CONSTRUCTION INDUSTRY COUNCIL
建造業議會

BIM

CIC BIM Standards for

Preparation of Statutory Plan Submissions

December 2020

Disclaimer

Whilst reasonable efforts have been made to ensure the accuracy of the information contained in this publication (Reference Materials), the CIC nevertheless encourages readers to seek appropriate independent advice from their professional advisers where possible. Readers should not treat or rely on this publication (Reference Materials) as a substitute for such professional advice.

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Document control	
Date	**Notes**
2019-12-30	Final BIM Standards published on CIC Website for General public to comment
2020-12-31	The sample drawings have been enhanced The sample projects, software templates and software user guides are supplemented

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Definition of Abbreviation

Abbreviation	
AP	Authorized Persons
B(A)R	Building (Administration) Regulations
BA	Building Authority
BD	Buildings Department
BO	Buildings Ordinance
CIC	Construction Industry Council
Com-BIM	Committee on BIM
D.T.I.L.	Disconnecting trap invert level
DEVB	Development Bureau
FFL	Finished Floor Level
G.W.T.	Ground Water Table
GBP	General Building Plans
HKPD	Hong Kong Principal Datum
IFC	Industry Foundation Classes
LL	Live Load
LOD	Level of Development
MEP	Mechanical, Electrical and Plumbing
PNAP	Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers
RGE	Registered Geotechnical Engineers
RSE	Registered Structural Engineers
SDL	Superimposed Dead Load
SFL	Structural Floor Level
the “Task Force”	The Task Force on BIM Standards
UU	Underground Utilities

(Refer to CIC BIM Dictionary)

Preface

The Construction Industry Council (CIC) is committed to seeking continuous improvement in all aspects of the construction industry in Hong Kong. To achieve this aim, the CIC forms Committees, Task Forces and other forums to review specific areas of work with the intention of producing Alerts, Reference Materials, Guidelines and Codes of Conduct to assist participants in the industry to strive for excellence.

The CIC appreciates that some improvements and practices can be implemented immediately whilst others may take more time for implementation. It is for this reason that four separate categories of publication have been adopted, the purposes of which are as follows:

Alerts	The Alerts are reminders in the form of brief leaflets produced quickly to draw the immediate attention of relevant stakeholders to the need to follow some good practices or to implement some preventive measures in relation to the construction industry.
Reference Materials	The Reference Materials are standards or methodologies generally adopted and regarded by the industry as good practices. The CIC recommends the adoption of the Reference Materials by industry stakeholders where appropriate.
Guidelines	The Guidelines provide information and guidance on particular topics relevant to the construction industry. The CIC expects all industry stakeholders to adopt the recommendations set out in the Guidelines where applicable.
Codes of Conduct	The Codes of Conduct set out the principles that all relevant industry participants should follow. Under the Construction Industry Council (Cap 587), the CIC is tasked to formulate codes of conduct and enforce such codes. The CIC may take necessary actions to ensure compliance with the codes.

If you have read this publication, we encourage you to share your feedback with us. Please take a moment to fill out the Feedback Form attached to this publication in order that we can further enhance it for the benefit of all concerned. With our joint efforts, we believe our construction industry will develop further and will continue to prosper for years to come.

Foreword (1)

In 2015, the Construction Industry Council (CIC) Hong Kong published the Building Information Modelling (BIM) Standards (Phase One), which was intended to be concise and straightforward such that it could be easily mastered by laymen and novice BIM practitioners. Since then, BIM practitioners have gained more practical experience in real-life projects, and there has been wider adoption of BIM in various areas for the fields of architecture, engineering, construction and operations in Hong Kong. With the release of the Technical Circulars (Works) No. 7/2017, No. 18/2018 and No. 9/2019 by Development Bureau (DEVB) of the Government of the Hong Kong Special Administrative Region (HKSAR), capital works projects with project estimates of more than HK$ 30 million have been mandated to use BIM since 1 January 2018. Throughout the years, CIC has been elaborating and establishing BIM Standards for specific BIM usages and disciplines through consultancies as well as conducting consultations.

The Task Force on BIM Standards (the “Task Force”) was established by the Committee on BIM (Com-BIM) of CIC at their meeting No. 001/17 held on 21 November 2017. The key initiatives of the Task Force are to identify and align common practices, as well as set up the standards and guidelines which are essential and beneficial to facilitate better implementation and adoption of BIM technologies with regard to project execution. The establishment of BIM Standards includes the following specific BIM usages and disciplines:

- Statutory Plans Submission
- Underground Utilities (UU)
- Mechanical, Electrical and Plumbing (MEP)

The Standards for using BIM in the preparation of Statutory Plans set the requirements in BIM in particular with information that can facilitate the production of statutory plans. It illustrates the methodologies in BIM modelling that can produce statutory plans for submission to the approval authority, namely the Building Authority (BA). The plans produced from BIM will then be used and reviewed by the Building Authority (BA) for processing under the Buildings Ordinance (BO). At the same time, with the benefit of having the BIM models which contain rich building information presented on the statutory plans, the information can also be used by BA to assist on the approval process.

The Standards are developed by the Task Force for publication by the CIC. It covers seven (7) types of statutory plans including Superstructure Plans (including Curtain Wall details), Foundation Plans, Demolition Plans (including Hoarding Plans), Excavation and Lateral Support (ELS) Plans, Site Formation Plans, Ground Investigation Plans and Drainage Plans.

In addition to the Standards, BIM Object Presentation Summary, Software Templates with Sample projects and drawings, User Guides for each selected software have also been developed by the “Task Force” to facilitate the preparation of plans for statutory submission purposes. Sample drawings provided in Appendix A are only provided to demonstrate the feasibility of drawings generation with the Standards. They do not represent a complete set

of submission drawings required for approval by BA. Due to the limitation to include all different types of design in a set of sample drawings, BIM Object Presentation Summary included in Appendix B is also provided to present as many as possible commonly used BIM Objects which may not be presented on the sample drawings.

The standardised representation of each BIM Object is provided with plan view, isometric 3D view, elevation/section views where applicable. When there is a schedule provided on submission drawings (e.g. Piling Schedule) with information extracted from BIM objects, the schedule is also provided in the Presentation Summary with identification of parameters that linked with graphical information or non-graphical information captured in the BIM object. 2D details and 3D objects are identified in the BIM Object Presentation Summary to illustrate the delineation between 2D and 3D objects when statutory plans are produced from BIM models.

Software Templates with Sample projects are provided for practitioners to download and adopt for preparing the statutory plan efficiently and practically. Together with the software specific User guides which contains step by step procedures of modelling, BIM users can easily apply the templates for the generation of statutory plan submission drawings.

Ar. Ada FUNG, BBS

Chairperson

Committee on Building Information Modelling

Construction Industry Council

December 2019

Foreword (2)

The CIC's BIM Standards have been implemented in stages. The first Standards, renamed as CIC BIM Standards – General was published in September 2015. Since then, BIM practitioners have gained more practical project experience, and there has been much wider adoption of BIM in various areas of the Architecture, Engineering, Construction, Owner and Operator (AECOO) industry in Hong Kong. With the release of the Technical Circular (Works) Nos. 7/2017, 18/2018 & 9/2019 by the Development Bureau (DEVB) of The Government of the Hong Kong Special Administrative Region (HKSAR), capital works projects with project estimates more than $30 Million are mandated to use BIM from 1st January 2018 onwards. All along the CIC has been continuing to develop and establish the CIC BIM Standards for specific BIM usages and disciplines, and to conduct consultations with relevant stakeholders, as an established practice.

With the establishment of the Task Force on BIM Standards under the Committee on BIM on 21 November 2017, the CIC would identify and align the common practices as well as set up new standards and guidelines to facilitate better implementation and adoption of BIM in project execution. The full suite of CIC BIM standards have been published covering the following specific BIM usages or disciplines separately:

i. CIC BIM Standards – General (August 2019); and (Version 2 - December 2020);
ii. CIC BIM Standards for Architecture and Structural Engineering (Version 2 – December 2020);
iii. CIC BIM Standards for Underground Utilities (August 2019);
iv. CIC BIM Standards for Mechanical, Electrical and Plumbing (August 2019);
v. CIC BIM Standards for Preparation of Statutory Plan Submissions (December 2020);
vi. CIC Production of BIM Objects Guide – General Requirements (August 2019); and
vii. CIC BIM Dictionary (December 2020).

After updating from December 2019 publication, I am glad to see the release of CIC BIM Standards for Preparation of Statutory Plan Submissions (December 2020), which comprises a total of seven types of statutory plans:

1. Superstructure (Including Curtain Wall Details)
2. Foundation
3. Demolition (Including Hoarding Plan)
4. Excavation and Lateral Support (ELS)
5. Site Formation
6. Ground Investigation (GI)
7. Drainage

This CIC BIM Standards is software neutral. Software specific user guides and templates are covered by the following suite of publications:

a. Appendix 1 - CIC BIM User Guide for Preparation of Statutory Plan Submissions ArchiCAD (December 2020) covering Drainage.
b. Appendix 2 - CIC BIM User Guide for Preparation of Statutory Plan Submissions Civil 3D (December 2020) covering Site Formation and GI.
c. Appendix 3 - CIC BIM User Guide for Preparation of Statutory Plan Submissions Revit (December 2020) covering all the above seven types of plans.
d. Appendix 4 - CIC BIM User Guide for Preparation of Statutory Plan Submissions Tekla (December 2020) covering Superstructure, Foundation, Demolition and ELS.

