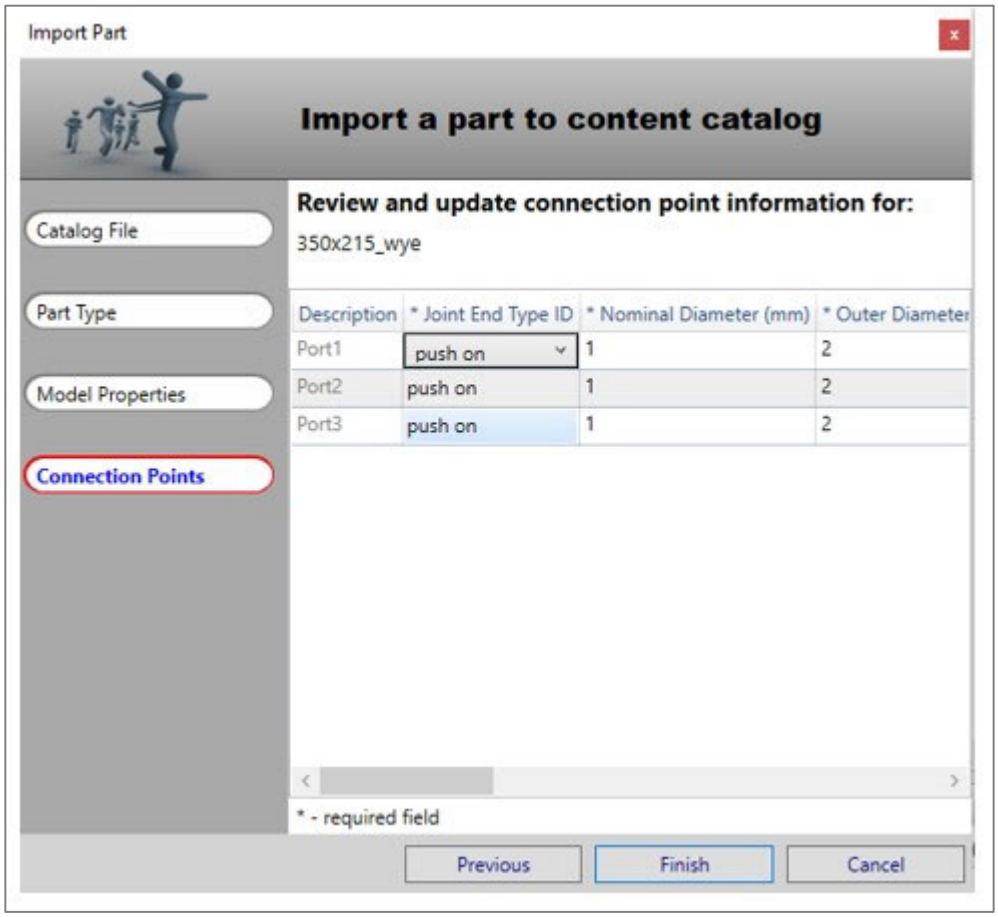
d) Configure model properties:

Figure 4-16 Configure Model Properties



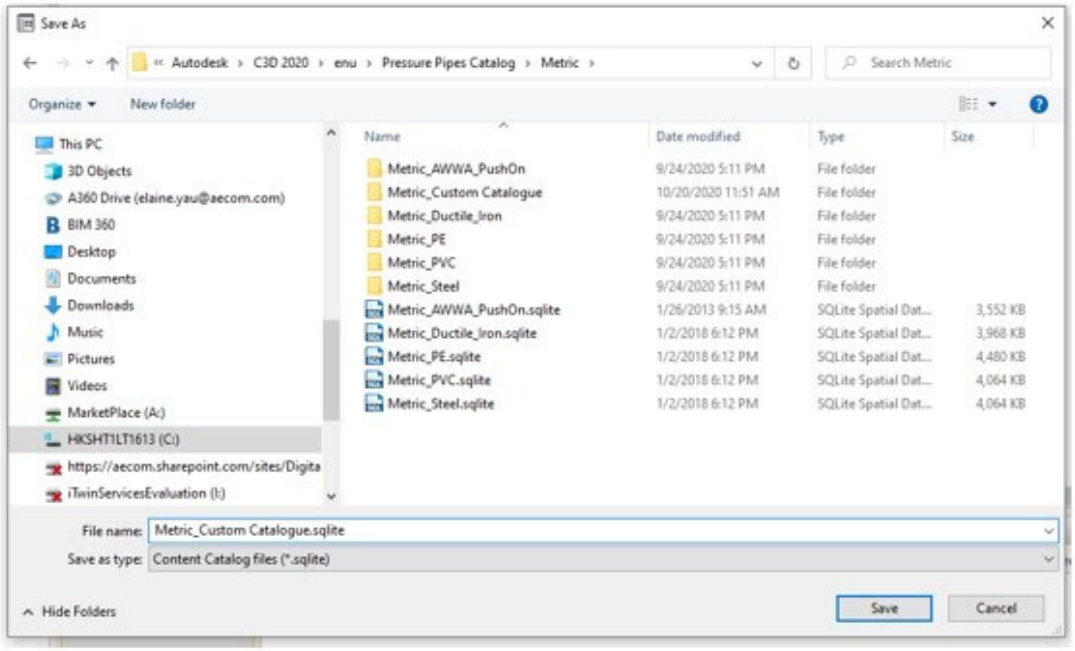
e) Review and update connection point information:

Figure 4-17 Review and Update Connection Point Information



f) After input the attributes, save as a new .sqlite file. The .sqlite file name should be same with the customed Catalog.

Figure 4-18 Save the Content Catalog file



g) This pressure pipe fitting can be reused for other projects by sharing the .sqlite, .dwg and Content Catalog File.

4.3.8. Incorporating the Revit BIM Model into Civil 3D

Revit BIM models could be incorporated into Civil 3D for authoring and coordination purposes. The steps are as follows:

a) Export Revit BIM models to *.dwg 3D solids.

b) In Civil 3D, open the *.dwg 3D solids and then insert Connection Points. “Connection Point” tab is under “Insert” Panel (refer to step o of Section 4.3.1).

c) Use command “PUBLISHPARTCONTENT” to publish a *.content file (refer to step p of Section 4.3.1).

d) In “Content Catalog Editor”, import the *.content file to “Pressure Network” content and customize the required attributes.

Appendix VI – LOD-I Requirements, Creation and Extraction

TABLE OF CONTENTS

1. Introduction VI-1

2. LOD-I Across the WDs VI-1
2.1. WDs' Attributes Requirements VI-1
2.2. The Groups of Attributes in the LOD-I Requirements VI-1
2.3. Mandatory and Required Attributes VI-2
2.4. BIM Authoring Software VI-2
2.5. Samples of Attributes Files VI-2

3. Creation of Attributes for Required Information VI-7
3.1. Creation of Project Information Attributes in Revit VI-7
3.2. Creation of Project Information Attributes in Civil 3D VI-7
3.3. Creation of Shared Parameters in Revit VI-8
3.4. Creation of Property Set in Civil 3D VI-10
3.5. Creation of Classification in Revit VI-15
3.6. Creation of Material Attribute in Revit VI-18
3.7. Filling in Default Attributes under Room in Revit VI-21

4. Types of BIM Model Attribute VI-22
4.1. Common Attributes VI-22
4.2. Common Attributes with Alternative Attribute Names VI-22
4.3. General Attributes VI-22
4.4. Remaining Attributes VI-23

5. Mapping and Extraction of Attributes from BIM Models VI-24
5.1. Extraction Method Overview VI-24
5.2. Extraction of Attributes from Revit VI-24
5.3. Extraction of Attributes from Civil 3D VI-24

List of Tables

Table App VI-1 LOD-I Across the WDs VI-3

List of Figures

Figure App VI-1 Shared Parameter File for Revit VI-2
Figure App VI-2 Project Information Attributes in Revit VI-7
Figure App VI-3 Project Information Attributes in Civil 3D VI-7
Figure App VI-4 Adding Custom Property Name in Civil 3D VI-8
Figure App VI-5 An Example of User-define Attribute for Pipe Using Property Sets VI-10
Figure App VI-6 Step a of Setting up Property Sets for Civil 3D BIM Object VI-10
Figure App VI-7 Step b of Setting up Property Sets for Civil 3D BIM Object VI-11
Figure App VI-8 Step c of Setting up Property Sets for Civil 3D BIM Object VI-11
Figure App VI-9 Step d of Setting up Property Sets for Civil 3D BIM Object VI-12
Figure App VI-10 Step e of Setting up Property Sets for Civil 3D BIM Object VI-12
Figure App VI-11 Step f of Setting up Property Sets for Civil 3D BIM Object VI-13
Figure App VI-12 Step a of Applying Property Sets to Civil 3D BIM Object VI-13
Figure App VI-13 Step b of Applying Property Sets to Civil 3D BIM Object VI-14
Figure App VI-14 Step c of Applying Property Sets to Civil 3D BIM Object VI-14
Figure App VI-15 An Example of Adding OmniClass Information as Shared Parameter in Revit VI-15
Figure App VI-16 An Example of Pre-set Parameters “OmniClass Number” and “OmniClass Title” under Identity Data in Revit Family VI-16
Figure App VI-17 Adding Material Attributes to Family Parameters for Loadable Families VI-18
Figure App VI-18 Adding Built-in Material Attributes to System Families VI-19
Figure App VI-19 Adding Built-in Material Attributes to Compound Structure System Families VI-20
Figure App VI-20 Filling in Default Attributes under Room in Revit VI-21
Figure App VI-21 Sample Tabular Format for Storing Attributes VI-22

1. Introduction

This Appendix describes Level of Information (LOD-I) for BIM models and BIM objects. Section 2 lists out and describes LOD-I across the WDs. Section 3 describes how to create attribute fields in different sample authoring software. Section 4 outlines different types of BIM attributes, and Section 5 describes principles of BIM attribute mapping and extraction. Validation tools with relevant user guidelines to perform initial assessments on the BIM data quality are also available for access at the login page of the Government BIM Data Repository (website link: https://gbdr.landsd.ccgo.hksarg/).

2. LOD-I Across the WDs

Table App VI-1 describes aligned information requirements of BIM models with LOD-I 100 to 500. The groupings of attributes have been developed based on principles set out in CIC BIM Standards - General. Further descriptions of the attribute table are as follows:

2.1. WDs' Attributes Requirements

Asset owner could define additional information needs. In accordance with paragraph 17 of the Technical Circular (Works) No. 1/2025, WDs are required to agree with their maintenance agents of the built assets on a standard practice for handover of as-built BIM models and documentation which contain the essential asset information requirements (AIR) to facilitate effective asset management. Asset owners who have not defined their information needs should refer to the table below as the basis. Asset owners who have already defined their own required attribute(s) should ensure the pre-defined attributes could cover relevant LOD-I.

2.2. The Groups of Attributes in the LOD-I Requirements

The list of attributes is formulated based on common approaches as discussed with WDs. Table App VI-1 contains the following groups of attributes:

a) Project Information is used to facilitate geolocation and data conversion via the Conversion Engine.

b) General Properties are used to enable information grouping and identification.

c) Design Properties are used to facilitate design review, drawing generation and quantity take-off.

d) Classification Properties are used to facilitate asset classification. Departmental classification(s) in addition to or instead of OmniClass could be defined by WDs.

e) Manufacturer's Equipment Properties, Condition Properties and Verification Property are used to facilitate asset information management.

2.3. Mandatory and Required Attributes

"M" indicates mandatory information to facilitate metadata extraction and geolocation for Conversion Engine. "R" indicates required information to the WDs. To facilitate information exchange, Table App VI-1 shows the minimum required LOD-I and should be inputted into BIM models as far as practicable. Exemptions to exclude required information to WDs should be sought from **maintenance agencies**, and the records on the decisions should be kept and documented in BEP.

2.4. BIM Authoring Software

Attributes that are built-in to BIM authoring software should be utilised as far as practicable. In the last two columns of Table App VI-1, Revit and Civil 3D are used as examples for the attributes' creation methods. If software other than these two software is adopted, the methods for creating attributes should be properly documented in the BEP.

2.5. Samples of Attributes Files

To facilitate WDs' adoption of the LOD-I across the WDs, a project-specific shared parameter text file for Autodesk Revit (refer to Figure App VI-1) and a .dwg file including for Autodesk Civil 3D with those attributes can be downloaded from DEVB's Website:
https://www.devb.gov.hk/en/publications_and_press_releases/publications/devb-harmonisation-guideline/index.html

Figure App VI-1 Shared Parameter File for Revit

```
# This is a Revit shared parameter file.
# Do not edit manually.
*META   VERSION MINVERSION
META    2   1
*GROUP  ID  NAME
GROUP   1   Classification Properties
GROUP   2   General Properties
GROUP   3   Design Properties
GROUP   4   Manufacturer's Equipment Properties
GROUP   5   Condition Properties
GROUP   6   Verification Property
*PARAM  GUID    NAME    DATATYPE    DATACATEGORY    GROUP   VISIBLE DESCRIPTION USERMODIFIABLE
PARAM   ba3c3418-a4ba-460d-bb47-f25ba4d56a8e    Equipment Capacity  TEXT        4   1       1
PARAM   f184fa44-50fe-4e0d-be15-f9e776181cd2    Contract Number of the Equipment    TEXT        4   1       1
PARAM   87dabc67-a110-4bca-982b-548150a66ed8    Verification    TEXT        6   1       1
PARAM   24d8fb6d-3f01-4a8c-b254-f55a95dda970    Material Grade  TEXT        3   1       1
PARAM   71f6107b-59c8-486f-8b2d-82f6c1aea810    CAT Code    TEXT        2   1       1
PARAM   de760a88-d846-4697-a9d2-b04bd0f58115    Manufacturer Name   TEXT        4   1       1
PARAM   7b262c88-0db1-4a8d-9b70-f8730a0a33ec    Design Capacity TEXT        3   1       1
PARAM   2be8dc88-6137-48ab-8a7e-564259dd95c4    Model Number    TEXT        4   1       1
PARAM   56848590-dd58-45b4-8561-4d90e97168bc    Departmental Unique ID  TEXT        2   1       1
PARAM   8979349f-9719-4416-9204-af0f333e75d1    Certified Completion Date   TEXT        5   1       1
PARAM   2a3681ac-2d41-47e6-922e-3282c823b9dd    Handover Date   TEXT        5   1       1
PARAM   c92b6fc2-f76c-4065-908f-adf5f22eb83e    Asset ID    TEXT        4   1       1
PARAM   cac282cd-9403-4c82-aeb4-a88757c778b7    OmniClassTitle  TEXT        1   1       1
PARAM   d06feedf-d592-495f-8db5-b0aafea86e98    LOD-G   TEXT        1   1       1
PARAM   e3f4d6e5-b221-42b4-ad34-49282662d045    Brand Name  TEXT        4   1       1
PARAM   56cb03ea-0752-490e-812b-19bfb0c50a5e    OmniClassVersion    TEXT        1   1       1
PARAM   676bb5f6-a71b-4a20-bf4e-5e8c143862a9    OmniClassCode   TEXT        1   1       1
PARAM   de1780f8-89a1-4175-a779-00e83675ad1a    Locations   TEXT        2   1       1
PARAM   28e1f8f9-479b-4de7-8a8f-53525653f350    LOD-I   TEXT        1   1       1
```

Table App VI-1 LOD-I Across the WDs

No.	Grouping	Attribute Name	Description	LOD-I					Proposed Input Format	Creation Method for Sample Authoring Software	
				100	200	300	400	500		Revit	Civil 3D
1	Project Information	Organisation Name	Client name (per agreement/ contract)	M	M	M	M	M	Alphanumeric	Use default attribute in Project Information Dialog Box Refer to Section 3.1	Use Custom Property in Drawing Properties Dialog Box Refer to Section 3.2
		Project Issue Date	Project Commencement date	M	M	M	M	M	MMM YYYY (eg. Nov 2014)		
		Project Address	The street address of the project	M	M	M	M	M	Alphanumeric		
		Project Name	The project name as shown on the drawing sheet's title block	M	M	M	M	M	Alphanumeric		
		Project Number	The project number as shown on the drawing sheet's title block	M	M	M	M	M	Alphanumeric		
2	General Properties	CAT Code	Departmental category **(see Remark 1)**	R	R	R	R	R	Alphanumeric	Shared Parameter Refer to Section 3.3	Property Set Refer to Section 3.4
		Locations	Location (e.g. district code for outdoor object)		R	R	R	R	Alphanumeric		
		Departmental Unique ID	The unique ID for departmental information management		R	R	R	R	Alphanumeric		

No.	Grouping	Attribute Name	Description	LOD-I					Proposed Input Format	Creation Method for Sample Authoring Software	
				100	200	300	400	500		Revit	Civil 3D
3	Design Properties	Material	Singular material or all materials pertaining to the assembly		R	R	R	R	Alphanumeric	Family parameter Refer to Section 3.6	Property Set Refer to Section 3.4
		Material Grade	Material grade (e.g. concrete grade, steel grade)		R	R	R	R	Alphanumeric	Shared Parameter Refer to Section 3.3	
		Design Capacity	Design capacity		R	R	R	R	Alphanumeric		
		Number	Room Number				R	R	Alphanumeric	Use default attributes under "Room" Refer to Section 3.7	N/A
		Name	Room Name				R	R	Alphanumeric		
4	Classification Properties **(see Remark 2)**	OmniClassCode	OmniClass code			R	R	R	Alphanumeric	Classification Refer to Section 3.5	Property Set Refer to Section 3.4
		OmniClassTitle	OmniClass title			R	R	R	Alphanumeric		
		OmniClassVersion	OmniClass version			R	R	R	Alphanumeric		

No.	Grouping	Attribute Name	Description	LOD-I					Proposed Input Format	Creation Method for Sample Authoring Software	
				100	200	300	400	500		Revit	Civil 3D
5	Manufacturer's Equipment Properties	Brand Name	Brand name				R	R	Alphanumeric	Shared Parameter Refer to Section 3.3	Property Set Refer to Section 3.4
		Manufacturer Name	Manufacturer name				R	R	Alphanumeric		
		Model Number	Model number of element / equipment				R	R	Alphanumeric		
		Equipment Capacity	Equipment capacity				R	R	Alphanumeric		
		Asset ID	Asset ID				R	R	Alphanumeric		
		Contract Number of the Equipment	The equipment's contract number				R	R	Alphanumeric		
6	Condition Properties	Certified Completion Date	Certified completion date				R	R	MMM YYYY (eg. Nov 2014)	Shared Parameter Refer to Section 3.3	Property Set Refer to Section 3.4
		Handover Date	Handover date				R	R	MMM YYYY (eg. Nov 2014)		

No.	Grouping	Attribute Name	Description	LOD-I					Proposed Input Format	Creation Method for Sample Authoring Software	
				100	200	300	400	500		Revit	Civil 3D
7	Verification Property	Verification	Verification method (input A for "field verified by visual inspection" and B for "field verified by a measured survey")					R	Text (e.g. A or B)	Shared Parameter Refer to Section 3.3	Property Set Refer to Section 3.4

Remarks:

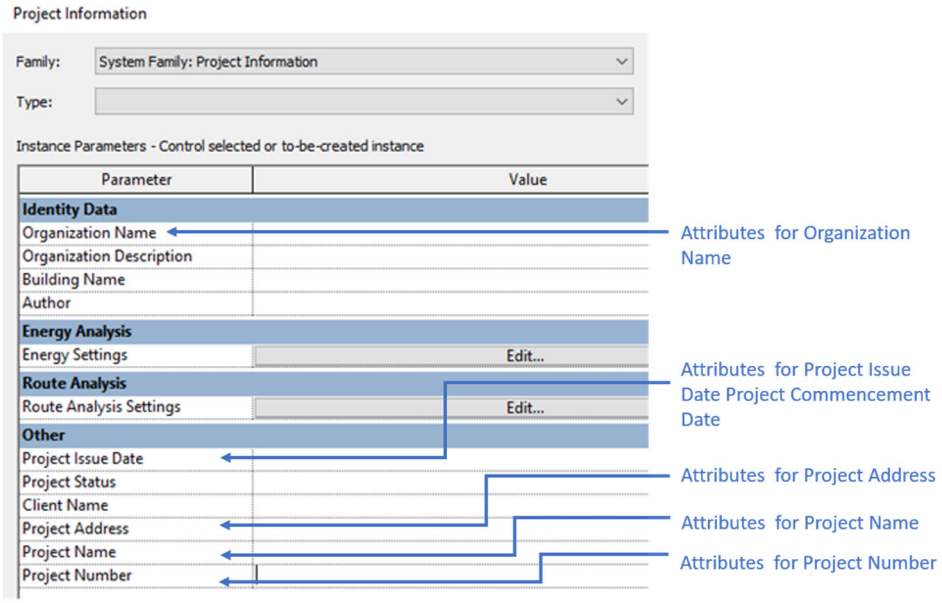
1. Category (in the form of the shared parameter “CAT Code” under “General Properties”) could facilitate grouping and data filtering. In addition, “category” may refer to:
   a) The use of appropriate category or object types when creating BIM objects to minimize data loss (especially LOD-G) during open format exchange.
   b) BIM Object naming's abbreviation code fields 1 & 2 to facilitate BIM object library management and consistency of information container ID naming.
2. Department-specified classification(s) in addition to or instead of OmniClass could be defined by WDs.

3. Creation of Attributes for Required Information

3.1. Creation of Project Information Attributes in Revit

In Revit, default attributes can be utilised for inputting Project Information under **Manage** tab → **Settings** panel → **Project Information**. The figure below illustrates the Revit Parameters used for Project Information.

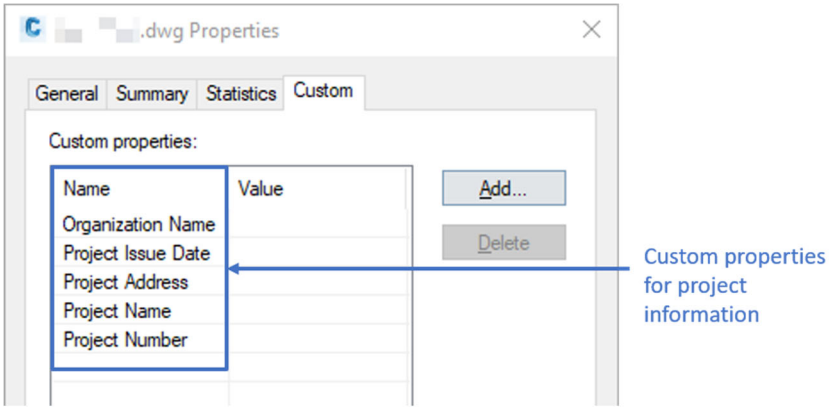
Figure App VI-2 Project Information Attributes in Revit



3.2. Creation of Project Information Attributes in Civil 3D

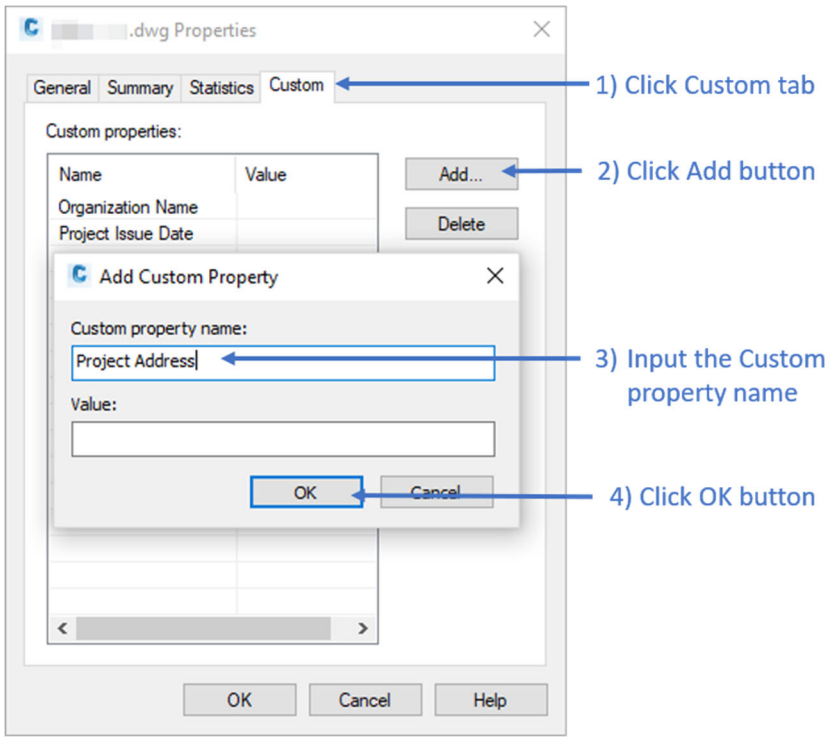
In Civil 3D, Project Information attributes can be created by using **Custom Property** in **Drawing Properties** dialog box.

