

Sharing on buildability requirements and submissions in CORENET X

No. of Slides: 35

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Outline

- Recap on Buildability Requirements and Submission
- CORENET X Gateway Process for Buildability
- CORENET X Submission Portal
- BIM submission in CORENET X
- Learning Points



Current Buildability Submission Procedure

1. Buildable Design Score (B-Score) and the Buildability Detailed Design and Implementation Plan (BDIP) are key documents required for Buildability compliance
2. Submissions are to be made and endorsed by Qualified Persons/PEs (Architect, Structural Engineer, M&E Engineer) at the following stages:
 - Building Plan (BP) stage
 - Temporary Occupation Permit (TOP)/Certificate of Statutory Completion (CSC) stage
3. B-Score for building works must meet the stipulated minimum requirement
4. QPs and PEs must submit BDIP to substantiate the extent of use of Design for Manufacturing and Assembly (DfMA), building systems etc to be/have been implemented in the project, which are as computed in the B-Score form for the building works



Buildability Requirements (COP on Buildability 2022)

Compliance Approach	Requirements for each compliance approach	
1. Code compliance option	Meeting minimum B-Score using Buildable Design Appraisal System (BDAS)	Meeting pre-requisite requirements as follows:
2. Outcome-based option for large projects (GFA $\geq 25,000\text{m}^2$)	a. Deemed acceptable solutions High prefabrication levels E.g. Residential non-landed projects: - Structural: 65% Prefab - Archi: 80% Prefab - MEP: 50% Prefab - System Formwork: 70% DfMA adoption E.g. Residential non-landed projects: 60% PPVC + 70% System Formwork or 50% PPVC (≤ 5-storey) + 70% System Formwork	For all projects - Floor mesh - Repetition of typical floor height - Industry standard precast staircase for typical storeys - Prefabricated and pre-insulated duct for air-conditioning system
	b. Open Option Proposal demonstrating min. 25% productivity improvement	For all Residential Non-Landed projects - Drywall - Precast household shelters (HS) - Industry standard precast HS - Prefabricated Bathroom Units (PBU) - Industry standard PBUs - Industry standard door structural openings - Industry standard precast refuse chutes

Productivity requirements for projects sold under the Government Land Sales (GLS) Programme

Type of Development	Requirements								
Residential non-landed (including Executive Condominium)	- Min 65% adoption of Prefabricated Prefinished Volumetric Construction (PPVC) - Min 65% adoption of Prefabricated Mechanical, Electrical and Plumbing (PMEP) - Min 70% adoption of system formwork								
Hotel	- Min 65% adoption of PPVC - Min 65% adoption of PMEP - Min 70% adoption of system formwork								
Office	- Min 80% adoption of Structural Steel - Min 65% adoption of PMEP - Min 70% adoption of system formwork								
Selected sites	- Min 30% productivity improvement (compared to 2010 level) - Min prefabrication levels:<table><tr><td>Structural (min. Advanced Precast Concrete System)</td><td>65%</td></tr><tr><td>Architectural</td><td>80%</td></tr><tr><td>PMEP</td><td>65%</td></tr><tr><td>System Formwork</td><td>70%</td></tr></table>	Structural (min. Advanced Precast Concrete System)	65%	Architectural	80%	PMEP	65%	System Formwork	70%
Structural (min. Advanced Precast Concrete System)	65%								
Architectural	80%								
PMEP	65%								
System Formwork	70%								

- GLS requirements are over and above the minimum buildability requirements and must be complied with when making submissions

CORENET X Gateway Process for Buildability

QPs/Builders are involved in the various gateways:

1. Pre-submission consultation, waiver (optional)
2. Construction Gateway – Buildability submission
3. Independent Submissions – Constructability Score (C-Score)
4. Completion Gateway – As-built B-Score and C-Score*

**Note: Project teams are strongly encouraged to submit B-Score and C-Score for clearance prior to TOP application (e.g. 2 months ahead) to ensure timely issuance of TOP*

① Design Gateway

*Critical
Design Parameters*



② Construction Gateway

*Detailed Design Requirements
(multi-agencies)*



(Independent Submissions)

*Independent technical
requirements that are
agency-specific*

③ Completion

(Occupancy Permit/ Stat. Completion)

*Completion & compliance to
Approved Design*



Pre-submission consultation^
^ Note: Pre-submission consultation
may be initiated at any stage prior to
submission

Buildability submission

Constructability submission

As-built B-Score and C-Score
submission

construction

Documents required for CORENET X submission

Gateways	Documents required
Construction Gateway	a. Calculations of Buildable Design Score (BS01) b. BDIP / Productivity Plans[^] c. For items that cannot be modelled in BIM, 2D plans can be submitted
Independent Submission	a. C-Score calculation form b. Constructability Implementation Plan (CIP)
Completion Gateway* <i>*prior to TOP application</i>	a. As-built Calculations of Buildable Design Score (BS03) b. As-built BDIP /Productivity Plans c. As-built C-Score calculation form d. As-built CIP e. Certificate of Compliance for Constructability Score (CCS01)

[^] BDIP refers to Buildability Detailed Design and Implementation Plan. Productivity Plans include Productivity Concept Implementation Plan (PCIP)

① Design Gateway

*Critical
Design Parameters*

② Construction Gateway

*Detailed Design Requirements
(multi-agencies)*

(Independent Submissions)

*Independent technical
requirements that are
agency-specific*

③ Completion

(Occupancy Permit/ Stat. Completion)

*Completion & compliance to
Approved Design*

Pre-submission consultation[^]

*[^]Note: Pre-submission consultation may be
initiated at any stage prior to submission.*

Buildability submission

BS01 + BDIP / Productivity Plan

Constructability submission

C-Score + CIP

As-built submission

*BS03 + BDIP / Productivity Plans +
C-Score + CIP + CCS01*

construction

Pre- submission consultation – Buildability

For buildability, constructability and productivity related matters (e.g. Productivity Concept Implementation Plan (PCIP), Integrated Digital Delivery, consultation request can be made by selecting agency specific requirements

Select submission

Only applicable submissions will be made available for selection

Submission category

Pre-submission consultation

Submission

Pre-submission consultation on agency specific requirements

Agency

Building and Construction Authority (BCA)

Agency category

Buildability

1

Details

Last saved on -

Draft

Relevant ES (if applicable)

Topic of consultation

Description of consultation

Upload documents

Upload all the supporting documents and ensure all files are tagged accordingly

Others (optional)

Drag and drop files here or [select files](#)

Each file cannot exceed 1 GiB.

2

Fill in details of consultation

Besides initiating consultation requests via CX, QPs/Builders can also email the relevant Processing Officer (PO) of your project for direct consultation

Construction Gateway – Buildability

QP to select one of the following options when making submission

A. Buildable Design Score (B-Score):

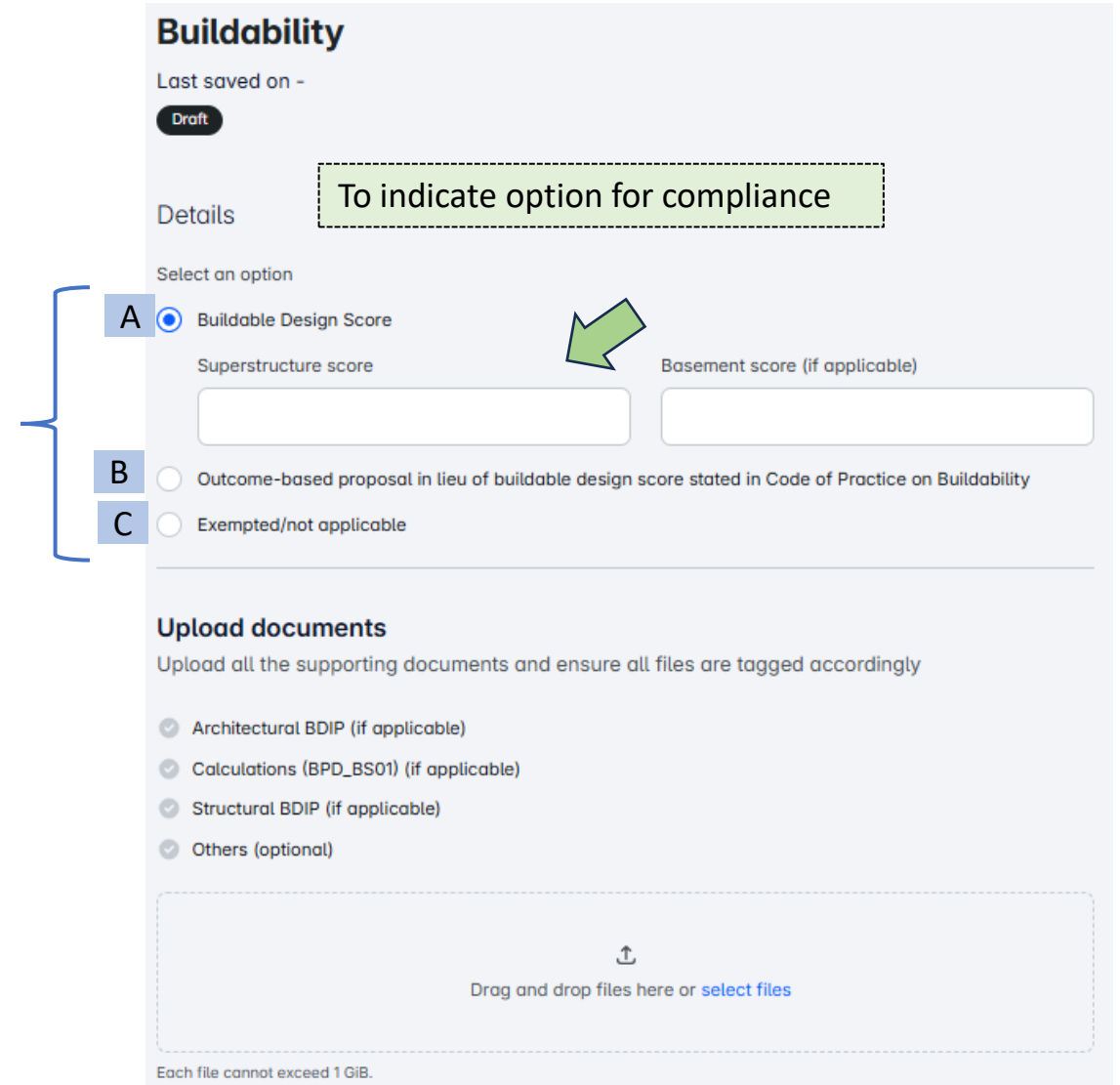
- For project adopting code compliance code option, to select 'Buildable Design Score' and fill in the Superstructure score and basement score (if applicable)