There are total two sets of software specific user guides and templates per each Statutory Plan, the sample models and sample drawings are covered in the above publications.

Sample drawings, sample models, software specific user guides and templates are provided to demonstrate the software neutral standards can be applied as a matter of principle.

Software Templates with Sample projects are provided for practitioners to download and adopt for preparing the statutory plan efficiently and practically. Together with the software specific User guides which contains step by step procedures of modelling, BIM users can easily apply the templates for the generation of statutory plan submission drawings

Sample drawings provided in Appendix A are only provided to demonstrate the feasibility of drawings generation with the Standards. They do not represent a complete set of submission drawings required for approval by BA. Due to the limitation to include all different types of design in a set of sample drawings, BIM Object Presentation Summary in Appendix B is also provided to present as many as possible commonly used BIM Objects which may not be presented on the sample drawings.

The standardised representation of each BIM Object is provided with plan view, isometric 3D view, elevation/section views where applicable. When there is a schedule provided on submission drawings (e.g. Piling Schedule) with information extracted from BIM objects, the schedule is also provided in the Presentation Summary with identification of parameters that linked with graphical information or non-graphical information captured in the BIM object. 2D details and 3D objects are identified in the BIM Object Presentation Summary to illustrate the delineation between 2D and 3D objects when statutory plans are produced from BIM models.

The Standards for using BIM in the preparation of Statutory Plans set the requirements in BIM in particular with information that can facilitate the production of statutory plans. It illustrates the methodologies in BIM modelling that can produce statutory plans for

submission to the approval authority, namely the Building Authority (BA). The plans produced from BIM will then be used and reviewed by the Building Authority (BA) for processing under the Buildings Ordinance (BO). At the same time, with the benefit of having the BIM models which contain rich building information presented on the statutory plans, the information can also be used by BA to assist on the approval process.

For the preparation of General Building Plans please refer to Guidelines for using Building Information Modelling in General Building Plans Submission (2019) by Buildings Department.

In response to demands from the industry, a Task Force on BIM Specifications and Agreement under the ambit of Committee on BIM was established on 23 October 2019. The Task Force is co-chaired by Committee on BIM and Committee on Construction Business Development. The CIC has been developing:

- CIC BIM Exchange Information Requirements (EIR) Template (BIM Specifications);
- CIC Special Conditions of Contract for BIM for incorporating into existing construction contracts and consultancy agreements for implementing BIM in construction projects; and
- CIC BIM Services Agreements for procuring BIM services under different contractual relationships.

Feedback on the CIC BIM Standards for Preparation of Statutory Plan Submissions (December 2020) from practitioners subsequent to the issuance of this publication will be considered in future revisions.

On behalf of the CIC, I would like to thank everyone who has contributed to producing this CIC BIM Standards for Preparation of Statutory Plan Submissions (December 2020), in particular to the members of the Task Force on BIM Standards.

Ar. Ada FUNG, BBS

Chairperson

Committee on Building Information Modelling

Construction Industry Council

December 2020

1 Executive Summary

The Standards has been developed to facilitate the preparation of prescribed plans for submission to the BA with reference to the Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (PNAP) ADV-34. The Standards cover seven (7) types of statutory plans which are Superstructure Plans (including Curtain Wall details), Foundation Plans, Demolition Plans (including Hoarding Plans), Excavation and Lateral Support (ELS) Plans, Site Formation Plans, Ground Investigation Plans and Drainage Plans. The Standards is software independent. Any BIM software meeting the requirements in the Standards can be used to produce prescribed plans for statutory submission.

The prescribed plans for approval, no matter how they are produced, **MUST FULFIL** the statutory requirements as stipulated under the BO and allied regulations, relevant Codes of Practice, PNAP and Circular Letters issued by BA. The application of BIM and the requirements set out in these Standards are **NOT** intended to change the submission requirements. The Standards aims to illustrate the methodologies for producing the prescribed plans in 2D format from BIM model based on the data-driven BIM objects, non-graphical information and 2D annotations in BIM models. Although BIM model can technically generate 2D plans, the content and presentation of plans for statutory submission may require manual and engineering input by AP/RSE/RGE to annotate for the appropriate presentation of the design on plans in 2D format.

Following the Standards, software-specific templates, user guides, sample project models and drawings are developed for two (2) BIM authoring software commonly used in Hong Kong to each type of plans. These documents illustrate how the Standards is applied to Hong Kong projects. All these deliverables are free to download by AP/RSE/RGE for preparing submissions for real projects. The selection of BIM authoring software for the purpose of illustrating the practicality of the Standards is based on the following criteria:

1. It is a BIM software certified by buildingSMART International;
2. It is a Parametric Modelling software contains data-driven 3D objects; and
3. It can produce 2D drawings using the information embedded in the data-driven 3D objects such that information presented is consistent when it is shown more than once, i.e. single source of truth.

The Standards is structured to explain what data-driven BIM objects will be included, what non-graphical information will be sufficient and what are 2D annotations (e.g. Tags, Lines or Symbols) to produce the prescribed plans. This provides Standards on which types of BIM objects are needed for the preparation of statutory plans in order to avoid confusion in the industry that all construction items are built with BIM objects or drawn in 3D. Each type of prescribed plans is presented to show the presentation style with the use of the templates.

2 Objectives

The Standards aims to set out:

(a) The requirements in BIM in preparing statutory plans by BIM authoring software; and

(b) Recommended good practices for the enhancement of submission standard.

2.1 Statutory submission/approval process with BIM

According to BD PNAP ADV-34, in addition to the statutory requirement of plan submission in paper format, AP/RSE/RGE are encouraged to present their building and/or building works proposals in digital format compatible with BIM viewing software, or real-time simulation, to enhance illustration of the proposals and/or the construction sequence of the proposed works in a specific manner and format.

BIM is submitted as supplementary information for reference. BA will continue processing approval of plans under the BO based on the information presented on the prescribed plans in paper format at least in the foreseeable future.

3 BIM File Submission Requirements

BIM model submission requirements should follow PNAP ADV-34 – 'Building Information Modelling'. Additional performance and administrative requirements are itemised below for reference.

3.1 Performance Requirements

All BIM Statutory Plan Submission files shall meet the following requirements:

- BO and all allied regulations
- Relevant Codes of Practice, PNAPs and Circular Letters issued by BA
- Relevant BIM sample templates as associated with the Standards

Information contained in BIM statutory plan submission files, shall be identical to the information shown on the prescribed plans. Prescribed plans submitted to BA shall be directly generated from the corresponding BIM model using information connected to the data-driven BIM Objects and combined with annotations input manually for drawings presentation.

3.2 Administrative Requirements

The BIM digital files shall be stored on a non-rewritable DVD-ROM in ISO/IEC 13346:1995 format (i.e. DVD format). Each BIM file should be limited to the size of 500MB and should contain / confine to one type of plan submission. Different type of plans may be cross-linked with each other under clear file hierarchy structure / linkage, as appropriate. Except otherwise agreed in writing by BA, all other electronic submission media are not acceptable.

Each BIM digital file should contain a 3D model, views, and schedules, as well as the drawing sheets, including plans, sections, schedules, etc. for the printout to hardcopy of prescribed plans. Text file should be included in the DVD-ROM to describe the hierarchy structure of linked files.

Example of BIM authoring software for the development of BIM native digital file currently accepted by BA includes but not limited to the following:

Type of Plans	Software 1	Software 2
Superstructure (Including Curtain Wall Details)	Revit (version 2017 or later)	Tekla (version 2019i or later)
Foundation	Revit (version 2017 or later)	Tekla (version 2019i or later)
Demolition (Including Hoarding Plan)	Revit (version 2017 or later)	Tekla (version 2019i or later)
Excavation and Lateral Support	Revit (version 2017 or later)	Tekla (version 2019i or later)

Type of Plans	Software 1	Software 2
Site Formation	Revit (version 2017 or later)	Civil 3D (version 2019 or later)
Ground Investigation	Revit (version 2017 or later)	Civil 3D (version 2019 or later)
Drainage	Revit (version 2017 or later)	ArchiCAD (version 21 or later)

Table 1

As BIM is growing rapidly, there may be add-ins programs or in-house scripts used for enhancing automation in the production of BIM statutory plan submission file. Add-ins or other embedded automation may cause the submission files not usable by the standard BIM authoring software accepted by BA. It is the responsibility of the AP/RSE/RGE to ensure that the purposes of the BIM statutory plan submission models (as elaborated in this Standards) are served without relying on add-ins or additional scripts.

Pre-acceptance from BA should be sought for software that is not listed in the above schedule. As a general rule for such pre-acceptance, the AP/RSE/RGE should submit at least one sample project file together with enabling software and valid license free of charge to BA for installation and testing. It should be clearly understood that BA does not accept any web-based BIM software.

BIM Native Files for each type of BIM authoring software should be saved in their corresponding format as list below.

Software	File Format
Revit	'.rvt'
Tekla	Tekla project name folder
Civil 3D	'.dwg'
ArchiCAD	'.pla'

Table 2

In addition to the above BIM native files, file format defined by buildingSMART International directly output from BIM models is also recommended to be submitted. All other lightweight, compressed or zipped file formats, such as '.dwf', '.dwfx', '.pdf(3D)' and '.u3d' will not be accepted.

The BIM statutory plan submission file(s) submitted in DVD format shall be self-contained and detached from the originating server. It should be able to be opened on any standalone computer with the above-mentioned software. All External Reference (X-Ref) files for the BIM model such as .xls, .xlsx, .pdf files, etc. should be stored in respective sub-folders in DVD-ROM and the links between all X-Ref files and BIM main file should be properly connected.