Figure App VI-3 Project Information Attributes in Civil 3D



To create the Custom Property, first input "**DWGPROPS**" in the command line to show the **Drawing Properties** dialog box, then follow the steps as illustrated in the figure below to add the Project Information attributes.

Figure App VI-4 Adding Custom Property Name in Civil 3D



3.3. Creation of Shared Parameters in Revit

3.3.1. In Revit, Shared Parameters are identified by unique GUIDs to facilitate attribute consistency across BIM files. Shared Parameters could be applied to BIM object and BIM model.

3.3.2. Adding Shared Parameters to Revit Family Files (BIM objects in .rfa format)

a) Create a new family or open an existing one.

b) Click **Create** tab ➤ **Properties** panel ➤ (**Family Types**).

c) In the **Family Types** dialog, under the **Parameters** group box, click **Add**.

d) In the **Parameter Properties** dialog, select **Shared Parameter**.

e) Click **Select** and choose the appropriate shared parameter from the appropriate parameter group. If desired, click **Edit**; this will return to the **Edit Shared Parameters** dialog which allows opening a different shared parameter file or adding new parameters (refer to the steps in Section 3.3.4).

f) Choose whether to store the parameter by instance or type.

g) Click **OK**. The parameter name appears in the **Family Types** dialog.

h) Optionally, enter a value for the shared parameter or create a formula to calculate its value.

3.3.3. Adding Shared Parameters to Revit Project Files (BIM models in .rvt format)

a) Create a new project or open an existing one.

b) Click **Manage** tab ➤ **Settings** panel ➤ (**Project Parameters**).

c) In the **Project Parameters** dialog, click Add.

d) In the **Parameter Properties** dialog, select **Shared parameter**.

e) Click **Select** and choose the appropriate shared parameter from the appropriate parameter group. If desired, click Edit; this will return to the **Edit Shared Parameters** dialog which allows opening a different shared parameter file or adding new parameters (refer to the steps in Section 3.3.4).

f) Choose whether to store the parameter by instance or type.

g) Select the categories to add the shared parameter on the right-hand side.

h) Click **OK**. The parameter will appear in the elements.

i) Optionally, enter a value for the shared parameter or create a formula to calculate its value.

3.3.4. Adding new Shared Parameters in Edit Shared Parameters Dialog

a) Click **Create**.

b) In the **Create Shared Parameter File** dialog, enter a file name, and save the dialog to a desired location.

c) In the **Groups** box, click **New** and enter a name for the parameter group.

d) From the **Parameter Group** drop-down menu, select a group.

e) In the **Parameters Group** box, click New.

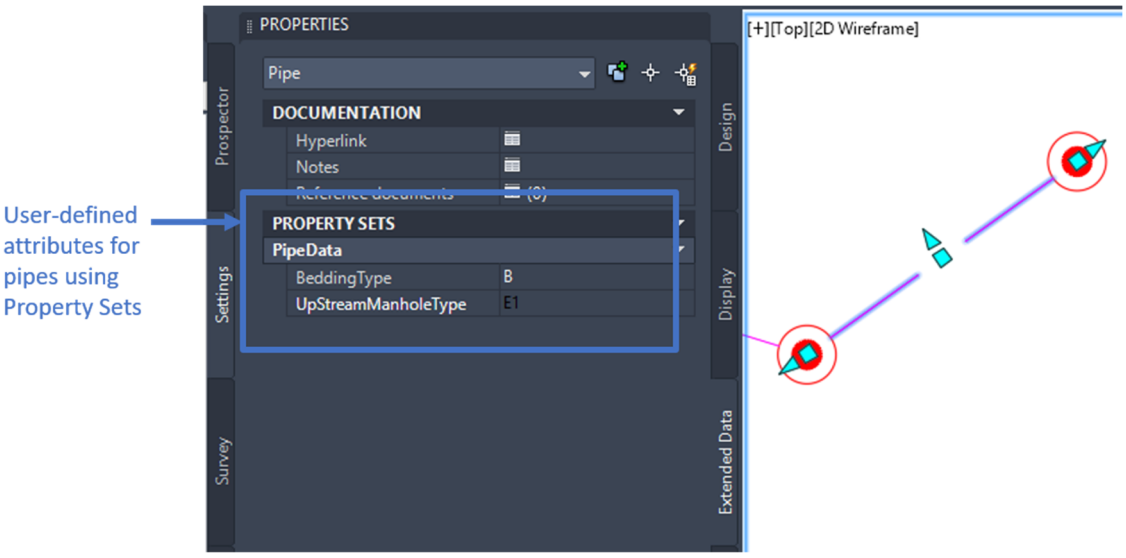
f) In the **Parameter Properties** dialog, enter a name, discipline, and type for the parameter.

g) Optionally, under **Tooltip Description**, click **Edit Tooltip**. In the **Edit Tooltip** dialog, enter the tooltip text, up to 250 characters.

3.4. Creation of Property Set in Civil 3D

3.4.1. In Civil 3D, **Property Sets** could be used for user-defined attributes for BIM model elements. Below is an example of user-define attribute for pipe using **Property Sets**.

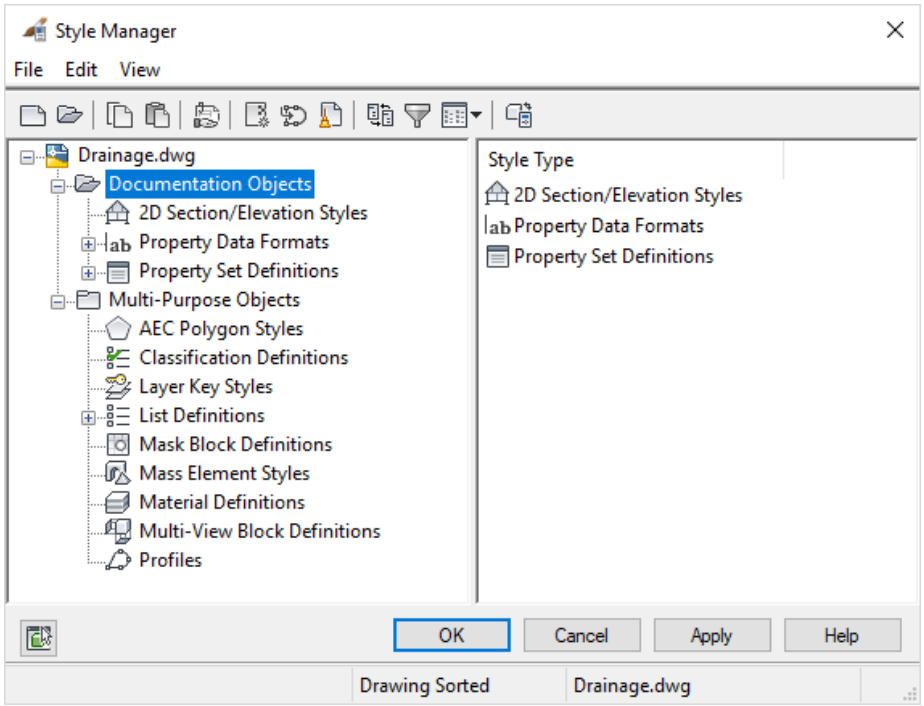
Figure App VI-5 An Example of User-define Attribute for Pipe Using Property Sets



3.4.2. **Property Sets** could be defined in **Style Manager**. The following are key steps for setting up **Property Set**s for user-defined attributes for Civil 3D BIM object.

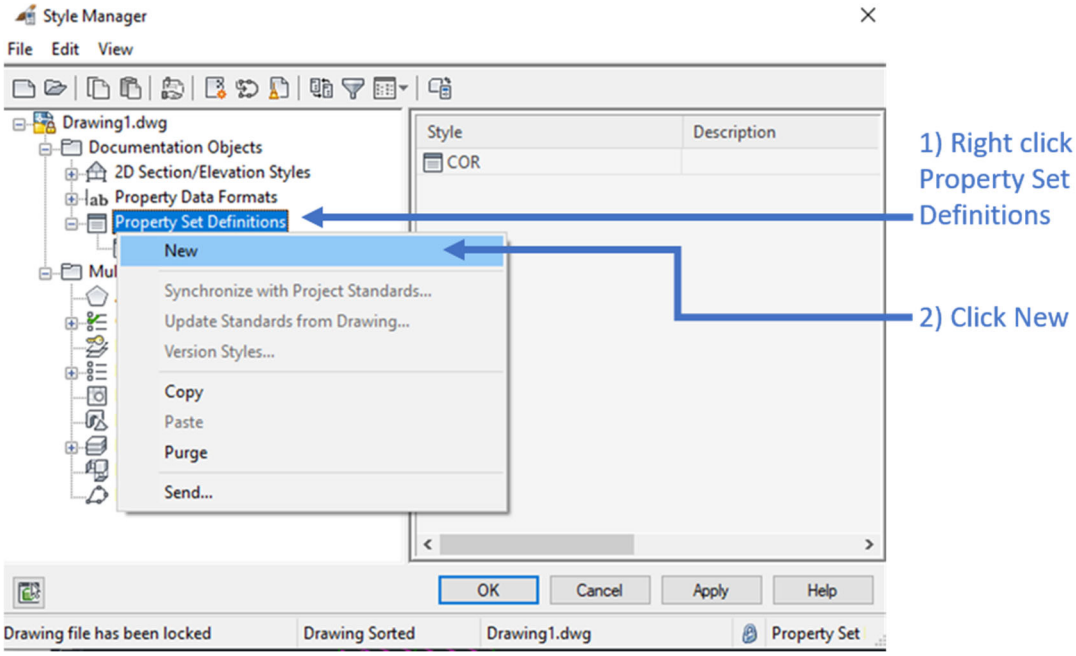
a) Input command "**STYLEMANAGER**" in the command line to open the **Style Manager** which is shown as below Figure:

Figure App VI-6 Step a of Setting up Property Sets for Civil 3D BIM Object



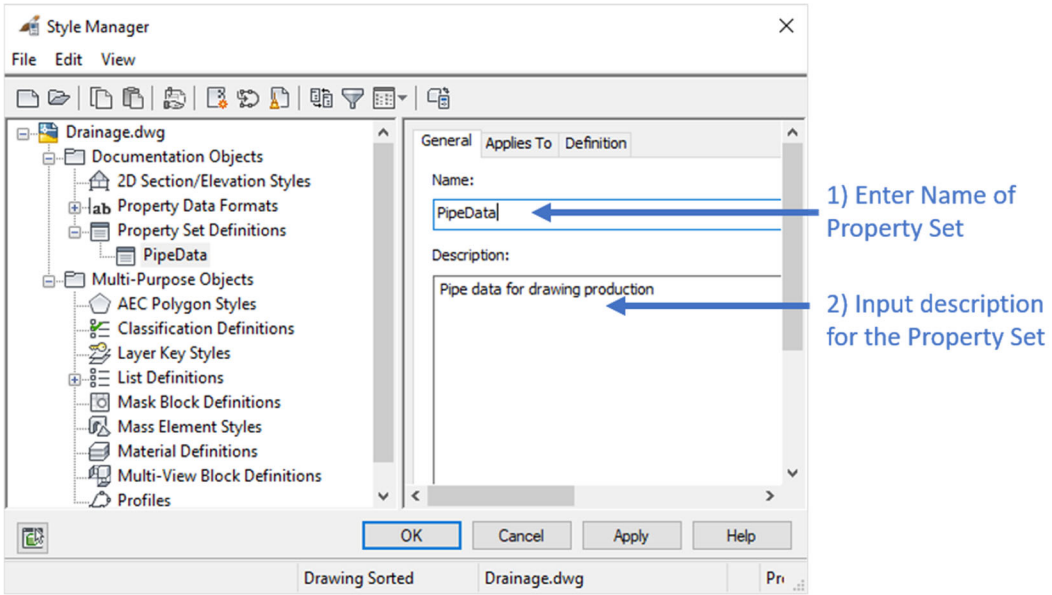
b) Under **Style Manager**, right click **Property Set Definitions** under **Documentation Objects**, then click **New**.

Figure App VI-7 Step b of Setting up Property Sets for Civil 3D BIM Object



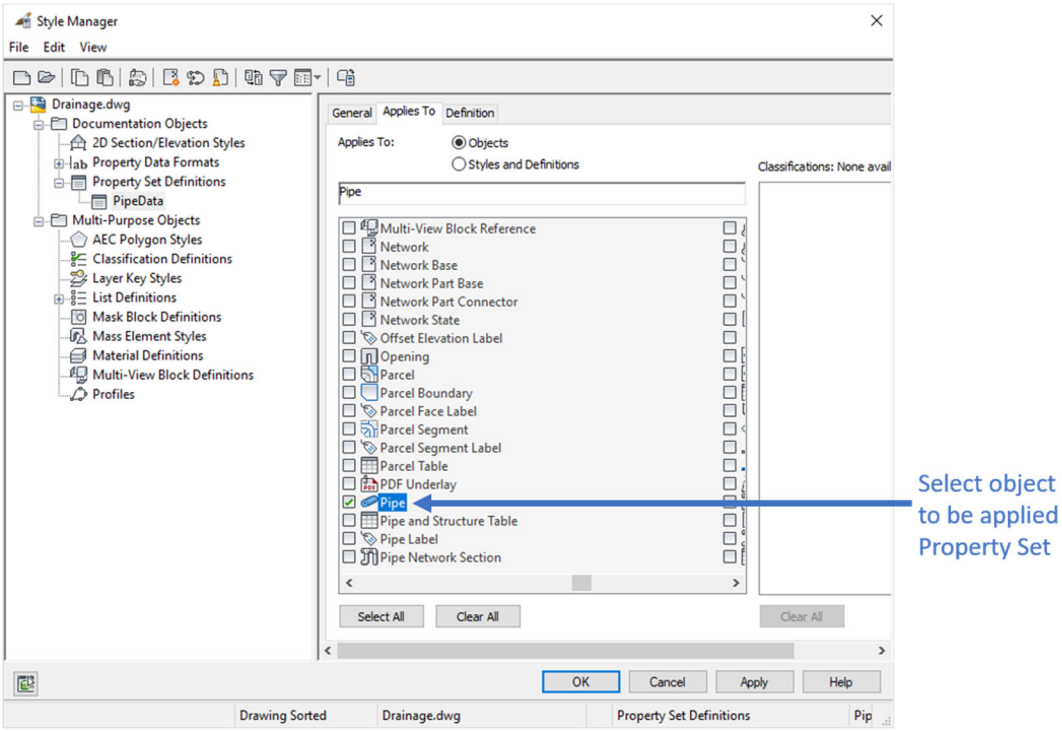
c) Input the **Name** and **Description** of the **Property Set** in **General** tab.

Figure App VI-8 Step c of Setting up Property Sets for Civil 3D BIM Object



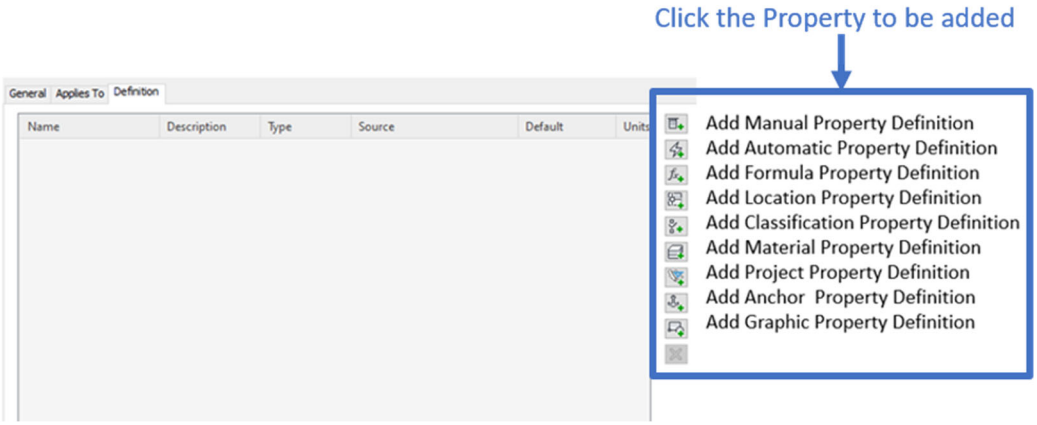
d) Under **Applies To** tab, select the types of object (e.g. Pipe) to be applied in the **Property Set**.

Figure App VI-9 Step d of Setting up Property Sets for Civil 3D BIM Object



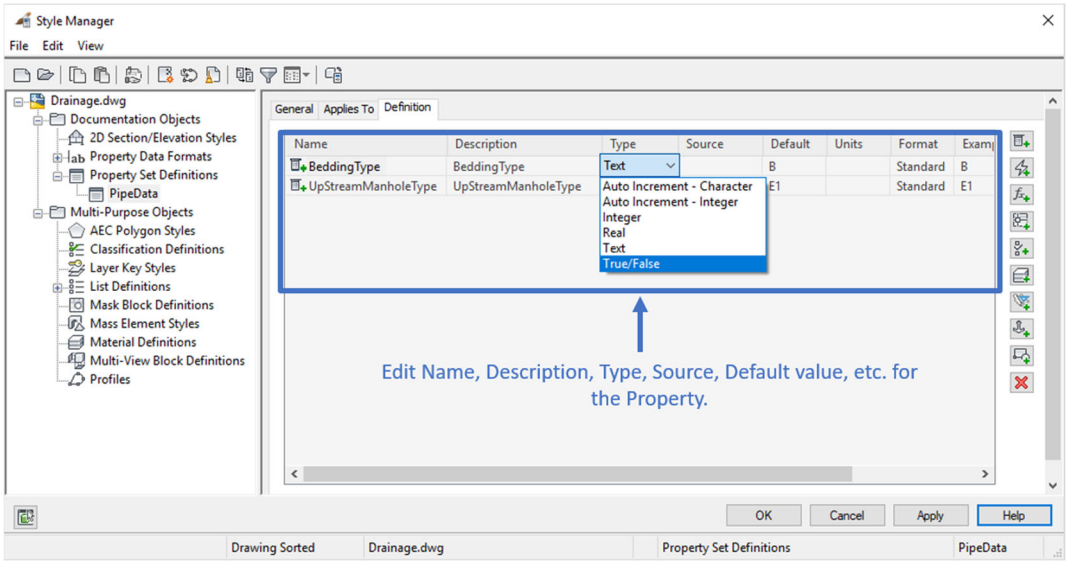
e) In **Definition** tab, click the properties as required to be added to the **Property Set**.

Figure App VI-10 Step e of Setting up Property Sets for Civil 3D BIM Object



f) Edit the Name, Description, Type, Source, Default value, etc. for the properties.

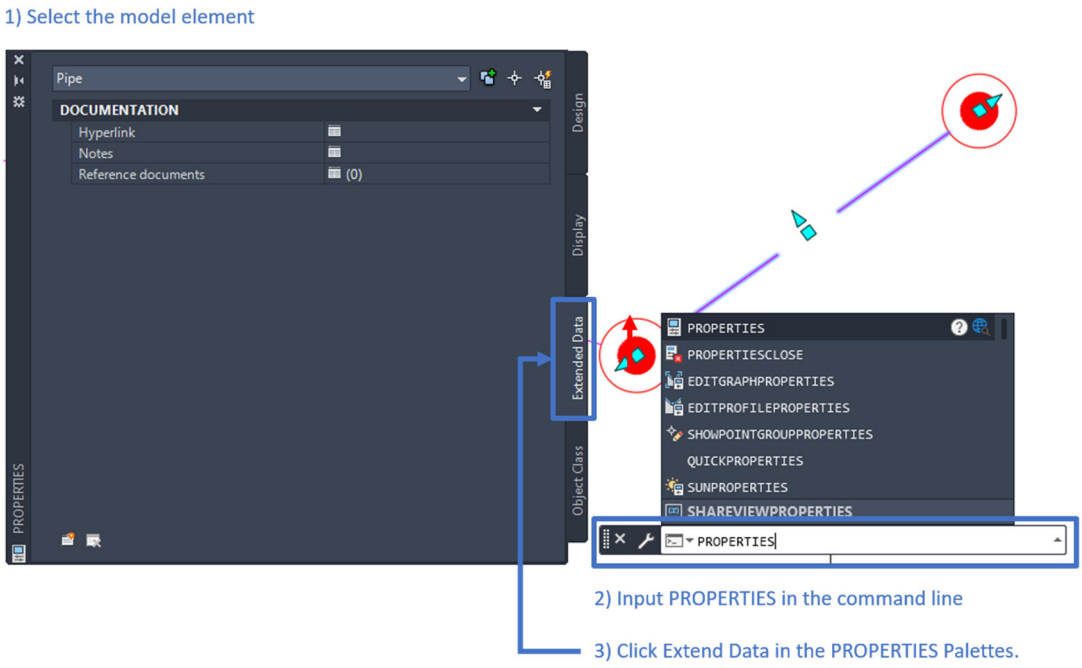
Figure App VI-11 Step f of Setting up Property Sets for Civil 3D BIM Object



3.4.3. The steps for applying **Property Set** to Civil 3D BIM objects are as follows:

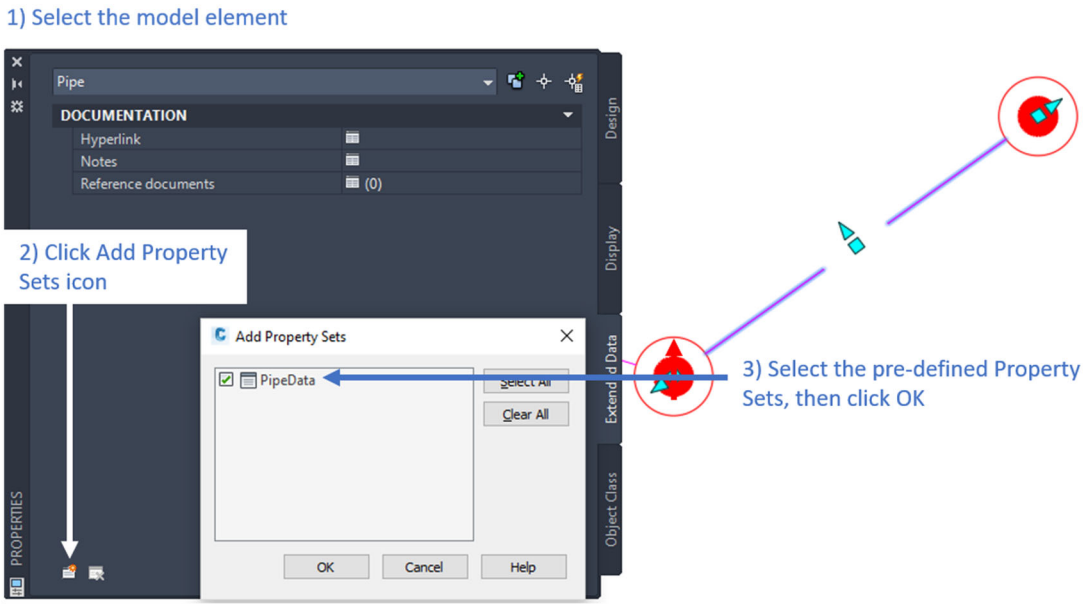
a) Select the model element, input **PROPERTIES** command in the command line, then click **Extend Data** in the **PROPERTIES** palettes.

Figure App VI-12 Step a of Applying Property Sets to Civil 3D BIM Object



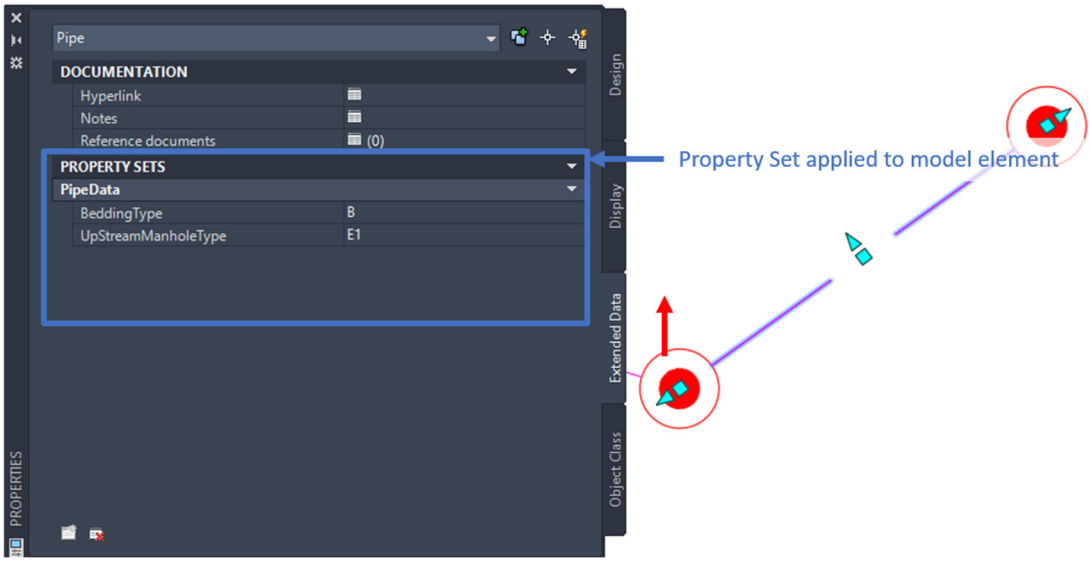
b) Click **Add Property Sets** icon in the bottom left of the **PROPERTIES** palettes. In the **Add Property Sets** dialog, click to select the pre-defined Property Set **"PipeData"**, then click the **OK** button.

