corenetx

20 OCT 2023 | CX Webinar

What You Need to Know

ZOOM | 20 Oct 2023

1000 - 1010	**Opening Address** Mr Han Yong Hoe, Executive Director (URA)
1010 - 1030	**CORENET X : Implementation Details and Timelines** Ms Chan Li Ming, Senior Architect (URA)
1030 – 1050	**Preparing for CORENET X Submissions – using the Code of Practice** Ar Colin Chew, Senior Architect (BCA)
1050 - 1150	**Q&A** Moderator: Mr Han Yong Hoe, Executive Director (URA) Panelists from regulatory agencies, led by Er Clement Tseng (Group Director, BCA) and Ms Goh Chin Chin (Group Director, URA)
1150 - 1200	**Closing** Feedback form and administrative information for CPD/ PDU points

SCAN ME

While waiting, download **1st Edition** of the CORENET X Code of Practice!

20 Oct 2023 | CX Webinar

CORENET X
IMPLEMENTATION DETAILS + TIMELINE

Ms Chan Li Ming
Senior Architect
Urban Redevelopment Authority

Agenda

01 CORENET X
- Recap of new Regulatory Approval process for Building Works (RABW) process & Direct Submission Process (DSP)

02 Phasing of Implementation of CORENET X
- Key dates to note

03 Initiatives to Get Ready
- Information and Resources
- Training
- Sandbox and Pilot Projects
- Code of Practice
- Increasing BIM adoption

04 Readiness Check
- What we can do individually
- What firms need to do

01

CORENET X

The new Regulatory Approval Process for Building Works

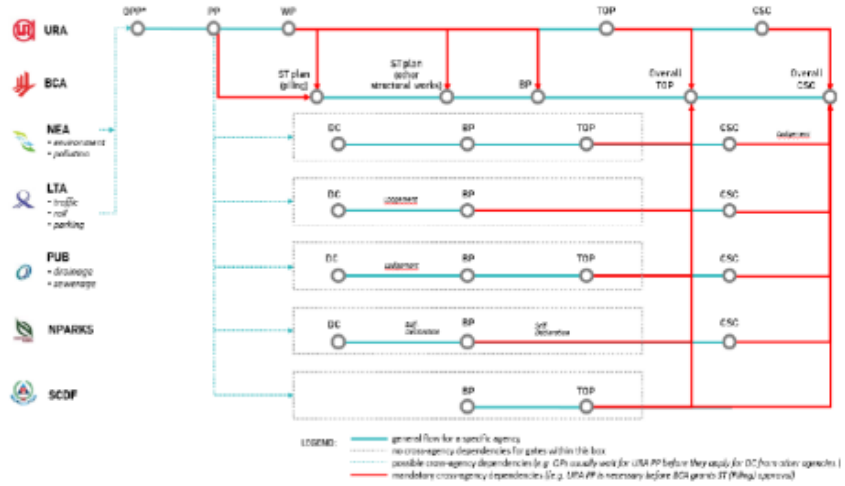
Key Changes and Potential Impact

New Regulatory Approval for Building Works (RABW) Process – 3 Gateways

All building works, regardless of GFA, will need to go through a new process involving 3 key sequential submission gateways to all Agencies for one collective and coordinated approval at each gateway.

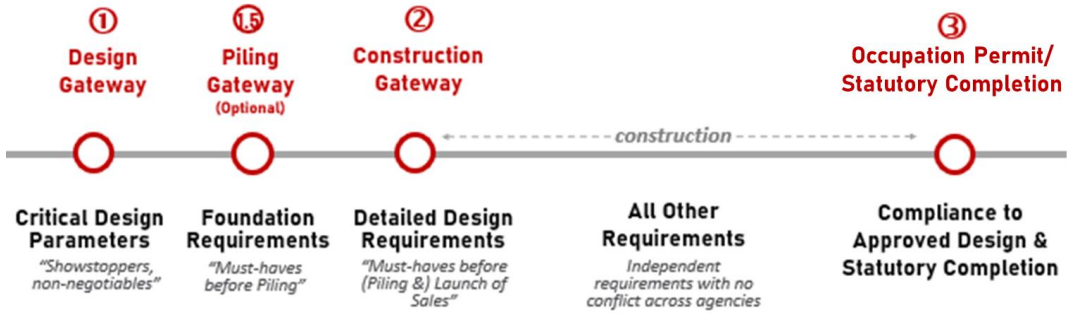
CURRENT

- Review in silos through over 20 approval touchpoints with separate responses. Fast, but disjointed.
- Uncoordinated design, submissions in silos.
- Abortive works from conflicting plans. Overall lower productivity.

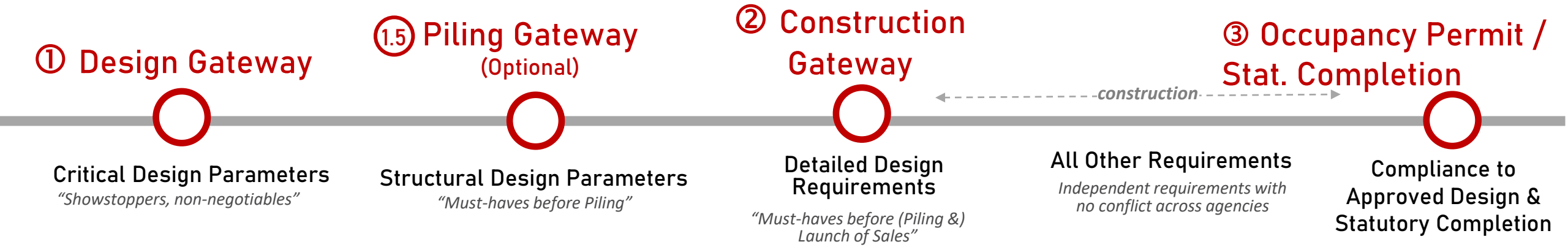


UPCOMING

- The new regulatory approval process streamlines the multiple touchpoints into key submission gateways.
- At these gateways, **coordinated submissions** (consisting of various building disciplines) will be submitted and **reviewed collectively** by agencies. This helps to ensure cross-agency issues and conflicts are identified upfront.

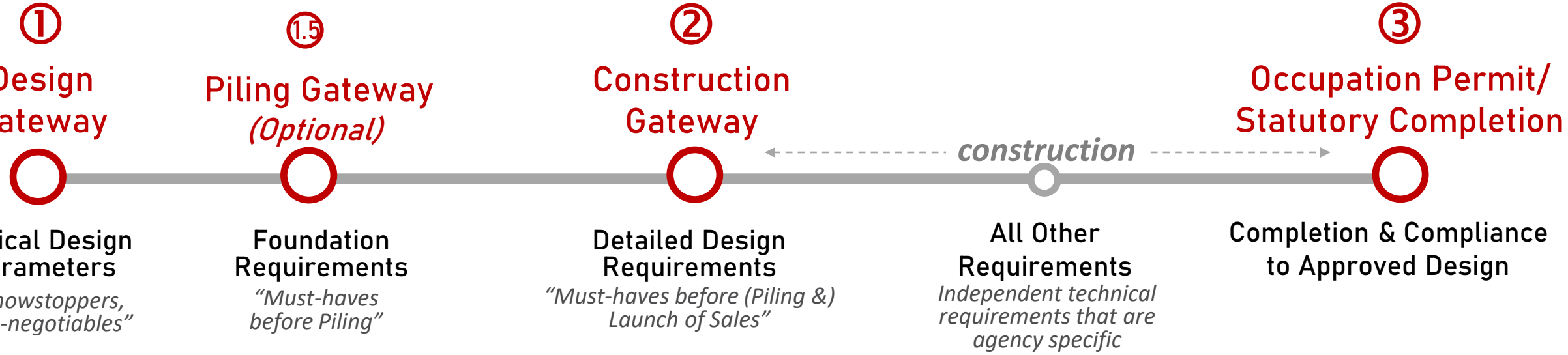


New RABW – Agencies' requirements at each Gateway



Submission Stage	Objective
Design Gateway	To resolve key parameters which have an impact on design parameters and client's brief, before proceeding to detailed design
Piling Gateway (Optional)	To resolve requirements pertaining to foundation works that do not affect main structural works
Construction Gateway	To resolve multi-agency requirements concerning design details that need to be coordinated before commencement of works and launch of sales
Independent submissions (if applicable)	To clear agency-specific requirements of respective building components regulated by respective agency E.g.: Structural submission of ancillary structures and components such as barriers/ claddings to BCA
Completion Gateway	To document "As-Built" plans and issue Occupancy Permit/ Statutory Completion

Approvals under consolidated CORENET X gateways



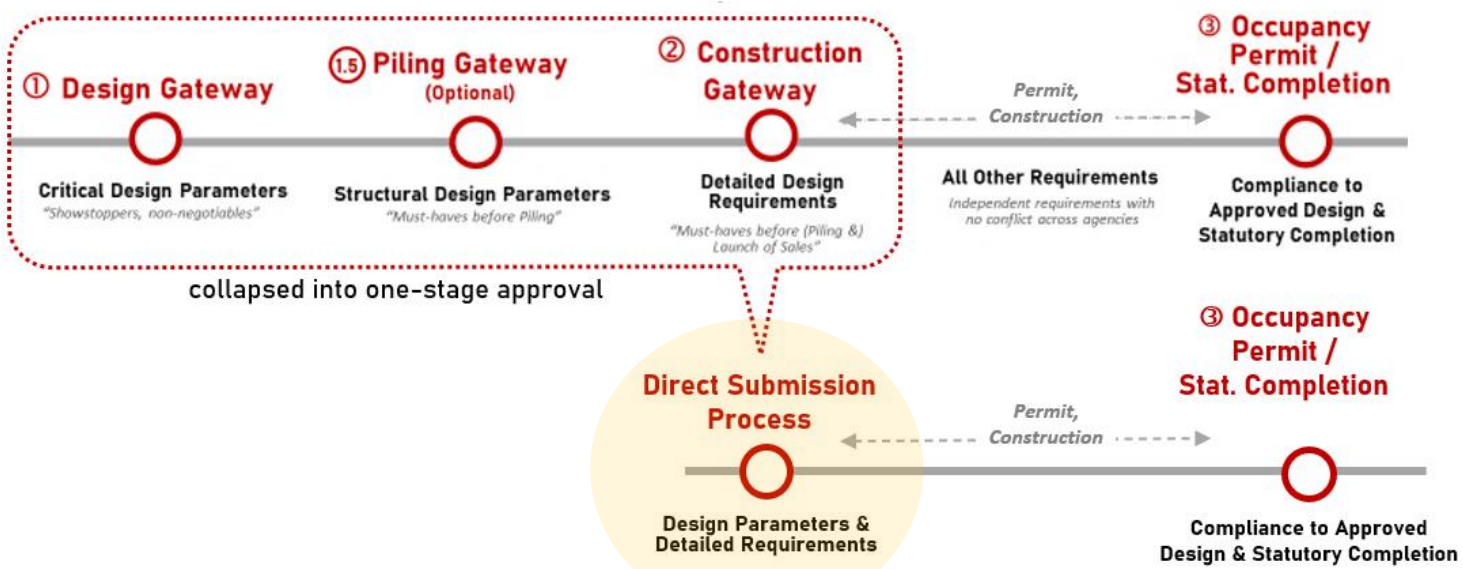
Approvals at each Gateway consist of the following agencies' equivalent clearances today:

- URA PP
- LTA Layout Plan, NEA and PUB DC Clearances
- NParks DG Approval including tree-cutting
- BCA ST Approvals for Permanent Piling Works
- LTA RPZ AIP for Pile Design and Layout Plan
- Independent clearances, e.g. NParks EMMP & PUB's Earth Control Measures Approval
- URA WP
- BCA BP and ST Approvals
- LTA Street Plan Clearance, BP (Parking), BP (Rails)
- NEA and PUB BP Clearance Cert
- SCDF BP Approval
- NParks CG Approval

Key Objective of Gateways
Resolve multi-agency requirements concerning design details that need to be coordinated

Direct Submission Process (DSP)

Differentiated approach for less complex building works that need not be subjected to the typical RABW 3-Gateway process *(e.g. single-unit residential landed development, standalone pavilion/ linkway, racking system, etc)*



One Stage Lodgement/Self-Declaration

- Models/drawings submitted, together with QP declaration on compliance with regulatory requirements, for auto-approval by agencies
- Audits conducted by agencies

System will auto-channel the applications based on the details provided

One Stage Plan Check for Approval

- Agencies directly assess plan application submission. Work will not be allowed to commence until after such approvals are granted

02

CORENET X

Implementation and Key Dates

CORENET X phased approach for industry onboarding

Phased Onboarding	Date	Requirements
New Projects		
Soft Launch	18 Dec 2023	Invited projects (e.g. teams that are familiar, have participated in Sandbox, etc)

Transition Plan for Ongoing Projects

Challenges faced by Ongoing Projects

i. Difficulties adjusting to the new process as their project timeline would be impacted

ii. Projects may be at different points of the project timeline and the impact would vary

Potential Transition Scenarios for Ongoing Projects

S/N	State of project when mandated submission on CORENET X system takes effect	Next steps required under the new process
1	In early stage of the design	Prepare for Design Gateway
2	Obtained some but not all DC clearances	Secure remaining DC clearances at Design Gateway submission
3	Obtained some but not all BP clearances	Secure remaining BP clearances at Construction Gateway submission
4	Obtained WP and BCA's BP approval, midst of construction or nearing completion	Independent submission / secure outstanding agency clearances before Completion Gateway

Transition Plan for Ongoing Projects

Preparation:

- Agencies will give notice of more than 2 years to the industry, as to when full migration to CORENET X is expected
- Projects are advised to plan for and secure plan approvals from all Authorities prior to the transition to CORENET X to minimise disruption
- Project teams with ongoing projects should minimally secure time-sensitive approvals, that may potentially impact the project timeline prior to the transition.

Submission Requirements:

- CX can support both BIM and non-BIM projects under the new RABW process
- To facilitate transition, open-BIM format (i.e. IFC-SG) will not be imposed on ongoing projects as it will require a lot of effort from the QPs to re-prepare the submissions

Approval Status:

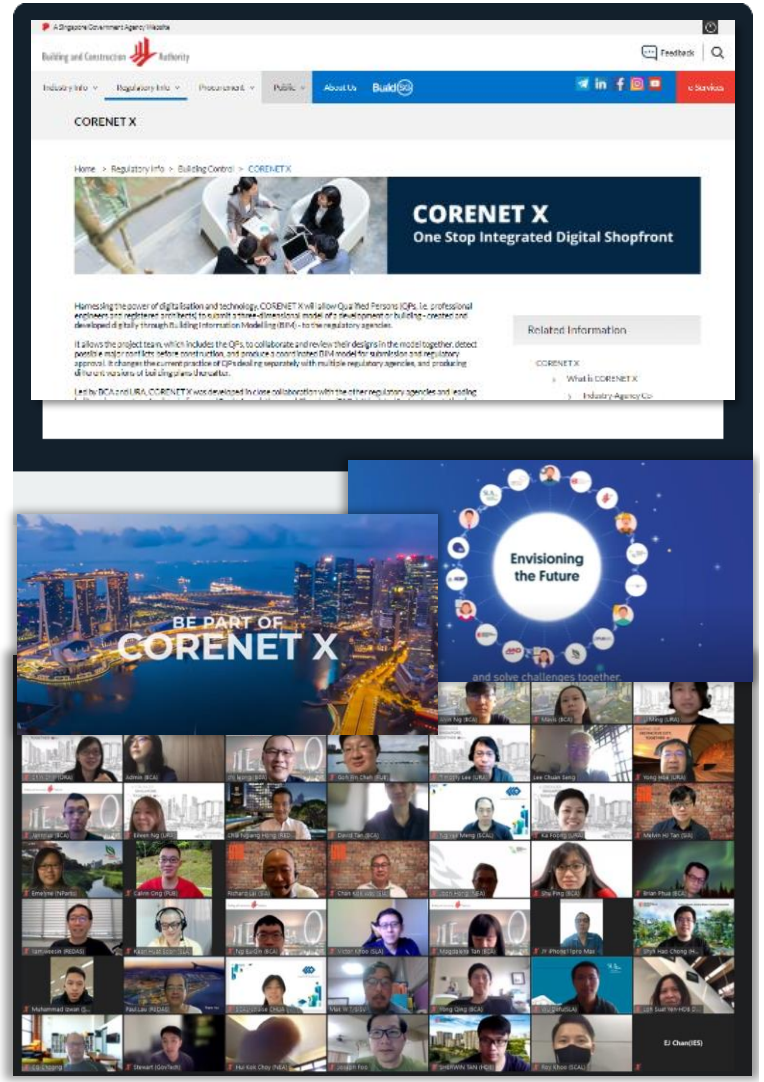
- For projects mapped to the new process under CX:
  - Agencies' approvals already issued under CN2 remain valid
  - Works that have commenced on-site based on the approval obtained under CN2 can continue and the relevant issued permits remain valid
  - Industry will only need to apply for the outstanding approvals under the respective gateways

03 CORENET X

Getting Yourself Ready

Resources and Information

CORENET X website with resource toolkits, videos, FAQs, infographics, webinar materials, training sessions



- [25 Aug 2023] IFC-SG Interoperability Tool for upcoming CORENET-X Submissions by Autodesk + SIA + BuildingSmart Singapore + CORENET X
- [21 Aug 2023] ACES CORENET X Lunchtime Talk
- [15 Jun 2023] CORENET X Draft Code of Practice Webinar
- [16 Mar 2023] CORENET X Leadership Forum
- [Oct 2022] Joint-TAC Industry Webinar
- [Sep to Nov 2021] CORENET X introductory webinars

Frequently Asked Questions

- FAQ on **1. General Information**
- FAQ on **2. New Regulatory Approval Process**
- FAQ on **3. New Data Requirements and Technology**
- FAQ on **4. Getting Ready**
- FAQ on **5. Agency-Specific Queries and Others**

2 **Being Future-Ready: Embracing a New Model**
by Ar. Tan Jwu Yih, Director, BCA

Understand the importance of data standardisation and how firms can benefit and build new capabilities.

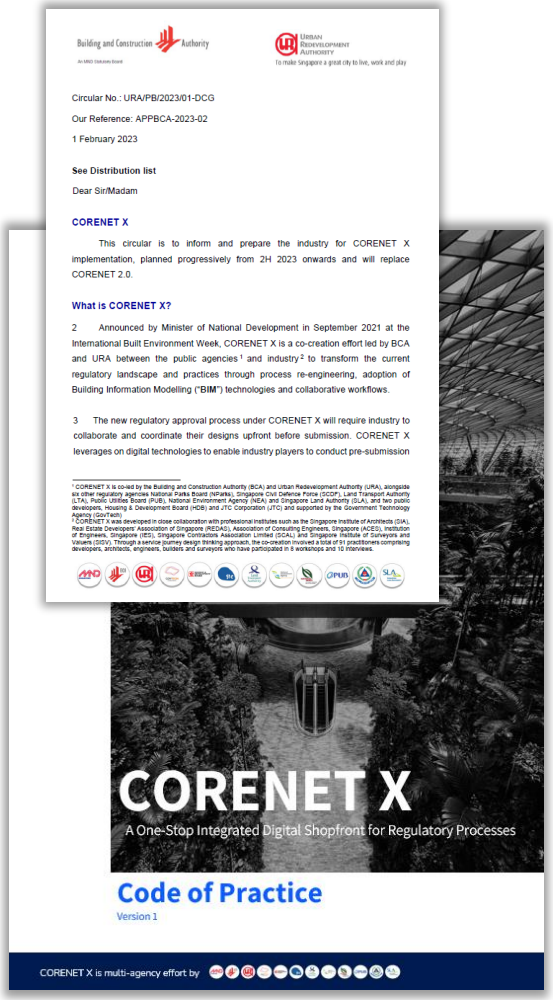
Download Slides: Presentation 2 by Ar. Tan Jwu Yih (BCA)

3 **Leading the Way: IDA's Insights from their Digital Transformation Journey towards CORENET X**
by Ar. Lin Hongsui, Director, ID Architects Pte Ltd

An industry perspective on the benefits, challenges, and the necessary in-house preparation.

Download Slides: Presentation 3 by Ar. Lin Hongsui (IDA)

Circulars to industry on upcoming changes


Building and Construction Authority
Urban Redevelopment Authority

Circular No.: URA/PB/2023/01-DCG
Our Reference: APPBCA-2023-02
1 February 2023

See Distribution list

Dear Sir/Madam

CORENET X

This circular is to inform and prepare the industry for CORENET X implementation, planned progressively from 2H 2023 onwards and will replace CORENET 2.0.

What is CORENET X?

2 Announced by Minister of National Development in September 2021 at the International Built Environment Week, CORENET X is a co-creation effort led by BCA and URA between the public agencies [1] and industry [2] to transform the current regulatory landscape and practices through process re-engineering, adoption of Building Information Modelling ("BIM") technologies and collaborative workflows.