4 BIM Model General Requirements

All BIM models should be developed by BIM software, which fulfils the interoperability requirement of accepting data exchange through the IFC data format defined by buildingSMART International.

4.1 BIM Model Environment Requirements

All BIM models should be set up with the required environment information to define the model with common sharing information to enable a common reference when it is shared or linked to other models.

4.1.1 Unit and measurement

All BIM elements should be modelled with linear dimensions in millimetres (mm) and angles in degrees (°).

4.1.2 BIM origin point and orientation

BIM models shall be setup with geo-reference to the Hong Kong 1980 Grid (HK1980 Grid) and the Hong Kong Principal Datum (HKPD). The origin or base point and orientation of the BIM model should have a 'True North' location taking reference to this geo-reference. The BIM model should also have a 'Project North' location setting to orientate the project to project grid directions to define an orthogonal environment for the ease of model authoring and presentation of plans.

4.2 BIM Common Object Requirements

All BIM models would have the common objects built in the individual model, copied from other models or linked from other models for use. These common objects should be checked for their accuracy if they are not linked from a single source of truth.

4.2.1 Level

Levels should be the floor level given in the General Building Plans (GBP). If the Finished Floor Level (FFL) and Structural Floor Level (SFL) are provided in the GBP, levels in the structural model should refer to SFL. For the Drainage plan submission, levels in the MEP model should refer to FFL.

4.2.2 Grid

Grids should be identical to those provided in the architectural model for the GBP.

4.2.3 Site boundaries

Site boundaries should be built in accordance with setting out coordinates at the ends of boundary segments, with additional information for the arc in terms of length or radius given in the lease document.

4.3 BIM Annotations Requirements

In addition to the 3D BIM objects, there are 2D annotations to present the non-graphical information, especially the parameter value embedded with the 3D objects. There are also Symbols (e.g. Symbol for the slope on plan view, level difference, etc.) that are added to enhance the description of a 2D representation only. As Symbol has no linkage to the BIM objects, the use of Symbol shall have a lower priority than Object Tag. Symbol shall be used with special care by the responsible professionals to ensure its accuracy and correctness.

4.3.1 Object Tag

Object Tag is a 2D Symbol linked to BIM objects with reference to the parameter value. In the case of text showing the parameter value, the value should preferably be used more than once to cross-check its accuracy. For example, the beam mark which is an Object Tag for beams showing ‘Depth x Width’ should use the same Depth and Width to control the size of the beam.

4.3.2 Symbol

Symbol is a 2D annotation to enhance the description of a 2D representation. As it has no linkage with the BIM objects, symbol should be added with care. The use of symbol does not change the practice in using 2D CAD as it needs ‘Human Intelligence’ and ‘Professional Knowledge’ to add the right symbol at the right place.

4.3.3 Dimensions

Dimensions are intelligent 2D annotations referenced to BIM objects. The dimension value is live update with its references and therefore should not be covered/replaced by numerical text to avoid any misleading presentation of the dimension value.

4.3.4 Notes

Notes are 2D text added to views in the BIM model. These views should be added to drawing sheets for the plan representation.

4.3.5 Legend

A legend should be developed to elaborate on the meaning of symbols and shapes. It should be shared in drawings for consistency of reuse.

4.3.6 Title block

Title block containing a unique drawing number showing revision legends, site/project title, drawing title etc. should be inserted in every drawing for identification purposes. Information for each drawing (e.g. drawing title, drawing number, etc.) should be stored with parameters for use. Also, the parameter values for the title block should be provided with the statutory plan submission.

4.3.7 Drawing list

A drawing list should be developed from the information on drawings and selected those meaningful attributes from Title block to present on the Drawing List.

4.3.8 2D Annotation requirements

The following 2D annotations are the basic types of Tags/Symbols that link with BIM objects to present the information live updated with the objects.

Type of 2D annotation	Tag/Symbol	Remarks
Elevation mark	Tag	• Tag with reference to object faces/reference points for the live update of the displayed objects in view, view range and extent can be adjusted manually
Section mark	Tag	• Tag with reference to object faces/reference points for the live update of the displayed objects in view, view range and extent can be adjusted manually
Spot coordinates	Tag	• Tag with coordinates live updated with the location of the marker of the symbol
Dimensions	Tag	• Tag with reference to object faces/reference points for the live update of the dimension value

Table 3

4.4 Common Types of Plans Requirements

Among all different types of statutory plans, requirements for these common items are unique and universally applicable as elaborated below.

4.4.1 Block plan

A block plan should be drawn to a scale as stipulated in PNAP ADV-33 and Building (Administration) Regulations (B(A)R). The block plan showing the map of an area surrounding the site should use the 2D CAD drawings of the government map obtained from the Hong Kong Map Service, which is managed by Survey and Mapping Office of the Lands Department. The map should be oriented to ‘True North’ with the site boundaries shown. Spot coordinates of the site boundaries should be added to show the correct location and orientation set.

4.4.2 Notes

Notes (including all texts in labels and tags) should be written with capital letters added in a 2D view in the BIM model to produce plans. The text height of notes should not be less than 2.5 mm. Text font should use a simple type, preferably ‘Arial Narrow’.

4.4.3 Typical Details

Typical details should consist of 2D drafting in the BIM model, as well as a view included in sheets for the plans. There are no specific requirements for the setting of 2D drafting provided the details are shown as neatly and tidily as in 2D CAD.

5 Statutory Plan Specific Requirements

The BIM model to generate drawings for statutory submission consists of ‘data-driven BIM Objects’ (basically 3D) and ‘2D Annotations’. Although it might be expected that all building items should be modelled as BIM Object or in 3D, the types of items modelled in 3D are defined to avoid excessive effort to produce unnecessary or inaccurate information. A Data-driven BIM Object contains BIM Object with graphical presentation of the geometry, ‘Graphical Information’ in relation to the colour, shape and size of geometry, and ‘Non-graphical Information’ not related to the geometry.

BIM Object is a 3D object with the colour, shape and size of the geometry defined by the graphical information. BIM Object enables the geometry to be shown in both 2D and 3D views.

Graphical Information is the information or parameter values that define the colour, shape and size of the geometry. For example, the size of a rectangular column section is defined by its width and depth. The ‘Width’ and ‘Depth’ are graphical information in relation to the geometry.

Non-graphical Information is the information or parameter values with no link/control to the colour, shape and size of the geometry. Non-graphical Information covers many types of information from material specifications to physical properties, or simply the label of an object and hyperlink. If the detailed shape of an object is not needed in the early stages of a project, or only at a low Level of Development (LOD) requirements, objects that are not modelled with the geometry can be described by Non-graphical Information. For example, rebar content can be described by ‘Rebar Content’ as numerical information with the unit in kg/m³. It can also be described in terms of the ‘Number’ and ‘Diameter’ of rebars, or ‘Diameter’ with ‘Spacing’.

Requirements for each type of statutory plans are developed from ‘BIM Object with graphical presentation of the geometry’. ‘Graphical Information in relation to the geometry’ and ‘Non-graphical Information’ are explained in detail. Detailed presentation requirements for each type of statutory plans are also illustrated in detail.

5.1 Superstructure Plans

Superstructure plans present the layout arrangement and structural details of the structural system from above foundation to the roof of a building. Essential information is also required to be added/annotated to include but not limited to design codes and standards, material specifications with the limit of material strength, design loads, fire resistance requirement and protection against corrosion to recognised standards, quality control standards and testing on workmanship and construction sequence of unconventional structures. Besides, the RSE should refer to other essential information to be provided and shown on the superstructure plans as required under the relevant PNAPs including but not limited to PNAPs ADM-8, ADM-9, ADM19 and ADV-33.

5.1.1 Data-driven BIM object requirements

(Refer to Software User Guides for parameter naming in templates.)

	BIM Object	Graphical information	Non-graphical information
Cast in situ concrete structural slab	• Intelligent Object indexed/categorised as 'Structural Slab' with a whole piece built across all spans at the same floor level (ignoring individual span) • Top of slab should be modelled to Structural Floor Level • Thickness of slab should only be the thickness of the cast in situ part • Rebar should be modelled with sufficient details for the statutory plan submission	• Thickness Rebar size / shape / spacing / concrete cover	• Concrete grade • Concrete density • Rebar material grade / layer
Precast concrete plank for structural slab	• Component Object indexed/categorised as 'Structural Slab' • Top of slab shall be modelled to the top level of the precast plank • Thickness of Component Object should be the thickness of the precast plank • Rebar should be modelled with all required details for fabrication	• Thickness • Rebar size / shape / spacing / concrete cover	• Object mark • Concrete grade • Concrete density • Rebar material grade
Structural beam (concrete)	• Intelligent Object indexed/categorised as 'Structural Framing' • Structural beam should be modelled to the full structural size of its width and depth • Rebar should be modelled with all required details for statutory plan submission	• Width • Depth • Additional information should be provided to define the geometry (e.g. distance to change of depth) • Rebar size / shape / spacing / concrete cover	• Object mark • Concrete grade • Concrete density • Rebar material grade
Structural beam (steel)	• Intelligent Object indexed/categorised as 'Structural Framing' • Structural beam should be modelled to the full structural size of the width, depth and thickness of flange/web	• Width • Depth • Additional information should be	• Object mark • Type mark • Steel grade • Steel density