Figure App VI-13 Step b of Applying Property Sets to Civil 3D BIM Object



c) The "**PipeData**" of **Property Set** is now added to BIM object shown as below Figure.

Figure App VI-14 Step c of Applying Property Sets to Civil 3D BIM Object

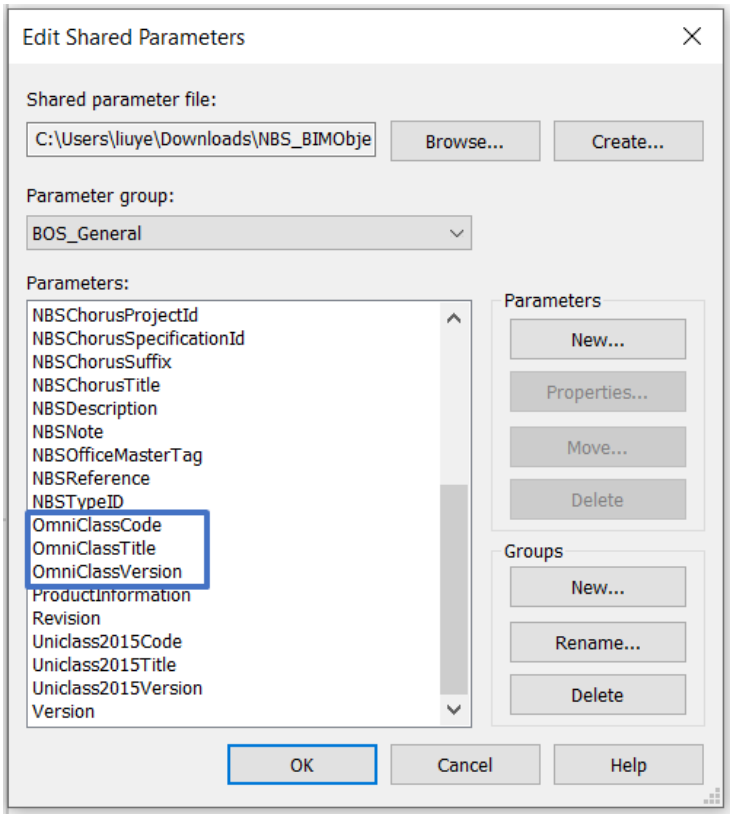


3.5. Creation of Classification in Revit

This section describes the methods of adding classification information in Revit. Classification information could be department-specified classification(s), additional classification (e.g. OmniClass), or both. If department-specified classification(s) are used, classification information could be created as Shared Parameters (refer to Section 3.3 for details). If OmniClass classification is used, there are three creation methods as described in sections below.

3.5.1. This section describes a sample creation method for classification information especially for OmniClass, as this method is not limited by OmniClass and Revit's updates. Considering OmniClass version would be updated from time to time, to ensure consistency, if OmniClass is the project-specific or stakeholder-specified classification system, OmniClass information should be inputted as Shared Parameters. Refer to the figure below for an example and Section 3.3. for details.

Figure App VI-15 An Example of Adding OmniClass Information as Shared Parameter in Revit

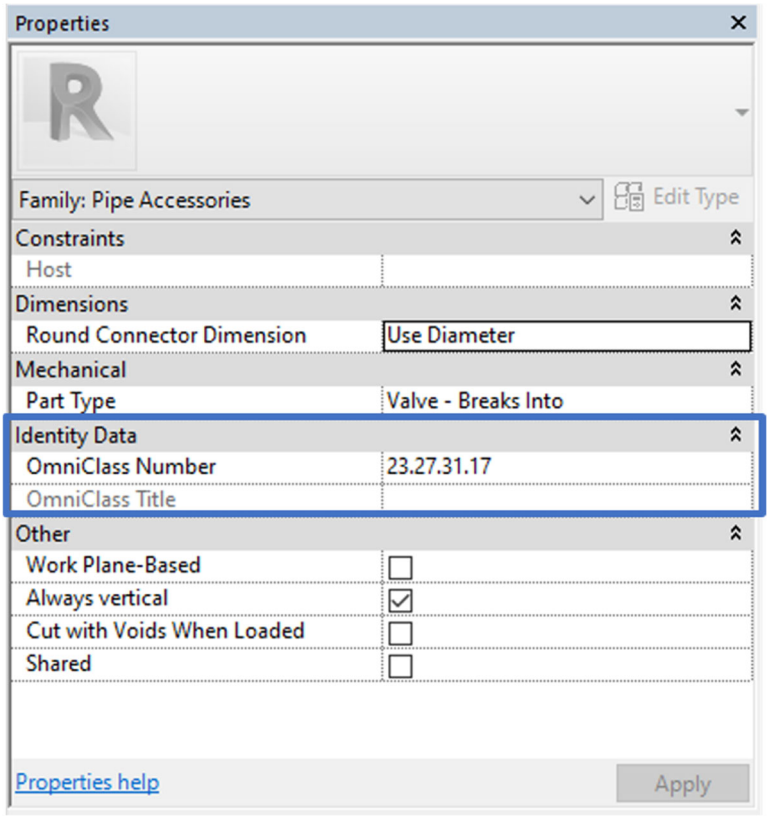


3.5.2. Revit has an add-in program named "Standardized Data Tool" for classification management. Refer to the below link for the details of the add-in program.

https://interoperability.autodesk.com/standardizeddatatool.php

3.5.3. Revit provides pre-set parameters "OmniClass Number" and "OmniClass Title" under Identity Data for Revit families. These parameters correspond to OmniClass "Table 23 – Products" in Revit Family. Classification number could be defined by editing the Revit family's properties. Refer to the figure below for an example.

Figure App VI-16 An Example of Pre-set Parameters "OmniClass Number" and "OmniClass Title" under Identity Data in Revit Family

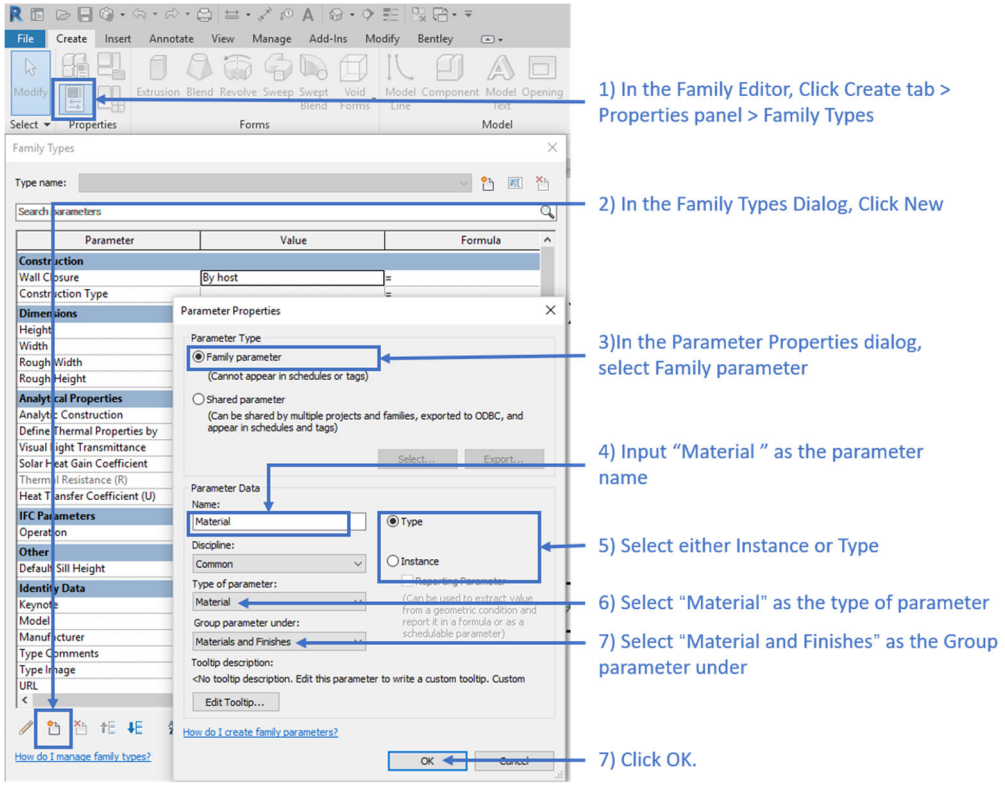


If OmniClass 2012 standards is assigned to be used and the OmniClass numbers supplied in Revit are incorrect, please refer to below link and update the OmniClass Taxonomy File accordingly.
https://knowledge.autodesk.com/support/revit-products/troubleshooting/caas/CloudHelp/cloudhelp/2020/ENU/Revit-Troubleshooting/files/GUID-BA0B2713-ADA0-4E51-A7CD-85D85511F3ED-htm.html

3.6. Creation of Material Attribute in Revit

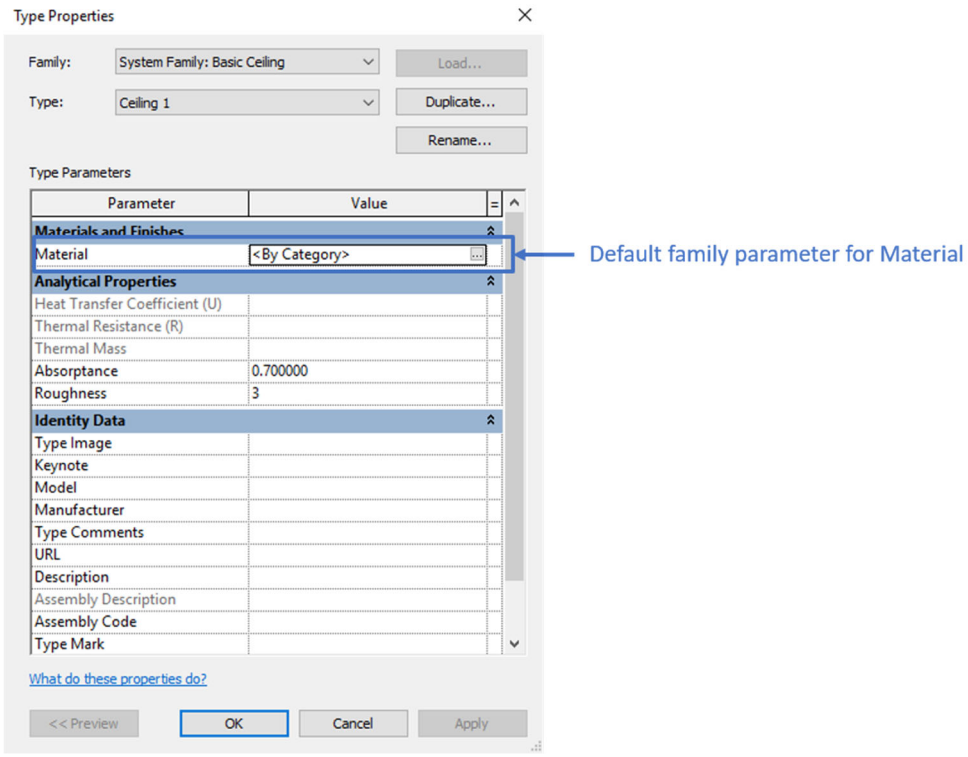
3.6.1. In Revit, Family parameters for loadable families can be added as material attributes in the **Family Editor**. Key steps for adding a material attribute are described as follows:

Figure App VI-17 Adding Material Attributes to Family Parameters for Loadable Families



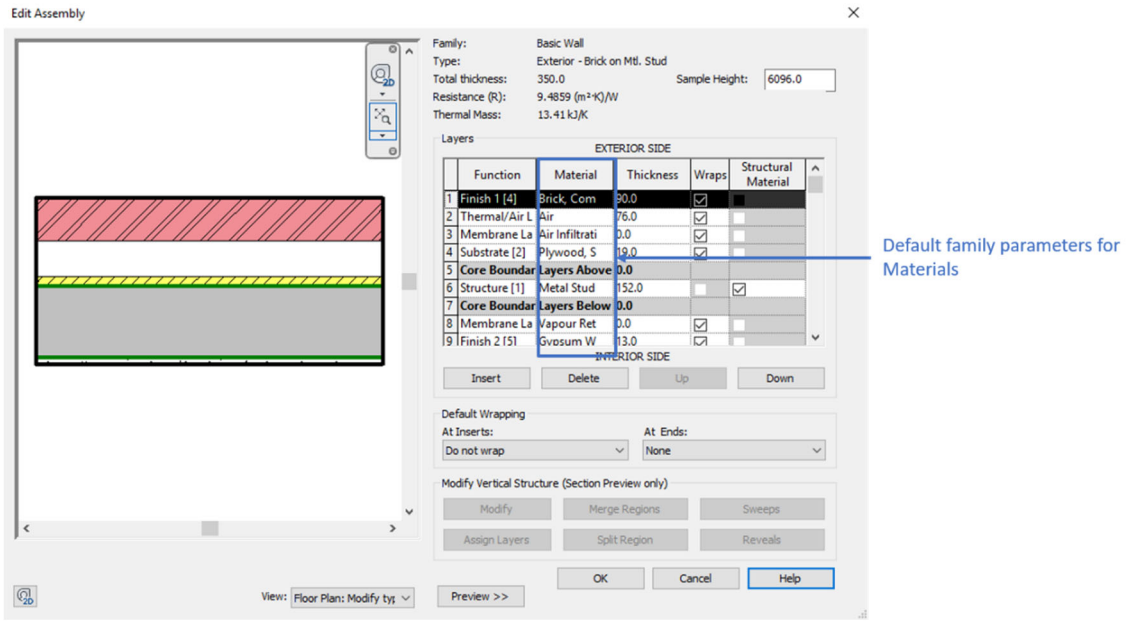
3.6.2. For Revit system families (e.g. basic ceilings, ramps), material should be set using the built-in "Material" parameter in the **Type Properties** dialog under **Materials and Finishes**. Refer to the figure below for details.

Figure App VI-18 Adding Built-in Material Attributes to System Families



3.6.3. For compound structures, which are system families composed of parallel layers (e.g. walls, floors, compound ceilings and roofs), material should be set using the built-in "Material" parameter for each compound structure layer in the **Type Properties** dialog under **Materials and Finishes**.

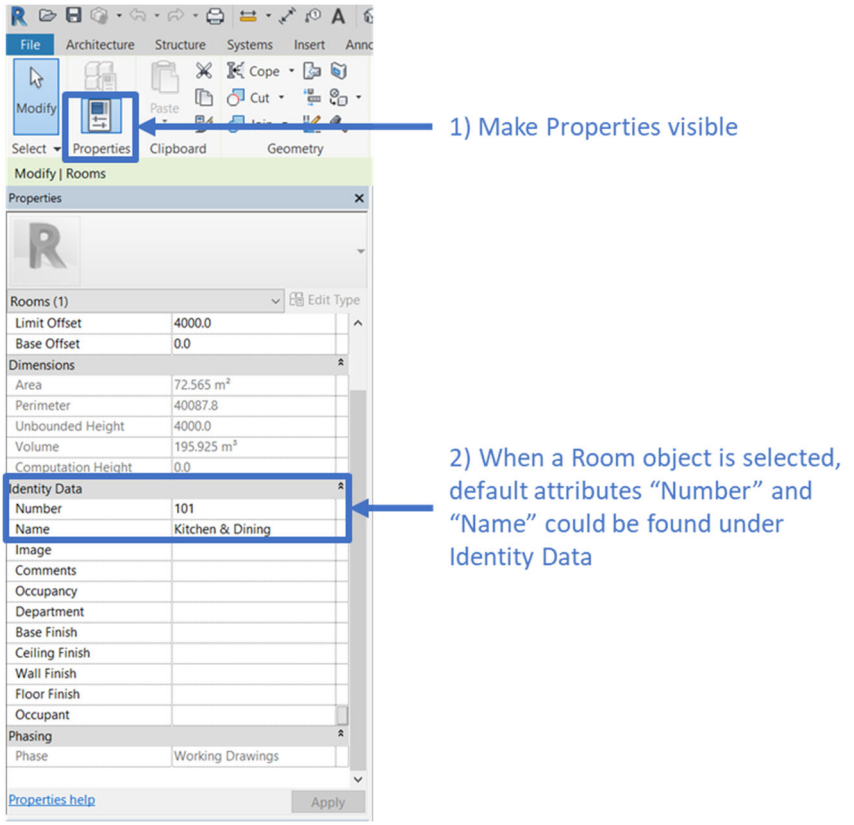
Figure App VI-19 Adding Built-in Material Attributes to Compound Structure System Families



3.7. Filling in Default Attributes under Room in Revit

In Revit, Room objects already contain Name and Number as default parameters. The location of these attribute on "**Properties**" tab are described as follows:

Figure App VI-20 Filling in Default Attributes under Room in Revit



4. Types of BIM Model Attribute

Prior to the publication of the Guidelines, some WDs have already defined and implemented asset owner-specific attributes. A mapping approach is utilised to consolidate the information whilst allowing WDs who needs to keep their pre-defined attributes. Four different types of LOD-I attributes exist, with different degrees of the alignment. This section explains their definitions and harmonisation approaches.

4.1. Common Attributes

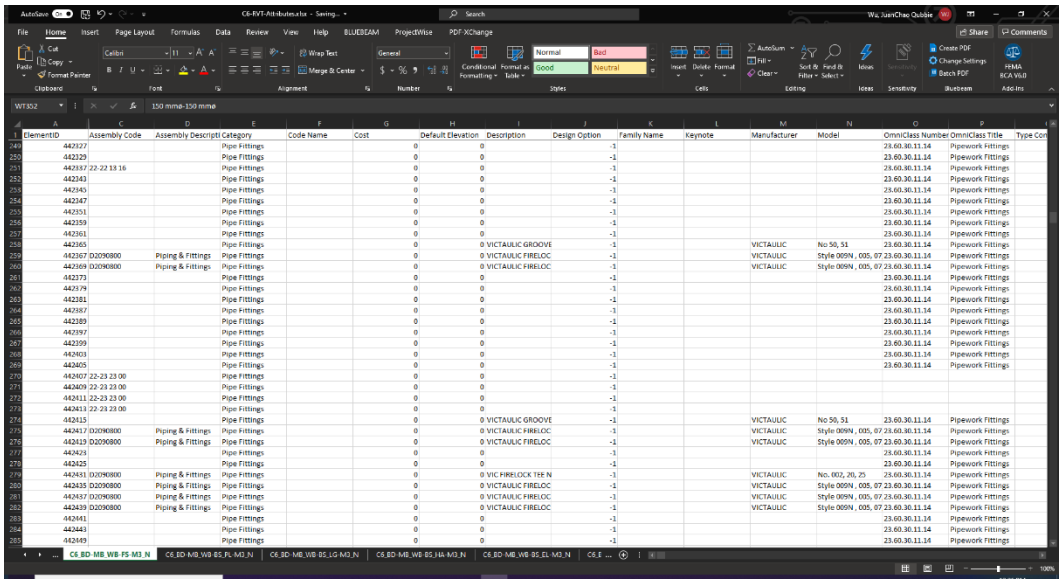
Common attributes are those with the same attribute names and GUID with those listed in Table App VI-1 of this appendix. This kind of attribute name are aligned, and the information could be stored with the same nature for ease query.

4.2. Common Attributes with Alternative Attribute Names

The common attributes with alternative attribute names are those who contain the same information as one of the common attributes with an alternative name as pre-defined by the WDs. Mapping is required to associate the WDs' attribute names with the common attribute. With mapping defined, naming of the attributes from different WDs but with the same nature could be mapped and stored for ease query.

For example, if multiple attributes meaning "Asset Code" exist with names such as DSD.Com.Asset Code, EMSD.Common.Asset Code, which could all be mapped into the same column in the tabular format. Refer to figure below for an example.

Figure App VI-21 Sample Tabular Format for Storing Attributes



4.3. General Attributes

The general attributes are those commonly adopted across more than one WD but without aligned attribute names. Similar to Section 4.2, review is required to group those attributes with similar nature, prior to map these attribute names into the same column of the tabular format.

4.4. Remaining Attributes

Remaining attributes are the attributes that not classified as the common attributes and general attributes. Those attributes are discipline-oriented and not necessary to be aligned. Thus, the remaining attributes list could be stored without alterations to maintain the completeness of the information.

5. Mapping and Extraction of Attributes from BIM Models

5.1. Extraction Method Overview

After attribute mapping, extraction of attributes from BIM models could be conducted through authoring software's built-in functions, scripts or plug-ins. The sections below describe principles of attribute extraction from Revit and Civil 3D.

5.2. Extraction of Attributes from Revit

The attributes in Revit can be exported to an external dataset in tabular format. The software default attributes and user defined attributes could be identified and extracted to tabular format. For example, Dynamo for Revit may be used to view and extract element parameters.

5.3. Extraction of Attributes from Civil 3D

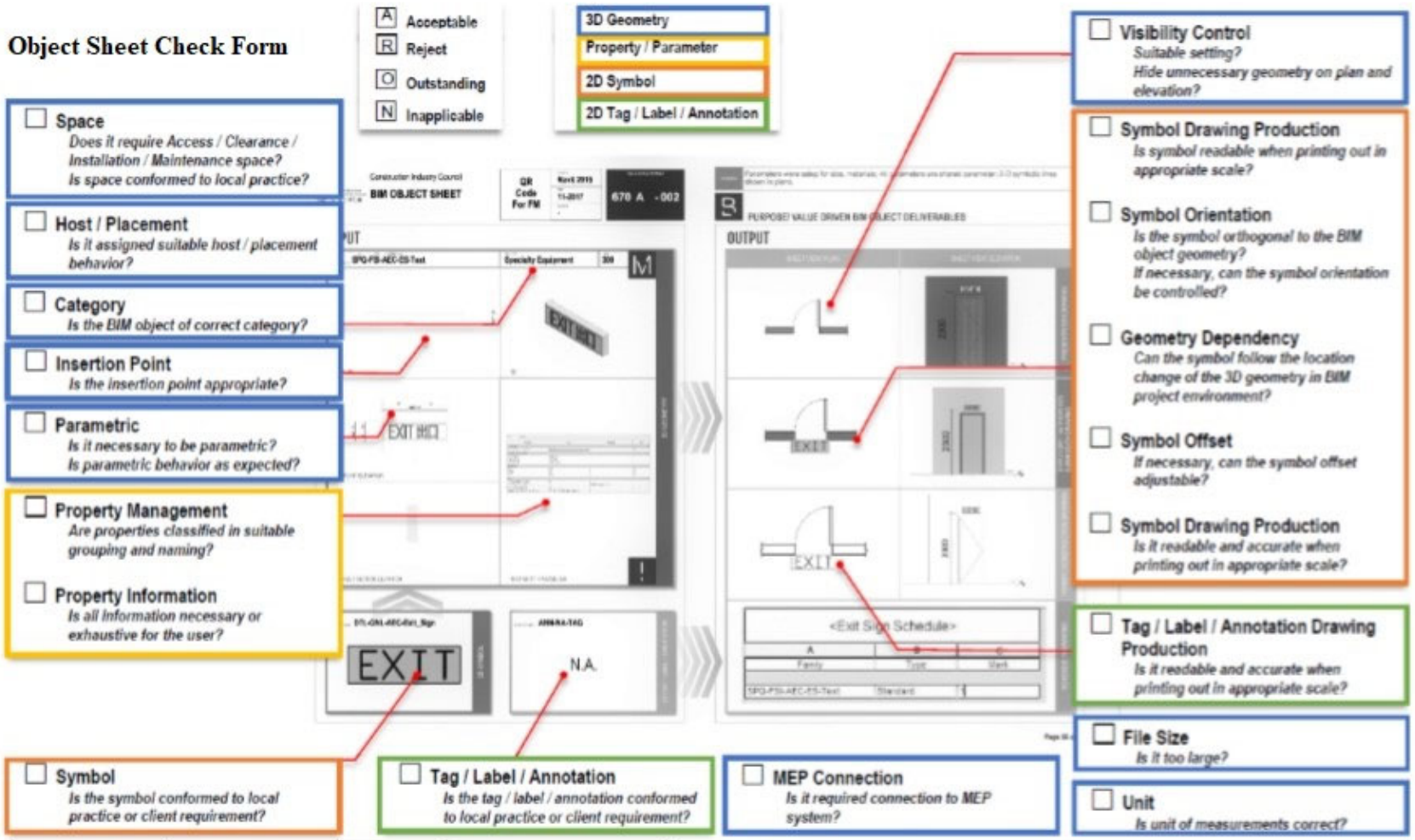
For Autodesk Civil 3D, since COBie spreadsheet cannot be exported directly from Civil 3D currently, **Property Set** should be defined in Civil 3D in order to extract the attributes in IFC format. Refer to Section 3.4 for details on **Property Set**.