B. Outcome-based proposal:

- For large projects (GFA $\geq 25,000\text{m}^2$) choosing the outcome-based approach, to select 'Outcome-based Proposal'

C. Exemption / B-Score not applicable

- For projects that are exempted or where buildability requirements are not applicable



The screenshot shows the 'Buildability' form interface. At the top, it says 'Last saved on -' and 'Draft'. Below this is a 'Details' section. A green dashed box highlights the text 'To indicate option for compliance'. Under 'Select an option', there are three radio button options: A. Buildable Design Score (selected), B. Outcome-based proposal in lieu of buildable design score stated in Code of Practice on Buildability, and C. Exempted/not applicable. A green arrow points to the 'Buildable Design Score' option. Below option A, there are two input fields: 'Superstructure score' and 'Basement score (if applicable)'. Below options B and C, there is an 'Upload documents' section with the instruction 'Upload all the supporting documents and ensure all files are tagged accordingly'. It lists four categories with checkboxes: Architectural BDIP (if applicable), Calculations (BPD_BS01) (if applicable), Structural BDIP (if applicable), and Others (optional). At the bottom of the upload section, there is a dashed box with an upload icon and the text 'Drag and drop files here or [select files](#)'. A note at the very bottom states 'Each file cannot exceed 1 GiB.'.



Construction Gateway – Buildability

Upload documents

Upload all the supporting documents and ensure all files are tagged accordingly

☒ Architectural BDIP (if applicable)

☒ Calculations (BPD_BS01) (if applicable)

☒ Structural BDIP (if applicable)

☒ Others (optional)

Drag and drop files here or [select files](#)

Each file cannot exceed 1 GiB.

buildability-framework-cop2022_bs01.xlsx ☒

346.04 KiB • 18 Jul 2025

Type of attachment

☐ Architectural BDIP (if applicable)

☐ Calculations (BPD_BS01) (if applicable)

☐ Structural BDIP (if applicable)

☐ Others (optional)

Upload documents

Upload all the supporting documents and ensure all files are tagged accordingly

☒ Architectural BDIP (if applicable)

☒ Calculations (BPD_BS01) (if applicable)

☒ Structural BDIP (if applicable)

☒ Others (optional)

Submit the relevant documents accordingly (see table below)

Buildability	Type of documents / attachment
Code Compliance Option	- Calculation (BS01) - Architectural BDIP - Structural BDIP - Others – MEP BDIP
Outcome-based option	- Calculation (BS01) – to indicate option chosen and compliance to pre-requisites - Others – Deemed Acceptable Proposal/ Project Productivity Improvement Plan (PPIP)
GLS projects	- Calculation (BS01) - Others – Productivity Concept Implementation Plan (PCIP)



As-built B-Score application

Select submission

Only applicable submissions will be made available for selection

Submission category

Technical clearances (certificate of supervision etc.)

Agency

Building and Construction Authority (BCA)

Submission

As-built Buildable Design Score Calculations

1

As-built Buildable Design Score Calculations

Last saved on 5:14pm, 18 July 2025 by Sam

Draft

2

As-built buildable design score calculation

Superstructure score

Basement score (if applicable)

Outcome-based proposal in lieu of a buildable design score stated in Code of Practice on Buildability

☒ Yes

Type of outcome-based proposal

1a Min 65% Str, 80% Arch, 50% MEP, 70% SF

☐ No

Expected date of TOP application

31/10/2025



- To fill in as-built B-Score or
- indicate 'Yes' to outcome-based option if project has adopted this approach instead of Code Compliance Option, and to select the type accordingly

Type of outcome-based proposal

Please select

1a Min 65% Str, 80% Arch, 50% MEP, 70% SF

1b Min 60% PPVC, 70% SF

1c Min 50% PPVC, 70% SF

2a Min 60% Str, 80% Arch, 50% MEP, 70% SF

2b Min 60% Str, 70% Arch, 50% MEP, 70% SF

- Since as-built submission must be made before TOP application, QP to indicate the expected TOP application date in the submission form
 - helps to support smooth TOP clearance for buildability



As-built B-Score application

Submit the relevant documents accordingly (see table on the right)

Upload documents

Upload all the supporting documents and ensure all files are tagged accordingly

- ✓ Architectural Buildability Detailed Design and Implementation Plans (BDIP)
- ✓ Calculations (BPD_BS03)
- ✓ Structural BDIP
- ✓ Deemed Acceptable Proposal (if applicable)
- ✓ Mechanical, Electrical and Plumbing (MEP) BDIP (if applicable)
- ✓ Project Productivity Improvement Plan (if applicable)
- ✓ Others (optional)

Drag and drop files here or [select files](#)

Each file cannot exceed 1 GiB.

Buildability	Type of attachment
Code Compliance Option	• Calculation (BS03) • Architectural BDIP • Structural BDIP • MEP BDIP (if applicable)
Outcome-based option	• Calculation (BS03) • Others – Deemed Acceptable Proposal/ Project Productivity Improvement Plan (PPIP)
GLS projects	• Calculation (BS03) • Others – Productivity Concept Implementation Plan (PCIP)



Submission of Documents for Buildability

‘Submission of Documents’ provides a channel for QPs to submit and communicate buildability-related documentation

Select submission

Only applicable submissions will be made available for selection

Submission category

Independent submission (to individual agencies) ▼

Agency

Building and Construction Authority (BCA) ▼

Submission

Submission of documents ▼

Agency category

Buildability ▼

Purpose of submission

Please select ▼

Supplementary documents

Documentation of outgoing project members

Reports (e.g. instrumentation reports)

Others

Details

Last saved on -

Draft

Purpose of submission

Please select ▼

Relevant ES (if applicable)

Description of submission 0/500

Description of document(s) uploaded 0/500

Upload documents

Upload all the supporting documents and ensure all files are tagged accordingly

☒ Submission document

☒ Others (optional)

Drag and drop files here or [select files](#)

Each file cannot exceed 1 GiB.

Types of Submission via Submission of Documents include:

1. Changes to productivity plans e.g. prefabricated MEP adoption
 - a. Updates to the types or extent of prefabricated MEP systems being used
 - b. Revisions to the coverage of prefabricated MEP components
2. Supporting documents for B-Score verification such as
 - a. Details of pump skid size dimensions
 - b. Drawings showing mechanical connections between precast components
3. Changes to the extent of system formwork being adopted

BIM submission in CORENET X



BIM submission in CORENET X

1. Starting 1 October 2025, all new projects with GFA of at least 30,000 m² must submit through CORENET X.
2. BIM submissions via CORENET X is required to :
 - a. Ensure cross-discipline model coordination with correct Easting and Northing (x,y) coordinates and grid dimensions, standardised level and zone naming for proper alignment across disciplines
 - b. Ensure all models are in IFC-SG format and comply with Corenet X COP
3. Incorporate buildability attributes for features such as precast components, prefabricated reinforcement, industry-standard sizes and other construction elements in the submission

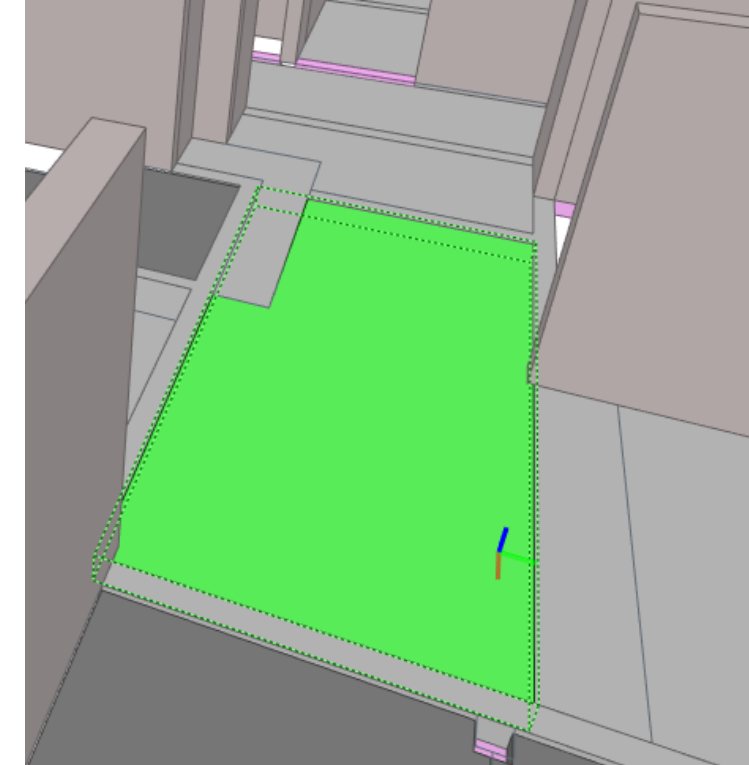


Examples of IFC properties tagged to element - IFC-SG: IfcSlab

IFC-SG properties for IfcSlab to be included when preparing structural model for submission:

IFC Entity	IfcSlab	
S/N	IFC-SG Property	Examples
1.	ConstructionMethod	CIS/ PC/ PT (Pre)/ PT (Post)/PPVC/ Prefab
2.	Area^	12.56
3.	Volume^	2.51
4.	WeldedMesh	True / False
5.	LatticeGirderReinforcement	True / False

^ These properties can be automatically generated from model's Quantity Take-off (Qto) parameters

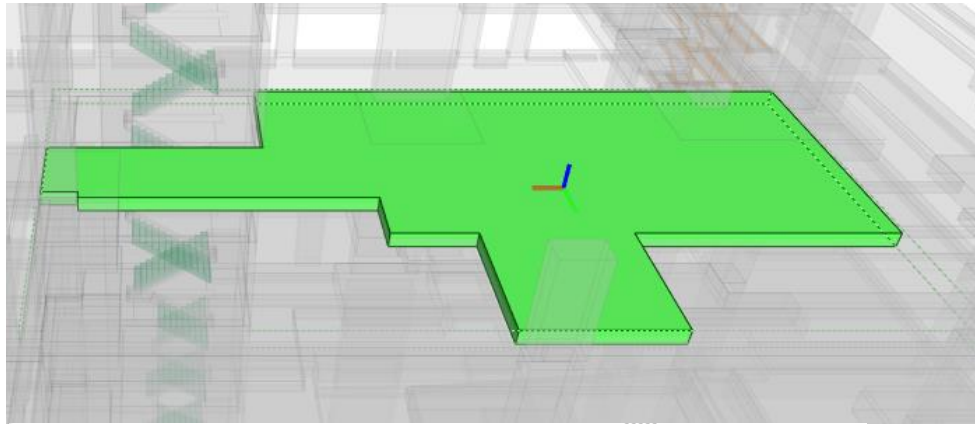


Qto_SlabBaseQuantities	
Depth	200
GrossArea	12.565031
GrossVolume	2.513006
NetArea	12.565031
NetVolume	2.513006
Perimeter	51.341599
Width	200

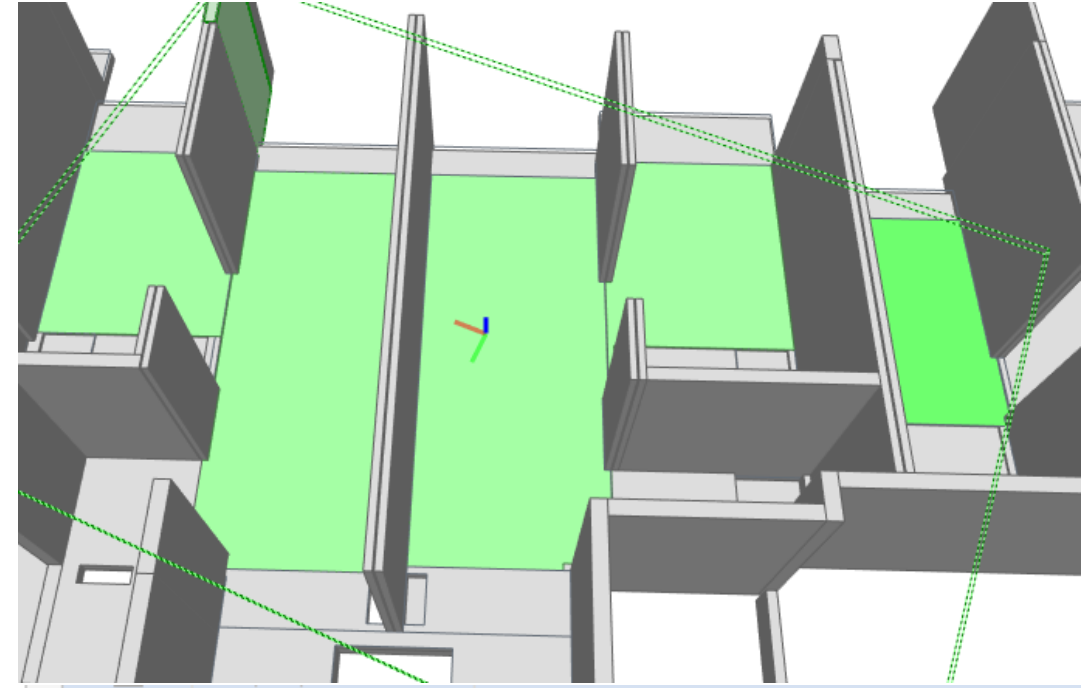


IFC-SG: IfcSlab

Example of IFC-SG properties such as ConstructionMethod, SlabType and WeldedMesh adopted for IfcSlab:



Properties	Location	Classification	Relations
Name		Value	
+ Qto_SlabBaseQuantities			
- SGPset_Material			
MaterialGrade		C32 / 40	
- SGPset_Slab			
✓	ConstructionMethod	PT	
	ReferTo2DDetail	DWG.NO. -- / PT-L4-RD01	
	ReinforcementSteelGrade	500B	
	ShelterUsage	No	
✓	SlabType	Flat slab with drop panel	
+ SGPset_SlabDimension			
- SGPset_SlabReinforcement			
	BottomDistribution_nominal	0	
	BottomMain_nominal	0	
	Stirrups	-	
	StirrupsType	-	
	TopDistribution_nominal	0	
	TopMain_nominal	0	
✓	WeldedMesh	Yes	



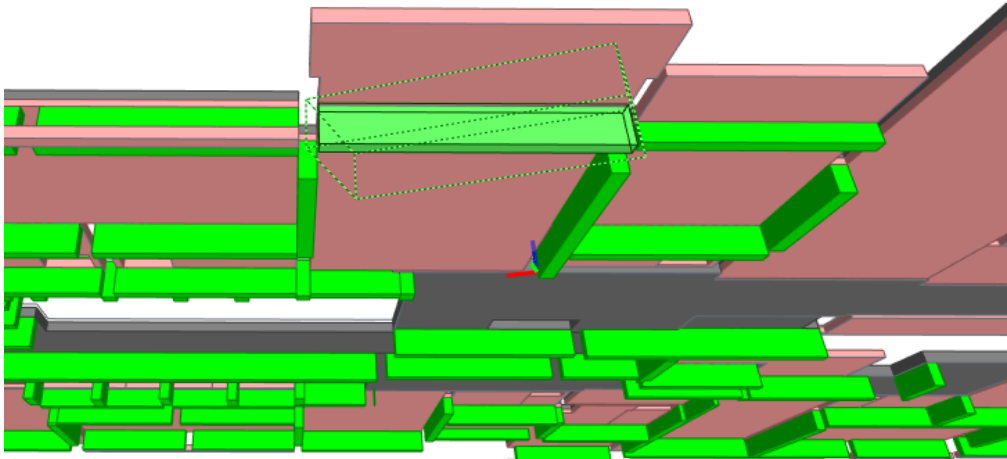
Properties		Location	Classification	Relations
	Name	Value		
	SGPset_Material			
	MaterialGrade	C32/40		
	SGPset_Slab			
	Accreditation_PAS	No		
✓	ConstructionMethod	PPVC		

Examples of IFC properties tagged to element : IFC-SG: IfcBeam

IFC-SG properties for IfcBeam to be included when preparing structural model for submission:

IFC Entity	IfcBeam	
S/N	IFC-SG Property	Examples
1.	ConstructionMethod	CIS/ PC/ PT (Pre)/ PT (Post)/PPVC/ Prefab
2.	Depth	600
3.	Width	200
4.	PrefabricatedReinforcementCage	True / False
5.	MechanicalConnectionType	Telescopic Beam Connector, grouted sleeves
6.	Volume^	0.94

^ These properties can be automatically generated from model's Quantity Take-off (Qto) parameters



Properties	Location	Classification	Relations
Name	Value		
✓ ConstructionMethod	CIS		
MechanicalConnectionType	Rebar connection		
ReinforcementSteelGrade	500A		
SGPset_BeamDimension			
✓ Depth	600		
Mark	2-TB65		
✓ MemberSection	200x600		
✓ Width	200		
SGPset_BeamReinforcement			
BeamCage	No		
BottomLeft	2H16		
BottomMiddle	2H16		
BottomRight	2H16		
✓ PrefabricationReinforcementCage	No		
StirrupsLeft	H10-300		