	BIM Object	Graphical information	Non-graphical information
		provided to define the geometry (e.g. thickness of flange/web)	• Section Physical Properties (e.g. second moment of area, radius of gyration etc.)
Structural column (concrete)	• Intelligent Object indexed/categorised as 'Structural Column' • Structural column should be modelled to the full structural size of width, depth and height • Rebar should be modelled with all required details for statutory plan submission	• Width • Depth • Height	• Object mark • Concrete grade • Concrete density
Structural column (steel)	• Intelligent Object indexed/categorised as 'Structural Column' • Structural Column should be modelled to the full structural size of width, depth, height and thickness of flange/web	• Length • Width • Height • Thickness of flange/web	• Object mark • Type mark • Steel grade • Steel density • Section Physical Properties (e.g. second moment of area, radius of gyration etc.)
Structural wall (concrete)	• Intelligent Object indexed/categorised as 'Wall' with identifier for 'Structural' • Structural wall should be modelled to the full structural size of length, thickness and height • Rebar should be modelled with sufficient details for the statutory plan submission	• Length • Thickness • Height • Rebar size / shape / spacing / concrete cover	• Object mark • Concrete grade • Concrete density • Rebar material grade / steel ratio
Stair (concrete)	• Intelligent Object indexed/categorised as 'Stair' for all landing and flight • Top level of landing and flight should be modelled to the Structural Floor Level of the item • Rebar should be modelled with sufficient details for statutory plan submission	• Thickness (landing and flight) • Rebar size / shape / spacing / concrete cover	• Object mark • Concrete grade • Concrete density • Rebar material grade

	BIM Object	Graphical information	Non-graphical information
Basement wall (concrete)	• Intelligent Object indexed/categorised as 'Wall' with identifier for 'Structural' • Structural Wall should be modelled to the full structural size of length, thickness and height • Rebar should be modelled with sufficient details for the statutory plan submission	• Length • Thickness • Height • Rebar size / shape / spacing / concrete cover	• Object mark • Concrete grade • Concrete density • Rebar material grade / steel ratio
Pile cap	• Intelligent Object indexed/categorised as 'Foundation' • Top level of pile cap should be modelled to the top level of the pile cap • Rebar should be modelled with sufficient details for the statutory plan submission	• Thickness • Rebar size / shape / spacing / concrete cover / shear link	• Object mark • Concrete grade • Concrete density • Rebar material grade / layer
Ground / Rock Stratum profile	• Topographic surface indexed/categorised as 'Site'	• Node coordinates and elevation	• Ground material
Coupler	• Coupler should be modelled to the size of external diameter and length	• External diameter • Total length of the coupler	• Type mark • Object mark • Steel grade • Steel density
Profiled steel sheet	• Intelligent Object indexed/categorised as 'Floor'	• Length • Additional information should be provided to define the geometry (e.g. thickness of flange/web)	• Type mark • Steel grade • Steel density • Section Physical Properties (e.g. second moment of area, radius of gyration etc.)
Steel floorplate	• Intelligent Object indexed/categorised as 'Floor'	• Width • Thickness • Additional information should be provided to define the geometry (e.g. thickness of flange/web)	• Type mark • Steel grade • Steel density • Section Physical Properties (e.g. second moment of area, radius of gyration etc.)

	BIM Object	Graphical information	Non-graphical information
		•	
Steel Connection plates	• Intelligent Object indexed/categorised as ‘Structural Connection’	• Size • Thickness • Additional information should be provided to define the geometry (e.g. thickness of flange/web)	• Type mark • Steel grade • Steel density • Section Physical Properties (e.g. second moment of area, radius of gyration etc.)

Table 4

5.1.2 2D Annotation requirements

Type of 2D Annotation	Tag/Symbol/ Others	Remarks
Floor Loading [Superimposed Dead Load (SDL) & Live Load (LL)] Layout	Hatch (Fill Region)	• 2D hatch on a view of structural plan manually define the layout and area of loading
Slab mark	Symbol	• Symbol with ‘Mark’, ‘Thickness’ and span direction(s)
Beam mark	Tag	• Tag linked with beam object using the beam ‘Mark’, ‘Width’ and ‘Depth’ to show beam mark (width x depth)
Column mark	Tag	• Tag linked with column object using the ‘Mark’ to show the column mark
Column schedule	Tag	• Tag linked with column rebar objects and/or non-graphical information
Wall mark	Tag	• Tag linked with wall object using the ‘Mark’ to show the wall mark
Level difference	Symbol	• Symbol with manual adjustment to the direction and which side to drop
Coupler mark	Tag	• Tag linked with coupler using the ‘Mark’ to show the coupler mark
Support connection type (moment/pinned joint) (Steel)	Symbol	• Symbol linked with steel structures using the ‘Start/End connection’ to show the support connection type

Table 5

5.1.3 Types of plans to be produced from BIM

Based on the above requirements, sample drawings to illustrate the preparation of Superstructure Plans including framing plans, beam and slab reinforcement details, column and wall schedules, steel structure layout plans and details etc. generated by BIM software are provided in Appendix A for reference.

5.1.4 BIM Object presentation style

The presentation style defined in the table below is for reference only instead of requirements from BA to follow.

		Projection		Cut	
		Line	Pattern	Line	Pattern
		Style, Colour, Thickness	Style, Colour	Style, Colour Thickness	Style, Colour
Framing plans (1:100)	Slab	Solid Black 0.22 mm	Solid fill, RGB 255-255-206	Solid Black 0.22 mm	None
	Beam (Concrete)	Solid Black 0.15 mm	None	Solid Black 0.35 mm	None
	Beam (Steel)	Solid Black 0.06 mm	None	Solid Black 0.15 mm	None
	Column (Concrete)	Solid Black 0.15 mm	None	Solid Black 0.35 mm	Solid fill, RGB 150-185-200
	Column (Steel)	Solid Black 0.06 mm	None	Solid Black 0.15 mm	None
	Wall	Solid Black 0.15 mm	None	Solid Black 0.35 mm	Solid fill, RGB 140-200-140
Slab R.C. details (1:100)	Slab (half tone)	Solid Black 0.22 mm	None	Solid Black 0.22 mm	None
	Beam (half tone)	Solid Black 0.15 mm	None	Solid Black 0.35 mm	None
	Column (half tone)	Solid Black 0.15 mm	None	Solid Black 0.35 mm	Solid fill, RGB 150-185-200

		Projection		Cut	
		Line	Pattern	Line	Pattern
		Style, Colour, Thickness	Style, Colour	Style, Colour Thickness	Style, Colour
	Wall (half tone)	Solid Black 0.15 mm	None	Solid Black 0.35 mm	Solid fill, RGB 140-200-140
	Rebar	Solid Black 0.35 mm	None	Solid Black 0.35 mm	None
Beam R.C. details	Beam / Column / Slab	Solid, Black 0.18 mm	None	Solid Black 0.18 mm	None
	Rebar	Solid black	None	Solid black	None
Column R.C. Details (1:25)	Column	Solid Black 0.18 mm	None	Solid Black 0.18 mm	None
	Vertical rebar / Stirrup	Solid Black	None	Solid Black	None
Wall R.C. Details (1:50)	Wall	Solid Black 0.18 mm	None	Solid Black 0.18 mm	None
	Vertical rebar / Stirrup	Solid Black	None	Solid Black	None
Staircase R.C. details (1:25)	Beam / Column / Slab	Solid Black 0.18 mm	None	Solid Black 0.18 mm	None
	Stairs	Hidden Black 0.18 mm	None	Solid Black 0.18 mm	None
	Rebar	Solid Black	None	Solid Black	None
Steel Connection details (1:10)	Bolt/Plate	Solid Black	None	Solid Black	None

Table 6

5.2 Foundation Plans

Foundation plans contain layouts, sections/elevations, structural details, geological condition (including Ground Investigation Records), details showing the characteristic features of the site and environments, column/wall loading tables, piling/footing schedules, locations and details of instrumentation and monitoring requirements. The RSE/RGE should refer to other essential information to be provided/ shown on the foundation plans as required under B(A)R, Code of Practice for Foundations 2017 and the relevant PNAPs including but not limited to PNAPs ADM-8, ADM-9, ADM19 and ADV-33.

5.2.1 Data-driven BIM Object requirements

(Refer to Software User Guides for parameter naming in templates.)