Appendix VII - Sample BIM Object Check Form

Object Name:_____ **3D Object** ☐ **2D Annotation** ☐

No.	Check Item	Content	Check Result (Y/N?)	Recommends
1	BIM Object Format	Does the BIM object have the correct file extension (.rfa, .pkt, .dwg) and software version?		
2	Naming Compliance Check	Does the BIM object's name conform to CIC naming convention?		
3	Category Type Check	Is the BIM object assign to the correct category?		
4	Parameter Capability Check	Do all necessary parametric properties exist and conform to the expected parametric behaviour?		
5	Visual Check	5.1 Does 2D presentation conform to local practice or client requirements?		
		5.2 Can the presentation /symbol follow change of location of the 3D geometry in the BIM project environment?		
		5.3 Does 3D model assign the correct material and visibility setting?		
		5.4a Does this BIM object need to be connected to MEP systems?		
		5.4b If yes, is MEP connector(s) correctly assigned to 3D model faces?		
		5.5 Is the BIM object's file size too large? (Generally recommended to be <5MB)		
		5.6 Does visibility setting correctly?		
		5.7 Is the unit of measurement correct?		
		5.8a Does it require Access / Clearance / Installation / Maintenance space?		
		5.8b If yes, does the space conform to local practice?		

		5.9 Is the BIM object assigned with suitable host / placement behaviour?		
		The following check items are applicable to 2D annotation objects only:		
		5.10 Do the tag, label and annotation conform to local practice or the client requirement?		
		5.11 Is the label information linked to correct parameter as designed?		
		5.12 Is the label/tag/annotation have different sizes for different scale of drawing production?		
6	BIM Object Sheet Check	6.1 Is the **CIC's Object Sheet Check Form** (next page) submitted?		
		6.2 Does this BIM object fulfil all BIM Object Sheet check items?		


Object Sheet Check Form
A Acceptable
R Reject
O Outstanding
N Inapplicable
3D Geometry
Property / Parameter
2D Symbol
2D Tag / Label / Annotation
Space
Does it require Access / Clearance / Installation / Maintenance space?
Is space conformed to local practice?
Host / Placement
Is it assigned suitable host / placement behavior?
Category
Is the BIM object of correct category?
Insertion Point
Is the insertion point appropriate?
Parametric
Is it necessary to be parametric?
Is parametric behavior as expected?
Property Management
Are properties classified in suitable grouping and naming?
Property Information
Is all information necessary or exhaustive for the user?
Symbol
Is the symbol conformed to local practice or client requirement?
Tag / Label / Annotation
Is the tag / label / annotation conformed to local practice or client requirement?
MEP Connection
Is it required connection to MEP system?
Visibility Control
Suitable setting?
Hide unnecessary geometry on plan and elevation?
Symbol Drawing Production
Is symbol readable when printing out in appropriate scale?
Symbol Orientation
Is the symbol orthogonal to the BIM object geometry?
If necessary, can the symbol orientation be controlled?
Geometry Dependency
Can the symbol follow the location change of the 3D geometry in BIM project environment?
Symbol Offset
If necessary, can the symbol offset adjustable?
Symbol Drawing Production
Is it readable and accurate when printing out in appropriate scale?
Tag / Label / Annotation Drawing Production
Is it readable and accurate when printing out in appropriate scale?
File Size
Is it too large?
Unit
Is unit of measurements correct?
BIM OBJECT SHEET
OUTPUT
EXIT
N.A.
<Exit Sign Schedule>
BIM Object Name
Ref. No.
Date
Assessment
APPROVED/
DISAPPROVED/
RESUBMIT
Inspector
Signature
Comment:

Appendix VIII – Federation Strategy Diagrams and Naming Examples

TABLE OF CONTENTS

1. Federation Strategy VIII-1
1.1. Federation Strategy for Field 3.2 (System): Building VIII-2
1.2. Federation Strategy for Field 3.2 (System): District Cooling System, Electrical Power Supply, Gas Supply, Stormwater Drainage, Telecommunications VIII-3
1.3. Federation Strategy for Field 3.2 (System): General Site Information, Geotechnical, Landscape. VIII-4
1.4. Federation Strategy for Field 3.2 (System): Sewerage VIII-5
1.5. Federation Strategy for Field 3.2 (System): Water Supply VIII-6
1.6. Federation Strategy for Field 3.2 (System): Road and Highway Structures VIII-7

2. Naming Examples for BIM Model VIII-8
2.1. Naming Example – a Subway Located in Volume C1 ..... VIII-8
2.2. Naming Example – Sewage Pumping Station in Volume C2 ..... VIII-9
2.3. Naming Example – a Market in Volume C6 ..... VIII-10

3. Naming Example for Drawings Generated from BIM Model VIII-11
3.1. Naming Example of Drawings VIII-11

List of Figures

Figure App VIII-1 Federation Strategy for Field 3.2 (System): Building VIII-2
Figure App VIII-2 Federation Strategy for Field 3.2 (System): District Cooling System, Electrical Power Supply, Gas Supply, Stormwater Drainage, Telecommunications VIII-3
Figure App VIII-3 Federation Strategy for Field 3.2 (System): General Site Information, Geotechnical, Landscape VIII-4
Figure App VIII-4 Federation Strategy for Field 3.2 (System): Sewerage VIII-5
Figure App VIII-5 Federation Strategy for Field 3.2 (System): Water Supply VIII-6
Figure App VIII-6 Federation Strategy for Field 3.2 (System): Road and Highway Structures VIII-7
Figure App VIII-7 Naming Example for a Subway VIII-8
Figure App VIII-8 Naming Example for Combined Model VIII-8
Figure App VIII-9 Naming Example for Sewage Pumping Station VIII-9
Figure App VIII-10 Naming Example for Different Project VIII-9
Figure App VIII-11 Naming Example for a Market Building VIII-10
Figure App VIII-12 Naming Example for the Market Building with MEP BIM Models VIII-10
Figure App VIII-13 Naming Example of Drawings Generated from BIM Model VIII-11

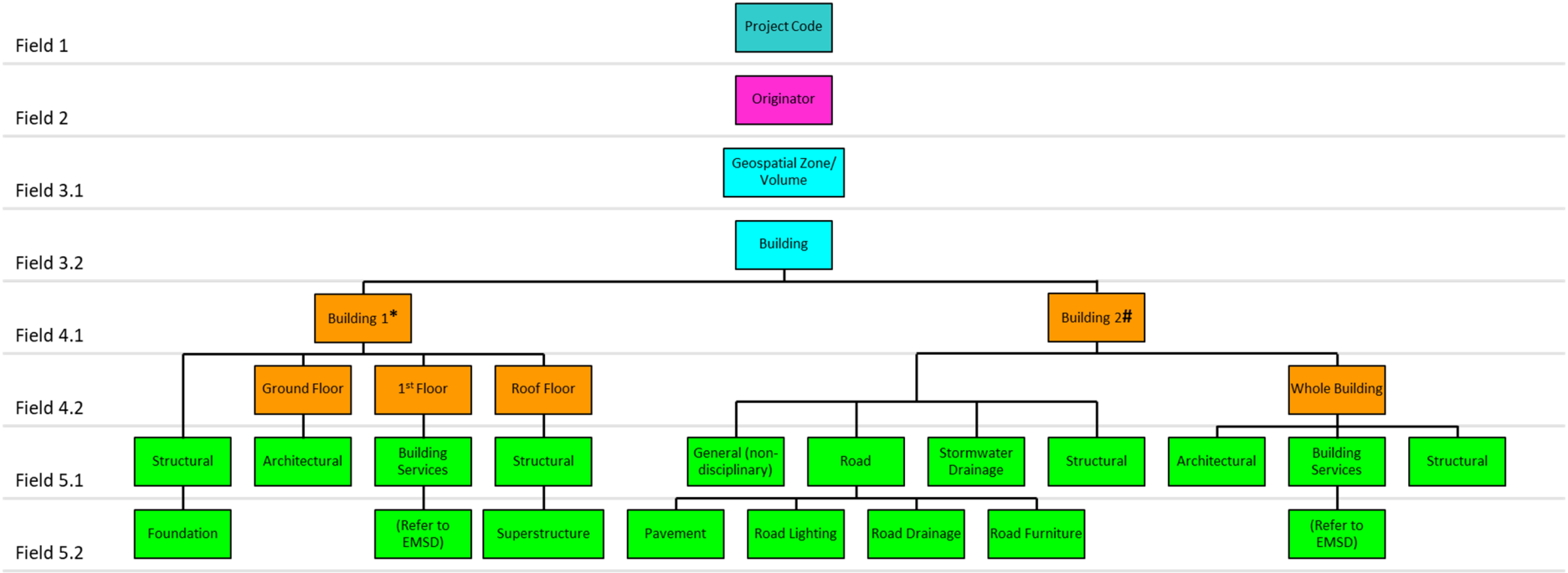
1. Federation Strategy

Figure App VIII-1 to Figure App VIII-6 are examples demonstrating the federation strategies for different systems within a project. As some items may not be included in the figures, refer to Appendix X for the list of common codes.

In Figure App VIII-1 below, it is not mandatory for Architectural, Structural and Stormwater Drainage disciplines to be further subdivided into subdiscipline model files. Also, in Figure App VIII-6, pavement, road drainage, road lighting, road furniture and noise barrier are known subdisciplines, while walkway cover, subway cover and concrete structural frame of lift tower should belong to other disciplines such as Architectural and Structural to facilitate information container breakdown.

1.1. Federation Strategy for Field 3.2 (System): Building

Figure App VIII-1 Federation Strategy for Field 3.2 (System): Building

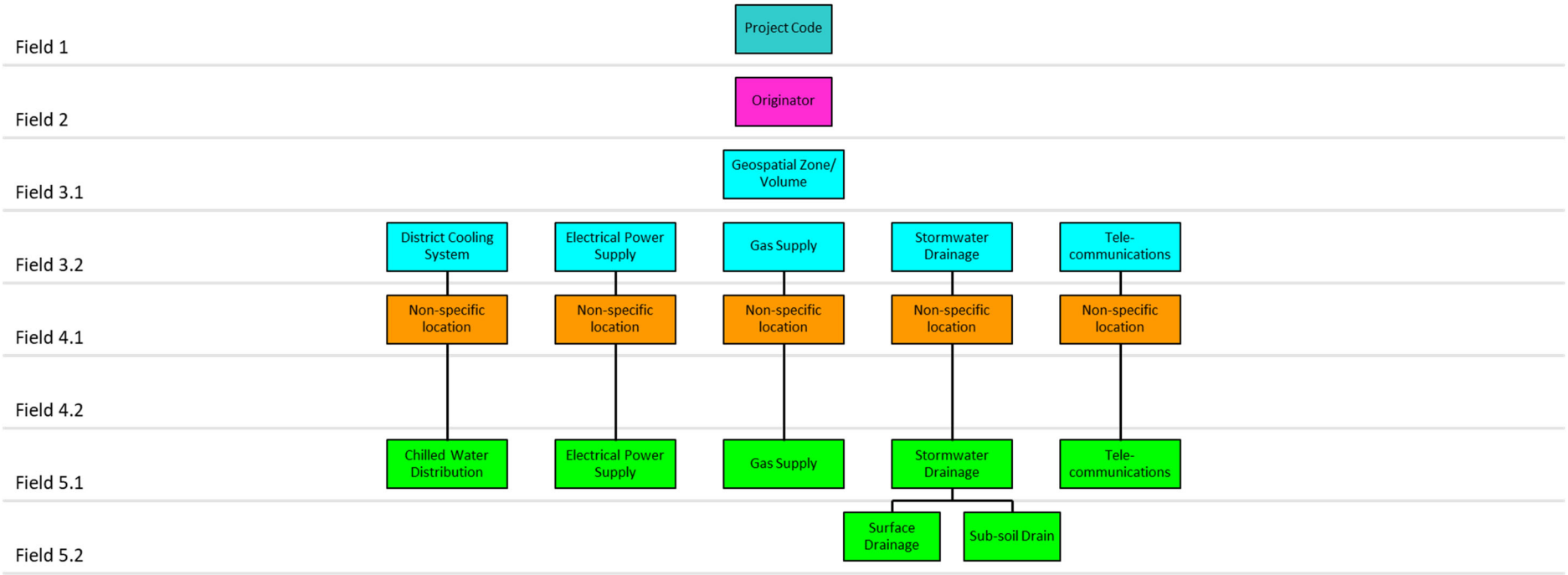


* Building 1 demonstrates a multi-story building, such as residential buildings and shopping malls, for which field 4.2 (sub-location) shall be used to indicate different levels within the building.

Building 2 demonstrates a whole building, such as pumping stations (or as specified by information owner), for which “Whole Building” could be adopted for field 4.2.

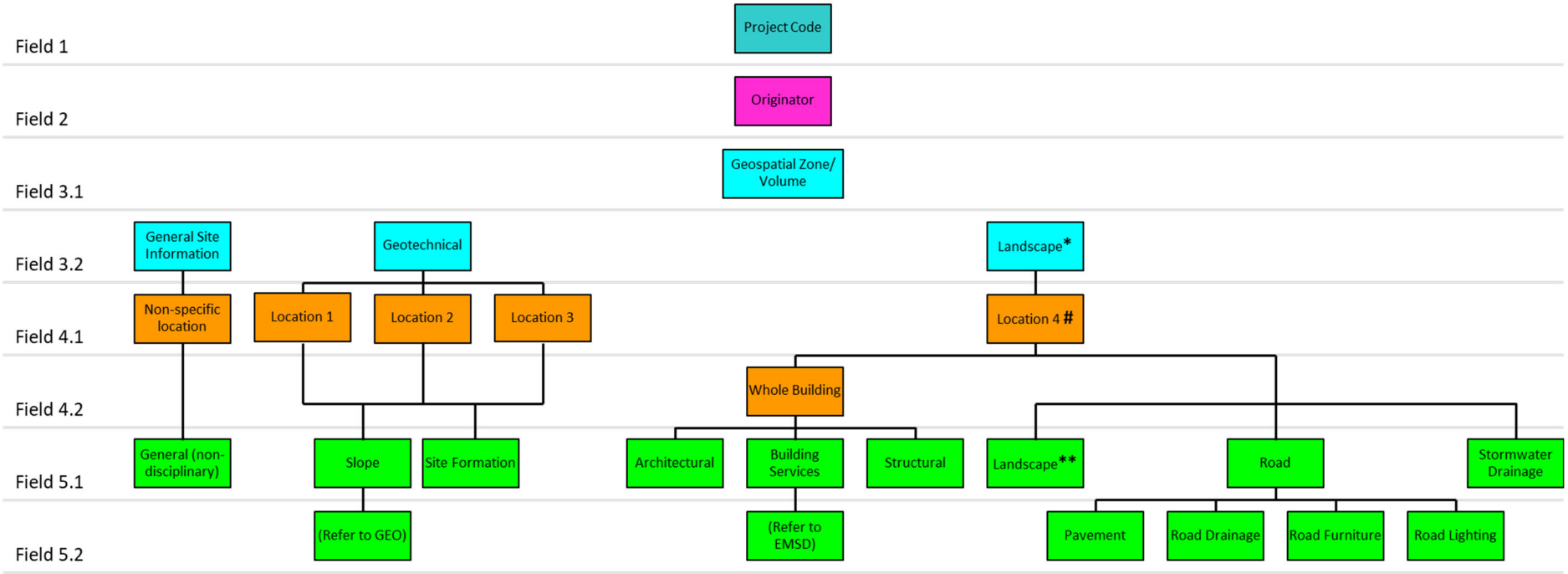
1.2. Federation Strategy for Field 3.2 (System): District Cooling System, Electrical Power Supply, Gas Supply, Stormwater Drainage, Telecommunications

Figure App VIII-2 Federation Strategy for Field 3.2 (System): District Cooling System, Electrical Power Supply, Gas Supply, Stormwater Drainage, Telecommunications



1.3. Federation Strategy for Field 3.2 (System): General Site Information, Geotechnical, Landscape

Figure App VIII-3 Federation Strategy for Field 3.2 (System): General Site Information, Geotechnical, Landscape



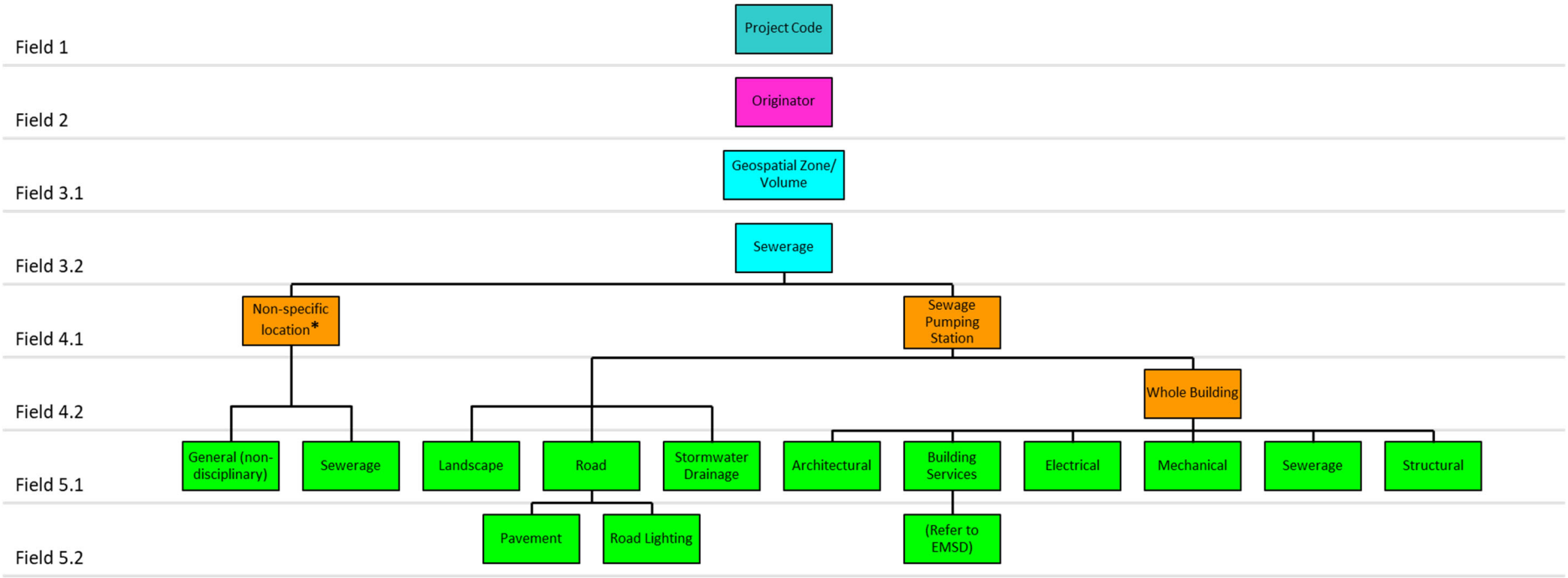
* Landscape is Field 3.2 (System) when it is used to define all elements within a boundary of a country park, neighbourhood park, etc.

** Landscape is Field 5.1 (Discipline) when it deals specifically with landscape elements such as hardscape, softscape, planting, landscape features, etc.

Location IDs for country parks, marine parks, parks and gardens may include public toilets, recreational facilities, campsites, etc.

1.4. Federation Strategy for Field 3.2 (System): Sewerage

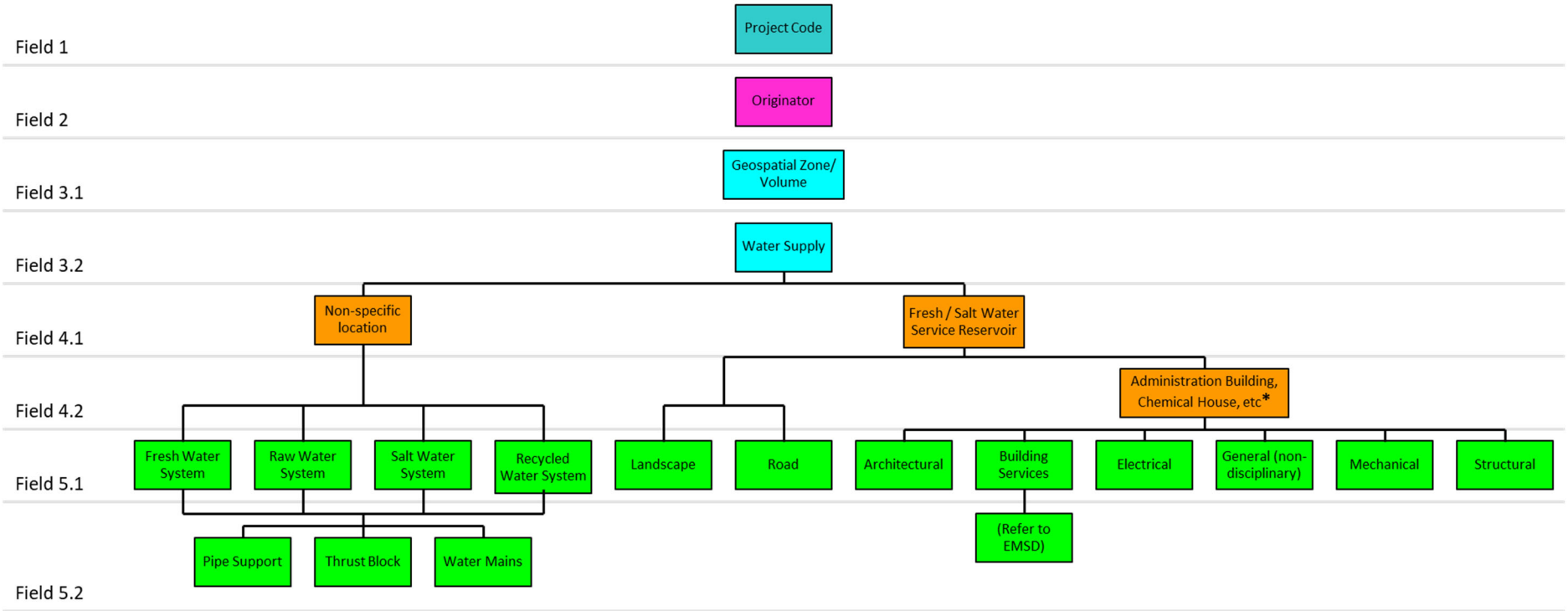
Figure App VIII-4 Federation Strategy for Field 3.2 (System): Sewerage



* Non-specific location pertains to the area outside of Sewage Pumping Station.