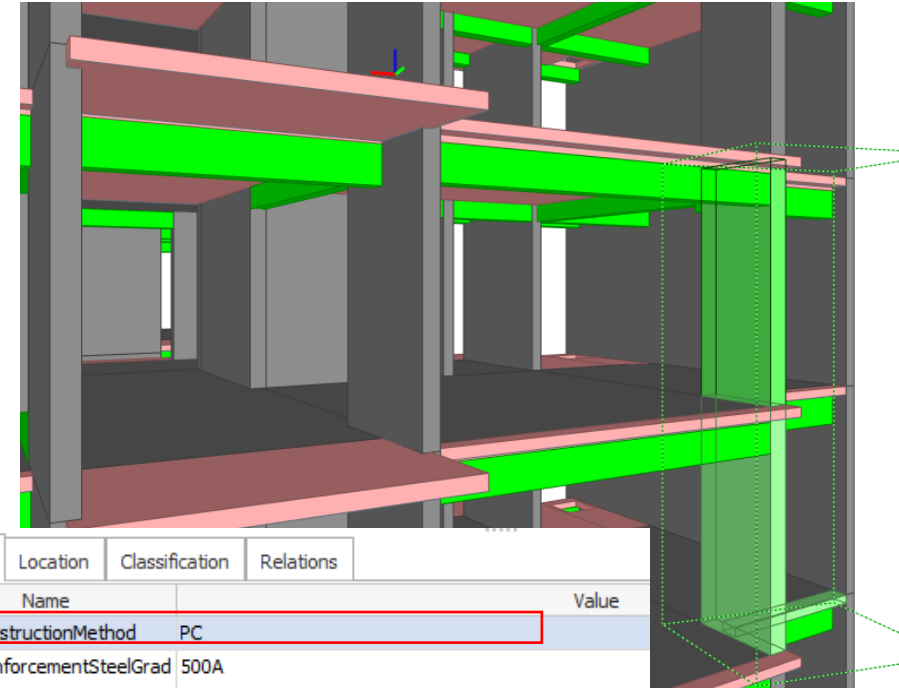


Examples of IFC properties tagged to element - IFC-SG: IfcColumn

IFC-SG properties for IfcColumn to be included when preparing structural model for submission:

IFC Entity	IfcColumn	
S/N	IFC-SG Property	Examples
1.	ConstructionMethod	CIS/ PC/ PT (Pre)/ PT (Post)/PPVC/ Prefab
2.	Width	300
3.	Breadth	1000
4.	MechanicalConnectionType	Column shoes, grouted sleeves, spiral connector
5.	PrefabricatedReinforcementCage	True / False
6.	Volume^	0.94

^ These properties can be automatically generated from model's Quantity Take-off (Qto) parameters



Properties	Location	Classification	Relations	
Name		Value		
✓	ConstructionMethod	PC		
	ReinforcementSteelGrade	500A		
	SGPset_ColumnDimension			
✓	Breadth	1 000		
	EndStorey	Lower Roof		
	Mark	4-1TW47		
✓	MemberSection	APCS - 300x1000		
	StartingStorey	18th Storey		
✓	Width	300		
	SGPset_ColumnReinforcement			
	ColumnCage	No		
	MainRebar	20H20		
✓	PrefabricationReinforcementCage	No		

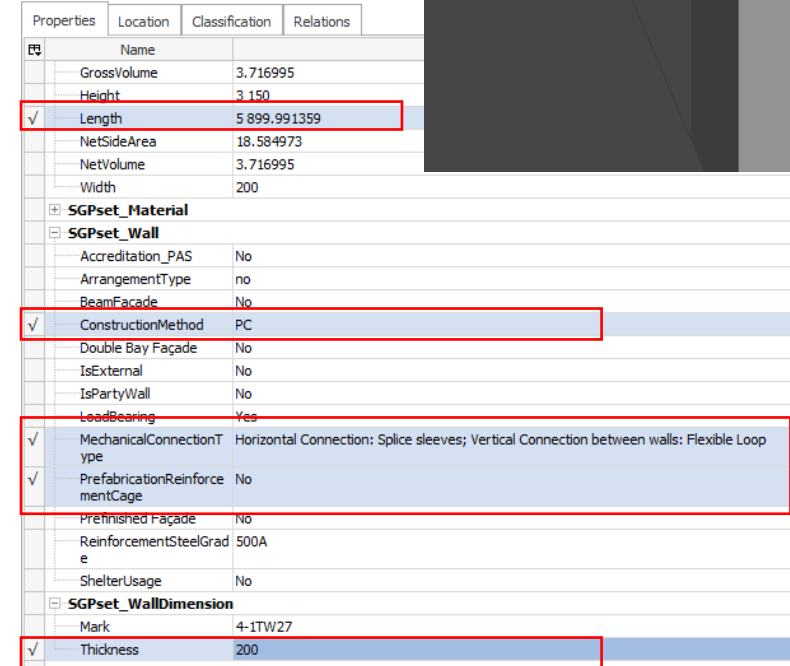
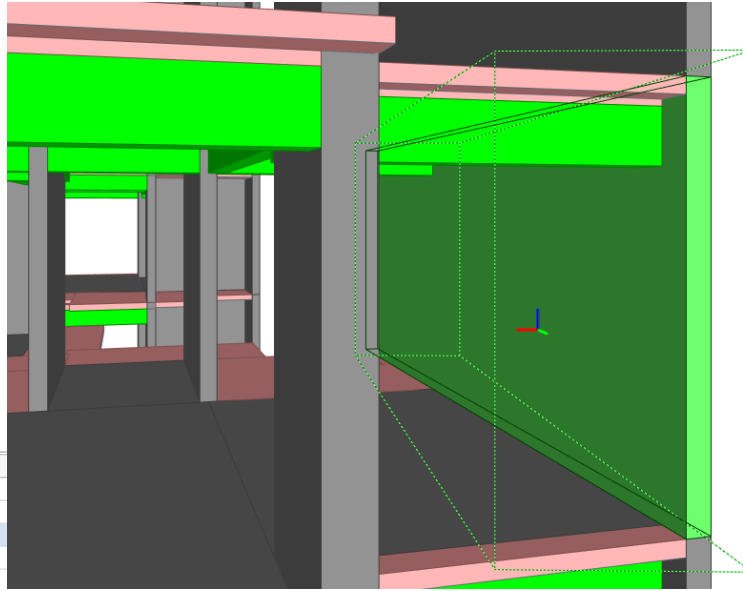


Examples of IFC properties tagged to element - IFC-SG: IfcWall

IFC-SG properties for IfcWall to be included when preparing structural model for submission:

IFC Entity	IfcWall	
S/N.	IFC-SG Property	Examples
1.	ConstructionMethod	CIS/ PC/ PT (Pre)/ PT (Post)/PPVC/ Prefab
2.	Length^	5900
3.	Thickness	200
4.	MechanicalConnectionType	Grouted sleeves, spiral connector, flexible loops
5.	PrefabricatedReinforcementCage	True / False
6.	Volume^	0.5

^ These properties can be automatically generated from model's Quantity Take-off (Qto) parameters



Properties	Location	Classification	Relations
Name			
GrossVolume	3.716995		
Height	3.150		
✓ Length	5899.991359		
NetSideArea	18.584973		
NetVolume	3.716995		
Width	200		
SGPset_Material			
SGPset_Wall			
Accreditation_PAS	No		
ArrangementType	no		
BeamFacade	No		
✓ ConstructionMethod	PC		
Double Bay Façade	No		
IsExternal	No		
IsPartyWall	No		
LoadBearing	Yes		
✓ MechanicalConnectionType	Horizontal Connection: Splice sleeves; Vertical Connection between walls: Flexible Loop type		
✓ PrefabricationReinforcementCage	No		
Prehshished Façade	No		
ReinforcementSteelGrade	500A		
ShelterUsage	No		
SGPset_WallDimension			
Mark	4-1TW/27		
✓ Thickness	200		



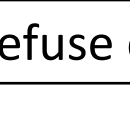
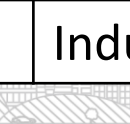
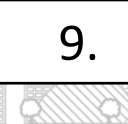
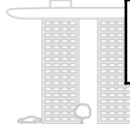
IFC-SG Requirements: Buildability Pre-requisites



Pre-requisites

All projects must satisfy the pre-requisites below and 3D model to include their IFC-SG properties accordingly