	BIM Object	**Graphical Information**	**Non-graphical Information**
Driven steel H-pile (including raking pile)	• Intelligent Object indexed/categorised as 'Structural Foundation' with full geometry of pile section and capping plate • Top of pile should be modelled to 'Cut-off Level' • Bottom of pile should be modelled to 'Tentative bottom level'	• Pile section with detailed size and thickness of flange and web • Cut-off level • Tentative founding level • Capping plate size (length/ width/depth) • Raking pile inclination angle or gradient (if applicable) •	• Pile mark • Grade of steel
Socketed steel H-pile	• Intelligent Object indexed/categorised as 'Structural Foundation' with full geometry of pile section, shaft diameter of grout in soil, shaft diameter of grout in rock • Top of pile should be modelled to 'Cut-off Level' • Bottom of pile should be modelled to 'Tentative Bottom Level'	• Pile section with detailed size and thickness of flange and web • Shaft diameters of grout in soil and rock • Cut-off level • Tentative founding level	• Pile mark • Grade of steel • Material specification of grouting • Minimum length and the grade of founding material for socketed steel H Pile
Large diameter bored pile	• Intelligent Object indexed/categorised as 'Structural Foundation' with full geometry of pile shaft, bell-out and sleeve (if any) • Top of pile should be modelled to 'Cut-off Level'	• Shaft diameter • Bell-out diameter • Cut-off level • Tentative founding level • Bottom level of sleeve • Thickness of sleeve	• Pile mark • Concrete grade • Concrete density • Rebar material grade

	BIM Object	Graphical Information	Non-graphical Information
	• Bottom of pile should be modelled to 'Tentative Bottom Level' • Geometry of bell-out should be generic with the bell-out diameter, inclination angle and flat base • Rebar should be modelled with enough details for the statutory plan submission		• Grade of founding material and designed allowable bearing pressure • Minimum socketed length, if applicable.
Mini-pile	• Intelligent Object indexed/categorised as 'Structural Foundation' with full geometry of rebars and the permanent casing • Spacers between rebar should be shown with details in 2D • Connection details between mini-piles and concrete cap	• Number and diameter of rebar • Diameter and thickness of permanent casing • Cut-off level and toe level • Tentative founding level	• Pile mark • Grade of steel rebar and casing • Material specification of grouting
Footing	• Intelligent Object indexed/categorised as 'Structural Foundation' with full geometry of footing and rebar details	• Dimension (including thickness) • Top level • Founding level	• Concrete grade • Rebar material grade • Founding material and designed allowable bearing pressure
Monitoring Instrument	• Generic Object with a symbolic shape and size should be modelled and added to location at ground or on structure where it is intended to be installed	• Response zone of the instrument installed, e.g. in piezometers and standpipes, extensometers, etc.	• Marker mark • Type

Table 7

5.2.2 2D Annotation requirements

Type of 2D Annotation	Tag/Symbol/Others	Remarks
Floor (SDL & LL) loading layout	Hatch (fill region)	• 2D hatch on a view of structural plan to manually define the layout and area of loading

Type of 2D Annotation	Tag/Symbol/Others	Remarks
Pile mark	Tag	• Tag linked with the 'Mark' of pile object
Borehole mark	Tag	• Tag linked with the 'Mark' of site object
Design Ground Water Table (G.W.T.)	Tag	• Tag linked with the 'line' according to the designated level of G.W.T.
(Section) Offset value of Borehole from the section cut location	Symbol	• Symbol pre-set with text 'OFFSET' and the value of offset dimension to be input manually.
(Section) Site Boundary	2D Line	• 2D drafting
(Section) SPT N Value of Borehole	Tag	• Tag linked with the 'N Value' of site object
(Section) Layer of Borehole	Tag	• Tag linked with the 'Layer' of site object
Monitoring Instrument points	Tag	• Tag linked with the type of monitoring instrument model

Table 8

5.2.3 Types of plans to be produced from BIM

Based on the above requirements, sample drawings to illustrate the preparation of foundation plans including piling layout plans and sections, reinforcement details, piling schedule and monitoring plans generated by BIM software are provided in Appendix A for reference.

5.2.4 BIM Object presentation style

The presentation style defined in table below is for reference only instead of BA's requirements to follow.

		Projection		Cut	
		Line	Pattern	Line	Pattern
		Style, Colour, Thickness	Style, Colour	Style, Colour Thickness	Style, Colour
Piling Layout plans (1:200)	Piling	Solid Black 0.4 mm	None	Solid Black 0.4 mm	None
	Tie Beam / Footing / Pile Cap	Solid Black 0.2 mm	None	Solid Black 0.2 mm	None

		Projection		Cut	
		Line	Pattern	Line	Pattern
		Style, Colour, Thickness	Style, Colour	Style, Colour Thickness	Style, Colour
	Column	Solid Black 0.2 mm	None	Solid Black 0.2 mm	Solid fill, RGB 150-185-200
	Wall	Solid Black 0.2 mm	None	Solid Black 0.2 mm	Solid fill, RGB 140-200-140
	Contours Lines	None	None	Solid Black 0.13 mm	None
Piling sections (1:150)	Piling	Solid Black 0.4 mm	None	Solid Black 0.4 mm	None
	Tie Beam / Footing / Pile Cap	Solid Black 0.2 mm	None	Solid Black 0.2 mm	None
	Screen Wall (half tone)	Solid Black 0.13 mm	None	Solid Black 0.2 mm	Hatch
	Others structural elements (half tone)	Solid Black 0.13 mm	None	Solid Black 0.2 mm	None
	Contours Lines	None	None	Solid Black 0.2 mm	None
Pile Cap Layout plans (1:200)	Tie Beam / Footing / Pile Cap	Solid Black 0.6 mm	None	Solid Black 0.6 mm	None
	Piling	Solid Black 0.06 mm	None	Solid Black 0.06 mm	None
	Wall	Solid Black 0.2 mm	None	Solid Black 0.2 mm	Solid fill, RGB 140-200-140
	Column	Solid Black 0.2 mm	None	Solid Black 0.2 mm	Solid fill, RGB 150-185-200

		Projection		Cut	
		Line	Pattern	Line	Pattern
		Style, Colour, Thickness	Style, Colour	Style, Colour Thickness	Style, Colour
	Contours Lines	None	None	Solid Black 0.13 mm	None
Column / Wall Layout plans (1:200)	Column	Solid Black 0.2 mm	None	Solid Black 0.2 mm	Solid fill, RGB 150-185-200
	Wall	Solid Black 0.2 mm	None	Solid Black 0.2 mm	Solid fill, RGB 140-200-140
	Screen Wall	Solid Black 0.2 mm	None	Solid Black 0.2 mm	Hatch
Pile Cap Reinforcement Layout plans (1:100)	Pile Cap	Solid Black 0.22 mm	None	Solid Black 0.22 mm	None
	Rebar	Solid Black 0.5 mm	None	Solid Black 0.5 mm	None
	Others structural elements (half tone)	Solid Black 0.22 mm	None	Solid Black 0.22 mm	None
Column / Wall Starter Bar details (1:25)	Wall / Column	Solid Black 0.18 mm	None	Solid Black 0.18 mm	None
	Rebar	Solid Black	None	Solid Black	None

Table 9

5.3 Demolition Plans (Including hoarding and covered walkway plans)

Demolition plans contain the structural framing plans of the existing structure, method of demolition, detailed demolition sequence for special structure. The AP/RSE/RGE should refer to essential information to be provided and shown on the demolition plans as required under B(A)R, Code of Practice for Demolition of Buildings 2004 and the relevant PNAPs including but not limited to PNAP ADM-19.

Separate submission for hoarding and covered walkway may be required for acceptance by BA. The AP/RSE/RGE should refer to essential information to be provided and shown on the hoarding and covered walkway plans as required under Code of Practice for Demolition of Buildings 2004 and the relevant PNAPs including but not limited to PNAPs APP-21 and APP-23.

5.3.1 Data-driven BIM Object requirements

The existing building to be demolished should be modelled for the structural system, demolition methodology, sequence of demolition, details about the use of mechanical plants, and precautionary works and safety measures for the public.

(Refer to Software User Guides for parameter naming in templates.)

	BIM Object	Graphical Information	Non-graphical Information
Concrete structural slab	• Intelligent Object indexed/categorised as 'Structural Floor' with a whole piece of Intelligent Object for all spans at the same floor level (ignoring individual span) • Top of slab should be modelled to structural floor level • Thickness of floor should only be the thickness of the cast in situ part	• Thickness • Rebar size / shape / spacing / concrete cover • Cantilevered balconies or Cantilevered structures #	• Rebar material grade / layer
Structural beam (concrete)	• Intelligent Object indexed/categorised as 'Structural Framing' • Structural beam should be modelled to the full structural size of the width and depth	• Width • Depth • Rebar size / shape / spacing / concrete cover	• Rebar material grade
Structural beam (steel)	• Intelligent Object indexed/categorised as 'Structural Framing' • Structural beam should be modelled to the full structural size of the width, depth and thickness of flange/web	• Width • Depth • Additional information should be provided to define the geometry (e.g. thickness of flange/web)	• Object mark • Type mark • Steel grade • Steel density • Section Physical Properties (e.g. second moment of area, radius of gyration etc.)

	BIM Object	Graphical Information	Non-graphical Information
Structural column (concrete)	• Intelligent Object indexed/categorised as 'Structural Column' • Structural column should be modelled to the full structural size of length, width and height	• Length • Width • Height • Rebar size / shape / spacing / concrete cover	• Rebar material grade / steel ratio
Structural column (steel)	• Intelligent Object indexed/categorised as 'Structural Column' • Structural Column should be modelled to the full structural size of width, depth, height and thickness of flange/web	• Length • Width • Height • Thickness of flange/web	• Object mark • Type mark • Steel grade • Steel density • Section Physical Properties (e.g. second moment of area, radius of gyration etc.)
Structural wall (concrete)	• Intelligent Object indexed/categorised as 'Wall' with identifier for 'Structural' • Structural wall should be modelled to the full structural size of length, thickness and height	• Length • Thickness • Rebar size / shape / spacing / concrete cover	• Rebar material grade / steel ratio
Stair (concrete)	• Intelligent Object indexed/categorised as 'Stair' for all landings and flights • Top level of landing and flight should be modelled to the structural floor level of the item	• Thickness (landing and flight) • Rebar size / shape / spacing / concrete cover	• Rebar material grade
Stair (concrete)	• Intelligent Object indexed/categorised as 'Stair' for all landing and flight • Top level of landing and flight should be modelled to the Structural Floor Level of the item • Rebar should be modelled with sufficient	• Thickness (landing and flight) • Rebar size / shape / spacing / concrete cover	• Object mark • Concrete grade • Concrete density • Rebar material grade