1.5. Federation Strategy for Field 3.2 (System): Water Supply

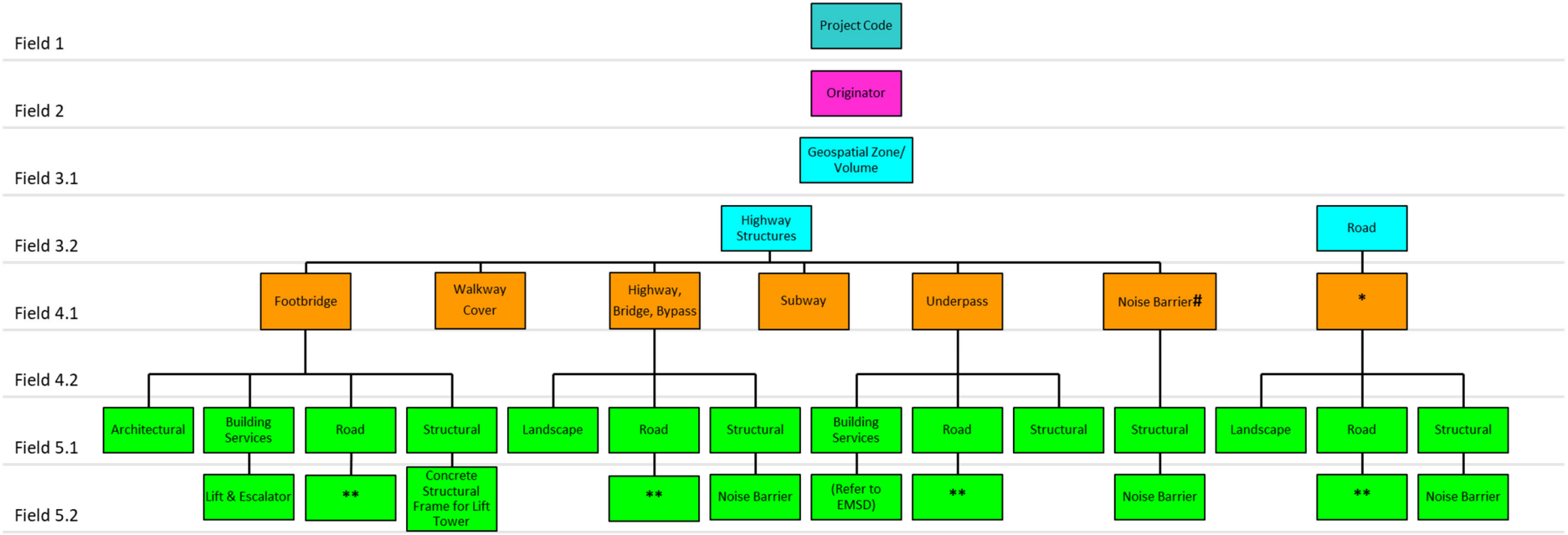
Figure App VIII-5 Federation Strategy for Field 3.2 (System): Water Supply



* Building blocks without water supply functions (e.g. Offices, Staff Quarters, Customer Enquiry Centre) are suggested to be grouped under Building System.

1.6. Federation Strategy for Field 3.2 (System): Road and Highway Structures

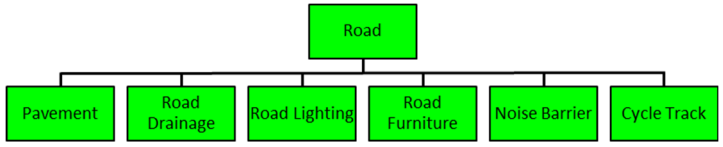
Figure App VIII-6 Federation Strategy for Field 3.2 (System): Road and Highway Structures



Noise barrier can be assigned as Location ID independent of the adjacent road. If the noise barrier exceeds a certain size, it should be assigned under the discipline "Structural".

* Location ID for roads (e.g. abbreviation of road names)

** The following sub-disciplines are applicable to Road discipline models.

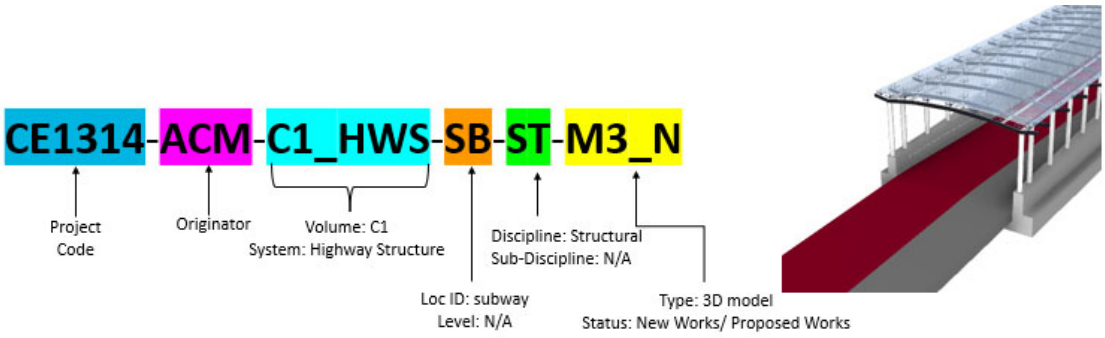


2. Naming Examples for BIM Model

2.1. Naming Example – a Subway Located in Volume C1

a) Naming example for a subway BIM model is as follows.

Figure App VIII-7 Naming Example for a Subway

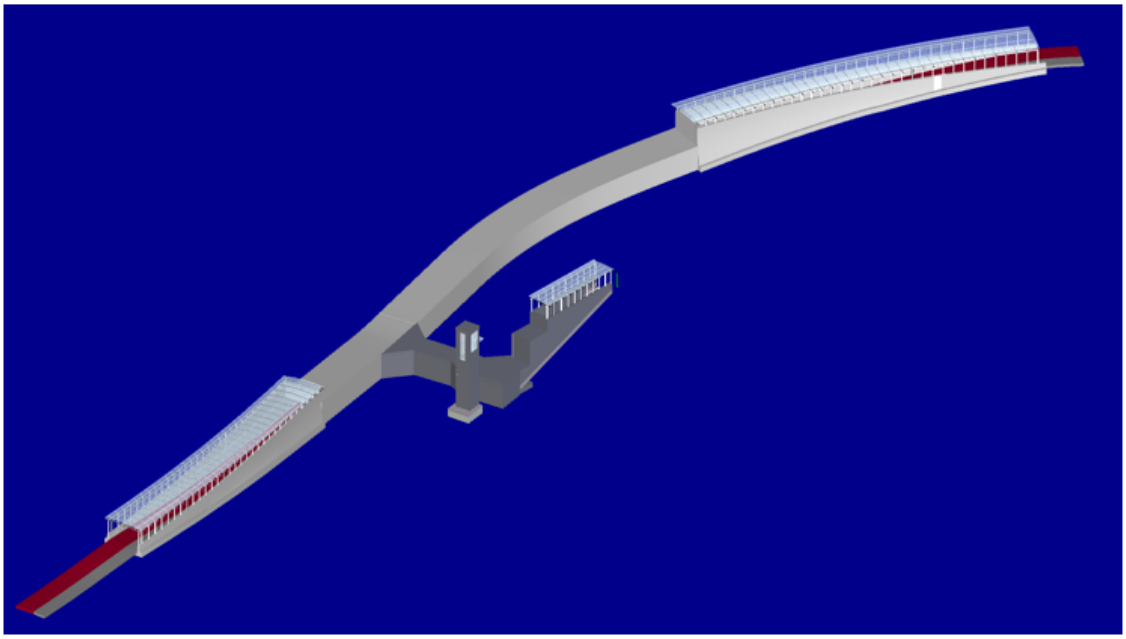


CE1314-ACM-C1_HWS-SB-ST-M3_N	Structural model includes structural wall, steel column, framing, glass, tunnel structure
CE1314-ACM-C1_HWS-SB-RD_PV-M3_N	Road model for pavements

b) Naming example for the subway BIM model combined with multiple disciplines' BIM models is as follows. These BIM models can be combined as one model based on the defined naming.

Figure App VIII-8 Naming Example for Combined Model

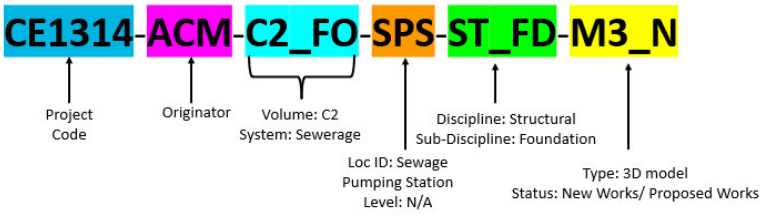
CE1314-ACM-C1_HWS-SB-ZZ-CM_N	Combined multi-discipline model for Subway

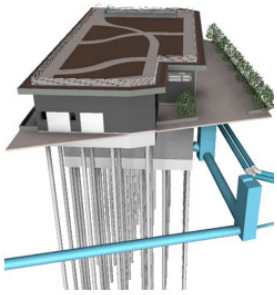


2.2. Naming Example – Sewage Pumping Station in Volume C2

a) Naming example for sewage pumping station BIM model is as follows.

Figure App VIII-9 Naming Example for Sewage Pumping Station

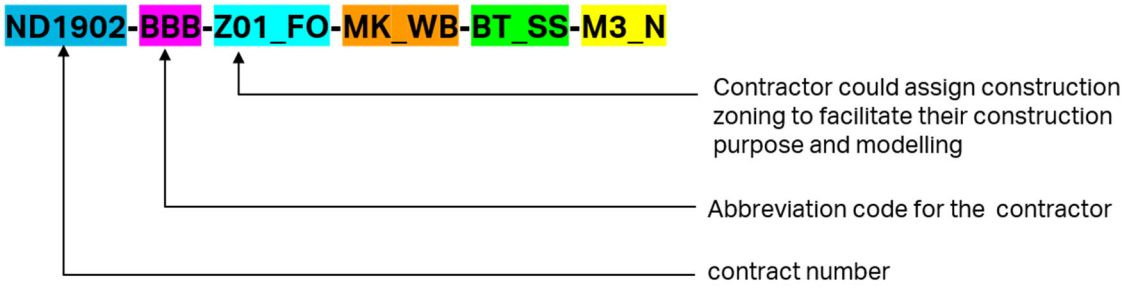




CE1314-ACM-C2_FO-SPS_WB-ME-M3_N	Sewage pumping station whole building – mechanical model
CE1314-ACM-C2_FO-SPS_WB-ST_SS-M3_N	Sewage pumping station whole building – superstructure model
CE1314-ACM-C2_FO-XX-FO-M3_N	Sewerage UU network within C2 boundary
CE1314-ACM-C2_FO-XX-FO-M3_E	Existing sewerage UU network within C2 boundary, "E" = existing model
CE1314-ACM-C2_FO-ZZ-ZZ-CM_N	Combined model for all sewerage related models in Contract 2

b) When project is in construction stage, some naming fields should be updated accordingly. An example with updated naming fields is as follows.

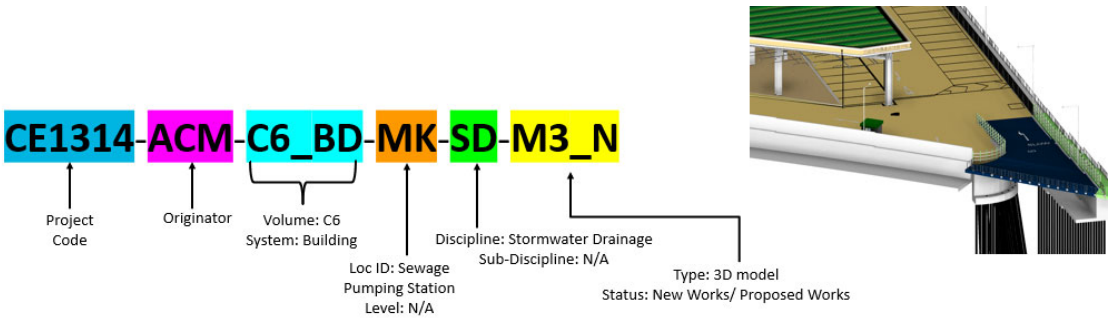
Figure App VIII-10 Naming Example for Different Project



2.3. Naming Example – a Market in Volume C6

a) Naming example for a market BIM model is as follows.

Figure App VIII-11 Naming Example for a Market Building

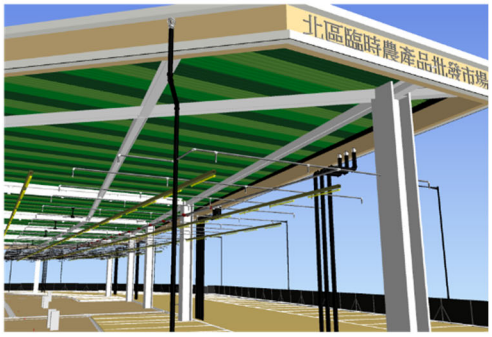


CE1314-ACM-C6_BD-MK_WB-AR-M3_N	Market whole building – architectural model
CE1314-ACM-C6_BD-MK_WB-BS_LG-M3_N	Market whole building – building services (lighting) model
CE1314-ACM-C6_BD-MK_WB-ST-M3_N	Market whole building – structural model
CE1314-ACM-C6_BD-MK-ST-M3_N	Market – structural (geotechnical elements within market boundary)
CE1314-ACM-C6_BD-MK-ZZ-CM_N	Market's combined model

b) In addition, for MEP details of the market building, the naming would be handled as follows:

Figure App VIII-12 Naming Example for the Market Building with MEP BIM Models

CE1314-ACM-C6_BD-MK_WB-FS-M3_N Market whole building – fire services model
CE1314-ACM-C6_BD-MK_WB-BS_LG-M3_N Market whole building – building services (lighting) model
CE1314-ACM-C6_BD-MK_WB-BS_HA-M3_N Market whole building – building services (HVAC) model
CE1314-ACM-C6_BD-MK_WB-BS_DR-M3_N Market whole building – building services (drainage) model
CE1314-ACM-C6_BD-MK-RD_RL-M3_N Market ground floor road lighting model

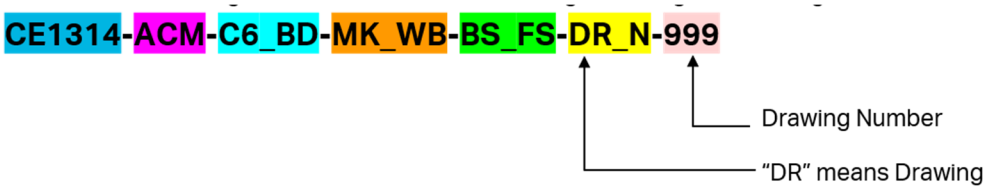


3. Naming Example for Drawings Generated from BIM Model

3.1. Naming Example of Drawings

WDs could consider to adopt the model naming format for drawing file naming. For example, abbreviation code of "DR" (meaning 2D Drawings) under Field 6.1 (Types) and 3-digit codes acting as the drawing number under Field 7 (Sequential Number) could be used. Naming example of drawings is as follows

Figure App VIII-13 Naming Example of Drawings Generated from BIM Model



Appendix IX – Sample Project-specific Codes for Naming

TABLE OF CONTENTS

1. Introduction IX-1
2. Codes for Field 1 – Project IX-1
3. Codes for Field 3.1 – Volume IX-2
4. Codes for Field 4.1 – Location IX-8

List of Tables

Table App IX-1 Codes for Field 1 – Project IX-1
Table App IX-2 Codes for Field 3.1 – Volume IX-2
Table App IX-3 Codes for Field 4.1 – Location Identifier IX-8

1. Introduction

For easier understanding, the sample project-specific codes in sections below are from the project of Kwu Tung North (KTN) and Fanling North (FLN) New Development Areas (NDA), Phase 1. The sections below have been incorporated into the corresponding project-specific validation list.

2. Codes for Field 1 – Project

Field 1 – Project is a unique identifier which serves to indicate the project code (e.g. agreement number, contract number, future asset categorisation). This identifier should be assigned to each project stage (e.g. design, construction and operations) to determine the relationship with a particular asset.

Table App IX-1 Codes for Field 1 – Project

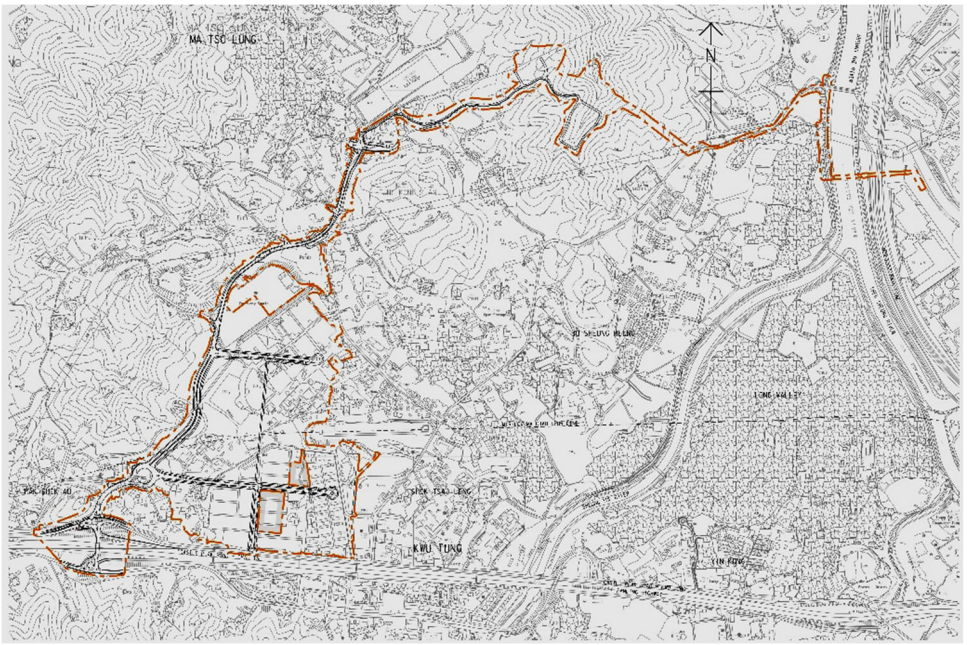
Field 1 - Project	Project Stage	Agreement No., Contract No. or Asset Categorization	Description
CE1314	Design (Agreements)	CE13/2014	Agreement No. CE 13/2014 (CE) Development of Kwu Tung North (KTN) and Fanling North (FLN) New Development Areas (NDA), Phase 1 – Design and Construction
ND1901	Construction (Contracts)	ND/2019/01	Kwu Tung North New Development Area, Phase 1: Site Formation and Infrastructure Works
ND1902		ND/2019/02	Kwu Tung North New Development Area, Phase 1: Roads and Drains between Kwu Tung North New Development Area and Shek Wu Hui
ND1903		ND/2019/03	Kwu Tung North and Fanling North New Development Areas, Phase 1: Development of Long Valley Nature Park
ND1904		ND/2019/04	Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shek Wu San Tsuen North to Lung Yeuk Tau)
ND1905		ND/2019/05	Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shung Him Tong to Kau Lung Hang)
ND1906		ND/2019/06	Fanling North New Development Area, Phase 1: Reprovisioning of North District Temporary

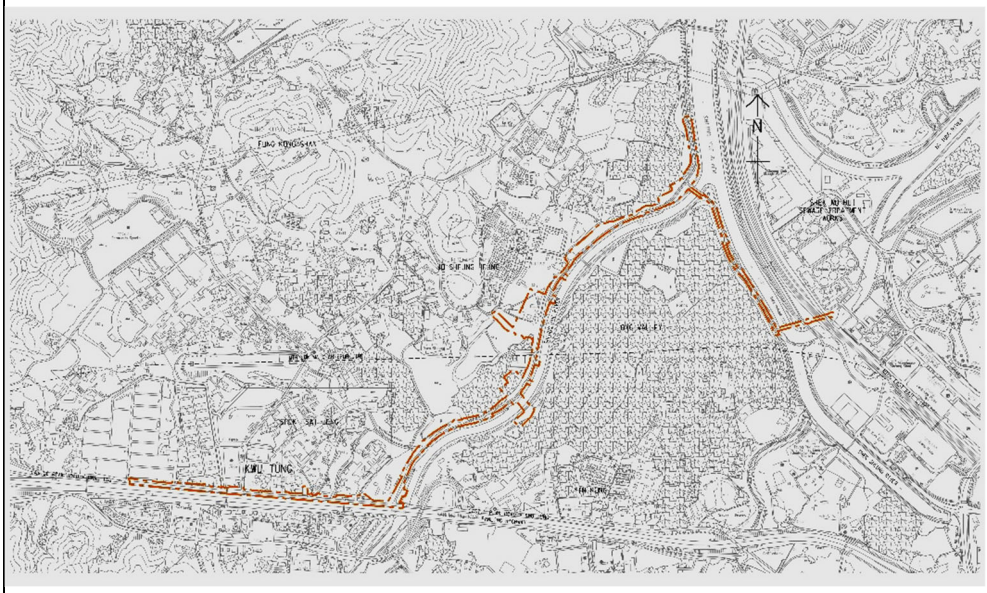
Field 1 - Project	Project Stage	Agreement No., Contract No. or Asset Categorization	Description
			Wholesale Market for Agricultural Products
ND1907		ND/2019/07	Fanling North New Development Area, Phase 1: Site Formation and Infrastructure Works
To be defined by during operation stage	Operations	N/A	N/A

3. Codes for Field 3.1 – Volume

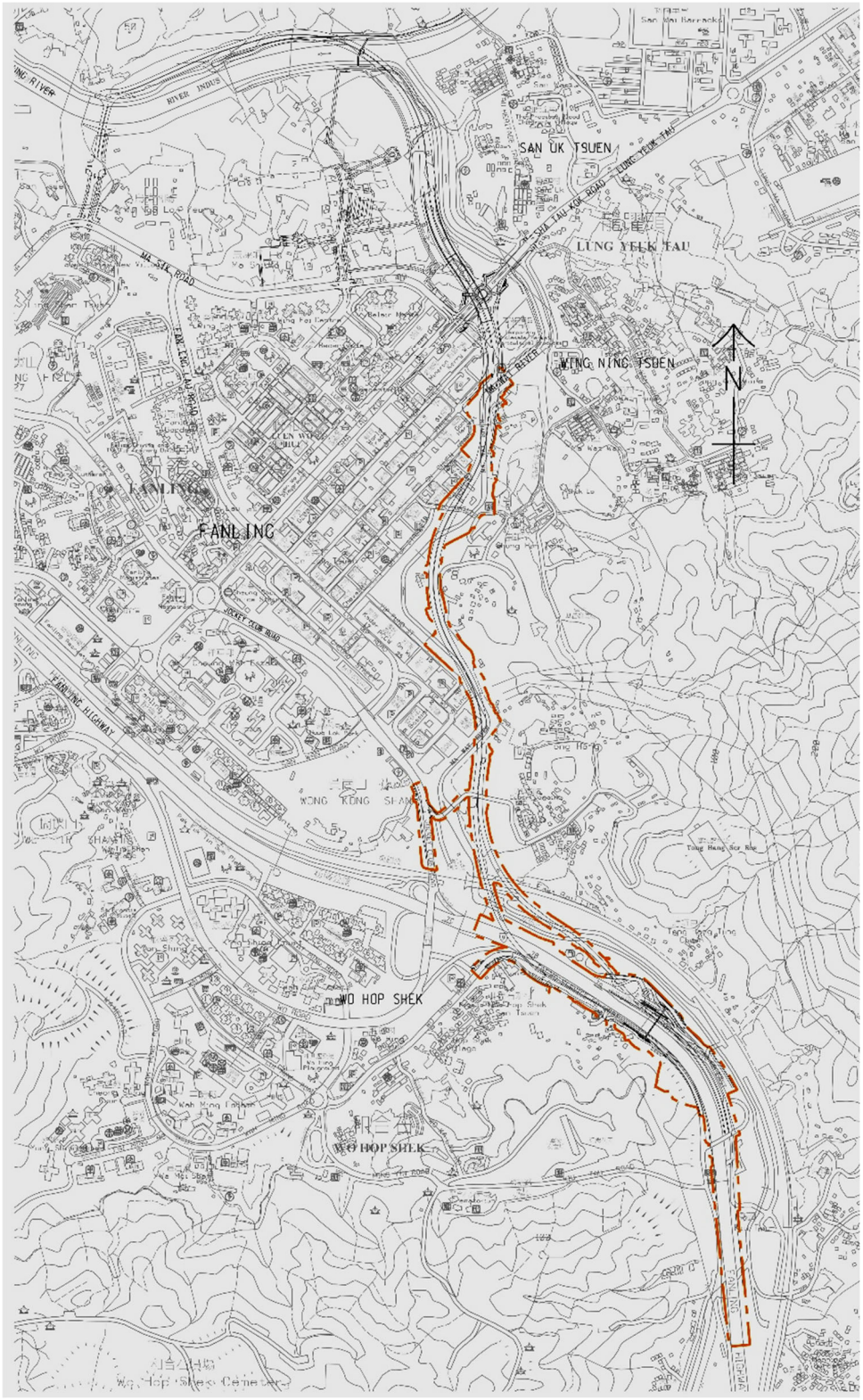
Field 3.1 – Volume is a unique identifier which serves to indicate specific geospatial zone or volume within a project.