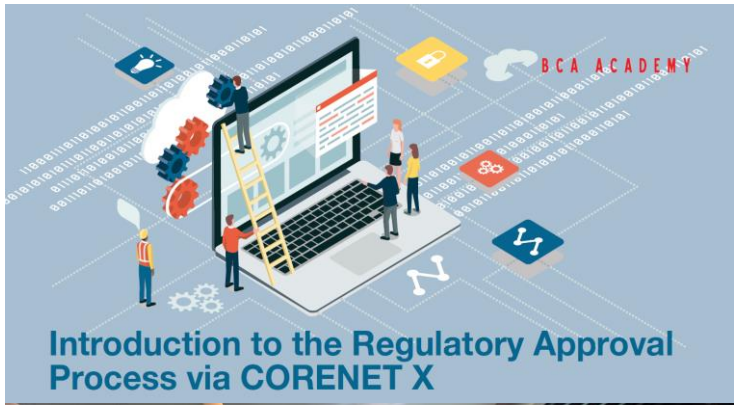
3 The new regulatory approval process under CORENET X will require industry to collaborate and coordinate their designs upfront before submission. CORENET X leverages on digital technologies to enable industry players to conduct pre-submission

[1] CORENET X is co-led by the Building and Construction Authority (BCA) and Urban Redevelopment Authority (URA), alongside six other regulatory agencies National Parks Board (NParks), Singapore Civil Defence Force (SCDF), Land Transport Authority (LTA), Public Utilities Board (PUB), National Environment Agency (NEA) and Singapore Land Authority (SLA), and two public developers, Housing & Development Board (HDB) and JTC Corporation (JTC) and supported by the Government Technology Agency (GovTech).
[2] CORENET X was developed in close collaboration with professional institutes such as the Singapore Institute of Architects (SIA), Real Estate Developers' Association of Singapore (REDAS), Association of Consulting Engineers, Singapore (ACES), Institution of Engineers, Singapore (IES), Singapore Contractors Association Limited (SCAL), and Singapore Institute of Surveyors and Valuers (SISV). Through a service journey design thinking approach, the co-creation involved a total of 51 practitioners comprising developers, architects, engineers, builders and surveyors who have participated in 8 workshops and 10 interviews.

Competency Building : RABW Course

231 consulting firms so far

> 650 RABW course attendees



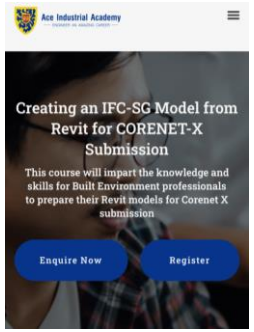
- ✓ Completed 3 physical runs conducted by BCA/URA at BCA Academy with regulatory agencies
- ✓ Onboarded 8 other training providers to conduct physical courses
- ✓ Developed an online asynchronous version with a training provider

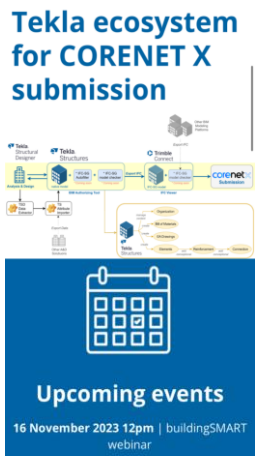
BIM/IFC-Sg Adoption

IFC-SG Training

62 consulting firms so far

> 165 IFC-SG course attendees





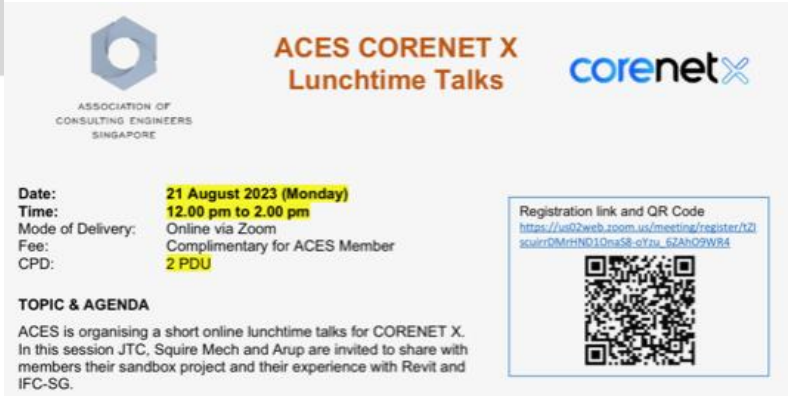
- ✓ Lecture and hands-on course in preparing BIM models for IFC-SG submission
- ✓ 5 training providers cater to users of all 4 different BIM software that support IFC-SG
- ✓ 1 more training provider in midst of onboarding

Other IFC-Sg Resources/Support

- \+ Autodesk Revit
- \+ Bentley OpenBuildings
- \+ Graphisoft Archicad
- \- Trimble Tekla
  - Online help on exporting to IFC in Tekla
  - Recording of the IFC Webinar, which includes demonstrations on features supporting IFC

IFC-SG Resource Toolkit

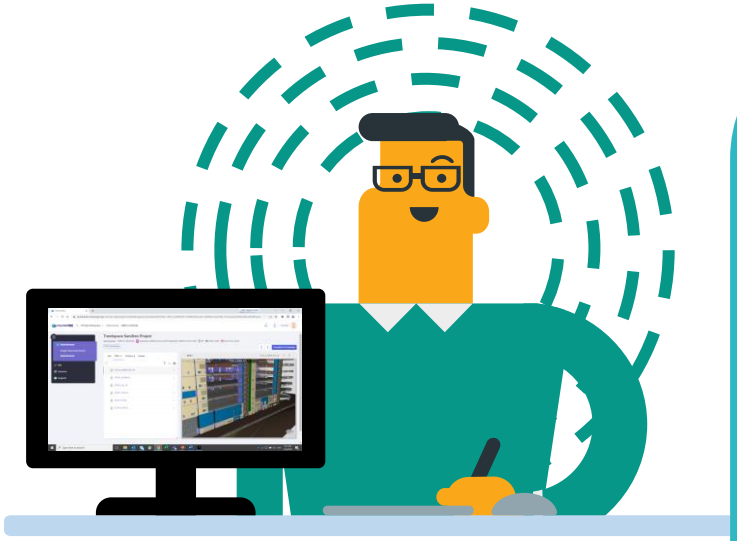
Geo-Referencing BIM Models



Opportunities to learn and refine workflows from Sandbox

1. Improving IFC-SG Data Representation

- Worked on creating 3rd party apps / scripts / etc for ease of populating and checking Data in IFC-SG Model
- Continued refinement and streamlining of IFC-Sg requirements to reduce data load in submissions



2. Increase Project Team Readiness

- Important for BIM managers to have clarity on how IFC-SG works, which may result in changes to in-house workflows
- Familiarization of team on multi-disciplinary submissions in new CORENET X RABW Gateways

Other Upcoming Initiatives

Clinics and Helpdesk

- To provide troubleshooting and support channels for industry when facing problems / issues in practice

Regular Clinics
in small class format, similar to tutorial classes

- to provide support and hand-holding in partnership with BIM training providers

Helpdesk

- to provide frontline support, managing queries, issues and feedback

04 CORENET X

Readiness Check

Getting Yourself CORENET X Ready

1 Learning

EQUIP

- Self-help resources and step-by-step videos on CX website
  - ➢ Past webinars on RABW, IFC-SG, and COP
  - ➢ how to prepare a CX submission
- Training courses
  - ➢ 1-day IFC-SG training on creating an IFC submission
  - ➢ 1-day RABW training on the new approval process with case study

Self-help resources & Basic CX Training

2 Practising

GUIDE

Code of Practice

- The COP provides clarity in CX submission requirements for all agencies across every gateway

May 2023	Draft released for industry feedback
Sep 2023	Official release of Version 1

IFC-SG Tools

- IFC-SG validator to help industry to validate the completeness of the IFC-SG model content
- BCA has worked with BIM software vendors to develop additional IFC-SG tools

3 Troubleshooting

SUPPORT

Clinics/ Tutorials

Partner with training providers to provide clinics/tutorials to assist and hand-hold

Helpdesk

- Provide frontline support, manage queries, issues and feedback
- Track cases and issues to ensure follow-up actions are carried out promptly

Readiness Checklist for Firms

Firms should have the following in place:

People

- Core team to oversee firm's preparation
  - ➢ Internal subject matter experts as "go-to" persons
- Internal change management and training plan
  - ➢ Setting and tracking of KPIs

Technology

- BIM and IFC-SG readiness
  - ➢ Trained in IFC-SG and familiar with various IFC-SG tools
  - ➢ Create/Map internal templates to meet IFC-SG requirements

Process

- Understand the RABW process & agencies' requirements
  - ➢ Attend RABW training to be familiar with process
  - ➢ Study the COP
  - ➢ Map RABW to workflow and assess impact

STRONG TEAM OF CONSULTANTS THAT ARE READY TOGETHER

Several firms have already started on CORENET X !

11 Sandbox Projects
Involving 20 Firms

5 projects

(3Q 2022 – 3Q 2023)

Multi-Disciplinary Data Modelling
Multi-Agency Processes

6 ongoing/incoming projects

4Q 2023

Live Submissions
(Actual Approvals via CX)

- Working with consultants of selected single-unit landed house projects for live DSP submission
- Targeted industry engagement to identify suitable projects and consultant teams for:
  - Live submission through CORENET X if the project timeline matches
  - Sandbox with parallel submission in CORENET 2 otherwise (e.g. CG)
- Dedicated resources to handhold project teams and guide them through the submission process
  - *Incl demo and testing out of the new submission portal*
  - *Hands-on Collab Platform workshops for agency processing officers*
  - *Trouble-shooting with relevant BIM software developers*
- Industry-agency partnerships and reiterative refinement processes
  - *IFC-SG Validation and Streamlining*
  - *COP Development and Refinements*

Summary of Useful Weblinks/QR codes

More details on CORENET X can be found at https://go.gov.sg/cx

https://go.gov.sg/cx

CORENET X Code of Practice https://go.gov.sg/cxcop

https://go.gov.sg/cxcop

CORENET X Training Resources https://go.gov.sg/cxtraining

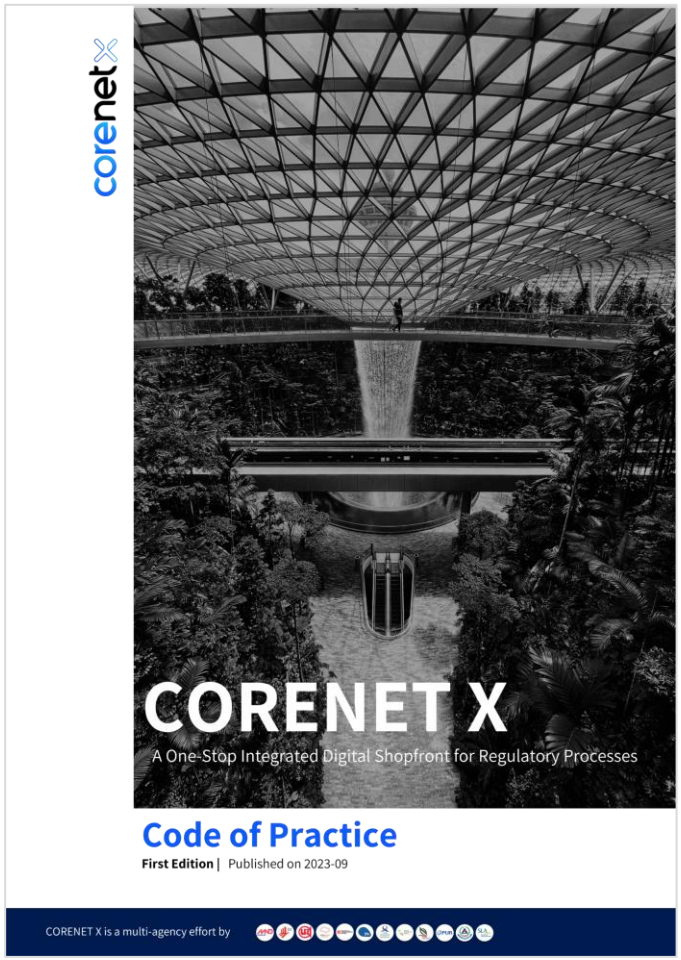
https://go.gov.sg/cxtraining

Thank You

Preparing your 1st CORENET X Submission with the Code of Practice

Ar. Colin Chew | CORENET X Project Office
No. of slides: 34

CORENET X Code of Practice Published!