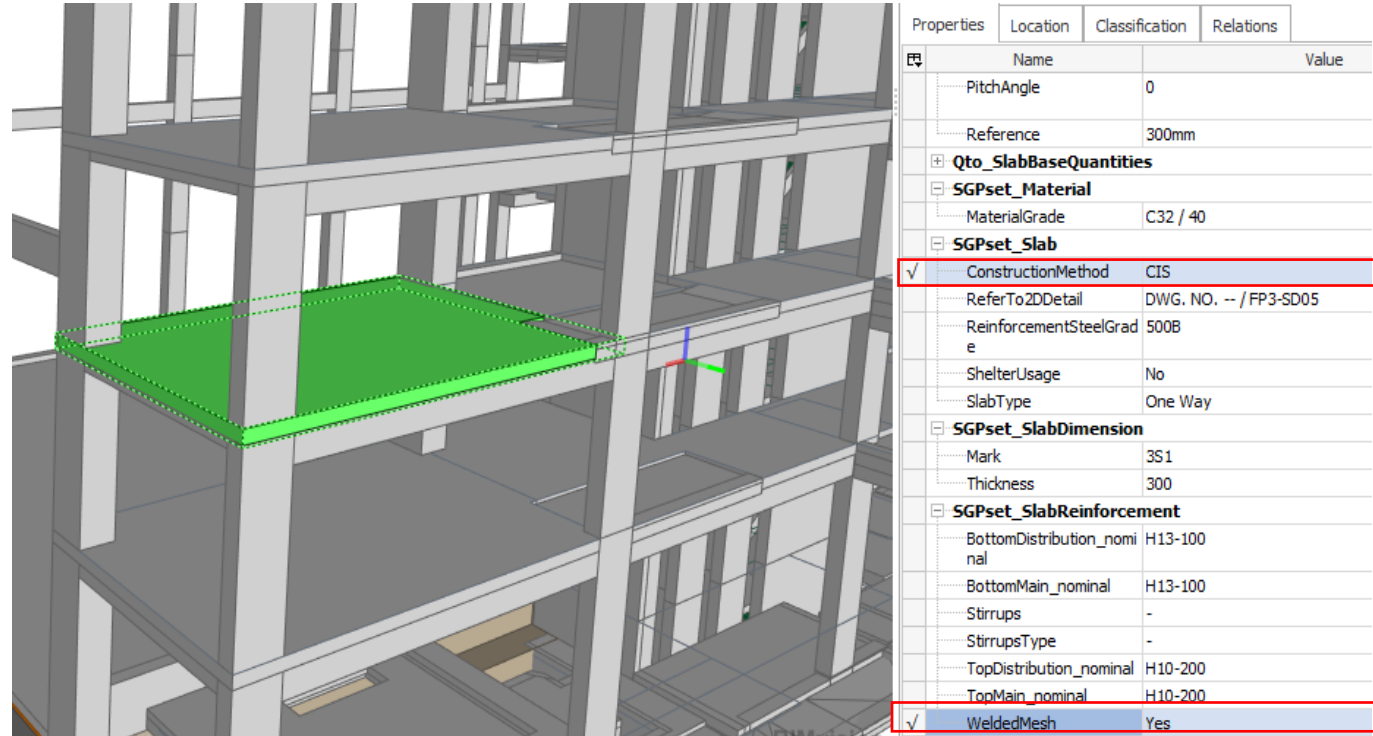
For all projects	
S/N	Description
1.	Floor mesh
2.	Repetition of typical floor height in multiples of 1.5M or 1.75M
3.	Industry standard precast staircase for typical storeys
4.	Prefabricated and pre-insulated duct for air-conditioning system
For all Residential Non-Landed projects	
5.	Drywall
6a.	Precast household shelter (HS)
6b.	Industry standard precast household shelter
7a.	Prefabricated Bathroom Unit (PBU)
7b.	Industry standard Prefabricated Bathroom Unit
8.	Industry standard door structural openings (width) (3 most common sizes)
9.	Industry standard precast refuse chutes



Floor mesh – IfcSlab

IFC-SG requirements in IfcSlab entity to demonstrate the adoption of floor mesh in BIM model

IFC Entity: IfcSlab		
S/N	IFC-SG property	Examples
1.	ConstructionMethod	CIS, PC, PPVC and etc
2.	WeldedMesh	True or False



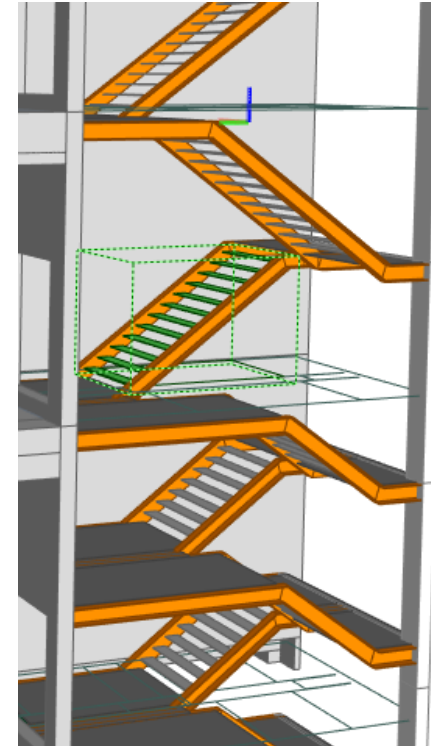
Note: IFC-SG properties must be correctly assigned to show that floor mesh is adopted in 65% of cast in-situ slabs



Precast staircase for typical storeys – IfcStairFlight

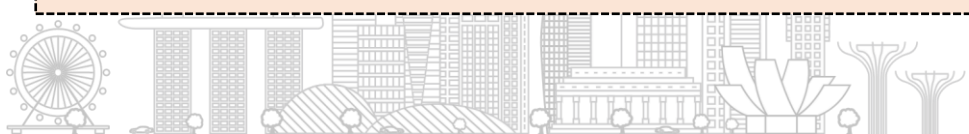
IfcStairFlight - IFC-SG requirements to demonstrate the use of precast staircases for typical storeys in the BIM model

IFC Entity: IfcStairFlight		
S/N	IFC-SG property	Examples
1.	ConstructionMethod	CIS, PC, Prefabricated (PF)
2.	RiserHeight	150mm or 175mm
3.	TreadLength	250mm, 275mm or 300mm



Properties	Location	Classification	Relations
Name	Value		
Profile			
ProfileName	Steel Flight		
Profile			
ProfileName	Steel Flight		
Pset_EnvironmentalImpactIndicators			
Reference	Steel Flight		
Pset_StairFlightCommon			
NosingLength	10		
NumberOfRiser	13		
NumberOfTreads	12		
Reference	Steel Flight		
✓ RiserHeight	175		
✓ TreadLength	250		
TreadLengthAtInnerSide	250		
TreadLengthAtOffset	250		
Qto_StairFlightBaseQuantities			
SGPset_Material			
MaterialGrade	S355		
SGPset_Stair			
✓ ConstructionMethod	PF		
ReferTo2DDetail	DWG. NO. -- / ST2-DT01		
SectionFabricationMethod	Hot rolled		

Note: IFC-SG properties must be consistent across typical storeys to show compliance to the 80% precast stair flight requirement with standard dimensions



Precast Household Shelter – IfcSpace, IfcWall, IfcSlab

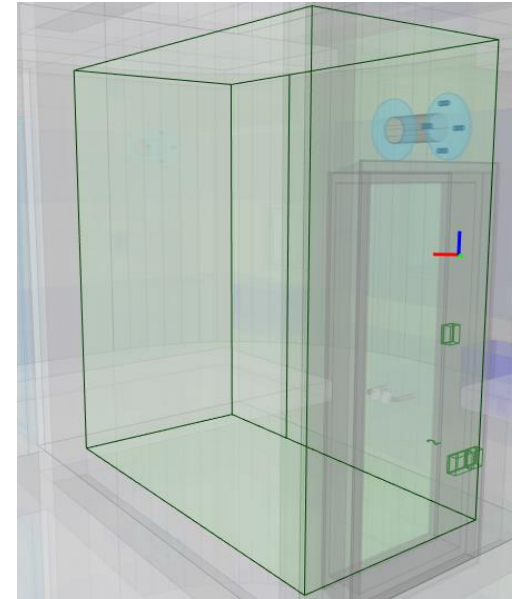
IFC-SG in IfcSpace, IfcWall and IfcSlab - to demonstrate adoption of precast household shelter (HS) and industry standard sizes in BIM model. Internal dimensions must be specified for all HS

Ifc Entity	IfcSpace	
S/N	IFC-SG property	Examples
1.	SpaceName	Household shelter
2.	ConstructionMethod	CIS/ PC
3.	InternalLength	2300
4.	InternalWidth	1250

Ifc Entity	IfcWall, IfcSlab	
S/N	IFC-SG property	Examples
1.	ConstructionMethod	CIS/ PC
2.	Thickness	250/ 300

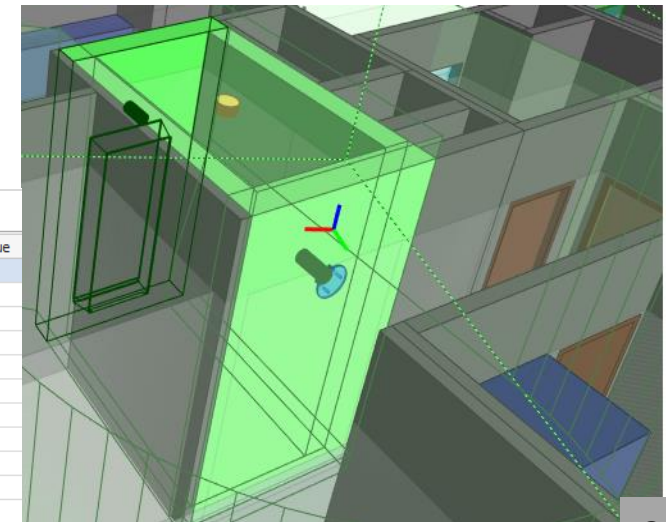
Notes:

1. Ensure all household shelter spaces are tagged with IFC-SG properties, including dimensions, to show both precast and compliance to industry standard sizes
2. Check that the ConstructionMethod property is aligned across all household shelters for IfcSpace and IfcWall components to avoid discrepancies between different elements.