Table App IX-2 Codes for Field 3.1 – Volume

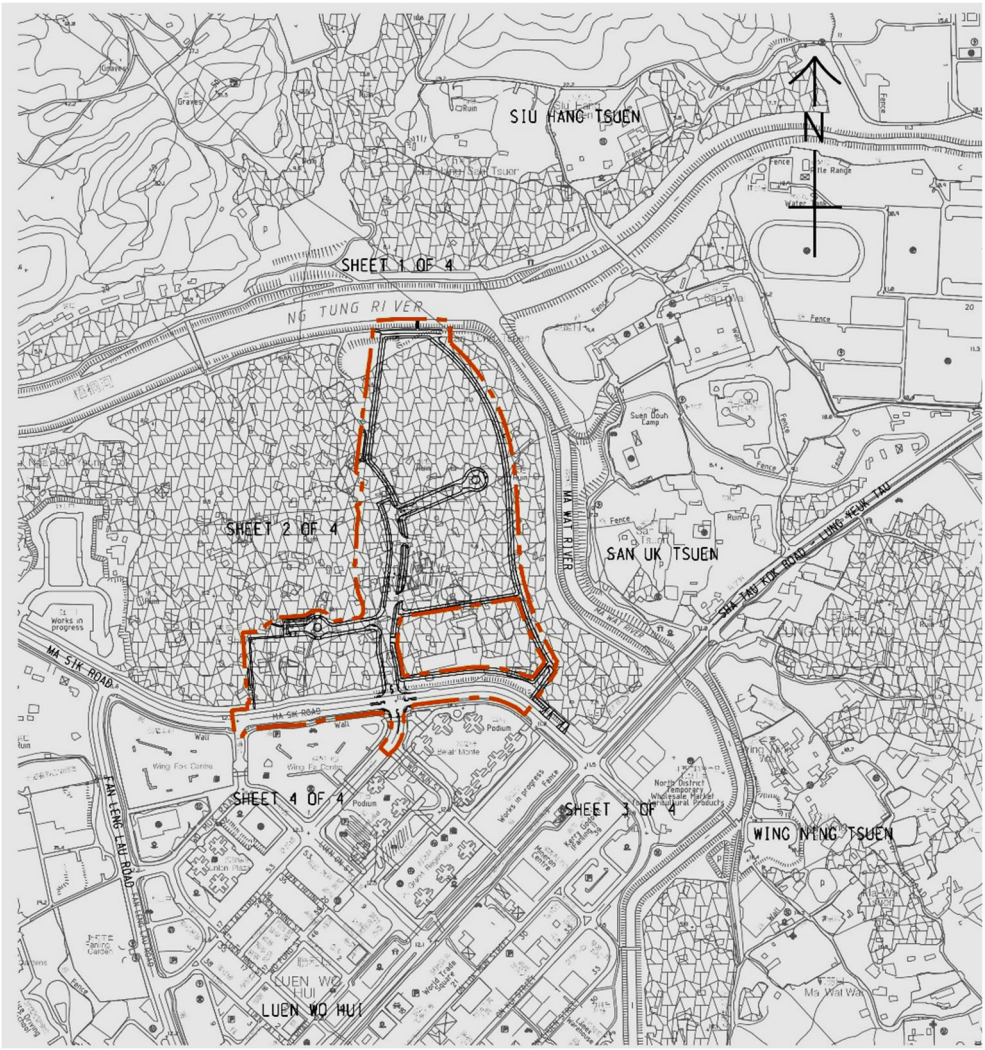
Field 3.1 - Volume	Description and Boundary
C1	Kwu Tung North New Development Area, Phase 1:Site Formation and Infrastructure Works 

Field 3.1 - Volume	Description and Boundary
C2	Kwu Tung North New Development Area, Phase 1:Roads and Drains between Kwu Tung North New Development Area and Shek Wu Hui 
C3	Kwu Tung North and Fanling North New Development Areas, Phase 1: Development of Long Valley Nature Park 

Field 3.1 - Volume	Description and Boundary
C4	Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shek Wu San Tsuen North to Lung Yeuk Tau) 

Field 3.1 - Volume	Description and Boundary
C5	Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shung Him Tong to Kau Lung Hang) 

Field 3.1 - Volume	Description and Boundary
C6	Fanling North New Development Area, Phase 1: Reprovisioning of North District Temporary Wholesale Market for Agricultural Products 

Field 3.1 - Volume	Description and Boundary
C7	Fanling North New Development Area, Phase 1: Site Formation and Infrastructure Works 

4. Codes for Field 4.1 – Location

Field 4.1 – Location is an identifier which serves to indicate specific location (e.g. slope number, feature code, building code) for geospatial coordination and future asset management. Common abbreviation codes (referring to Appendix X) should be used as far as practicable.

For locations that cannot be sufficiently covered by common abbreviation codes, additional location codes should be documented in the BEP for project.

Table App IX-3 Codes for Field 4.1 – Location Identifier

Field 4.1 - Location	Located in Which Volume	Definition	Currently Used By
RDW1	C1	Road W1	N/A
SRHO	C1	Special Residential Home Ownership Scheme Area	N/A
A6	C2	Road A6	N/A
A100	C2	Road A100	N/A
VRE	C2	Village Resite Area	N/A
BW	C3	Boardwalk	N/A
LVNP	C3	Long Valley Nature Park	N/A
PD	C3	Pedestrian Walkway	N/A
SS	C3	Typical Storage Shed	N/A
ST01	C3	Storage House Type 1 (ST01)	N/A
ST02	C3	Tea House Pavilion (ST02)	N/A
ST03	C3	Compositing Facility (ST03)	N/A
ST04	C3	Bird Hide (ST04)	N/A
ST06	C3	Outdoor classroom shelter (ST06)	N/A
ST07	C3	Storage House Type 2 (ST07)	N/A
WSR	C3	Wa Shan Road	N/A
YKR	C3	Yin Kong Road	N/A
FBF4	C4	Footbridge F4	N/A
FBF6	C4	Footbridge F6	N/A
MSR	C4	Ma Sik Road	N/A
RO	C4	Roundabout	N/A
HKYF	C5	Footbridge (Ho Ka Yuen)	N/A
PD	C5	Pedestrian Walkway	N/A

Field 4.1 - Location	Located in Which Volume	Definition	Currently Used By
UD	C4 and C5	Under Deck	N/A
MWRV	C6	Ma Wat River	N/A
HOLF	C7	Home of Loving Faithfulness	N/A

*Similar abbreviations for different locations should be assigned sequential numbering, e.g., ST01, ST02, ST03…etc.

Appendix X – Common Codes for Information Container ID Fields

Remarks: Please refer to the latest Common Codes for Information Container ID Fields at the link below:

https://www.devb.gov.hk/en/publications_and_press_releases/publications/devb-harmonisation-guideline/index.html

Appendix XI – A Sample Spreadsheet for BIM File Name Validation

Table of Content

1. Introduction XI-1
2. BIM File Name Validation Process Using Spreadsheet XI-1

List of Figures

Figure App XI-1 - The "Project Specified Code" Worksheet XI-2
Figure App XI-2 –The Worksheets for Each Field XI-3
Figure App XI-3 - The "Model Naming" Worksheets XI-3
Figure App XI-4 – Example of Drop-Down List for Selecting Codes XI-4
Figure App XI-5 - Example of Auto-Generated Information for Model Files XI-4
Figure App XI-6 - Hidden Columns on the "Model Naming" Worksheet XI-5
Figure App XI-7 – Example of Cells with Grey Font Colour XI-5

1. Introduction

1.1. BIM file name validation process can be embedded in BIM CDCP, GBDR or spreadsheet.

1.2. This Appendix provides an example of BIM file name validation process using the spreadsheet approach. This process is not required if the BIM CDCP has validation capabilities.

1.3. This Appendix is composed of the following:

1.3.1. A spreadsheet file containing worksheets for code management and BIM model name generation; and

1.3.2. The step-by-step instructions in the section below on how to utilise the spreadsheet to facilitate the data validation process.

2. BIM File Name Validation Process Using Spreadsheet

2.1. In this example, a data spreadsheet has been created based on the project of Kwu Tung North (KTN) and Fanling North (FLN) New Development Areas (NDA), Phase 1.

2.2. To ensure that the data going through conversion engine into GBDR to be shared with other parties have consistent naming (information container ID), a validation list is formed based on two types of codes:

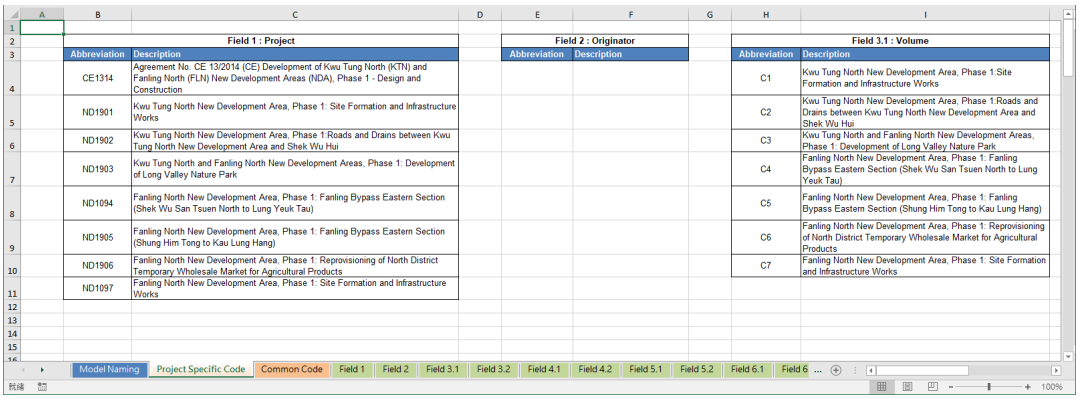
2.2.1. **Common Codes** in accordance with Appendix X – Common Codes for Naming; and

2.2.2. **Project-specific Codes** which would be different for different projects. An example of project-specific codes is provided in Appendix IX – Sample Project Specific Codes for Naming.

2.3. To add codes to the list:

2.3.1. Go to the "Project Specific Code" worksheet (orange coloured tab). The “Common Code” worksheet should not be modified without consensus between all WDs.

Figure App XI-1 - The “Project Specified Code” Worksheet



Field 1 : Project	
Abbreviation	Description
CE1314	Agreement No. CE 13/2014 (CE) Development of Kwu Tung North (KTN) and Fanling North (FLN) New Development Areas (NDA), Phase 1 - Design and Construction
ND1901	Kwu Tung North New Development Area, Phase 1: Site Formation and Infrastructure Works
ND1902	Kwu Tung North New Development Area, Phase 1:Roads and Drains between Kwu Tung North New Development Area and Shek Wu Hui
ND1903	Kwu Tung North and Fanling North New Development Areas, Phase 1: Development of Long Valley Nature Park
ND1094	Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shek Wu San Tsuen North to Lung Yeuk Tau)
ND1905	Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shung Him Tong to Kau Lung Hang)
ND1906	Fanling North New Development Area, Phase 1: Reprovisioning of North District Temporary Wholesale Market for Agricultural Products
ND1097	Fanling North New Development Area, Phase 1: Site Formation and Infrastructure Works

Field 2 : Originator	
Abbreviation	Description

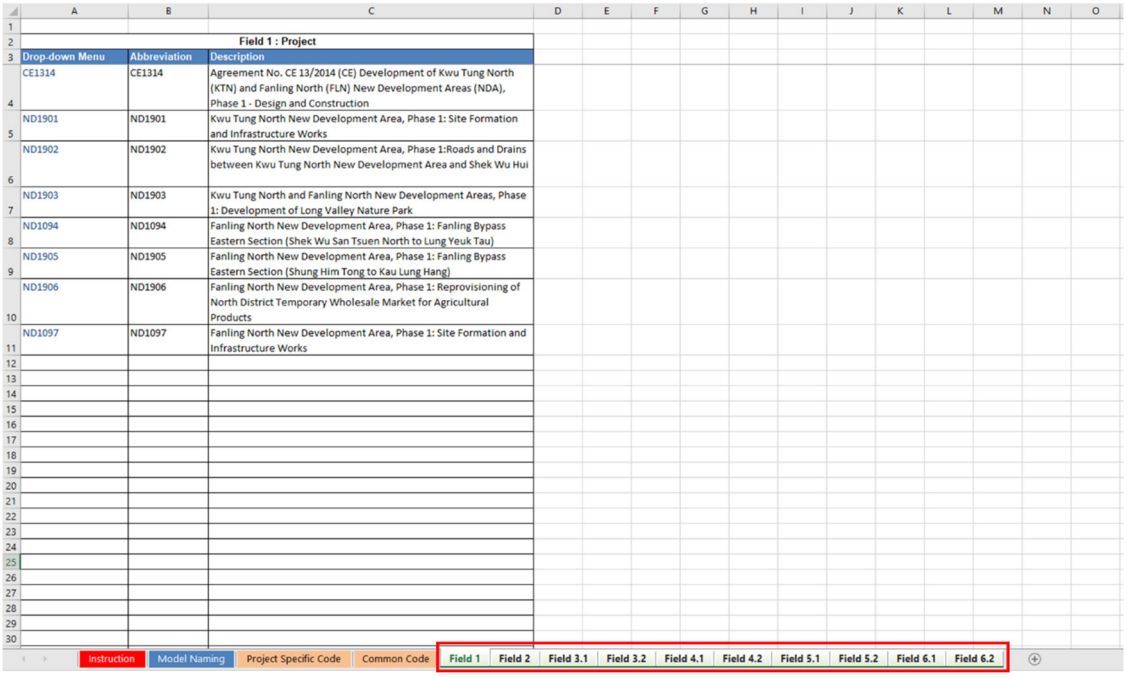
Field 3.1 : Volume	
Abbreviation	Description
C1	Kwu Tung North New Development Area, Phase 1:Site Formation and Infrastructure Works
C2	Kwu Tung North New Development Area, Phase 1:Roads and Drains between Kwu Tung North New Development Area and Shek Wu Hui
C3	Kwu Tung North and Fanling North New Development Areas, Phase 1: Development of Long Valley Nature Park
C4	Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shek Wu San Tsuen North to Lung Yeuk Tau)
C5	Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shung Him Tong to Kau Lung Hang)
C6	Fanling North New Development Area, Phase 1: Reprovisioning of North District Temporary Wholesale Market for Agricultural Products
C7	Fanling North New Development Area, Phase 1: Site Formation and Infrastructure Works

Model Naming | Project Specific Code | Common Code | Field 1 | Field 2 | Field 3.1 | Field 3.2 | Field 4.1 | Field 4.2 | Field 5.1 | Field 5.2 | Field 6.1 | Field 6 ...

2.3.2. Find the corresponding field and add the information to the bottom of the list. The field length and format as specified in the Guidelines should be followed.

2.3.3. The value of the field will be automatically updated in the corresponding field worksheet (green coloured tabs).

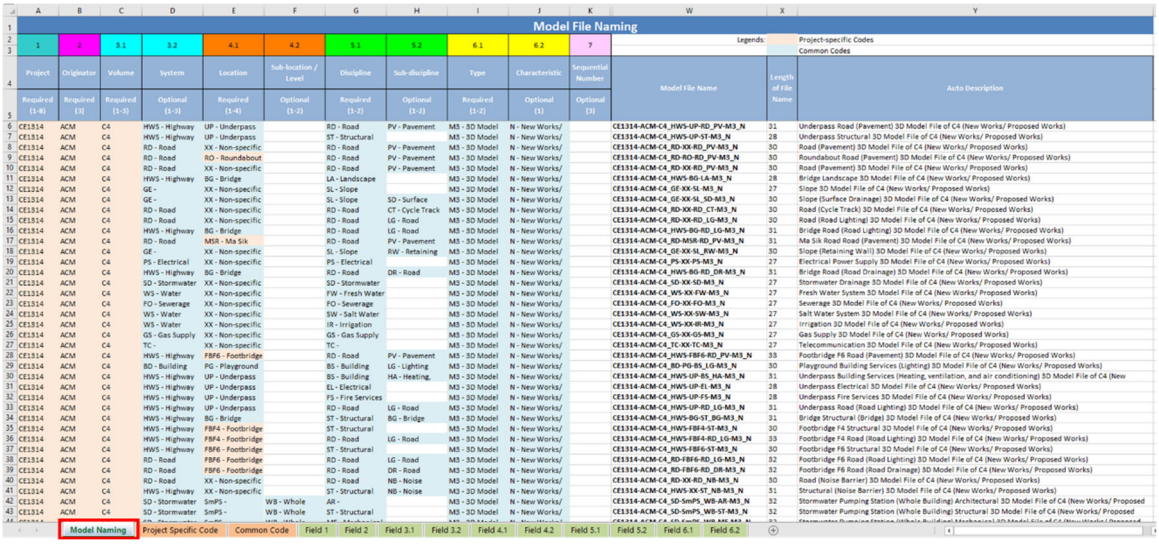
Figure App XI-2 –The Worksheets for Each Field



Field 1 : Project		
Drop-down Menu	Abbreviation	Description
CE1314	CE1314	Agreement No. CE 13/2014 (CE) Development of Kwu Tung North (KTN) and Fanling North (FLN) New Development Areas (NDA), Phase 1 - Design and Construction
ND1901	ND1901	Kwu Tung North New Development Area, Phase 1: Site Formation and Infrastructure Works
ND1902	ND1902	Kwu Tung North New Development Area, Phase 1:Roads and Drains between Kwu Tung North New Development Area and Shek Wu Hui
ND1903	ND1903	Kwu Tung North and Fanling North New Development Areas, Phase 1: Development of Long Valley Nature Park
ND1094	ND1094	Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shek Wu San Tsuen North to Lung Yeuk Tau)
ND1905	ND1905	Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section (Shung Him Tong to Kau Lung Hang)
ND1906	ND1906	Fanling North New Development Area, Phase 1: Reprovisioning of North District Temporary Wholesale Market for Agricultural Products
ND1097	ND1097	Fanling North New Development Area, Phase 1: Site Formation and Infrastructure Works

2.3.4. The updated codes can now be selected from the “Model Naming” worksheet (blue coloured tabs).

Figure App XI-3 - The “Model Naming” Worksheets



Model File Naming													
1	2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	7	Legends:	Project-specific Codes	
												Common Codes	
Project	Originator	Volume	System	Location	Sub-location / Level	Discipline	Sub-discipline	Type	Characteristic	Sequential Number	Model File Name	Length of File Name	Auto Description
Required (1-8)	Required (1)	Required (1-3)	Optional (1-3)	Required (1-4)	Optional (1-2)	Required (1-2)	Optional (1-2)	Required (1-2)	Optional (1)	Optional (3)			
CE1314	ACM	C4	HWS - Highway	UP - Underpass		RD - Road	PV - Pavement	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-UP-RD_PV-M3_N	31	Underpass Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	UP - Underpass		ST - Structural		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-UP-ST-M3_N	28	Underpass Structural 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	RD - Road	XX - Non-specific		RD - Road	PV - Pavement	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_RD-XX-RD_PV-M3_N	30	Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	RD - Road	RO - Roundabout		RD - Road	PV - Pavement	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_RD-RO-RD_PV-M3_N	30	Roundabout Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	RD - Road	XX - Non-specific		RD - Road	PV - Pavement	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_RD-XX-RD_PV-M3_N	30	Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	BG - Bridge		LA - Landscape		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-BG-LA-M3_N	28	Bridge Landscape 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	GE -	XX - Non-specific		SL - Slope		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_GE-XX-SL-M3_N	27	Slope 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	GE -	XX - Non-specific		SL - Slope	SD - Surface	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_GE-XX-SL_SD-M3_N	30	Slope (Surface Drainage) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	RD - Road	XX - Non-specific		RD - Road	CT - Cycle Track	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_RD-XX-RD_CT-M3_N	30	Road (Cycle Track) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	RD - Road	XX - Non-specific		RD - Road	LG - Road	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_RD-XX-RD_LG-M3_N	30	Road (Road Lighting) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	BG - Bridge		RD - Road	LG - Road	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-BG-RD_LG-M3_N	31	Bridge Road (Road Lighting) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	RD - Road	MSR - Ma Sik		RD - Road	PV - Pavement	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_RD-MSR-RD_PV-M3_N	31	Ma Sik Road Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	GE -	XX - Non-specific		SL - Slope	RW - Retaining	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_GE-XX-SL_RW-M3_N	30	Slope (Retaining Wall) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	PS - Electrical	XX - Non-specific		PS - Electrical		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_PS-XX-PS-M3_N	27	Electrical Power Supply 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	BG - Bridge		RD - Road	DR - Road	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-BG-RD_DR-M3_N	31	Bridge Road (Road Drainage) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	SD - Stormwater	XX - Non-specific		SD - Stormwater		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_SD-XX-SD-M3_N	27	Stormwater Drainage 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	WS - Water	XX - Non-specific		FW - Fresh Water		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_WS-XX-FW-M3_N	27	Fresh Water System 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	FO - Sewerage	XX - Non-specific		FO - Sewerage		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_FO-XX-FO-M3_N	27	Sewerage 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	WS - Water	XX - Non-specific		SW - Salt Water		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_WS-XX-SW-M3_N	27	Salt Water System 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	WS - Water	XX - Non-specific		IR - Irrigation		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_WS-XX-IR-M3_N	27	Irrigation 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	GS - Gas Supply	XX - Non-specific		GS - Gas Supply		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_GS-XX-GS-M3_N	27	Gas Supply 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	TC -	XX - Non-specific		TC -		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_TC-XX-TC-M3_N	27	Telecommunication 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	FBF6 - Footbridge		RD - Road	PV - Pavement	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-FBF6-RD_PV-M3_N	33	Footbridge F6 Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	RD - Building	PG - Playground		BS - Building	LG - Lighting	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_RD-PG-BS_LG-M3_N	30	Playground Building Services (Lighting) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	UP - Underpass		BS - Building	HA - Heating,	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-UP-BS_HA-M3_N	31	Underpass Building Services (Heating, ventilation, and air conditioning) 3D Model File of C4 (New
CE1314	ACM	C4	HWS - Highway	UP - Underpass		EL - Electrical		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-UP-EL-M3_N	28	Underpass Electrical 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	UP - Underpass		FS - Fire Services		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-UP-FS-M3_N	28	Underpass Fire Services 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	UP - Underpass		RD - Road	LG - Road	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-UP-RD_LG-M3_N	31	Underpass Road (Road Lighting) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	BG - Bridge		ST - Structural	BG - Bridge	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-BG-ST_BG-M3_N	31	Bridge Structural (Bridge) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	FBF4 - Footbridge		ST - Structural		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-FBF4-ST-M3_N	30	Footbridge F4 Structural 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	FBF4 - Footbridge		RD - Road	LG - Road	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-FBF4-RD_LG-M3_N	33	Footbridge F4 Road (Road Lighting) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	FBF6 - Footbridge		ST - Structural		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-FBF6-ST-M3_N	30	Footbridge F6 Structural 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	RD - Road	FBF6 - Footbridge		RD - Road	LG - Road	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_RD-FBF6-RD_LG-M3_N	32	Footbridge F6 Road (Road Lighting) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	RD - Road	FBF6 - Footbridge		RD - Road	DR - Road	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_RD-FBF6-RD_DR-M3_N	32	Footbridge F6 Road (Road Drainage) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	RD - Road	XX - Non-specific		RD - Road	NB - Noise	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_RD-XX-RD_NB-M3_N	30	Road (Noise Barrier) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	HWS - Highway	XX - Non-specific		ST - Structural	NB - Noise	M3 - 3D Model	N - New Works/		CE1314-ACM-C4_HWS-XX-ST_NB-M3_N	31	Structural (Noise Barrier) 3D Model File of C4 (New Works/ Proposed Works)
CE1314	ACM	C4	SD - Stormwater	SmPS -	WB - Whole	AR -		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_SD-SmPS_WB-AR-M3_N	32	Stormwater Pumping Station (Whole Building) Architectural 3D Model File of C4 (New Works/ Proposed
CE1314	ACM	C4	SD - Stormwater	SmPS -	WB - Whole	ST - Structural		M3 - 3D Model	N - New Works/		CE1314-ACM-C4_SD-SmPS_WB-ST-M3_N	32	Stormwater Pumping Station (Whole Building) Structural 3D Model File of C4 (New Works/ Proposed

2.4. To automatically generate a list of model names for the model registers:

2.4.1. Go to the “Model Naming” worksheet.

2.4.2. Use the drop-down list of each field (from Column A to Column K) to select the correct code. Required fields must not be omitted. The cells with project-specific code selected

would be automatically highlighted with orange colour while that with common code selected would be automatically highlighted with blue colour.