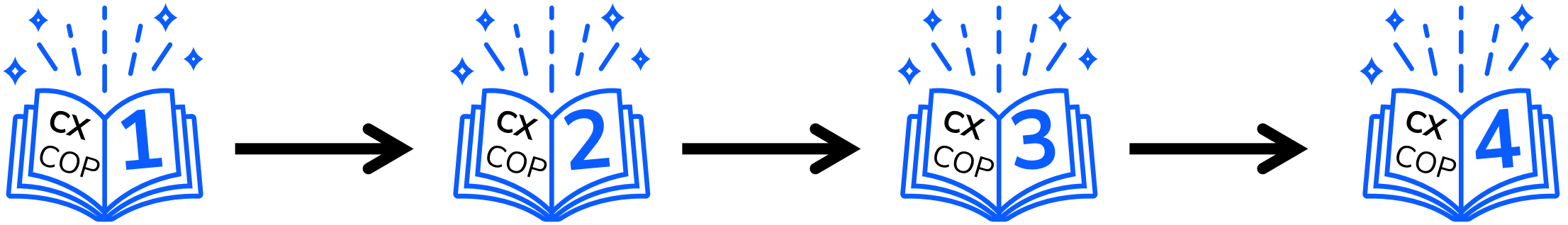


SCAN ME

https://go.gov.sg/cxcop

- ✓ **First Edition** published on 26 Sep 2023 with industry's feedback
- ✓ Guide on how to prepare regulatory **submissions on CORENET X**
- ✓ This Code of Practice **does not** substitute Handbooks, Circulars or other regulatory publications of our regulatory agencies.
- ✓ **Complements other resources on the CORENET X website**, including the IFC-SG Resource Toolkit

Preparing your 1st CORENET X Submission with the COP



Overview of CORENET X

General Requirements

Specific Requirements

BIM Components

Preparing your 1st CORENET X Submission with the COP

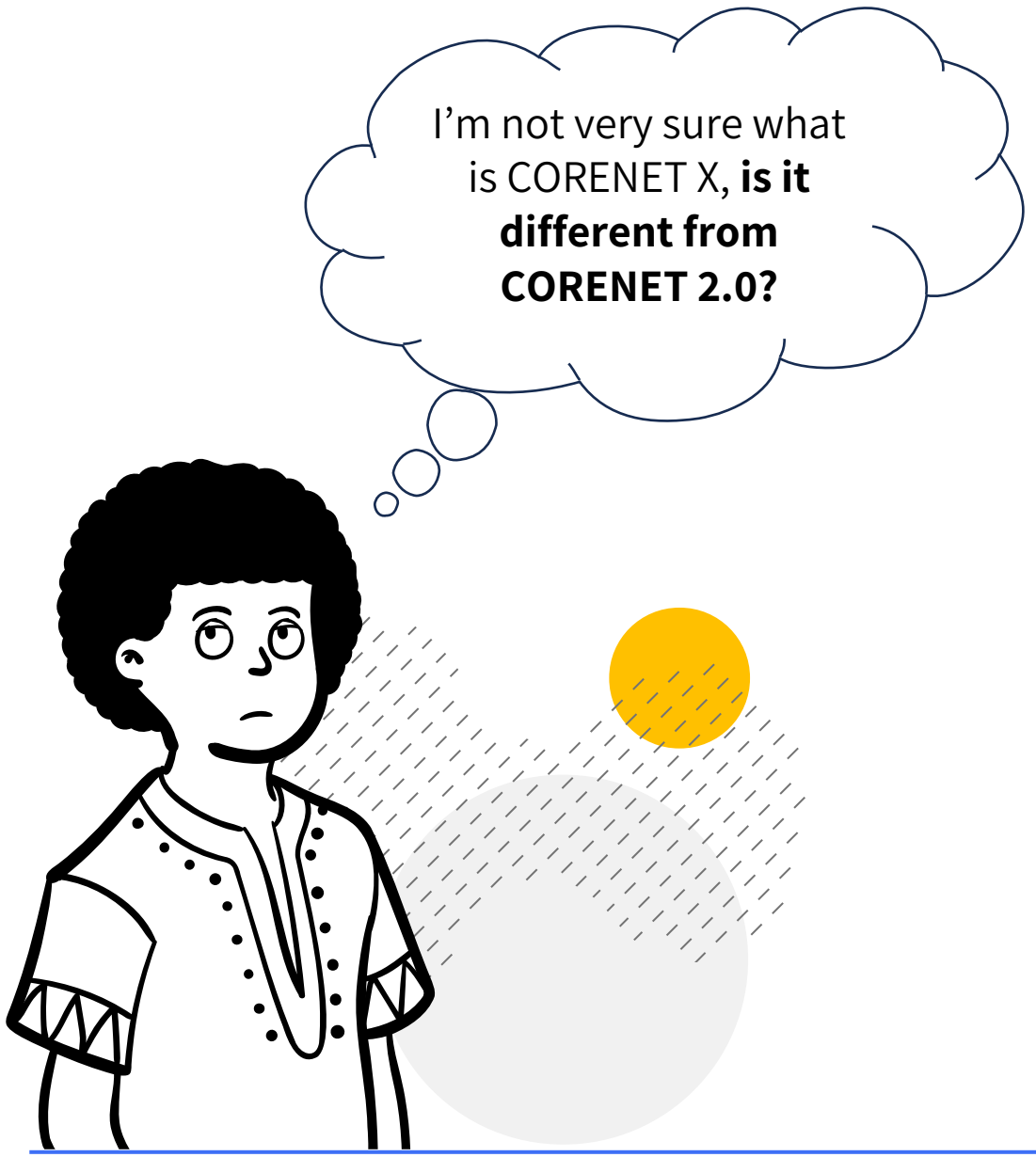
Overview of CORENET X

General Requirements

Specific Requirements

BIM Components

A Quick Recap of CORENET X



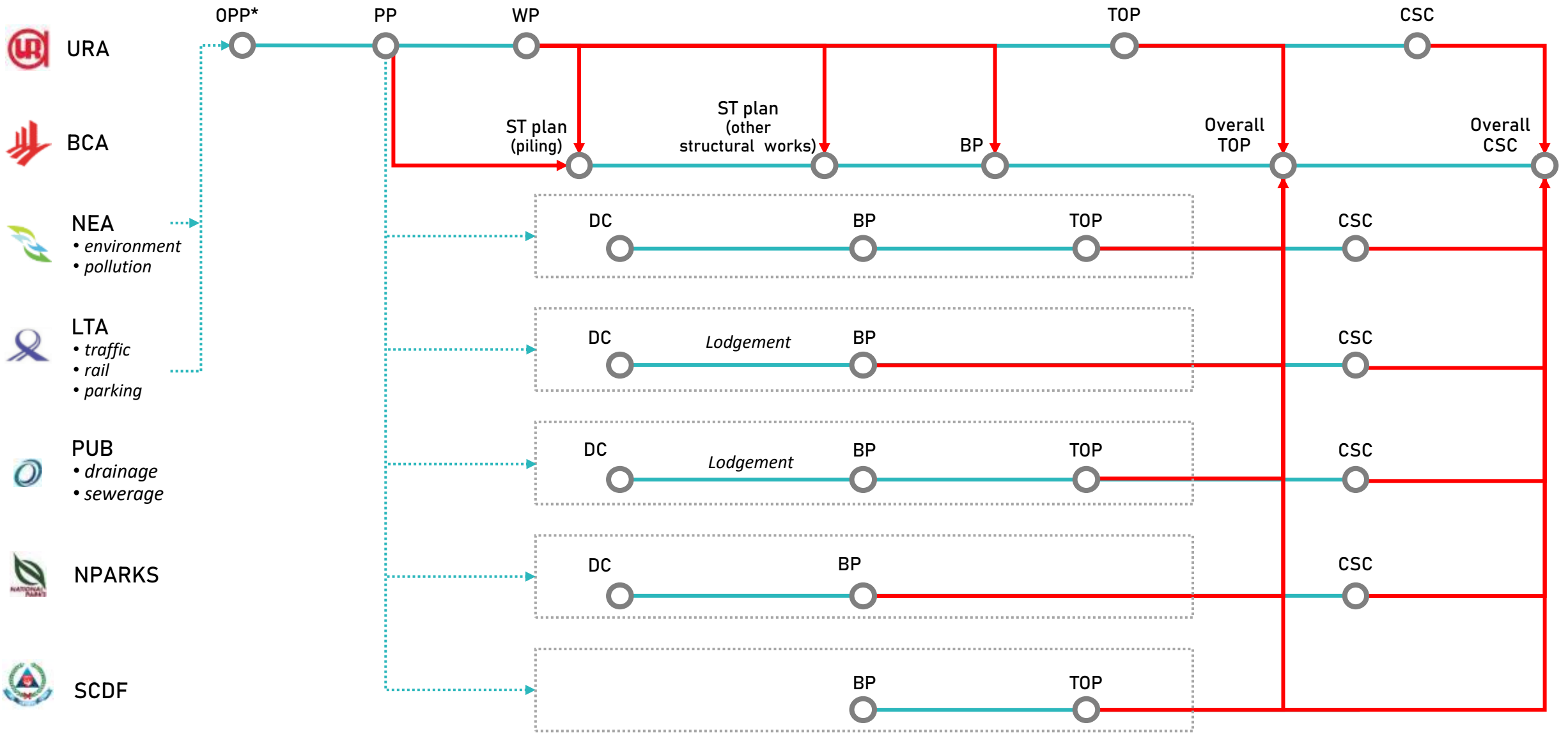
- Unlike CORENET 2.0, **CORENET X** will

(1) Facilitate and support new workflows that allow **project teams to submit coordinated BIM** to the authorities, and