Properties	Location	Classification	Relations
Name			
Qto_SpaceBaseQuantities			
SGPset_Space			
BarrierFreeAccessibility		No	
Bathroomforfutureretrofitting		No	
ConstructionMethod		PC	
FireExit		No	
InternalLength		2300	
InternalWidth		1250	
Retrofit		No	
SpaceName		HOUSEHOLD SHELTER	
SGPset_SpaceAreaDimension			

Properties	Location	Classification	Relations
Name			
Value			
Element Specific			
Pset_EnvironmentalImpactIndicators			
Pset_ReinforcementBarPitchOfWall			
Pset_WallCommon			
Qto_WallBaseQuantities			
SGPset_Material			
Material		Precast Concrete Wall	
SGPset_Wall			
ConstructionMethod		PC	
SGPset_WallDimension			
Length		1 599.975045	



Prefabricated Bathroom Unit (PBU) – IfcSpace, IfcWall, IfcSlab

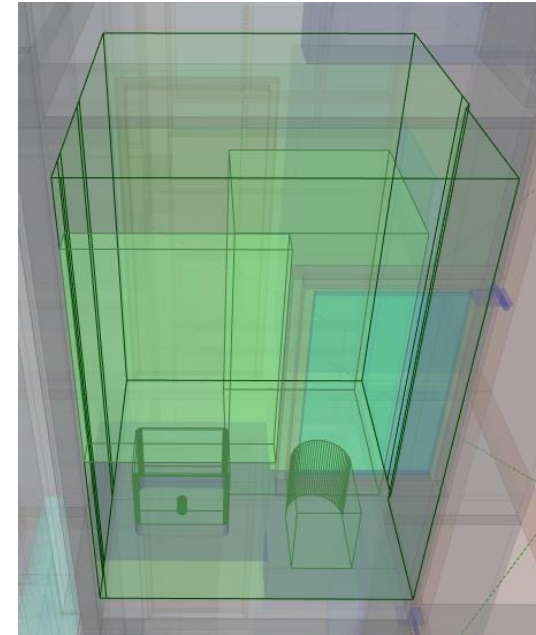
IFC-SG in IfcSpace, IfcWall and IfcSlab - to demonstrate the adoption of PBUs in the BIM model. Internal dimensions must be specified for all bathrooms

Ifc Entity	IfcSpace	
S/N	IFC-SG property	Examples
1.	SpaceName	Master Bath, Maid Bath, Toilet
2.	ConstructionMethod	CIS/ PBU
3.	Accreditation_MAS	True/False
4.	InternalLength	2700
5.	InternalWidth	1850

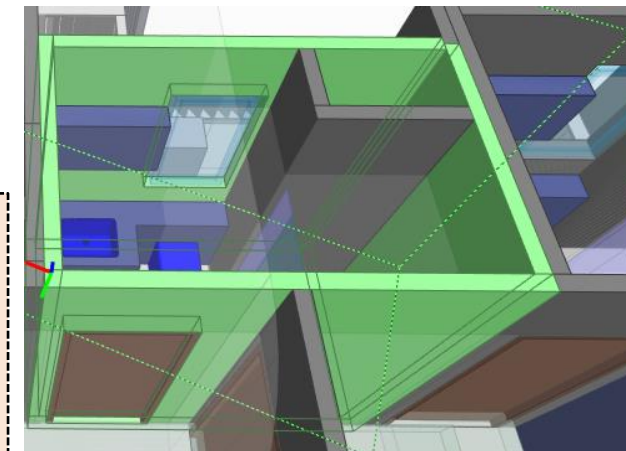
Ifc Entity	IfcWall, IfcSlab	
S/N	IFC-SG property	Examples
1	ConstructionMethod	CIS/ PC / Prefabricated

Notes:

1. Ensure all bathroom spaces are tagged with the required IFC-SG properties, including dimensions, to show PBU adoption and compliance to industry standard sizes
2. Check that the ConstructionMethod property is aligned across all bathrooms for IfcSpace, IfcWall and IfcSlab components to avoid discrepancies between different elements



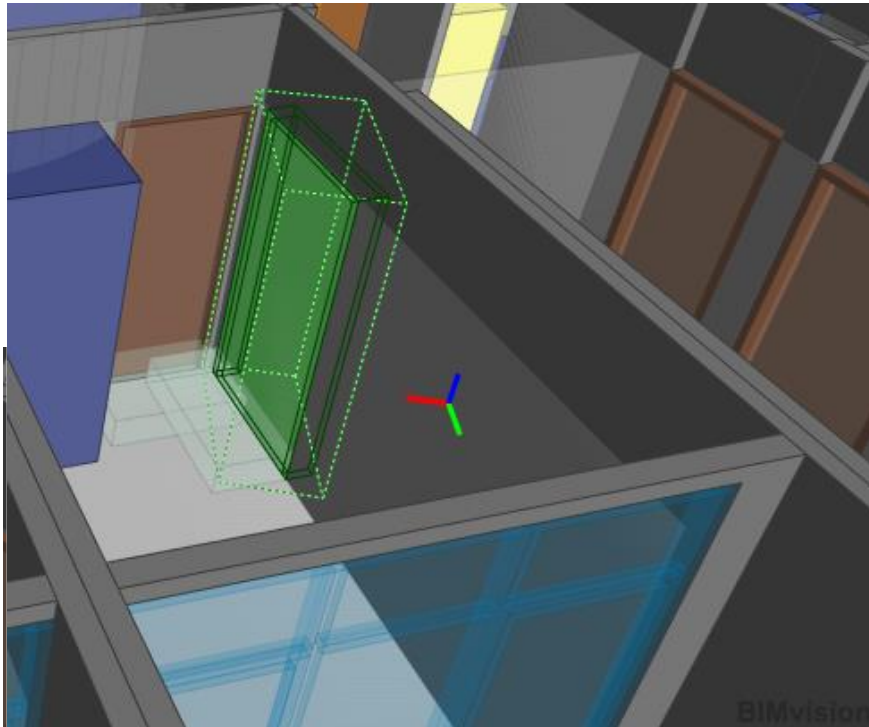
Properties	Location	Classification	Relations
Name			
SGPset_Space			
BarrierFreeAccessibility	Yes		
Bathroomforfutureretrofitting	Yes		
✓ ConstructionMethod	PBU		
Fire Exit	No		
✓ InternalLength	2700		
✓ InternalWidth	1850		
Retrofit	No		
✓ SpaceName	MASTER BATH		



Properties	Location	Classification	Relations
Name			
Element Specific			
Pset_EnvironmentalImpactIndicators			
Pset_ReinforcementBarPitchOfWall			
Pset_WallCommon			
Qto_WallBaseQuantities			
SGPset_Material			
Material	Precast Concrete Wall		
SGPset_Wall			
ConstructionMethod	PC		
SGPset_WallDimension			
Length	937.512609		

Industry standard door structural openings – IfcDoor

IFC-SG requirements for IfcDoor - to demonstrate the adoption of Industry standard door structural openings in BIM model



SGPset_Door	
BarrierFreeAccessibility	Yes
Self Closing	No
SGPset_DoorDimension	
Clear Height	2 325
Clear Width	858
Overall Width	1 000
√ ProfileName	Common Bedroom

Ifc Entity	IfcDoor	
S/N	IFC-SG property	Examples
1.	OverallWidth	1000



Industry standard Precast Refuse Chutes – IfcSpace, IfcWall

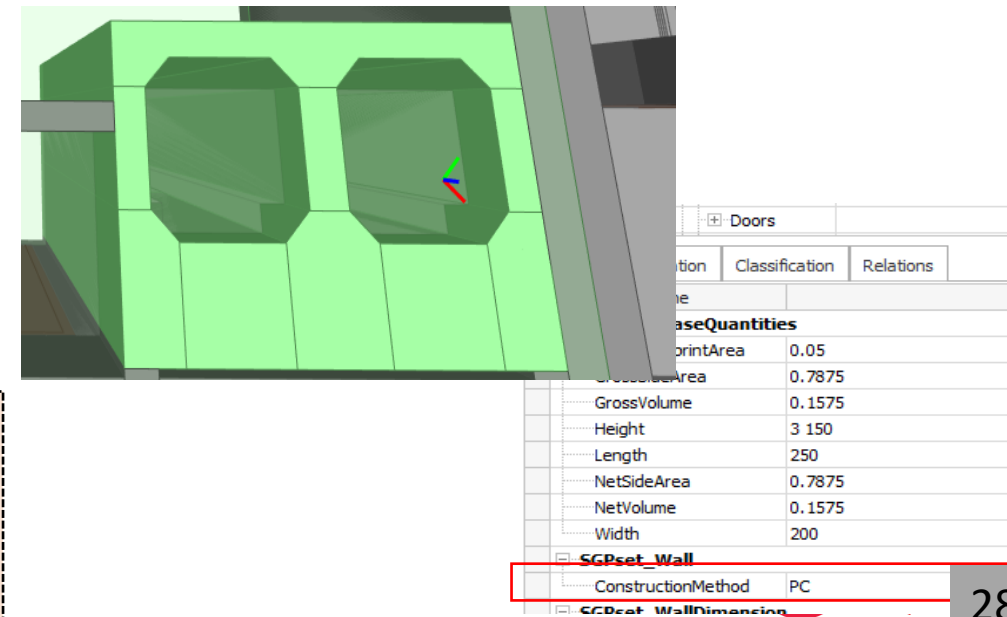
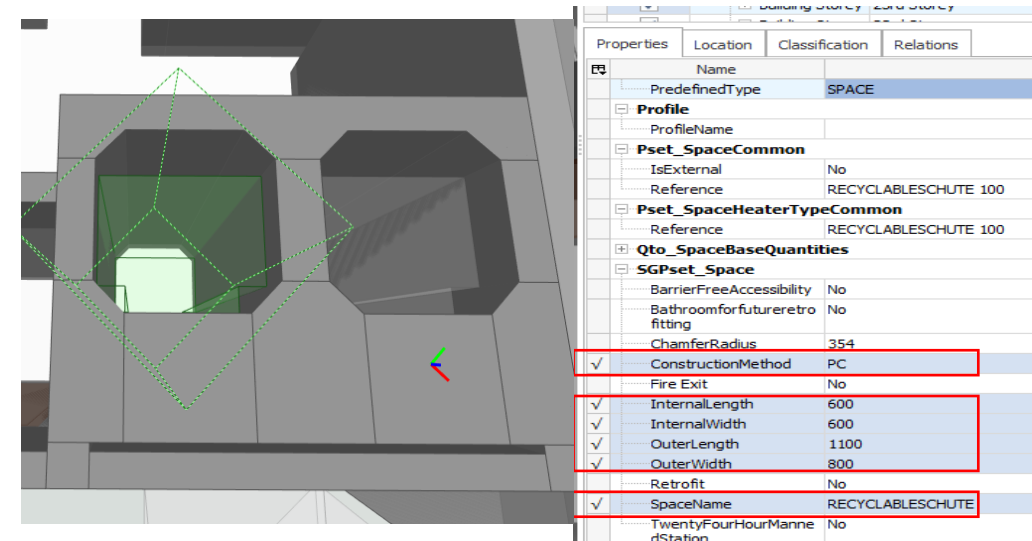
IFC-SG requirements for IfcSpace and IfcWall - to demonstrate the adoption of Industry standard Precast Refuse Chutes in BIM model