Figure App XI-4 – Example of Drop-Down List for Selecting Codes

A	B	C	D	E	F	G	H	I	J	K
Model File Nar										
1	2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	7
Project	Originator	Volume	System	Location	Sub-location / Level	Discipline	Sub-discipline	Type	Characteristic	Sequential Number
Required (1-8)	Required (3)	Required (1-3)	Optional (1-3)	Required (1-4)	Optional (1-2)	Required (1-2)	Optional (1-2)	Required (1-2)	Optional (1)	Optional (3)
CE1314	ACM	C4	HWS - Highway	UP - Underpass		RD - Road	V - Pavement	M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	HWS - Highway	UP - Underpass				M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	RD - Road	XX - Non-specific			V - Pavement	M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	RD - Road	RO -			V - Pavement	M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	RD - Road	XX - Non-specific			V - Pavement	M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	HWS - Highway	BG - Bridge				M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	GE -	XX - Non-specific				M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	GE -	XX - Non-specific		SL - Slope	SD - Surface	M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	RD - Road	XX - Non-specific		RD - Road	CT - Cycle Track	M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	RD - Road	XX - Non-specific		RD - Road	LG - Road	M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	HWS - Highway	BG - Bridge		RD - Road	LG - Road	M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	RD - Road	MSR - Ma Sik		RD - Road	PV - Pavement	M3 - 3D Model	N - New Works/	
CE1314	ACM	C4	GE -	XX - Non-specific		SL - Slope	RW - Retaining	M3 - 3D Model	N - New Works/	

RD - Road
RW - Raw Water System
SD - Stormwater Drainage
SF - Site Formation
SL - Slope
ST - Structural
SW - Salt Water System
TC - Telecommunication

2.4.3. After selecting the codes for all required fields, the model file name, length of file name and description (from Column W to Column Y) would be generated automatically.

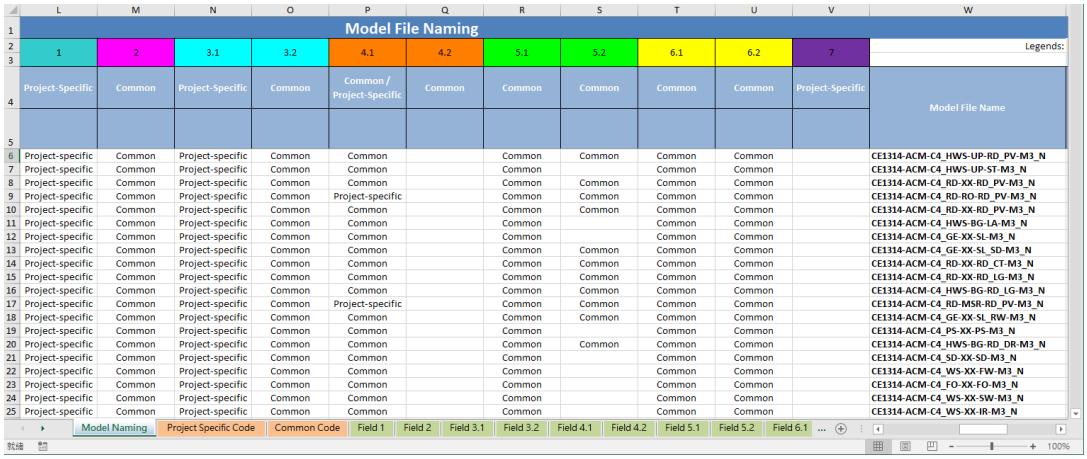
Figure App XI-5 - Example of Auto-Generated Information for Model Files

W	X	Y
ming		
Legends:		Project-specific Codes
		Common Codes
Model File Name	Length of File Name	Auto Description
CE1314-ACM-C4_HWS-UP-RD_PV-M3_N	31	Underpass Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_HWS-UP-ST-M3_N	28	Underpass Structural 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_RD-XX-RD_PV-M3_N	30	Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_RD-RO-RD_PV-M3_N	30	Roundabout Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_RD-XX-RD_PV-M3_N	30	Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_HWS-BG-LA-M3_N	28	Bridge Landscape 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_GE-XX-SL-M3_N	27	Slope 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_GE-XX-SL_SD-M3_N	30	Slope (Surface Drainage) 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_RD-XX-RD_CT-M3_N	30	Road (Cycle Track) 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_RD-XX-RD_LG-M3_N	30	Road (Road Lighting) 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_HWS-BG-RD_LG-M3_N	31	Bridge Road (Road Lighting) 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_RD-MSR-RD_PV-M3_N	31	Ma Sik Road Road (Pavement) 3D Model File of C4 (New Works/ Proposed Works)
CE1314-ACM-C4_GE-XX-SL_RW-M3_N	30	Slope (Retaining Wall) 3D Model File of C4 (New Works/ Proposed Works)

2.5. The limitations of the sample spreadsheet for BIM file name validation should be noted. To keep this spreadsheet's file size manageable, the numbers of rows for the "Model Naming" worksheet and the worksheets for each field are capped at 10,000.

2.6. On the "Model Naming" worksheet, the cells from Column L to Column V are input with formulas for background control of Data. Since users don't need to input or view these cells, they are hidden for better user experience.

Figure App XI-6 - Hidden Columns on the "Model Naming" Worksheet

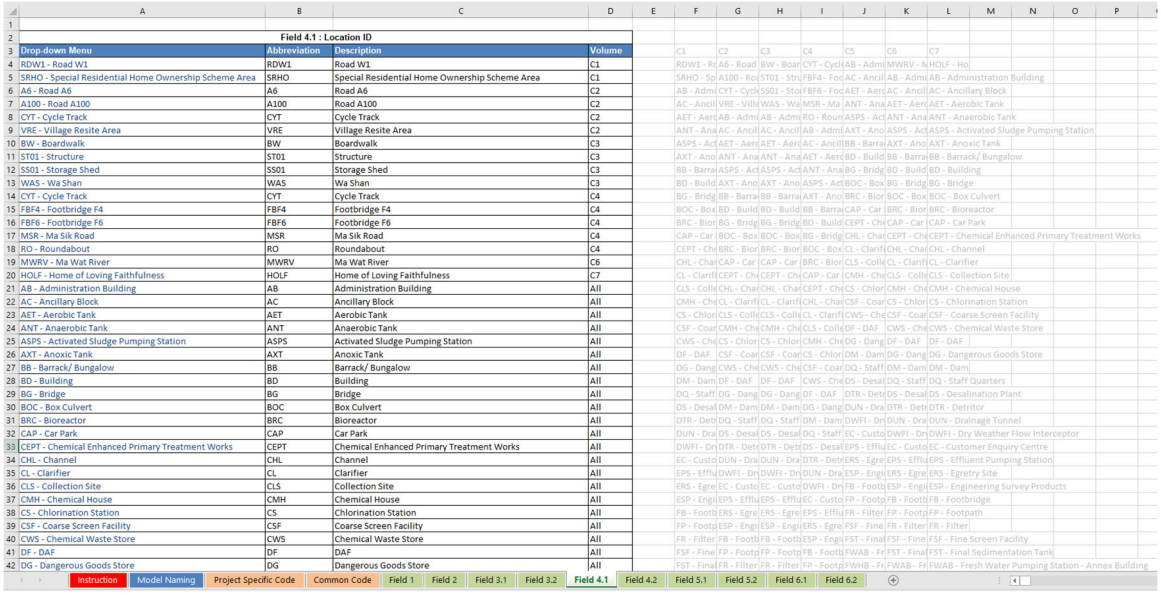


	L	M	N	O	P	Q	R	S	T	U	V	W
1	Model File Naming											
2	1	2	3.1	3.2	4.1	4.2	5.1	5.2	6.1	6.2	7	Legends:
4	Project-Specific	Common	Project-Specific	Common	Common / Project-Specific	Common	Common	Common	Common	Common	Project-Specific	Model File Name
6	Project-specific	Common	Project-specific	Common	Common		Common	Common	Common	Common		CE1314-ACM-C4_HWS-UP-RD_PV-M3_N
7	Project-specific	Common	Project-specific	Common	Common		Common		Common	Common		CE1314-ACM-C4_HWS-UP-ST-M3_N
8	Project-specific	Common	Project-specific	Common	Common		Common	Common	Common	Common		CE1314-ACM-C4_RD-XX-RD_PV-M3_N
9	Project-specific	Common	Project-specific	Common	Project-specific		Common	Common	Common	Common		CE1314-ACM-C4_RD-RO-RD_PV-M3_N
10	Project-specific	Common	Project-specific	Common	Common		Common	Common	Common	Common		CE1314-ACM-C4_RD-XX-RD_PV-M3_N
11	Project-specific	Common	Project-specific	Common	Common		Common		Common	Common		CE1314-ACM-C4_HWS-BG-LA-M3_N
12	Project-specific	Common	Project-specific	Common	Common		Common		Common	Common		CE1314-ACM-C4_GE-XX-SL-M3_N
13	Project-specific	Common	Project-specific	Common	Common		Common	Common	Common	Common		CE1314-ACM-C4_GE-XX-SL_SD-M3_N
14	Project-specific	Common	Project-specific	Common	Common		Common	Common	Common	Common		CE1314-ACM-C4_RD-XX-RD_CT-M3_N
15	Project-specific	Common	Project-specific	Common	Common		Common	Common	Common	Common		CE1314-ACM-C4_RD-XX-RD_LG-M3_N
16	Project-specific	Common	Project-specific	Common	Common		Common	Common	Common	Common		CE1314-ACM-C4_HWS-BG-RD_LG-M3_N
17	Project-specific	Common	Project-specific	Common	Project-specific		Common	Common	Common	Common		CE1314-ACM-C4_RD-MSR-RD_PV-M3_N
18	Project-specific	Common	Project-specific	Common	Common		Common	Common	Common	Common		CE1314-ACM-C4_GE-XX-SL_RW-M3_N
19	Project-specific	Common	Project-specific	Common	Common		Common		Common	Common		CE1314-ACM-C4_PS-XX-PS-M3_N
20	Project-specific	Common	Project-specific	Common	Common		Common	Common	Common	Common		CE1314-ACM-C4_HWS-BG-RD_DR-M3_N
21	Project-specific	Common	Project-specific	Common	Common		Common		Common	Common		CE1314-ACM-C4_SD-XX-SD-M3_N
22	Project-specific	Common	Project-specific	Common	Common		Common		Common	Common		CE1314-ACM-C4_WS-XX-FW-M3_N
23	Project-specific	Common	Project-specific	Common	Common		Common		Common	Common		CE1314-ACM-C4_FO-XX-FO-M3_N
24	Project-specific	Common	Project-specific	Common	Common		Common		Common	Common		CE1314-ACM-C4_WS-XX-SW-M3_N
25	Project-specific	Common	Project-specific	Common	Common		Common		Common	Common		CE1314-ACM-C4_WS-XX-IR-M3_N

Model Naming | Project Specific Code | Common Code | Field 1 | Field 2 | Field 3.1 | Field 3.2 | Field 4.1 | Field 4.2 | Field 5.1 | Field 5.2 | Field 6.1 ...

2.7. On the "Field 4.1" and "Field 5.2" worksheets, the cells with grey font colour are input with formulas for generating the drop-down lists. They should not be modified, cleared or deleted.

Figure App XI-7 – Example of Cells with Grey Font Colour



	A	B	C	D
2	Field 4.1 : Location ID			
3	Drop-down Menu	Abbreviation	Description	Volume
4	RDW1 - Road W1	RDW1	Road W1	C1
5	SRHO - Special Residential Home Ownership Scheme Area	SRHO	Special Residential Home Ownership Scheme Area	C1
6	A6 - Road A6	A6	Road A6	C2
7	A100 - Road A100	A100	Road A100	C2
8	CYT - Cycle Track	CYT	Cycle Track	C2
9	VRE - Village Resite Area	VRE	Village Resite Area	C2
10	BW - Boardwalk	BW	Boardwalk	C3
11	ST01 - Structure	ST01	Structure	C3
12	SS01 - Storage Shed	SS01	Storage Shed	C3
13	WAS - Wa Shan	WAS	Wa Shan	C3
14	CYT - Cycle Track	CYT	Cycle Track	C4
15	FBF4 - Footbridge F4	FBF4	Footbridge F4	C4
16	FBF6 - Footbridge F6	FBF6	Footbridge F6	C4
17	MSR - Ma Sik Road	MSR	Ma Sik Road	C4
18	RO - Roundabout	RO	Roundabout	C4
19	MWRV - Ma Wat River	MWRV	Ma Wat River	C6
20	HOLF - Home of Loving Faithfulness	HOLF	Home of Loving Faithfulness	C7
21	AB - Administration Building	AB	Administration Building	All
22	AC - Ancillary Block	AC	Ancillary Block	All
23	AET - Aerobic Tank	AET	Aerobic Tank	All
24	ANT - Anaerobic Tank	ANT	Anaerobic Tank	All
25	ASPS - Activated Sludge Pumping Station	ASPS	Activated Sludge Pumping Station	All
26	AXT - Anoxic Tank	AXT	Anoxic Tank	All
27	BB - Barrack/ Bungalow	BB	Barrack/ Bungalow	All
28	BD - Building	BD	Building	All
29	BG - Bridge	BG	Bridge	All
30	BOC - Box Culvert	BOC	Box Culvert	All
31	BRC - Bioreactor	BRC	Bioreactor	All
32	CAP - Car Park	CAP	Car Park	All
33	CEPT - Chemical Enhanced Primary Treatment Works	CEPT	Chemical Enhanced Primary Treatment Works	All
34	CHL - Channel	CHL	Channel	All
35	CL - Clarifier	CL	Clarifier	All
36	CLS - Collection Site	CLS	Collection Site	All
37	CMH - Chemical House	CMH	Chemical House	All
38	CS - Chlorination Station	CS	Chlorination Station	All
39	CSF - Coarse Screen Facility	CSF	Coarse Screen Facility	All
40	CWS - Chemical Waste Store	CWS	Chemical Waste Store	All
41	DF - DAF	DF	DAF	All
42	DG - Dangerous Goods Store	DG	Dangerous Goods Store	All

Instruction | Model Naming | Project Specific Code | Common Code | Field 1 | Field 2 | Field 3.1 | Field 3.2 | Field 4.1 | Field 4.2 | Field 5.1 | Field 5.2 | Field 6.1 | Field 6.2

Appendix XII – Sample Project Close-out Checklist

The table below shows an example of the Project Close-out Checklist. The checklist could be expanded to include any project-specific check items.

No.	Check Item Description	Fulfils Project-specific Requirement?
1	Information Requirements and Exchange	
a	Do file contents meet project-specific LOIN?	Y / N
b	Are Level of Geometry and Level of Information in compliance with project-specific requirements?	Y / N
c	Has a project-specific Responsibility Matrix been authored and followed?	Y / N
d	Are hardware used in compliance with DEVB's latest requirements?	Y / N
e	Are software versions in compliance with those specified by the BEP?	Y / N
f	Are exchange formats in compliance with those specified by the BEP?	Y / N
2	Federation and Naming	
a	Does the sequence of information container ID field comply with the BIM Harmonisation Guidelines?	Y / N
b	Are any mandatory information container ID fields missing?	Y / N
c	Do common codes used comply with those specified by the BIM Harmonisation Guidelines?	Y / N
d	Do project-specific codes used comply with those specified by the BEP?	Y / N
e	Does model naming comply with information container ID as specified by the BEP?	Y / N
f	Does the naming of drawings generated from BIM comply with WDs' specifications?	Y / N
g	Does the naming of BIM objects comply with the latest version of CIC Production of BIM Object Guide General Requirements?	Y / N
3	Modelling Methodology	
a	Are BIM models authored using BIM objects from CIC BIM Portal and WDs' BIM objects?	Y / N
b	Are the following found in the BIM file(s)? i. Overlapping elements ii. Large-spanning continuous elements iii. Objects authored in generic model category iv. Complex geometry v. Special elements imported from other software If yes, please minimise their use and document any exceptions in the BEP.	Y / N
c	Are indoor spaces modelled using Room?	Y / N

No.	Check Item Description	Fulfils Project-specific Requirement?
d	Do coordinates comply with the BEP?	Y / N
e	Do colour settings comply with the BEP?	Y / N
4	Project Close-out Protocols	
a	Was the checklist completed thoroughly prior to passing the BIM file(s) to GBDR?	Y / N

Appendix XIII – Example of Project Boundary Authoring and Model File List

Remarks: Please read this Appendix in conjunction with Appendix XIV- Guidelines for Submission of Design and As-built BIM Models to LandsD.

TABLE OF CONTENTS

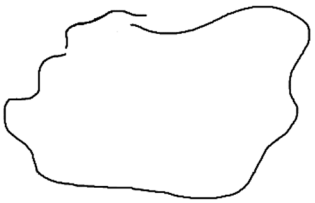
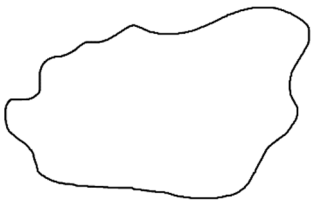
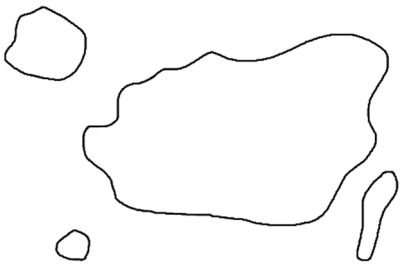
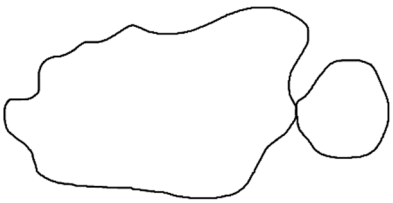
1. Project Boundary XIII-1

2. Model File List XIII-2

1. Project Boundary

1.1 The project boundary should be set up for BIM model per project. The boundary should be one or multiple closed outer lines of all model elements.

Table 1-1 Examples of Project Boundary

	
Not closed, overlapping	Closed
×	✓
	
Multiple closed areas	Multiple closed areas with intersection
✓	✓

1.2 The project boundary in 2D should be provided and stored in a separated file in one of the following formats: DWG, Shapefile, or DGN format for each project. The file shall be named *Project boundary.dwg, Project boundary.shp*, or *Project boundary.dgn*, as appropriate, and be prepared in accordance with the following requirements:

a) Supported file format versions:

- DWG: 2018 or later
- DGN: V8
- Shapefile: Version 1.0.

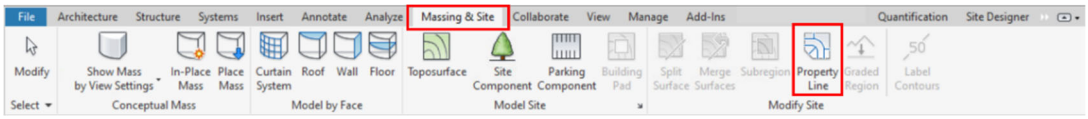
b) The setting of coordinate system should be HK1980 Grid and in meter.

c) Any object which is not related to the boundary should be hidden.

d) Reference blocks should be avoided.

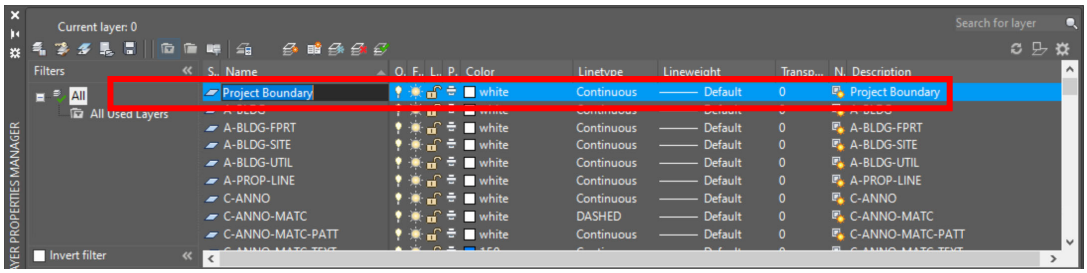
1.3 For Autodesk Revit model, a DWG file should be exported from the Revit project file to store the project boundary separately. The exported layer should be named as Project Boundary and it should be modelled as Property Line.

Figure 1-1 Call Out Property Line in Revit



1.4 For Civil 3D, the DWG file should be based on project specific Civil 3D template with project information. The layer should be named as Project Boundary and used continuous line as the line type.

Figure 1-2 Layer Setting for Project Boundary in DWG



1.5 WDs should follow Appendix XIV - Guidelines for Submission of Design and As-built BIM Models to LandsD to submit the project boundary to respective folder for effective data management on the GBDR.

2. Model File List

2.1 WDs should input the following information in model file list template and submit it to respective folder according to Appendix XIV - Guidelines for Submission of Design and As-built BIM Models to LandsD. An .xlsx file describes model file list can be downloaded from DEVB's Website:

https://www.devb.gov.hk/en/publications_and_press_releases/publications/devb-harmonisation-guideline/index.html

No.	Item
1	Serial Number
2	Model File Name
3	Description
4	Stage – Detail Design (D) / As-built (AB)
5	File Format
6	Software Version

Appendix XIV - Guidelines for Submission of Design and As-built BIM Models to LandsD

TABLE OF CONTENTS

1. Introduction XIV-1

2. The Essentials for Successful BIM Data Submission to GBDR XIV-2

2.1 Folder Structure for BIM Data Submission XIV-2

2.2 Completeness Check for BIM Data Submission XIV-6

3. BIM Data Submission to GBDR XIV-7

3.1 Submission via the GBDR Web User Interface XIV-7

3.2 Submission using GBDR BIM APIs XIV-9

4. Checklist for the Complete BIM Data Submission XIV-12

List of Tables

Table App XIV-1 Subfolders at Level 1 ..... XIV-3

Table App XIV-2 Subfolders at Level 2 ..... XIV-3

Table App XIV-3 Subfolders at Level 3 ..... XIV-3

Table App XIV-4 Subfolders at Level 4 ..... XIV-3

Table App XIV-5 Subfolders at Level 5 ..... XIV-3

Table App XIV-6 Subfolders at Level 6 ..... XIV-4

Table App XIV-7 Subfolders at Level 7 ..... XIV-5

Table App XIV-8 BIM Submission Requirements XIV-6

Table App XIV-9 Examples of GBDR BIM APIs XIV-9

List of Figures

Figure App XIV-1 The 7-Level Folder Structure in GBDR XIV-2

Figure App XIV-2 Input Project Details XIV-7

Figure App XIV-3 Assign Files to the Corresponding Subfolders XIV-8

Figure App XIV-4 BIM API Document on the GBDR Website XIV-10

Figure App XIV-5 GBDR BIM API Sandbox XIV-10

Figure App XIV-6 Response Simulated by GBDR BIM API Sandbox XIV-11

1 Introduction

1.1.1 The Government BIM Data Repository (GBDR) serves as the common platform for territory-wide BIM data sharing across the Government in support of BIM Harmonisation and continuously uplifting of BIM data quality, enabling seamless BIM/GIS data integration to support smart city applications.

1.1.2 Currently, the GBDR provides two submission modes:

- **Web User Interface** of the GBDR, and
- **GBDR BIM Application Programming Interfaces (APIs)**.