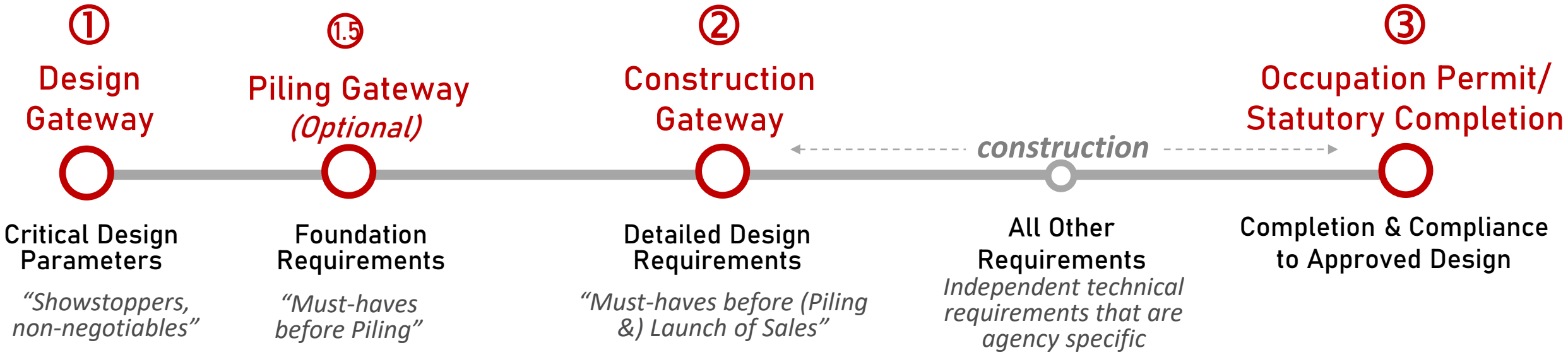
(2) Bring **officers from multiple agencies** together to **review submission collectively** and provide a **consolidated response** to the project team

- For more introduction of CORENET X, you can refer to **Section 1 of the COP**

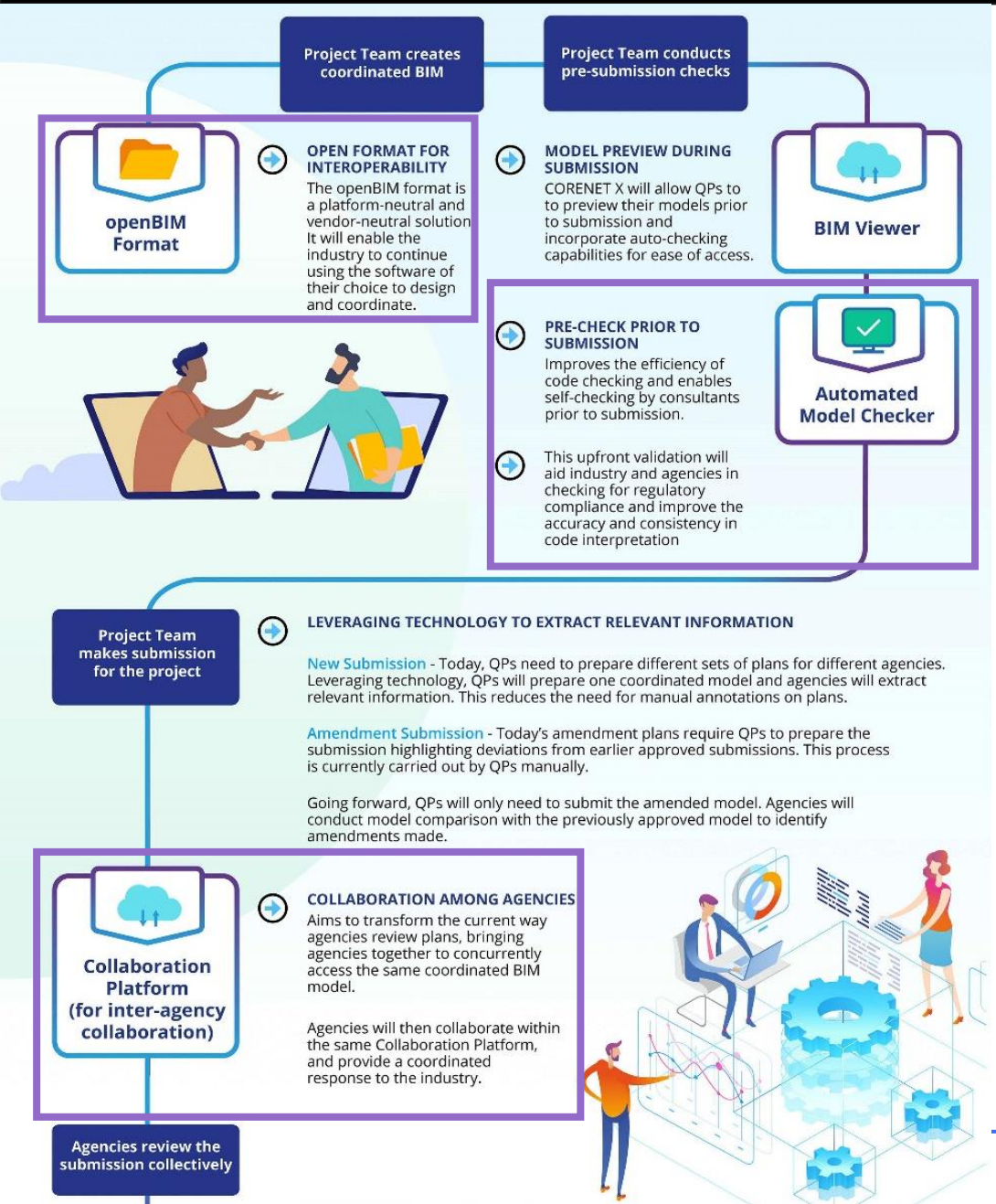
Today's Practice



Future Submissions via CORENET X



CORENET X User Journey



- To support the new workflows, technological enablers are being developed:

(1) **openBIM format**

(2) **Automated Model Checker**

(3) **CX Backend: Collaboration Platform for agencies' use**

- For a user journey of workflow and tech enablers of CORENET X, you can refer to **Section 1 of the COP**

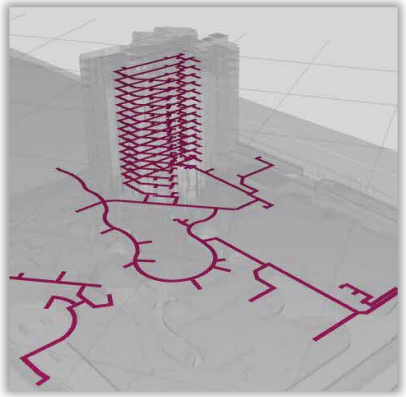
How will **Agencies Come Together** to Review My Submission?

Preview of CORENET X Backend Platform to Facilitate Collaboration among Agencies

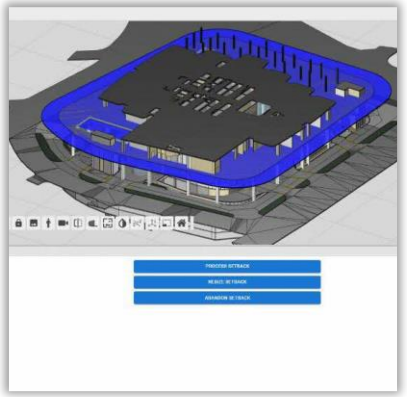
Yin Zili | CORENET X Project Office

A Preview of CORENET X Backend: Collaboration Platform (CP)

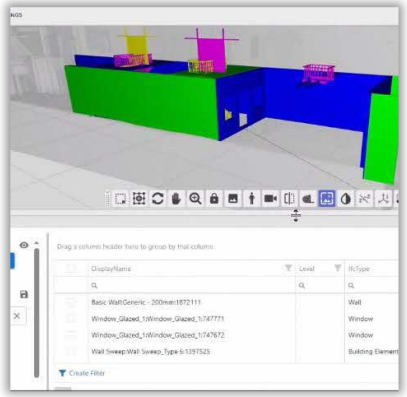
Facilitating Concurrent BIM Review



Auto-extract & present data



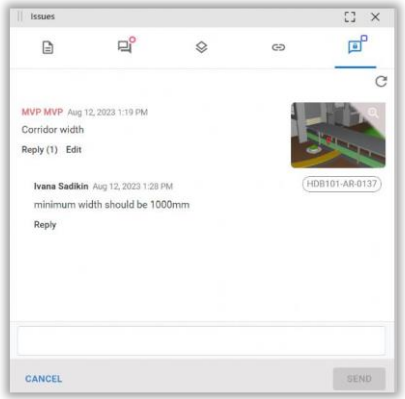
Enable setback checks



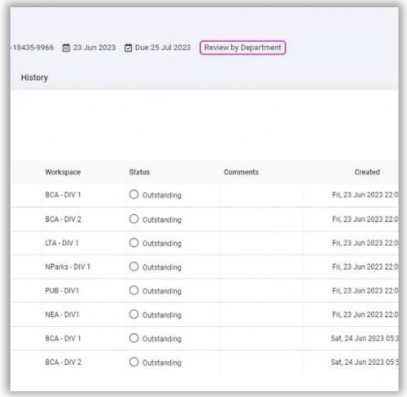
Auto-identify changes

Enabling Collaboration

Standardization in issues recording



Collaboration among Agencies



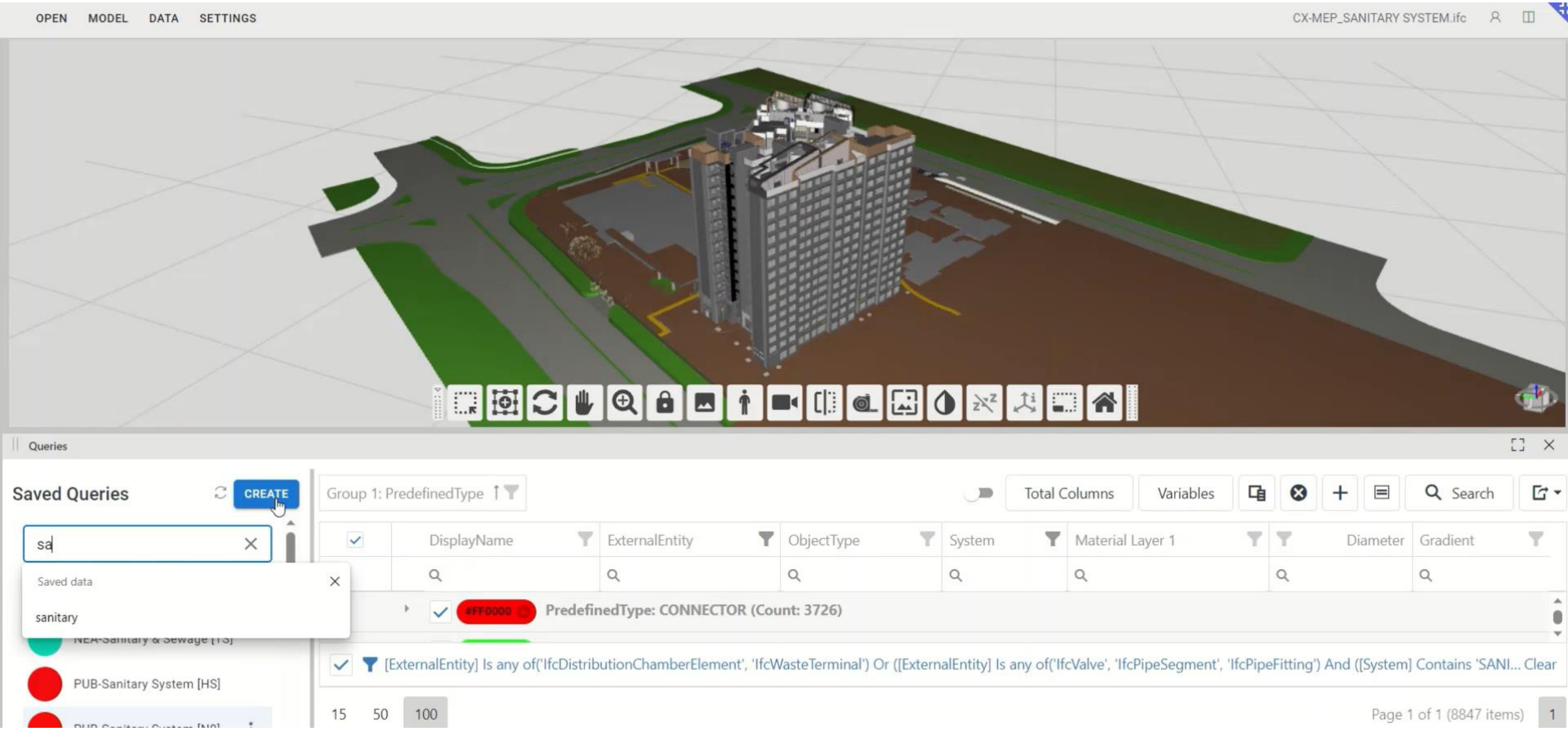
Transparency in Response

Preview of CP: Auto-extract & present data

Query (Accessible Route)