	BIM Object	Graphical Information	Non-graphical Information
	details for statutory plan submission		
Hangers (or hanging structures)	• Intelligent Objects indexed/categorised as 'Wall' with identifier for 'Hanger' • Hangers should be modelled to the full structural size of length, thickness and height	• Length • Thickness • Rebar size / shape / spacing / concrete cover	• Rebar material grade / steel ratio
Temporary supports	• Intelligent Objects indexed/categorised as 'Temporary Works' modelled in full size and configuration with the major elements (e.g. vertical members and bracings) included	• Temporary support spacing	• NONE
Scaffolding, Screen covers and catchfan	• Intelligent Objects indexed/categorised as 'Temporary Works' • Bamboo scaffolding should be modelled to the overall profile showing the location and space to be occupied. (Details of bamboo and its fixing are not necessary.)	• Width	• NONE
Debris chute	• Intelligent Objects indexed/categorised as 'Temporary Works' • Debris chute should be modelled to the overall profile showing the location and space to be occupied. (Details of debris chute and its fixing are not necessary.)	• NONE	• NONE
Hoarding, covered walkway and catchfan	• Intelligent Objects indexed/categorised as 'Site' • Hoardings and covered walkway should be modelled to the full	• Footing length • Footing width • Footing height	• NONE

	BIM Object	Graphical Information	Non-graphical Information
	geometry of the footing base and the geometry of the overall profile of the hoarding and covered walkway structure above the footing		
Street furniture	• Intelligent Objects indexed/categorised as 'Street Furniture' • The following items within the pavement area should be modelled with Intelligent Objects: • Railing • Traffic light • Fire hydrant • Lamp post/lighting mast • Pillar box • Tram cable mast/support • Trees along the hoarding alignment should be represented by a point cloud produced by laser scanning • Bus Stop • Road Sign • Post Box • Parking meters	• NONE	• NONE
CCTV	• Intelligent Objects indexed/categorised as "Site" • The intended location, elevation and viewing direction shall be specified	• Location • Height from reference level • Viewing Direction	• NONE
Adjacent Building	• Massing blocks	• Building Height • Building Extent	• NONE
Monitoring Instrument	• Generic Object with a symbolic shape and size should be modelled and added to location at	• NONE	• Marker mark • Type

	BIM Object	Graphical Information	Non-graphical Information
	ground or on structure where it is intended to be installed		

Table 10

 # Refer to Software User Guides for parameter settings in templates.

5.3.2 2D Annotation requirements

Typical method of demolishing structural elements should be shown in 2D drafting only.

Type of 2D Annotation	Tag/Symbol/Others	Remarks
Prestressed Concrete structure	Hatch	• Hatch linked with the parameter value of 'Prestressed Concrete Structure' in Slab objects
Cantilever structure	Hatch	• Hatch linked with the parameter value of 'Cantilever Structure' in Slab objects
Exit Route	Symbol	• Symbol to be placed on drawing view to show the exit route

Table 11

5.3.3 Types of plans to be produced from BIM

Based on the above requirements, sample drawings to illustrate the preparation of demolition plans including general notes, layout plans and sections, details generated by BIM software are provided in Appendix A for reference.

Hoarding, covered walkway and catchfan layout and details should be under separate submission.

5.3.4 BIM Object Presentation Style

The presentation style defined in table below is for reference only instead of BA's requirements to follow.

		Projection		Cut	
		Line	Pattern	Line	Pattern
		Style, Colour, Thickness	Style, Colour	Style, Colour Thickness	Style, Colour
Framing plans (1:100)	Slab	Solid Black 0.22 mm	Solid fill, RGB 255-255-206	Solid Black 0.22 mm	None

		Projection		Cut	
		Line	Pattern	Line	Pattern
		Style, Colour, Thickness	Style, Colour	Style, Colour Thickness	Style, Colour
	Beam	Solid Black 0.15 mm	None	Solid Black 0.35 mm	None
	Column	Solid Black 0.15 mm	None	Solid Black 0.35 mm	Solid fill, RGB 150-185-200
	Wall	Solid Black 0.15 mm	None	Solid Black 0.35 mm	Solid fill, RGB 140-200-140

Table 12

5.4 Excavation and Lateral Support (ELS) plans

Excavation and Lateral Support (ELS) plans generated from the BIM model present the layout arrangement and details of the lateral support system, including the temporary pile walls and multi-layers of strutting system. Essential information is also required to be added or annotated to include construction method and sequence, details showing the characteristic features of the site, the proposed precautionary measures, details of the proposed instrumentation and monitoring, and the corresponding structural details, etc. The RSE/RGE should refer to other essential information to be provided/ shown on the ELS plans as required under B(A)R and the relevant PNAPs including but not limited to PNAPs ADM-8, ADM-9, ADM-19 and ADV-33.

5.4.1 Data-driven BIM Object requirements

(Refer to Software User Guides for parameter naming in templates.)

	BIM Object	Graphical information	Non-graphical information
Sheet piling	• Intelligent Object indexed/categorised as 'Pile Wall' for the sheet pile with the correct shape (including the customised shape for corner pile), size should be modelled • Grouting (with grout pipes and required zone)	• Top level • Required Toe level • Sheet piling profile • Thickness	• Type mark • Weight per unit length (kg/m) • Section properties (EI, Area, etc) • Grout mix

	BIM Object	Graphical information	Non-graphical information
Pipe pile wall (with Lagging Plate)	• Intelligent Object indexed/categorised as 'Pile Wall' for the pipe pile with the correct size should be modelled • Grouting (with grout pipes and required zone)	• Diameter • Top level • Required Toe level • Top and bottom level of grouting zone • Thickness of Pipe Pile Wall • Thickness of Lagging Plate	• Type mark • Weight per unit length (kg/m) • Section properties (EI, Area, etc) • Grout mix • Maximum Spacing
Steel waling	• Intelligent Object indexed/categorised as 'Structural Framing' for the steel walling with the correct size and length should be modelled	• Width • Depth • Length • Flange thickness • Web thickness • Level	• Type mark • Weight per unit length (kg/m) • Section properties (EI, Area, etc)
Diaphragm Wall	• Intelligent Object indexed/categorised as 'Structural Wall' for the diaphragm wall with the correct size should be modelled	• Thickness • Length • Height	• Concrete and Reinforcement Grade • Wall mark • Section properties (EI, Area, etc)
Steel strut	• Intelligent Object indexed/categorised as 'Structural Framing' for the steel strutting with the correct size and length should be modelled	• Width • Depth • Flange thickness • Web thickness • Length • Level	• Type mark • Weight per unit length (kg/m) • Section properties (EI, Area, etc)
King post	• Intelligent Object indexed/categorised as "Structural Column" for the King post with the correct size, length and depth should be modelled	• Width • Depth • Flange thickness • Web thickness • Top Level • Required Toe Level	• Type mark • Weight per unit length (kg/m) • Section properties (EI, Area, etc)
Excavation levels in stages	• Intelligent Object of the surface indexed/categorised as 'Topography' built up by spot locations with elevations should be modelled	• Node coordinates and elevation	• NONE

	BIM Object	Graphical information	Non-graphical information
Monitoring Instrument	• Generic Object with a symbolic shape and size should be modelled and added to location at ground or on structure where it is intended to be installed	• NONE	• Marker mark • Type

Table 13

5.4.2 2D Annotation requirements

Type of 2D Annotation	Tag/Symbol/Others	Remarks
Waling / Strutting mark	Tag	• Tag linked with beam object using the waling/strutting 'Mark'
Pile mark	Tag	• Tag linked with the 'Mark' of pile object
Pile wall mark	Dimensions	• Edit text for the dimension in order to show the types of pile wall.
Borehole mark	Tag	• Tag linked with the 'Mark' of site object
Cut Slope mark	Symbol	• Symbol with manual adjustment to the direction and which side to fall
Layer of excavation level	Tag	• Tag linked with the 'line' according to each topographic layer.
Design Ground Water Table (G.W.T.)	Tag	• Tag linked with the 'line' according to the designated level of G.W.T.
(Section) Offset value of Borehole from the section cut location	Symbol	• Symbol present with text 'OFFSET' and the value of offset dimension to be input manually.
(Section) Site Boundary	2D Line	• 2D drafting
(Section) SPT N Value of Borehole	Tag	• Tag linked with the 'N Value' of site object
(Section) Layer of Borehole	Tag	• Tag linked with the 'Layer' of site object
Monitoring Instrument points	Tag	• Tag linked with the type of monitoring instrument model

Table 14

5.4.3 Types of plans to be produced from BIM

Based on the above requirements, sample drawings to illustrate the preparation of ELS plans including general notes, layout plans, elevations and sections, construction sequence,

monitoring plan and pumping test setting out plan generated by BIM software are provided in Appendix A for reference.

		Projection		Cut	
		Line	Pattern	Line	Pattern
		Style, Colour, Thickness	Style, Colour	Style, Colour Thickness	Style, Colour
ELS plans (1:200)	Steel Waling	Solid Black 0.06 mm	None	Solid Black 0.13 mm	None
	Diaphragm Wall	Solid Black 0.13 mm	None	Solid Black 0.20 mm	None
	Steel Strut	Solid Black 0.06 mm	None	Solid Black 0.13 mm	None
	King Post	Solid Black 0.06 mm	None	Solid Black 0.13 mm	None
	Pile Wall (Sheet Pile)	Solid Black 0.06 mm	None	Solid Black 0.06 mm	None
	Pile Wall (Pipe Pile)	Solid Black 0.06 mm	None	Solid Black 0.06 mm	None

5.5 Site Formation Plans

Site formation plans generated from BIM model present the layout and details of site formation, e.g. slope gradients, soil nails and U-Channel layouts. Cutting slopes, retaining structures/ walls, catchpits, sand traps and U-Channel layout. The AP/RSE/RGE should refer to other essential information to be provided/ shown on the site formation plans as required under B(A)R and the relevant PNAPs including but not limited to PNAPs ADM-8, ADM-9, ADM-19 and ADV-33.