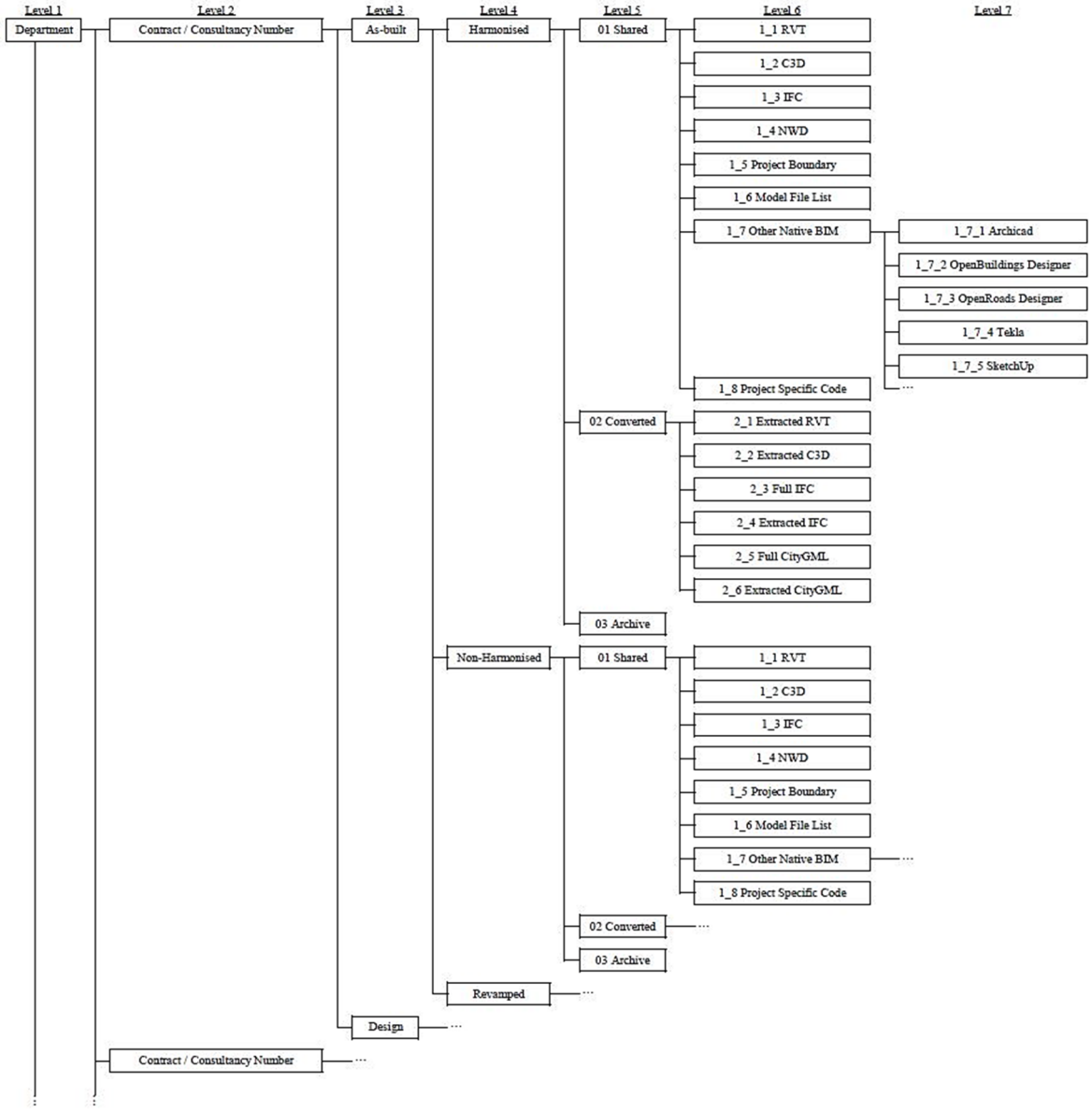
1.1.3 This appendix outlines the requirements for submitting BIM data to the GBDR to facilitate effective BIM data sharing. It also provides comprehensive guidance to the data providers in arranging BIM submission to LandsD using the two aforementioned submission modes of the GBDR.

2 The Essentials for Successful BIM Data Submission to GBDR

2.1. Folder Structure for BIM Data Submission

2.1.1. To facilitate efficient and structured BIM data management, a standardised **7-level folder structure** is being implemented for uploading and storing of BIM data in the GBDR. This hierarchical structure (refer to Figure App XIV-1) is designed to streamline submission procedures, ensure consistency, and support robust BIM data organisation and management across projects.

Figure App XIV-1 The 7-Level Folder Structure in GBDR



2.1.2. Folders and subfolders for BIM data submission across all seven levels are systematically created by the GBDR, based on project information collected by Development Bureau (DEVB) from works departments (WDs).

2.1.3. The descriptions of folder and subfolder from Level 1 to Level 7 are summarised below:-

Table App XIV-1 Subfolders at Level 1

Subfolder name	**Description**
ArchSD	Architectural Services Department
CEDD	Civil Engineering and Development Department
DSD	Drainage Services Department
EMSD	Electrical and Mechanical Services Department
HyD	Highways Department
WSD	Water Supplies Department

Table App XIV-2 Subfolders at Level 2

Subfolder name	**Description**
CONTRACT / CONSULTANCY NUMBER	Contract number or consultancy agreement number of projects with BIM adoption, collected by DEVB from WDs

Table App XIV-3 Subfolders at Level 3

Subfolder name	**Description**
DESIGN	Design BIM model submission
AS-BUILT	As-built BIM model submission

Table App XIV-4 Subfolders at Level 4

Subfolder name	**Description**
HARMONISED	BIM models that comply with DEVB BIM Harmonisation Guidelines for WDs
NON-HARMONISED	BIM models that do not comply with DEVB BIM Harmonisation Guidelines for WDs
REVAMPED	BIM models **revamped by LandsD** to comply with DEVB BIM Harmonisation Guidelines for WDs

Table App XIV-5 Subfolders at Level 5

Subfolder name	**Description**

01 SHARED	BIM data submitted by WDs
02 CONVERTED	Open BIM data in IFC format and Open GIS data in CityGML format converted by LandsD **(Only for harmonised or revamped BIM models)**
03 ARCHIVE	For data archive

Table App XIV-6 Subfolders at Level 6

Subfolder name	**Description**
1_1 RVT	BIM models in Autodesk Revit format (.rvt)
1_2 C3D	BIM models in Autodesk Civil 3D format (.dwg)
1_3 IFC	BIM models in IFC format (.ifc)
1_4 NWD	A federated model of the project in Autodesk Navisworks Document format (.nwd)
1_5 PROJECT_BOUNDARY	Project boundary file in GIS or CAD format of .dwg, .shp or .dgn *[Refer to Appendix XIII for details]*
1_6 MODEL_FILE_LIST	An excel file (.xlsx) detailing all files to be submitted under the project, including BIM data, project boundary, etc. *[Refer to Appendix XIII for required input details]*
1_7 OTHER_NATIVE_BIM	BIM models in formats other than RVT, C3D and IFC, such as Archicad, OpenBuildings Designer, OpenRoads Designer, Tekla, SketchUp, etc. *[Refer to "Details of subfolders at Level 7" in Section 2.1]*
1_8 PROJECT_SPECIFIC_CODE	A configuration file in JSON format (.json) that defines project-specific file naming conventions. **(Applicable only to harmonised or revamped BIM models)** *[Refer to Native BIM Validation Tool package available on GBDR website]*
2_1 EXTRACTED_REVIT	Extracted set of "1_1 RVT" (.rvt) converted by the GBDR
2_2 EXTRACTED_C3D	Extracted set of "1_2 C3D" (.dwg) converted by the GBDR
2_3 FULL_IFC	Full set of IFC models converted by the GBDR from "1_1 RVT" and "1_2 C3D" (.ifc)
2_4 EXTRACTED_IFC	Extracted set of "2_3 FULL_IFC" (.ifc) converted by the GBDR

Subfolder name	Description
2_5 FULL_CITYGML	Full set of CityGML models converted by the GBDR from "2_3 FULL_IFC" (.gml)
2_6 EXTRACTED_CITYGML	Extracted set of "2_5 FULL_CITYGML" (.gml) converted by the GBDR

Table App XIV-7 Subfolders at Level 7

Subfolder name	Description
1_7_1 ARCHICAD	BIM models created using Archicad (.pln)
1_7_2 OPENBUILDINGS_DESIGNER	BIM models created using OpenBuildings Designer (.dgn)
1_7_3 OPENROADS_DESIGNER	BIM models created using OpenRoads Designer (.dgn)
1_7_4 TEKLA	BIM models created using Tekla Structures (.zip) *[A zip file of the whole model folder]*
1_7_5 SKETCHUP	BIM models created using SketchUp (.skp)

2.2. Completeness Check for BIM Data Submission

2.2.1 WDs can submit BIM data either through the **GBDR Web User Interface** or using the **GBDR BIM APIs**. Both submission modes are supported by streamlined procedures for uploading BIM data, which are detailed in Sections 3.1 to 3.2.

2.2.2 Once non-harmonised, harmonised, or revamped models are uploaded to the appropriate subfolders under the "**01 SHARED**" folder, the GBDR will automatically initiate a completeness check mechanism. This backend mechanism check whether all the necessary files have been included in the submission to the GBDR.

2.2.3 A summary of the submission requirements is provided in **Table App XIV-8 BIM Submission Requirements**. If the system detects any missing data or incomplete submission, an email notification will be sent to the respective WD for follow up.

Table App XIV-8 BIM Submission Requirements

File Format	**Allowable File Extension**	**Subfolder Name**	**Mandatory / Optional**
BIM File			
Revit	.rvt	1_1 RVT	**Mandatory** *Note: submit at least one format*
Civil 3D	.dwg	1_2 C3D	
IFC	.ifc	1_3 IFC	
Archicad	.pln	1_7_1 ARCHICAD	
OpenBuildings Designer	.dgn	1_7_2 OPENBUILDINGS_DESIGNER	
OpenRoads Designer	.dgn	1_7_3 OPENROADS_DESIGNER	
Tekla	.zip	1_7_4 TEKLA	
SketchUp	.skp	1_7_5 SKETCHUP	
Reference File			
Navisworks	.nwd	1_4 NWD	**Optional**
Project Boundary			
GIS / CAD	.dwg/.dgn/.shp	1_5 PROJECT_BOUNDARY	**Mandatory**
Model File List			
Excel	.xlsx	1_6 MODEL_FILE_LIST	**Mandatory**
Project Specific Code			
JSON	.json	1_8 PROJECT_SPECIFIC_CODE	**Mandatory** *Note: not required for non-harmonised BIM data submission*

3 BIM Data Submission to GBDR

3.1 Submission via the GBDR Web User Interface

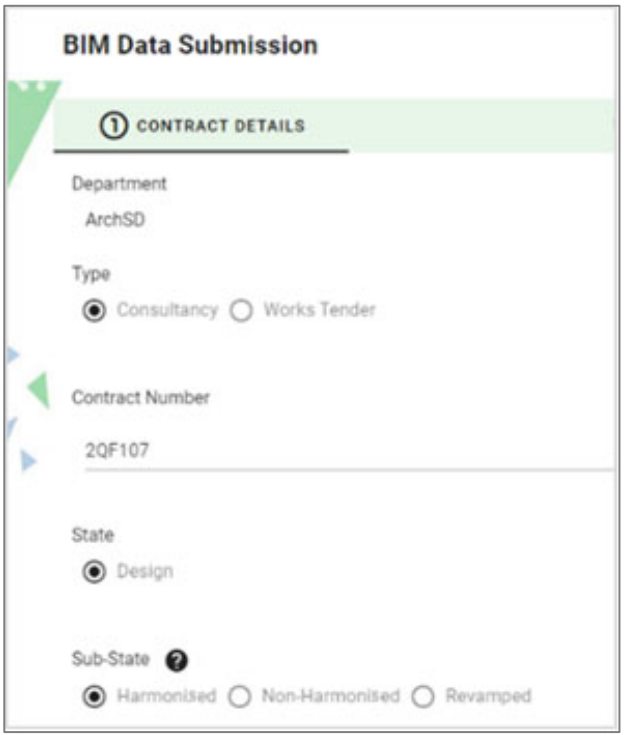
To submit BIM data via the GBDR Web User Interface, follow the steps outlined below.

3.1.1 Login to the GBDR.

3.1.2 Click "**BIM Data Submission**".

3.1.3 Input the required project details (refer to Figure App XIV-2). Then, click "**Select Data**".

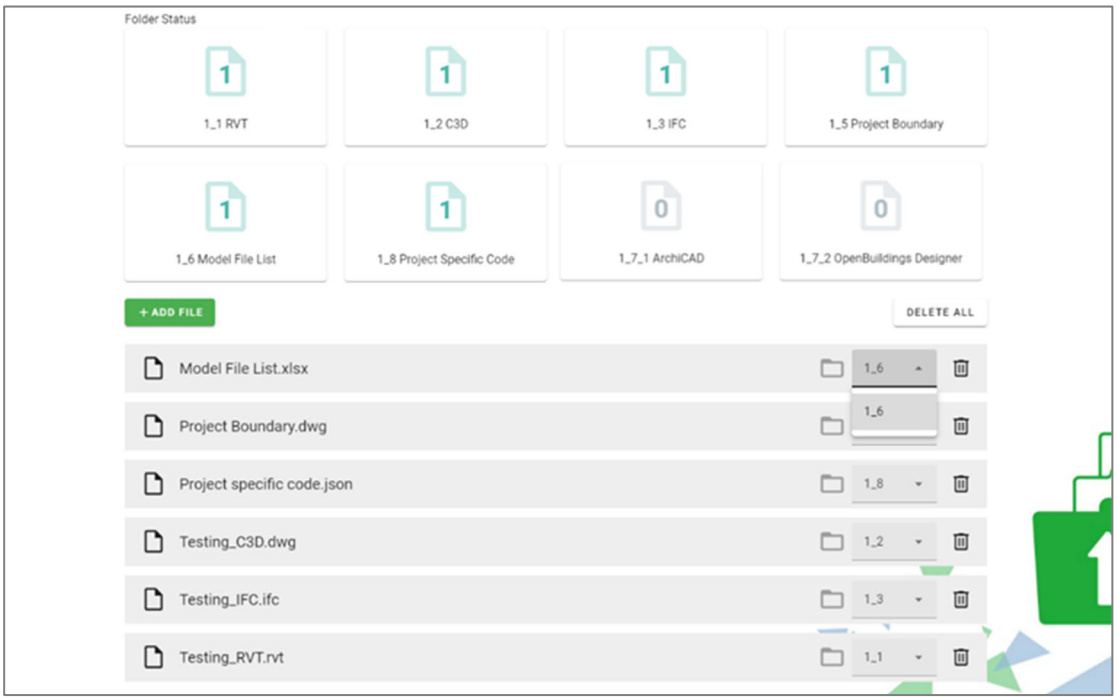
Figure App XIV-2 Input Project Details
(Note: This figure is for illustration purpose only.)



3.1.4 Click "**ADD FILE"** to add files in accordance with the requirements set out in Table App XIV-8 BIM Submission Requirements. Ensure that all files meet the prescribed format to facilitate successful submission to the GBDR.

3.1.5 Click to assign the added files to the corresponding subfolders. Then, Click "**Next**". (Refer to Figure App XIV-3)

Figure App XIV-3 Assign Files to the Corresponding Subfolders
(Note: This figure is for illustration purpose only.)



3.1.6 Add reference file(s), if applicable. Click "**Next**".

3.1.7 Click "**Confirm Data Upload**" to proceed with uploading the selected files to the GBDR. Once the process is complete, check the upload status of each file to ensure successful submission.

3.1.8 To delete any previously submitted files from the GBDR, navigate to the relevant subfolder, and select the file to be removed. Then, click to initiate the deletion process.

3.1.9 A message box will appear once the deletion process is completed. Click "**Close**".

3.2 Submission using GBDR BIM APIs

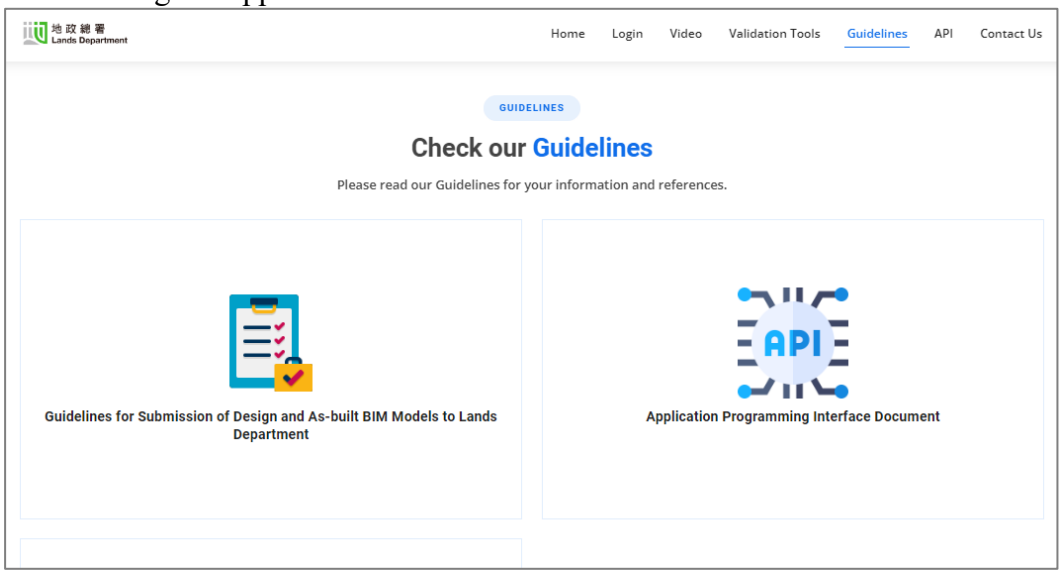
3.2.1 To support the development of system interfacing between the GBDR and the BIM Common Data Collaboration Platform (CDCP) or BIM/GIS applications of WDs, a suite of BIM APIs has been developed (refer to Table App XIV-9). These BIM APIs enable direct submission of BIM models and data from WDs' CDCP and systems to the GBDR, and the retrieval of BIM data from the GBDR for further use and analysis in the WDs' CDCP and systems.

3.2.2 For detailed specifications and implementation guidelines, please refer to the BIM API Document available on the GBDR website (refer to Figure App XIV-4).

Table App XIV-9 Examples of GBDR BIM APIs

API Name	Description
Login to Government BIM Data Repository	This API is provided for logging into the Government BIM Data Repository with UserID and SessionKey.
Retrieve BIM Model List	This API is provided for retrieving the full list of BIM models available for download. Before downloading the BIM Model, users may apply filters to narrow of selection based on the parameters provided. If no filters are specified, a complete list is returned.
Select and Download BIM Files	This API is provided for selecting specific BIM model files from the list for download.
Get Download URL for BIM Model	This API is provided for obtaining the URL needed to download the selected BIM models.
Get Contract and Department Information	This API is provided for retrieving Contract and Department information from the list of project information provided by DEVB collected from WDs.
Upload BIM File	This API is provided for uploading BIM files and other data to the GBDR.
Checking if File Exists	This API is provided for checking whether a specific BIM file already exists in the GBDR.
Delete BIM File	This API is provided for deleting previously submitted BIM files from the GBDR.
Check BIM File Upload Status	This API is provided for checking the upload status of BIM files submitted to the GBDR.

Figure App XIV-4 BIM API Document on the GBDR Website



3.2.3 In addition to the API documentation, LandsD has developed the **GBDR BIM API Sandbox** (refer to Figure App XIV-5) to assist IT developers and contractors of WDs in simulating API responses. This sandbox environment supports system interfacing development, testing and integration workflows (refer to Figure App XIV-6) , which is accessible on GBDR website.

Figure App XIV-5 GBDR BIM API Sandbox

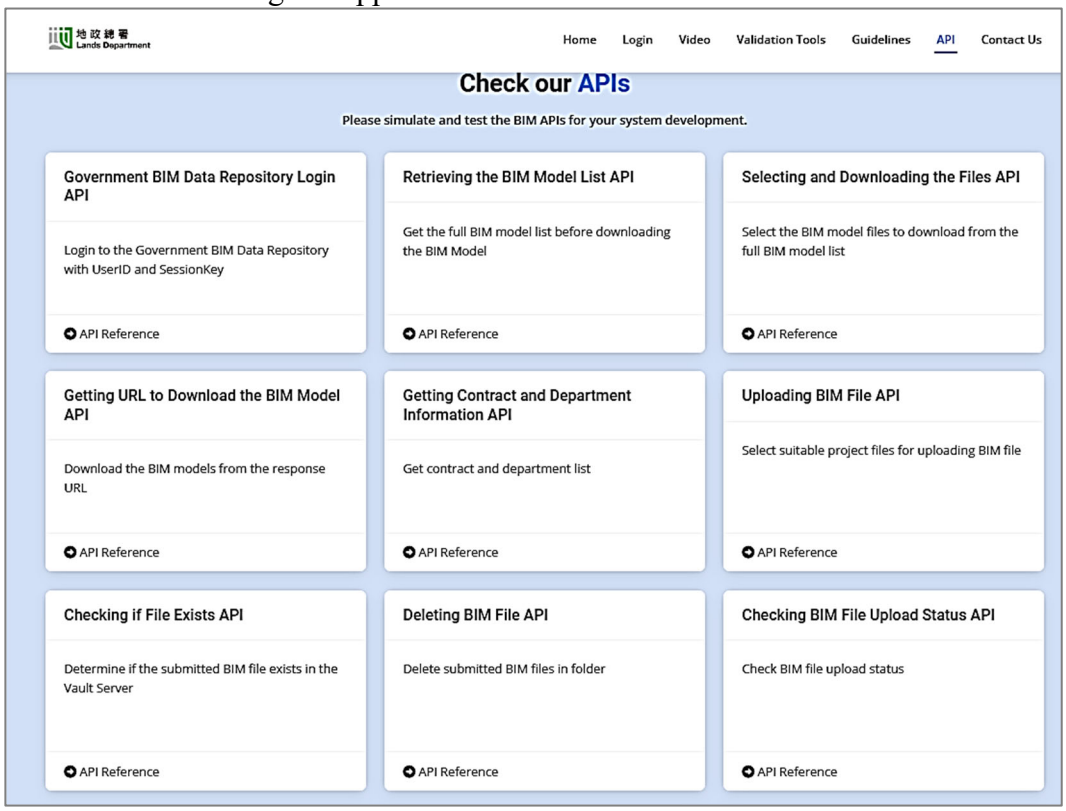


Figure App XIV-6 Response Simulated by GBDR BIM API Sandbox

Getting Contract and Department Information API

This API is provided for getting the Contract and Department information from the Design and As-built Data Register. Information of the Design and As-built Data Register is updated by the Development Bureau on quarterly basis.

API URL

https://gbdr.landsd.ccgo.hksarg/bim-dr-api/api/BIMUpload/getContractNameAndDept

API URL for testing

https://test-gbdr.landsd.ccgo.hksarg/bim-dr-api/api/BIMUpload/getContractNameAndDept

Method

GET

Parameter

Variable Name	Type	Length	Description	Mandatory
userId	Number	11	User id. User id is returned by the login API.	Yes
sessionKey	String	255	User session key. Session key is returned by the login API.	Yes
type	String	255	Consultancy/WorksTender	Yes
bimType	String	1	Adoption of BIM – Y/N	No
contractNo	String	255	It specifies the consultancy agreement no. or contract no. of each project.	No

Response

The data will be returned in JSON format. For example:


```
{
   STATUS: "success",
   STATUSCODE: "0000",
   DESCRIPTION: "API Response Success",
   DATA: [
      {
         contractNo: "CE 6/2012 (DS)",
         deptName: "DSD",
         tentativeCompletionDate: null,
         actualCompletionDate: null,
         id: 1,
         title: "Construction of Additional Sewage Rising Mains and Rehabilitation of the Existing Sewage Rising Main between Tung Chung and Siu Ho Wan - Investigation,
         publishStatus: "Y"
      },
      {
         contractNo: "SQH140",
         deptName: "ArchSD",
         tentativeCompletionDate: "2025-12",
         actualCompletionDate: null,
         id: 2,
         title: "Quantity Surveying Services for Design and Construction of Government Chinese Medicines Testing Institute in Tseung Kwan O",
         publishStatus: "N"
      }
   ],
   LASTUPDATETIMESTAMP: 1707216392058,
   VERSION: "1.1.3"
}
```


Try the API

User ID

Session Key

4 Checklist for the Complete BIM Data Submission

4.1.1 This checklist can be used to check that all essential items are prepared for a successful BIM data submission to the GBDR.

Checklist for Complete BIM Data Submission			
A	**Project Details**		
A1	Project Type	☐ Consultancy Agreement	☐ Works Tender
A2	Stage	☐ Design (D)	☐ As-built (AB)
A3	Comply with the DEVB BIM Harmonisation Guidelines for WDs?	☐ Yes *[Harmonised]*	☐ No *[Non-Harmonised]*

B	**Data Upload**	
B1	**Submit at least one format:**	
☐ 1_1 RVT (.rvt)		☐ 1_2 C3D (.dwg)
☐ 1_3 IFC (.ifc)		☐ 1_7_1 ARCHICAD (.pln)
☐ 1_7_2 OPENBUILDINGS_DESIGNER(.dgn)		☐ 1_7_3 OPENROADS_DESIGNER (.dgn)
☐ 1_7_4 TEKLA (.zip) *only one ZIP file for the whole model		☐ 1_7_5 SKETCHUP (.skp)
B2	**Submit all of the below information:**	
☐ 1_5 PROJECT_BOUNDARY (.dwg, .shp or .dgn) **Submit **ONLY ONE** file* *File Name: **Project boundary.dwg/.shp/.dgn***		☐ 1_6 MODEL_FILE_LIST (.xlsx) **Submit **ONLY ONE** file* *File Name: **Model file list.xlsx*** *Mark all files in "1_1", "1_2", "1_3", "1_5", "1_7" and "1_8"*
B3	**If select "Yes" in item A3 of this checklist, submit below information:**	
☐ 1_8 PROJECT_SPECIFIC_CODE (.json) **Submit **ONLY ONE** file* *File Name: **Project specific code.json***		

*Note: This checklist is intended to help users review the completeness of the data files before uploading them to the GBDR. It is provided for guidance only and is **NOT** required as part of the submission.*