Preview of CP: Auto-extract & present data

Query (Sanitary)



Preview of CP: Auto-extract & present data

Query (Structural Column)

Queries

Saved Queries

CREATE

Filter Queries

Assessment - Accessible Route

Assessment - Parking Lot

Assessment - Trees

BD-Area of Structural System Adopted

Drag a column header here to group by that column

Sync Viewer

Sync Issues

Total Columns

Variables

Search

No data

15

50

100

Page 1 of 1 (0 items)

1

Preview of CP: Auto-extract & present data

Query (Refuse Rate)

Queries

Saved Queries

CREATE

Filter Queries

Assessment - Accessible Route

Assessment - Parking Lot

Assessment - Trees

BD-Area of Structural System Adopted

Drag a column header here to group by that column

Sync Viewer

Sync Issues

Total Columns

Variables

Search

No data

15 50 100

Page 1 of 1 (0 items)

Preview of CP: Enable Setback Checks

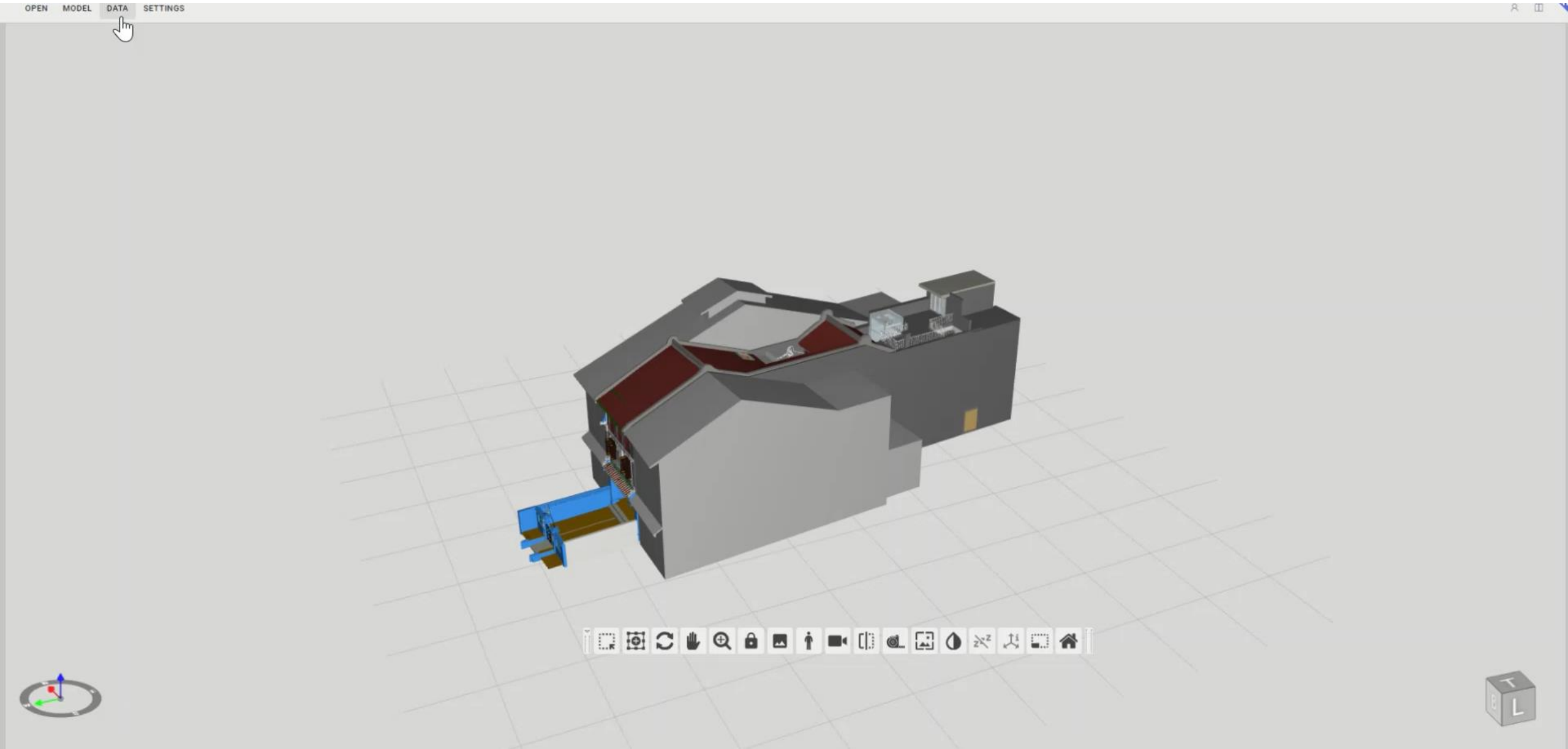
Setback

Preview of CP: Collaboration among Agencies

Leaving Comments

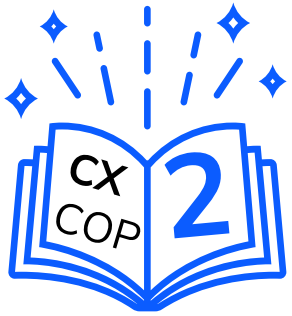
Preview of CP: Auto-identify Changes

Version Compare



Preparing your 1st CORENET X Submission with the COP

Overview of CORENET X

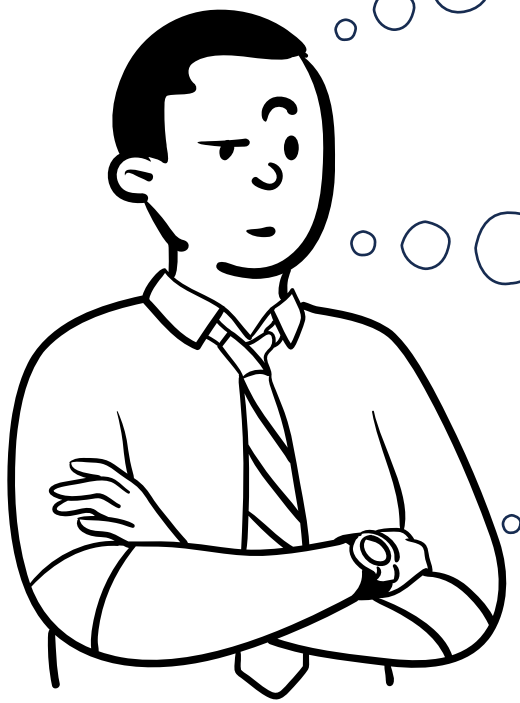


General Requirements

Specific Requirements

BIM Components

Basics of a CORENET X Submission



With all these changes in submission processes, will the QP's **liabilities today change**?

I heard we need to have upfront coordination, but **what exactly is needed**?

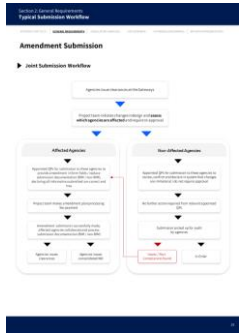
Can I still do an **amendment submission** like today?

- Nope! All Statutory responsibilities **remain unchanged**
- In a BIM submission, the project team should ensure that **basic / key components** from each discipline **do not clash** with one another
- Step by step diagrams on **joint** submission workflows for new and amendment submissions can be found in **Section 2 of the COP**

Amendment Submission Workflow

Amendment submission should **not be done in silos**, let's review amendments to **design holistically**!

Smart Reminder



Agencies issue clearances at the Gateways

Project team initiates changes in design and **assess which agencies are affected** and require re-approval

Affected Agencies

Appointed QPs for submission to these agencies to provide amendment in form fields / replace submission documentation (BIM / non-BIM), declaring all information submitted are correct and true

Project team makes amendment plan processing fee payment

Amendment submission successfully made, affected agencies collaborate and process submission documentation (BIM / non-BIM)

Agencies issues clearances

Agencies issues consolidated WD

Non-Affected Agencies

Appointed QPs for submission to these agencies to review, confirm and declare in system that changes are immaterial / do not require approval

No further action required from relevant appointed QPs

Submission picked up for audit by agencies

Issues / Non-Compliances found

In Order

....

QPs, remember to **indicate the agencies affected** during your amendment submissions