5.5.1 Data-driven BIM Object requirements

(Refer to Software User Guides for parameter naming in templates.)

	BIM Object	Graphical information	Non-graphical information
Existing ground profile ***Note: Details and information of the existing ground profile should contain all ground features as if it is given in topographic survey.***	• Intelligent Object of the surface indexed/categorised as 'Topography' built up by spot locations with elevations should be modelled • Existing ground features, e.g. retaining wall, drains, existing slopes with suitable symbols indicating soil/rock slopes • Existing trees	• Node coordinates and elevation • Section	• Material
Site formation profile (slope/ berm/platform/ design ground water level/ subsoil profile)	• Intelligent Object of the surface indexed/categorised as 'Topography' built up by spot locations with elevations should be modelled • The surface should be able to 'Soil Cut Slope', 'Rock Cut Slope' and 'Fill Slope' when compared with the previous stage of site formation works • Type of surface protection should be modelled in 'Material' in Graphical information with representative colour	• Formation level • Node coordinates and elevation • Section	• NONE
Site drainage (channels/ catchpit/ Manhole//raking drain etc.)	• Intelligent Object indexed/categorised as 'Site' with the correct size, depth or fall should be modelled	• Width • Depth • Gradient • Fall direction	• NONE
Retaining wall	• Intelligent Object with the correct size, depth, inclination and position should be modelled • Any mass concrete filling beneath the base of retaining wall	• Width • Depth • Thickness • Founding level	• Grade of founding material and designed allowable bearing pressure • Material properties including concrete grade and density

	BIM Object	Graphical information	Non-graphical information
Soil nail	• Intelligent Object indexed/categorised as ‘Site’ with the correct size, length or fall should be modelled	• Bar Length • Bar Diameter • Inclination • Bearing • Level • Spacing	• Rebar material grade • Cement grout and anchor plate/block material grade • Maximum Spacing
Rock Slope Stabilisation Measures (e.g. Buttress and Rock dowels)	• Intelligent Object indexed/categorised as ‘Site’	• Size (objects dependent)	• Mark
Monitoring Instrument	• Generic Object with a symbolic shape and size should be modelled and added to location at ground or on structure where it is intended to be installed	• none	• Marker mark • Type

Table 15

5.5.2 2D Annotation requirements

Type of 2D Annotation	Tag/Symbol/Others	Remarks
U Channel mark	Tag	• Tag linked with the ‘type mark’ in the site object
Soil Nail mark	Tag	• Tag linked with the ‘mark’ of Site Object
Slope Label	Symbol	• Symbol with manual adjustment to the slope type, direction and which side to fall
Catch pit mark	Tag	• Tag linked with the ‘mark’ of Site Object
Tie back /Soil Nail mark	Tag	• Tag linked with the ‘mark’ of Site Object
Monitoring Instrument points	Tag	• Tag linked with the type of monitoring instrument model
Site Boundary	Property Line	• Create Property Lines as Site Boundary

Table 16

5.5.3 Types of plans to be produced from BIM

Based on the above requirements, sample drawings to illustrate the preparation of Site Formation Layout plans generated by BIM software are provided in Appendix A for reference.

5.6 Ground Investigation Plans

Ground Investigation (G.I.) layout and details such as borehole, trial pit and the topographic profiles to be presented in Ground Investigation Plans in the Scheduled Areas, Site Formation Plans, Foundation Plans and ELS Plans. The AP/RSE/RGE should refer to other essential information to be provided/ shown on the GI plans as required under B(A)R and relevant PNAPs.

5.6.1 Data-driven BIM Object requirements

(Refer to Software User Guides for parameter naming in templates.)

	BIM Object	Graphical information	Non-graphical information
Borehole	• Intelligent Object indexed/categorised as 'Site' showing the thickness of stratum should be modelled to location	• Top level • Toe level	• Borehole mark
Geological profile and stratum	• Intelligent Object of the surface indexed/ categorised as 'Topography' built up by spot locations with elevations for the top level of stratum should be modelled	• Node coordinates and elevation • Section	• Grade or short description • Stratum description
Trial pit	• Intelligent Object indexed/categorised as 'Site Component' showing the size and depth should be modelled to location	• Plan dimension (e.g. length, width) • Elevation at top of trial pit • Elevation at bottom of trial pit	• Trial pit mark
Monitoring Instrument	• Generic Object with a symbolic shape and size should be modelled and added to location at ground or on structure where it is intended to be installed	• NONE	• Marker mark • Type

	BIM Object	Graphical information	Non-graphical information
Standpipe/ piezometer	Intelligent Object indexed/categorised as 'Site Component' with details should be modelled to location	• Elevation at top of standpipe • Elevation at top of light non-aqueous phase liquid (LNAP) • Elevation at bottom of light non-aqueous phase liquid (LNAP) • Elevation at top of dense non-aqueous phase liquid (DNAP) • Elevation at bottom of dense non-aqueous phase liquid (DNAP)	• Mark

Table 17

5.6.2 2D Annotation requirements

Type of 2D Annotation	Tag/Symbol/Others	Remarks
Borehole geological stratum tag	Tag	• Tag linked with the 'Grade or short description' of borehole geological stratum
Geological profile tag	Tag	• Tag linked with the 'Grade or short description' of geological Profile
Groundwater symbol	Symbol	• Symbol for the groundwater level
Bedrock symbol	Symbol	• Symbol for the bedrock profile
Monitoring instrument points	Tag	• Tag linked with the type of monitoring instrument model

Table 18

5.6.3 Types of plans to be produced from BIM

Based on the above requirements, G.I. information is gathered in the Site Formation Plans, Foundation Plans and ELS Plans. Sample drawings to illustrate the preparation of these plans generated by BIM software are provided in Appendix A for reference.

5.7 Drainage Plans

Drainage plans present the drainage layouts including plans and schematic diagrams. The AP should refer to other essential information to be provided or shown on the drainage plans as required under B(A)R and the relevant PNAPs including but not limited to PNAPs ADM-9, ADM-19 and ADV-33.

5.7.1 Data-driven BIM Object requirements

(Refer to Software User Guides for parameter naming in templates.)

	BIM Object	Graphical information	Non-graphical information
Sanitary Item	• Intelligent Objects indexed/categorised as 'Sanitary Fitment' • The following items should be modelled with Intelligent Objects: o Water closet o Wash basin o Urinal o Bath/Shower tray o Sink	• None	• None
Pipe (including underground drain)	• Intelligent Objects indexed/categorised as 'Pipe'	• Inside Diameter (only this can be changed) / Outer Diameter • Type of pipe • Material • Fall direction	• System Type
Floor Drain	• Intelligent Objects indexed/categorised as 'Plumbing Fixture'	• Size	• Type mark
Vertical Floor Drain	• Intelligent Objects indexed/categorised as 'Plumbing Fixture'	• Size	• Type mark
Rain water outlet	• Intelligent Objects indexed/categorised as 'Plumbing Equipment'	• NONE	• Object mark
Storm Water Manhole	• Intelligent Objects indexed/categorised as 'Manhole'	• Internal dimension • Wall thickness • Top and bottom slabs thickness	• Object mark • Pipe diameter • Invert level • Disconnecting trap invert level (D.T.I.L.) • Type of manhole • Cover level • Bottom level

	BIM Object	Graphical information	Non-graphical information
Foul Water Manhole	• Intelligent Objects indexed/categorised as 'Manhole'	• Internal dimension • Wall thickness • Top and bottom slabs thickness	• Object mark • Pipe diameter • Invert level • Disconnecting trap invert level (D.T.I.L) • Type of manhole • Cover level • Bottom level
Petrol Interceptor	• Intelligent Objects indexed/categorised as 'Plumbing Equipment'	• Overall Size • Internal dimension • Wall thickness • Top and bottom slabs thickness	• Object mark • Invert level • Bottom level • Cover level
Septic tank	• Intelligent Objects indexed/categorised as 'Plumbing Equipment'	• Overall Size • Internal dimension • Wall thickness • Top and bottom slabs thickness	• Object mark • Invert level • Bottom level • Cover level
Sump pit	• Intelligent Objects indexed/categorised as 'Plumbing Equipment'	• Overall Size • Internal dimension • Thickness	• Object mark • Invert level • Bottom level • Cover level • Pump number • Pump duty (flow, head)
Grease Trap	• Intelligent Objects indexed/categorised as 'Plumbing Equipment'	• Overall Size • Internal dimension • Thickness	• Object mark • Invert level • Bottom level • Flow Rate
Seal Trap Gully	• Intelligent Objects indexed/categorised as 'Plumbing Equipment'	• NONE	• Type Mark
Open Trap Gully	• Intelligent Objects indexed/categorised as 'Plumbing Equipment'	• NONE	• Type Mark
Wire Balloon	• Intelligent Objects indexed/categorised as 'Plumbing Equipment'	• NONE	• Type Mark

	BIM Object	Graphical information	Non-graphical information
Fresh Air Inlet	• Intelligent Objects indexed/categorised as 'Plumbing Equipment'	• NONE	• Type Mark
Cleaning eye	• Intelligent Objects indexed/categorised as 'Plumbing Equipment'	• NONE	• Type Mark

Table 19

5.7.2 2D Annotation requirements

Type of 2D Annotation	Tag/Symbol/Others	Remarks
Pipe size and system type	Tag	• Tag linked with the 'system abbreviation' and 'diameter' of pipe object
Floor Drain type and size	Tag	• Tag linked with the 'type mark' of pipe object
Fall gradient	Symbol	• Symbol with manual input to the fall gradient and fall direction
Sanitary Item symbol (schematic diagram)	Tag	• Tag linked with the 'mark' of sanitary object.
Drainage system symbol (schematic diagram)	Tag	• Tag linked with the 'mark' and necessary information of drainage system object.
Sunken (schematic diagram)	Hatch	• 2D hatch to manually define the area of sunken in schematic diagram.
Schematic line diagram	2D line	• 2D drafting

Table 20

5.7.3 Types of plans to be produced from BIM

Based on the above requirements, sample drawings to illustrate the preparation of Drainage plans including general notes, schematic diagram, layout plans, schedules and details generated by BIM software are provided in Appendix A for reference.