Ifc Entity	IfcSpace	
S/N	IFC-SG property	Examples
1.	SpaceName	RefuseChute, RecyclablesChute
2.	ConstructionMethod	CIS/ PBU/ Prefabricated
3.	InnerLength	600
4.	InnerWidth	600
5.	OuterLength	1100
6.	OuterWidth	800
7.	ChamferRadius	354

Ifc Entity	IfcWall	
S/N	IFC-SG property	Examples
1.	ConstructionMethod	CIS/ PC
2.	Thickness	100/ 150 / 200

Notes:

1. Ensure all refuse chutes spaces are tagged with the required IFC-SG properties, including dimensions, to show both precast and compliance to industry standard sizes
2. Check that the ConstructionMethod property is aligned across all refuse chutes for IfcSpace and IfcWall components to avoid discrepancies between different elements

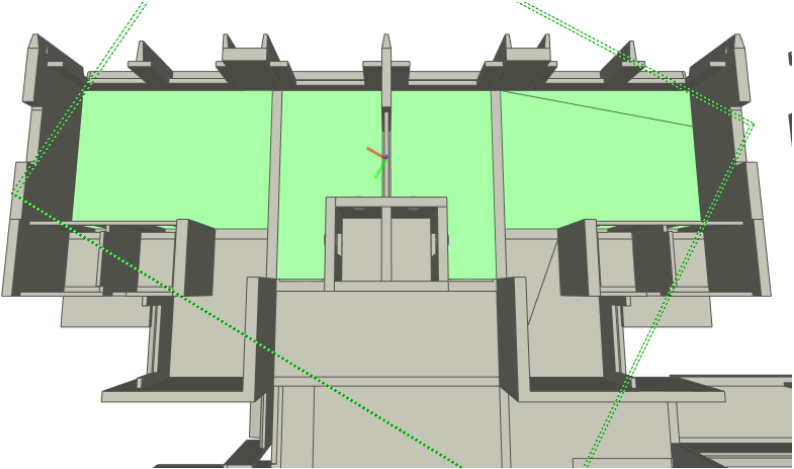


Learning Points



Learning Points

1. Ensure alignment of properties between the architectural and structural models, including construction methods
 - In example below for slab, there was a discrepancy in the ConstructionMethod for IfcSlab, which was indicated as 'precast' in the structural model but 'cast in-situ' in the architectural model

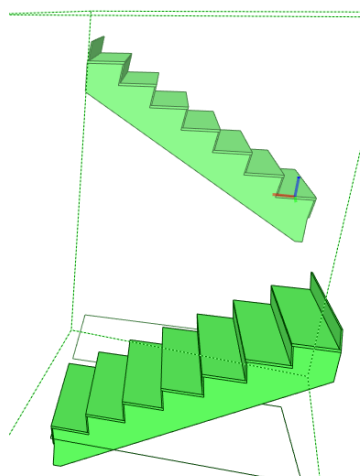
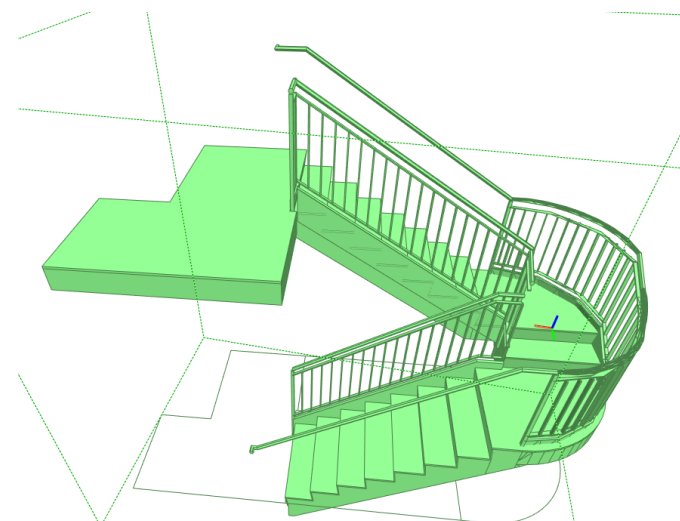
C&S model	Architectural model																																															
 <table border="1" data-bbox="433 1128 1223 1299"><thead><tr><th>Properties</th><th>Location</th><th>Classification</th><th>Relations</th></tr></thead><tbody><tr><td>Name</td><td></td><td></td><td>Value</td></tr><tr><td colspan="4">SGPset_Material</td></tr><tr><td colspan="4">SGPset_Slab</td></tr><tr><td>✓</td><td>ConstructionMethod</td><td>PC</td><td></td></tr></tbody></table>	Properties	Location	Classification	Relations	Name			Value	SGPset_Material				SGPset_Slab				✓	ConstructionMethod	PC		 <table border="1" data-bbox="1299 1071 2127 1306"><thead><tr><th>Properties</th><th>Location</th><th>Classification</th><th>Relations</th></tr></thead><tbody><tr><td>Name</td><td></td><td></td><td>Value</td></tr><tr><td colspan="4">AntiSlipSurface</td><td>No</td></tr><tr><td colspan="4">CategoryOfLoadedArea</td><td></td></tr><tr><td colspan="4">ChemicalResistantMaterial</td><td>No</td></tr><tr><td>✓</td><td>ConstructionMethod</td><td>CIS</td><td></td></tr></tbody></table>	Properties	Location	Classification	Relations	Name			Value	AntiSlipSurface				No	CategoryOfLoadedArea					ChemicalResistantMaterial				No	✓	ConstructionMethod	CIS	
Properties	Location	Classification	Relations																																													
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Learning Points

2. Missing construction method for IfcStairFlight

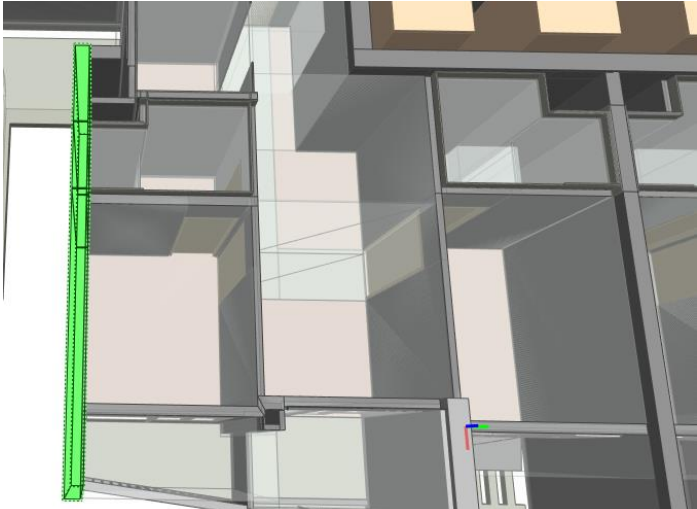
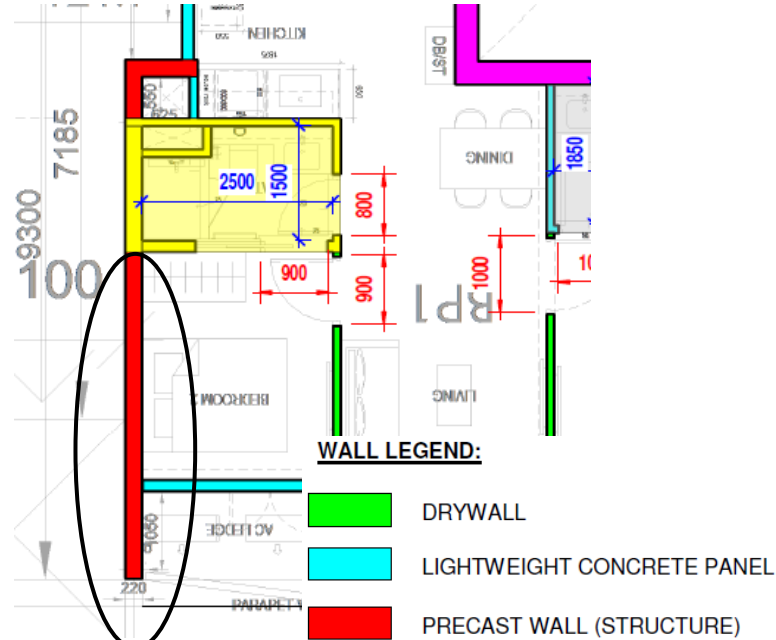
- This is required as buildability requirements for precast staircases are applicable to stair flights