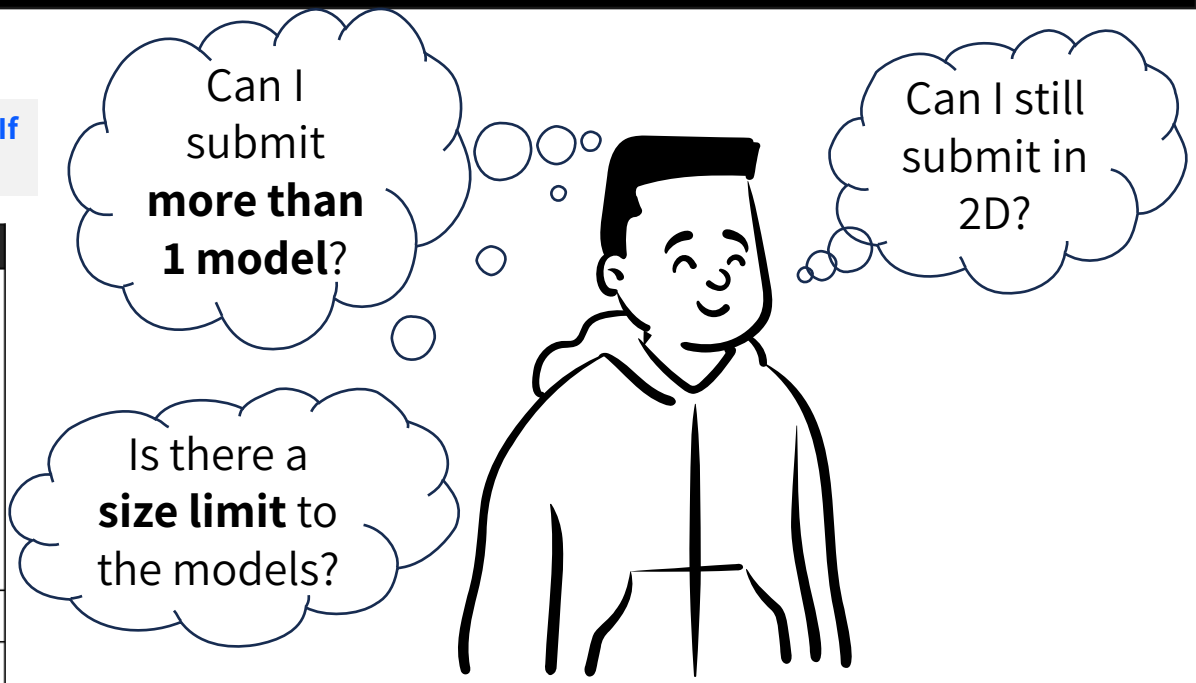
Smart Reminder Mini

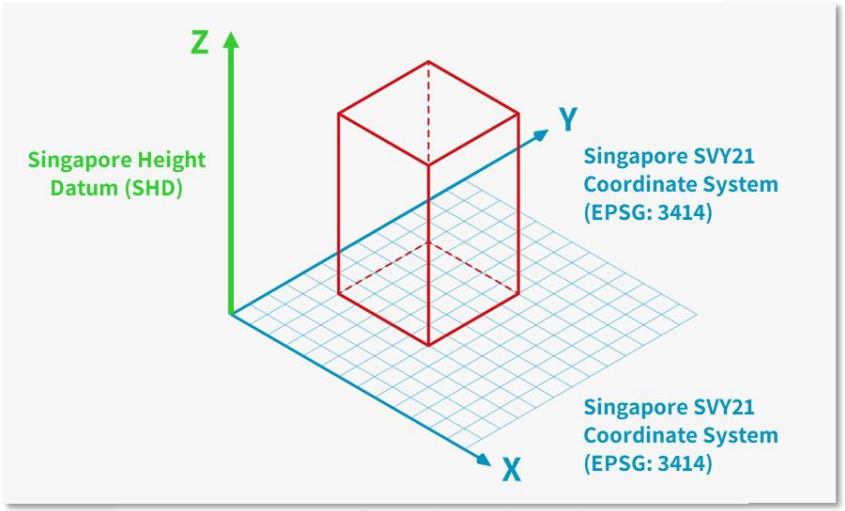
How To Include Multiple Files Per Submission

Model Size

Each model should not exceed 800 MB, and be submitted by parts (i.e. 1 block per file). If a part model exceeds 800MB, the part model should be split into smaller files.

Examples	Architecture	C&S Engineering	M&E Engineering
IFC-SG models, all geo-referenced	• Blk 1 Model • Blk 2 Model • Podium Model	• Blk 1 Model • Blk 2 Model • Podium Model • Substructure Model (For foundation and piling works) Note: For projects which did not opt for Piling Gateway (G1.5), the project team will need to include all permanent foundation works in Construction Gateway (G2).	• Blk 1 Model • Blk 2 Model • Podium Model
	As mentioned on Page 16, models from all disciplines MUST name levels and zones identically.		
2D drawings	• Details (e.g. household / storey shelter documentation and detailing) • External Works	• General notes • Special details (e.g. slab reinforcement detailing, complex structure detailing, precast joints, prestressed details, steel connections) • External Works	• Details (e.g. cooling tower documentation and detailing) • External Works
Design Calculation reports	-	Design calculation reports from QP, AC, [QP(Geo) & AC (Geo), if needed]	-
Additional supporting documents	• B-Score BDAS form • Public Communication Plans (if applicable)	• B-Score BDAS form Supporting documents for piling works: • Site Investigation report in pdf & AGS format • Impact assessment report • Topography	• B-Score BDAS form • Pollution Control Study (PCS) reports
Pre-consultation document	-	Completion letter of pre-consultation (for complex structure only)	-





CX COP 2

Simplified 6 Key Steps on IFC modelling

- Key BIM Software Vendors have also contributed 6 simplified modelling steps to help with IFC onboarding in **Section 2** of the COP

Section 2: General Requirements
Model Preparation (Revit)

INTRODUCTION TO CX | GENERAL REQUIREMENTS | REGULATORY AGENCIES | KEY GATEWAYS | OTHER BUILDING WORKS | BIM DATA REPRESENTATION

Preparing Models for Submission (Revit)

Example using Revit Configuration File

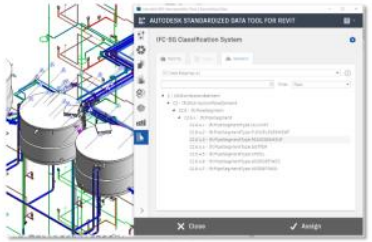
3. Set the Revit Workset

- To easily select the elements during IFC-SG Parameters mapping.
- To filter the views per Agency Submission.
- To reduce time when Exporting model in IFC format.
- To easily navigate when Modelling and model auditing.

S2 - Fig 11

4. IFC-SG Mapping

- **Use BIM Interoperability Tools to assign IFC parameters**
- To avoid misspelled IFC parameters (misspelled parameters will not be exported).
- Faster than manual parameter key-in.
- Elements will be exported into the correct IFC category.



S2 - Fig 12

Link:
IFC-SG Resource Kit

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Section 2: General Requirements
Model Preparation (Archicad)

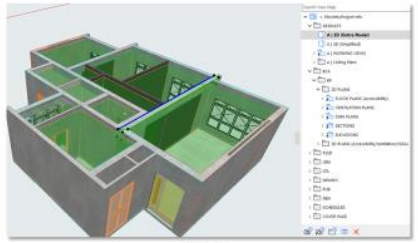
INTRODUCTION TO CX | GENERAL REQUIREMENTS | REGULATORY AGENCIES | KEY GATEWAYS | OTHER BUILDING WORKS | BIM DATA REPRESENTATION

Preparing Models for Submission (Archicad)

Example using Archicad Configuration File

3. Set the View for Export from Navigator

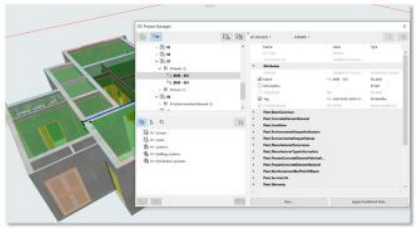
- To easily view and select the elements while modelling.
- To easily navigate while modeling and checking.
- To filter the views as per Agency Submission.
- To easily export only elements visible on the current view.



S2 - Fig 19

4. Model Verification using IFC Project Manager

- IFC Project Manager for Model Verification before export
- Assign or edit IFC-SG Property Values.
- Create custom IFC Property, Groups (Zones, Systems)



S2 - Fig 20

Link:
IFC-SG Resource Kit

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Section 2: General Requirements
Model Preparation (Tekla)

INTRODUCTION TO CX | GENERAL REQUIREMENTS | REGULATORY AGENCIES | KEY GATEWAYS | OTHER BUILDING WORKS | BIM DATA REPRESENTATION

Preparing Models for Submission (Tekla)

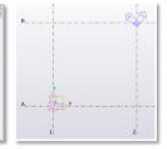
Example using Tekla Configuration File

1. Geo-reference the project

- To place model relative to the selected project base point using the coordinate system values.

S2 - Fig 23 :
Example of Base Point Dialog Box

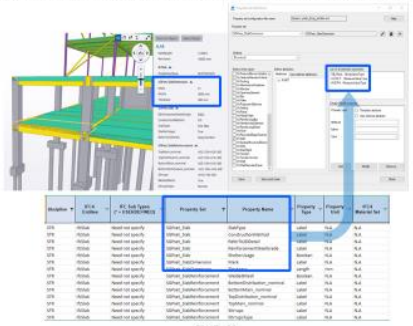
S2 - Fig 24 :
Example of Add model Dialog Box



S2 - Fig 25 :
Example of Base Point on model

2. Identify the IFC properties to be tagged into each element of your model

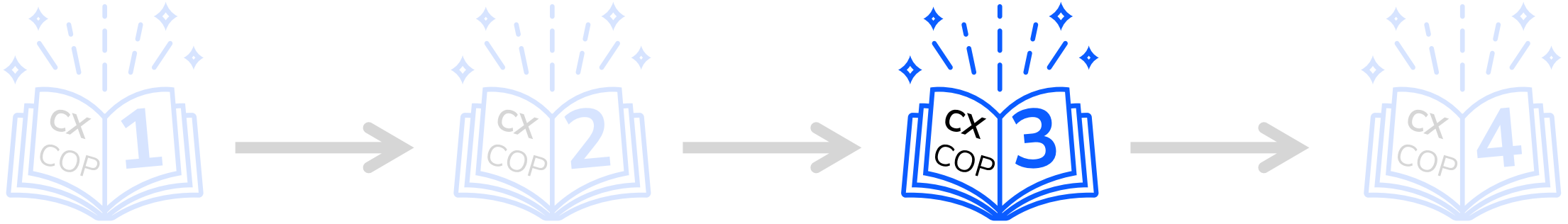
- Element's properties are automatically populated as measure type while modeling, no need to fill-in manually.



S2 - Fig 26

32

Preparing your 1st CORENET X Submission with the COP



Overview of CORENET X

General Requirements

Specific Requirements

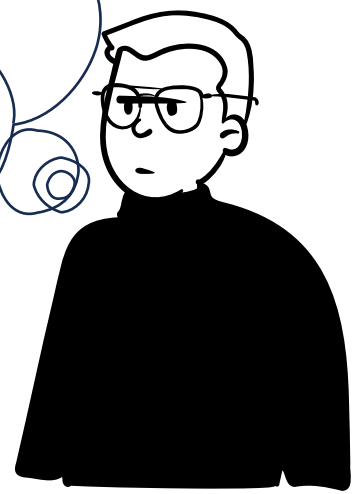
BIM Components

All about the new CORENET X Process

- **All agencies' requirements are listed** in detail for the respective disciplines at each of the gateway to prepare / obtain **multi-agency gateway** approvals
- If required, the project team may carry out **pre-consultation with agencies** prior to submission
- For **agency-specific submission, independent submissions** are allowed.
- The COP has indicated whether they need to be in BIM or in 2D format to complement the BIM submissions.
- If you are tasked to **plan your project timeline**, pls refer to **Section 3 of the COP**

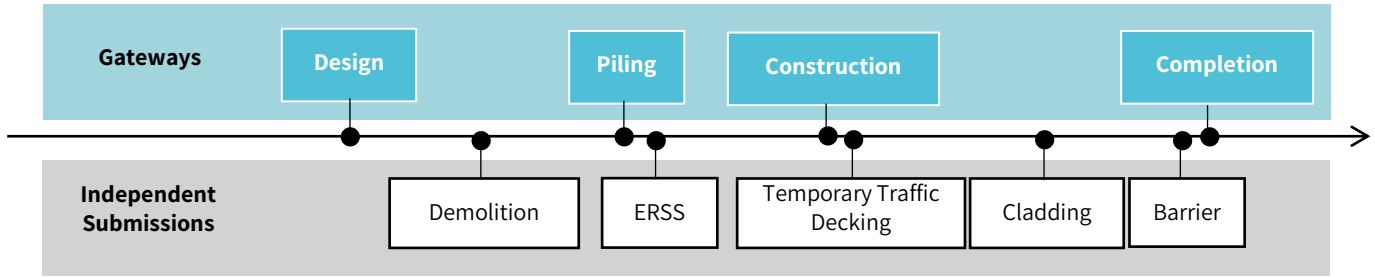
Are there drawings that I can still submit **independently** like current practice?