5.8 Curtain Wall Plans

Curtain Wall Details in this BIM Guideline presents the structural framing and key structural details and the installation procedures excluding any unnecessary shop fabrication details, to be included in the curtain wall plans for submission to the BA for approval. The AP/RSE/RGE should refer to other essential information to be provided or shown on the curtain wall plans as required the relevant PNAPs including but not limited to PNAPs ADM-9, APP-37 and ADV-33.

5.8.1 Data-driven BIM Object requirements

(Refer to Software User Guides for parameter naming in templates.)

	BIM Object	Graphical information	Non-graphical information
Embed	• Generic object with full geometry of embed and member section.	• Size • Material	• Type mark • Grade of steel
Mullion and Transom	• Intelligent Object indexed/categorised as 'Mullion / Transom'.	• Length • Section profile	• Member mark • Grade of steel / aluminium
Glass Panels	• Intelligent Object indexed/categorised as 'panel'	• Size • Glass thickness • Thickness of interlayer for laminated glass • Space between two panes for insulating glass unit	• Type Mark • Panel types • Glass types • Number of glass panes for laminated glass and insulating glass unit
Louvre	• Intelligent Object indexed/categorised as 'Panel'	• Size • Thickness • Section profile	• Type Mark • Louvre Type

5.8.2 2D Annotation requirements

Type of 2D Annotation	Tag/Symbol	Remarks
Embed type mark	Tag	• Tag linked with the 'mark' of embed object
Mullion and Transom mark	Tag	• Tag linked with the 'mark' of mullion and transom object
Glass span direction	Symbol	• Symbol with and span direction(s)

Type of 2D Annotation	Tag/Symbol	Remarks
Glass panel materials	Hatch	• Hatch linked with the parameter value of ‘Type mark’ in glass panel objects

5.8.3 Types of plans to be produced from BIM

Based on the above requirements, sample drawings to illustrate the preparation of Curtain wall details including layout plans, cast-in layout plans, elevations, sections and details generated by BIM software are provided in Appendix A for reference.

Appendix A

Sample Drawings

-Software 1

-Software 2

(Disclaimer: The sample drawings shown on this Standards *are for reference only. They consist of 2D representation of 3D Objects and manual input of essential 2D annotation for the completion of drawing. Sample drawings are provided to demonstrate how the Standard templates and User Guides should be used to build 3D models for generation of 2D submission plans. The Sample drawings do not represent the complete set of submission drawings required for BA's approval under the BO. Essential information/details for submission of statutory plans should refer to relevant Code of Practice, PNAPs including but not limited to PNAPs ADM-8, ADM-9, ADM19 and ADV-33 and Circular Letters issued by BA, and complied with BOs and subsidiary regulations.)*

List of Sample Drawings

Drawing number	Drawing title
S001	GENERAL NOTES FOR SUPERSTRUCTURE
S002	TYP FLOOR FRAMING PLAN
S003	BEAM R.C. SCHEDULE
S004	BEAM R.C. DETAIL
S005	COLUMN R.C. DETAIL
S006	WALL R.C. DETAIL (1 OF 2)
S007	WALL R.C. DETAIL (Schedule)
S008	WALL R.C. DETAIL (2 OF 2)
S009	SLAB R.C. DETAIL
S010	STAIRCASE R.C. DETAIL
S011	WATER TANK R.C. DETAIL
R001	STEEL STRUCTURE BLOCK PLAN AND GENERAL NOTES
R002	STEEL STRUCTURE FLOOR PLAN
R003	STEEL STRUCTURE DETAIL
R004	STEEL STRUCTURAL SECTIONS
C001	CURTAIN WALL GENERAL NOTES
C002	CURTAIN WALL LAYOUT PART PLAN
C003	CURTAIN WALL CAST-IN LAYOUT PART
C004	EMBED DETAIL
C005	CURTAIN WALL ELEVATIONS AND SECTIONS
P001	GENERAL NOTES FOR FOUNDATION
P002	PILING LAYOUT PLAN
P003	PILING SECTION A & B
P004	PILING SECTION C
P005	COLUMN WALL LOADING PLAN
P006	COLUMN WALL LOADING SCHEDULE
P007	LOADING INTENSITY PLAN
P008	PILE LOAD SCHEDULE
P009	FOUNDATION MONITORING PLAN

Drawing number	Drawing title
P010	PILE CAP REINFORCEMENT LAYOUT PLAN (1 OF 2)
P010A	PILE CAP REINFORCEMENT LAYOUT PLAN (2 OF 2)
P011	COLUMN AND WALL STARTER DETAILS
P012	TIE BEAM DETAILS & SCHEUDLE
P013	PILE CAP LAYOUT PLAN
P014	GENERAL NOTES FOR PILE CAP
D001	GENERAL NOTES FOR DEMOLITION
D002	DEMOLITION PLAN - EXISTING G/F, 1/F FRAMING PLAN
D003	DEMOLITION DETAILS (BY HAND HELD TOOLS)
D004	DETAIL FOR DEMOLITION WORKS (1/2)
D005	DETAIL FOR DEMOLITION WORKS (2/2)
H001	HOARDING LAYOUT PLAN
H002	HOARDING TYPICAL DETAILS
E001	EXCAVATION & LATERAL SUPPORT GENERAL NOTES
E002	EXCAVATION & LATERAL SUPPORT LAYOUT PLAN
E003	EXCAVATION & LATERAL SUPPORT SECTIONS (1 OF 2)
E004	EXCAVATION & LATERAL SUPPORT SECTIONS (2 OF 2)
E005	EXCAVATION & LATERAL SUPPORT CONSTRUCTION SEQUENCE (1 OF 2)
E006	EXCAVATION & LATERAL SUPPORT CONSTRUCTION SEQUENCE (2 OF 2)
E007	EXCAVATION & LATERAL SUPPORT ELEVATION
E008	EXCAVATION & LATERAL SUPPORT WORKS MONITORING PLAN
E009	EXCAVATION & LATERAL SUPPORT WORKS PUMPING TEST SETTING OUT PLAN
G001	PROPOSED GROUND INVESTIGATION PLAN
T001	SITE FORMATION BLOCK PLAN
T002	SITE FORMATION LAYOUT PLAN
T003	SITE FORMATION SECTIONS
M001	GENERAL NOTES FOR DRAINAGE
M002	SCHEMATIC DIAGRAM OF DRAINAGE SYSTEM

Drawing number	Drawing title
M003	DRAINAGE LAYOUT PLAN FOR TYPICAL FLOOR (NEW APPROACH)
M003A	DRAINAGE LAYOUT PLAN FOR TYPICAL FLOOR (TRADITIONAL STYLE)
M004	DRAINAGE INSTALLATION DETAILS
M005	DRAINAGE SCHEDULES

Appendix B

BIM Object Presentation Summary

(Disclaimer: Please note that the BIM Object Presentation Summary aimed at providing a more comprehensive summary to major BIM Objects applied for preparing the 7 types of statutory plan submissions due to limitation on the representation on Sample drawings provided in Appendix A. Given that all Typical details are prepared by 2D drafting in BIM software.)

Appendix 1

CIC BIM User Guide for Preparation of Statutory Plan Submissions
ArchiCAD (December 2020)

Appendix 2

CIC BIM User Guide for Preparation of Statutory Plan Submissions
Civil 3D (December 2020)

Appendix 3

CIC BIM User Guide for Preparation of Statutory Plan Submissions
Revit (December 2020)

Appendix 4

CIC BIM User Guide for Preparation of Statutory Plan Submissions
Tekla (December 2020)

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Acknowledgement

The CIC would like to acknowledge the assistance of the following organisations for providing valuable comments:

- Airport Authority Hong Kong
- Architectural Services Department
- Buildings Department
- Civil Engineering and Development Department
- Development Bureau
- Drainage Services Department
- Electrical and Mechanical Services Department
- Highways Department
- Hong Kong Housing Authority
- Hospital Authority
- Lands Department
- The Association of Consulting Engineers of Hong Kong
- The Hong Kong Institute of Architects
- The Hong Kong Institution of Engineers
- The Hong Kong Institute of Surveyors
- The Hong Kong Institute of Building Information Modelling
- The Mass Transit Railway Corporation
- Urban Renewal Authority
- Water Supplies Department

The CIC thanks all stakeholders who have participated in the Stakeholders Consultation Seminars and/or Forums and offered opinions.

Feedback Form

CIC BIM Standards for Preparation of Statutory Plan Submissions December 2020

To improve future editions of this publication, we would be grateful to have your comments.

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Informative	❑	❑	❑	❑	❑
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