IfcStairFlight	IfcStair (consists of stair flights, landings and railings)																																																																																
 <table><tr><th>Properties</th><th>Location</th><th>Classification</th><th>Relations</th></tr><tr><td colspan="4">Name</td></tr><tr><td colspan="4">Value</td></tr><tr><td colspan="4">Element Specific</td></tr><tr><td>Guid</td><td colspan="3">17WyMKIzb4MfMFFKGBxX08</td></tr><tr><td>✓ IfcEntity</td><td colspan="3">IfcStairFlight</td></tr><tr><td>✓ RiserHeight</td><td colspan="3">175</td></tr><tr><td>✓ TreadLength</td><td colspan="3">275</td></tr><tr><td>TreadLengthAtInnerSide</td><td colspan="3">275</td></tr><tr><td>TreadLengthAtOffset</td><td colspan="3">275</td></tr><tr><td>WalkingLineOffset</td><td colspan="3">1.64042</td></tr><tr><td colspan="4">Qto_StairFlightBaseQuantities</td></tr><tr><td colspan="4">SGPset_StairFlight</td></tr><tr><td>✓ ConstructionMethod</td><td colspan="3">PC</td></tr></table>	Properties	Location	Classification	Relations	Name				Value				Element Specific				Guid	17WyMKIzb4MfMFFKGBxX08			✓ IfcEntity	IfcStairFlight			✓ RiserHeight	175			✓ TreadLength	275			TreadLengthAtInnerSide	275			TreadLengthAtOffset	275			WalkingLineOffset	1.64042			Qto_StairFlightBaseQuantities				SGPset_StairFlight				✓ ConstructionMethod	PC			 <table><tr><th>Properties</th><th>Location</th><th>Classification</th><th>Relations</th></tr><tr><td colspan="4">Name</td></tr><tr><td colspan="4">Value</td></tr><tr><td colspan="4">Element Specific</td></tr><tr><td>Guid</td><td colspan="3">17WyMKIzb4MfMFFKGBxX0F</td></tr><tr><td>✓ IfcEntity</td><td colspan="3">IfcStair</td></tr></table>	Properties	Location	Classification	Relations	Name				Value				Element Specific				Guid	17WyMKIzb4MfMFFKGBxX0F			✓ IfcEntity	IfcStair		
Properties	Location	Classification	Relations																																																																														
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Guid	17WyMKIzb4MfMFFKGBxX0F																																																																																
✓ IfcEntity	IfcStair																																																																																

Learning Points

3. Verify consistency between Productivity Plan submitted and BIM model

- In the architectural model, the ConstructionMethod was indicated as 'cast in-situ', but 'precast' in the productivity plan

Architectural model	Productivity Plan																				
 <table border="1"><thead><tr><th>Properties</th><th>Location</th><th>Classification</th><th>Relations</th></tr></thead><tbody><tr><td>Name</td><td></td><td></td><td>Value</td></tr><tr><td>Mode of Ventilation</td><td></td><td></td><td></td></tr><tr><td>SGPset_Wall</td><td></td><td></td><td></td></tr><tr><td>ConstructionMethod</td><td></td><td>Cast-In-Situ</td><td></td></tr></tbody></table>	Properties	Location	Classification	Relations	Name			Value	Mode of Ventilation				SGPset_Wall				ConstructionMethod		Cast-In-Situ		 WALL LEGEND: - DRYWALL - LIGHTWEIGHT CONCRETE PANEL - PRECAST WALL (STRUCTURE)
Properties	Location	Classification	Relations																		
Name			Value																		
Mode of Ventilation																					
SGPset_Wall																					
ConstructionMethod		Cast-In-Situ																			



Learning Points

4. Inconsistency in properties under IFC entities

- ConstructionMethod was specified as precast under IfcSlab, while other properties within the same IFC entity indicated cast in-situ.
- Similarly, for IfcStairFlight, the 'name' property showed 'Cast-In-Place Stair' while the 'Material' property specified 'Precast Concrete'

Properties	Location	Classification	Relations
	Name		Value
.....Guid	0w3K3mHrv5EA0Zp7Ku8pF		
.....IfcEntity	IfcSlab		
.....Name	Floor: CIS Slab_175mm:4186135		
.....ObjectType	Floor: CIS Slab_175mm		
.....PredefinedType	FLOOR		
.....Tag	4186135		
+ Profile			
- Pset_EnvironmentalImpactIndicators			
.....Reference	CIS Slab_175mm		
+ Pset_PrecastSlab			
- Pset_ReinforcementBarPitchOfSlab			
.....Reference	CIS Slab_175mm		
- Pset_SlabCommon			
.....IsExternal	No		
.....LoadBearing	Yes		
.....PitchAngle	0		
.....Reference	CIS Slab_175mm		
+ Qto_SlabBaseQuantities			
+ SGPset_Material			
- SGPset_Slab			
.....Accreditation_PAS	No		
.....ConstructionMethod	PC		

Properties	Location	Classification	Relations
	Name	Value	
	Element Specific		
	Guid	2d7KEg\$9PEEHrCtCe6FRT	
	IfcEntity	IfcStairFlight	
	Name	Cast-In-Place Stair:Stair:1636057 Run 1	
	ObjectType	-	
	PredefinedType	STRAIGHT	
	Tag	1636058	
	Pset_EnvironmentalImpactIndicators		
	Reference	Monolithic Run	
	Pset_StairFlightCommon		
	NosingLength	15	
	NumberOfRiser	13	
	NumberOfTreads	12	
	Reference	Monolithic Run	
	RiserHeight	175	
	TreadLength	250	
	TreadLengthAtInnerSide	250	
	TreadLengthAtOffset	250	
	WalkingLineOffset	1.722441	
	Qto_StairFlightBaseQuantities		
	SGPset_Material		
	Material	Precast Concrete	

Note: Ensure all properties within the same IFC entity align with each other.

Learning Points

5. For projects with GLS requirements, submit the Productivity Plan during Construction Gateway

- As projects are subject to more stringent productivity requirements, these shall take precedence over minimum buildability requirements
- Productivity plan must be submitted to demonstrate compliance with the higher requirements

6. For projects adopting the outcome-based option, select this option in BS01 form. Fill in the necessary information under Part IV

BS01 form to indicate outcome-based option

(b) We hereby declare that we are submitting one of the outcome-based proposals for the project in lieu of a buildable design score as stated in 1a above.

Please select one of the options if you have indicated 'Yes' for Option (b)

0

Yes

Please select one of the options if you have indicated 'Yes' for Option (b)

Option 1a (For residential non-landed projects with GFA $\geq 25,000\text{m}^2$ only): Min. 65% Prefab Structural + Min. 80% Prefab Architectural + Min. 50% Prefab MEP + Min. 70% System Formwork
Option 1b (For residential non-landed projects with GFA $\geq 25,000\text{m}^2$ only): Min. 60% PPVC + Min. 70% System Formwork
Option 1c (For residential non-landed projects with GFA $\geq 25,000\text{m}^2$ only): Min. 50% PPVC + Min. 70% System Formwork (for building with 5 storeys and below only)
Option 2a (For Industrial or Commercial projects with GFA $\geq 25,000\text{m}^2$ only): Min. 60% Prefab Structural + Min. 80% Prefab Architectural + Min. 50% Prefab MEP + Min. 70% System Formwork
Option 2b (For Commercial Office projects with GFA $\geq 25,000\text{m}^2$ only): Min. 60% Prefab Structural + Min. 70% Prefab Architectural + Min. 50% Prefab MEP + Min. 70% System Formwork
Option 2c (For Industrial or Commercial projects with GFA $\geq 25,000\text{m}^2$ only): Min. 50% Steel/APCS/MET + Min. 80% Prefab Architectural + Min. 50% Prefab MEP + Min. 70% System Formwork
Option 2d (For Commercial Office projects with GFA $\geq 25,000\text{m}^2$ only): Min. 50% Steel/APCS/MET + Min. 70% Prefab Architectural + Min. 50% Prefab MEP + Min. 70% System Formwork
Option 2e (For Industrial or Commercial projects with GFA $\geq 25,000\text{m}^2$ only): Min. 60% PPVC + Min. 50% Prefab MEP + Min. 70% System Formwork
Option 3a (For Institutional, School and Other projects with GFA $\geq 25,000\text{m}^2$ only): Min. 60% Prefab Structural + Min. 80% Prefab Architectural + Min. 50% Prefab MEP + Min. 70% System Formwork
Option 3b (For Institutional, School and Other projects with GFA $\geq 25,000\text{m}^2$ only): Min. 50% Steel/APCS/MET + Min. 80% Prefab Architectural + Min. 50% Prefab MEP + Min. 70% System Formwork
Option 3c (For Institutional, School and Other projects with GFA $\geq 25,000\text{m}^2$ only): Min. 60% PPVC + Min. 50% Prefab MEP + Min. 70% System Formwork

Information to be provided under Part IV

PART IV: OTHER INFORMATION

1. Prefabrication Level (%)

(a) Structural System

0%

To input additional prefab level %
if system is not listed

+

=

0%

(b) Architectural System

0%

+

=

0%

2. DfMA Level (%) - To input accordingly

(a) PPVC

0%

(b) MET

0%

(c) Structural Steel

0%

(d) APCS

0%

(e) MEP System

0%

3. Use of Industry Standard Components

Description	Sizes (m)	No.	Coverage (%)	Remarks
(a) Prefabricated Bathroom Unit (PBU) - 5 most common sizes	Select PBU size			
	Select PBU size			
	Select PBU size			
	Select PBU size			
	Select PBU size			
(b) Precast Household Shelter - 3 most common sizes	Select Precast HS size			
	Select Precast HS size			
	Select Precast HS size			
(c) Prefabricated Kitchen Unit - 3 most common sizes	To input internal L x W (m)			
	To input internal L x W (m)			
	To input internal L x W (m)			
(d) Precast Refuse Chute - most common size	Select Chute size			
(e) Prefabricated Pump Skid - most common size	Select Skid size			



Thank you



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