What are the **URA requirements** at the gateways? Is it like the PP today?



All about the new CORENET X Process

Example of a project making regulatory submissions across CORENET X Gateways



Section 3: Specific Requirements by Regulatory Agencies
Singapore Civil Defence Force (SCDF)

INTRODUCTION TO CX | GENERAL REQUIREMENTS | REGULATORY AGENCIES | KEY GATEWAYS | OTHER BUILDING WORKS | BIM DATA REPRESENTATION

Singapore Civil Defence Force (SCDF)

Legend: Architecture | C&S | M&E | IFC COMPONENT

G2 Construction Gateway

Key Words	Requirement Category
Fire Alarm System *(continued from previous page)*	**Combined Sprinkler and Wet Riser System** • Types of buildings / areas requiring combined sprinkler and wet riser system • Provision of sprinklers for basement and aboveground • QP to declare combined sprinkler and wet riser system is provided for the functional space Components to be modelled: o Location of Sprinkler Control Valve o Breeching Inlet o Landing Valve Components to be indicated: o Fire Alarm Panel
	Home Fire Alarm Device (HFAD) • Types of building requiring HFAD • QP to declare Home Fire Alarm Device is provided for the functional space • Location and Number of HFAD points
	Manual Alarm System • Types of building / usage exempted from manual call points Components to be modelled: o Manual Alarm Call Points o Fire Alarm Sounder o Visual Alarm Components to be indicated: o Fire Alarm Panel
	Sprinkler System • Types of buildings / areas requiring sprinkler system • Provision of sprinklers for basement and aboveground buildings • Exemption of sprinkler system Components to be modelled: ... Components to be indicated: ...

Section 3: Specific Requirements by Key Gateways
Independent Agency Submissions

INTRODUCTION TO CX | GENERAL REQUIREMENTS | REGULATORY AGENCIES | KEY GATEWAYS | OTHER BUILDING WORKS | BIM DATA REPRESENTATION

Independent Agency Submissions

Legend: Architecture | C&S | M&E | Builder | IFC COMPONENT

Buildability

Agency	Requirement Category
BCA	**Constructability Implementation Plan (CIP)** • BIM Plans which describe and define the type, extent of use and details of the system framework **Supporting Documents for CIP:** a) Documents (e.g. photos, 2D plans, etc.) on the use of construction techniques, processes, plant, equipment and innovative methods **Constructability Score (C-Score)** a) C-Score Calculations (to be computed and submitted by Builder in PDF format)

Conservation

Agency	Requirement Category
URA	Refer to URA Conservation Requirements here

Environmental Sustainability

Agency	Requirement Category
BCA	• Air-Tightness and Leakage • Building Energy Performance (e.g. Plant efficiency, Air distribution efficiency, Total System Efficiency, Lighting system performance etc) where applicable • Measurement and Verification (M&V) Instrumentation • Electrical Submetering • Maintenance of Building Cooling System Performance • Carbon Reduction Measures, including Resource Efficiency Measures such as CUI, Embodied Carbon etc. For more information, please refer to the Guidance Notes and Documentation Requirements under Code for Environmental

Section 3: Specific Requirements by Other Building Works
External Works

INTRODUCTION TO CX | GENERAL REQUIREMENTS | REGULATORY AGENCIES | KEY GATEWAYS | OTHER BUILDING WORKS | BIM DATA REPRESENTATION

External Works

About

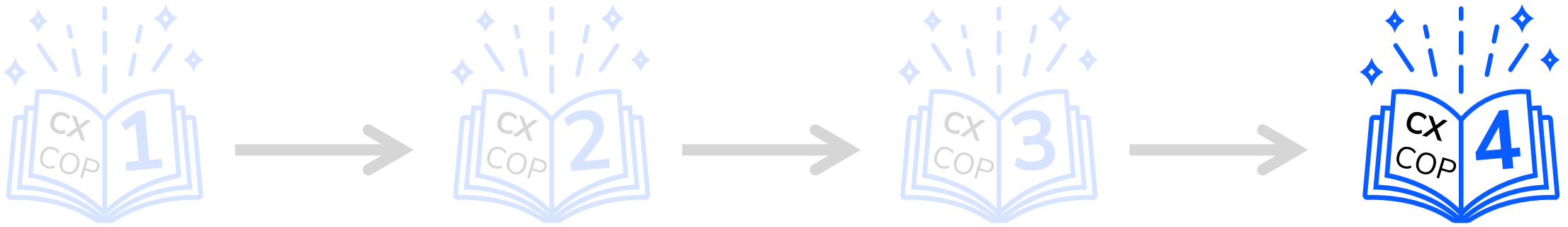
Note that External Works is undergoing further refinements. More updates will be released in future COP versions.

- Under CORENET X, the QP has to submit the proposed external works to the LTA, NParks and PUB for a coordinated regulatory review. To guide the industry in preparing their external works submissions at the various gateways, the agencies have worked together to map their regulatory objectives and requirements. Due care was taken to ensure that:
  - ✓ There are no direct conflicts in the rules between the agencies.
  - ✓ Various components of the road typology is holistically reviewed by the respective agencies within the same gateway.
- External works details can be submitted in the 2D CAD format.

Sharing of Submission Templates to Standardise Details

Agency	2D Plan Representation / Templates	
	Description	Examples
LTA	• LTA will provide drawing templates for the various plans (e.g. traffic, alignment, site plan, profile, section / details etc.) to better guide QPs to prepare the design details to be reflected in the plans. ➢ Example, S3 – Fig 1 (right): Part of a road layout template for various common road infrastructure facilities.	

Preparing your 1st CORENET X Submission with the COP



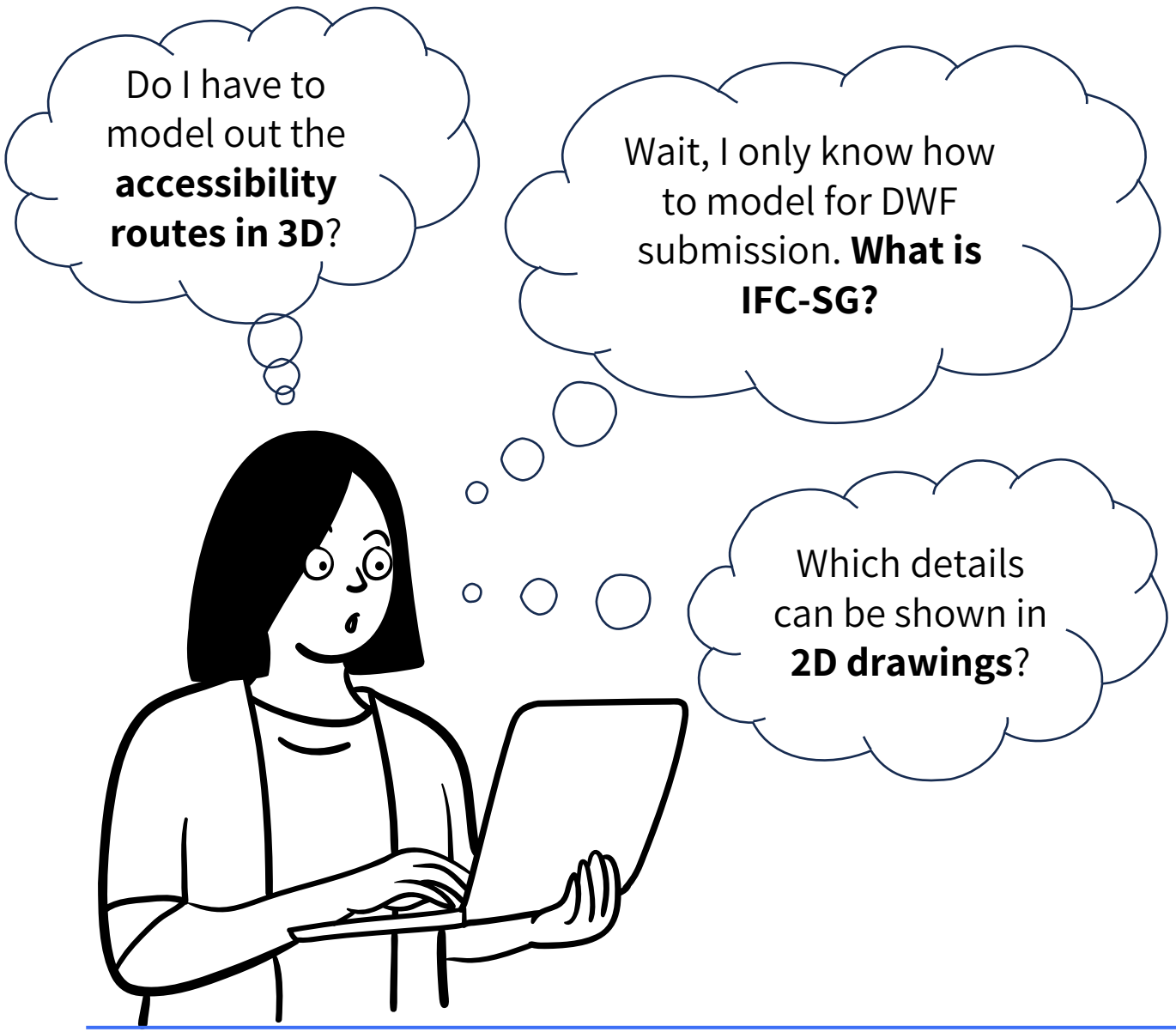
Overview of CORENET X

General Requirements

Specific Requirements

BIM Components

How the new process links to IFC-SG components



- **A-Z glossary on 3D components**, on IFC-SG data needed, with diagrams, tips and examples of how they are shown tomorrow
- Indicates process related to each 3D component
- Complements the **IFC-SG Resource Kit** (templates to generate IFC models)
- For more on Data information, you can refer to **Section 4 of the COP**

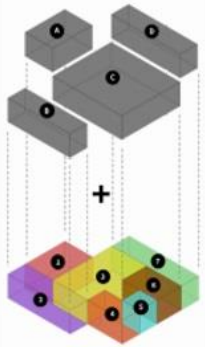
Diagrams to help with IFC-SG understanding

Space

About

As 'IfcSpace' is the most common component across all agencies, it is broken down into 2 sub-sections for ease of understanding. 'IfcSpace' consists of:

- Space (Area Schemes)
- Space (Usage)

	Space Definition	Requirements Involved	Definition	Conceptual Illustration (Not to Scale)
1	**Space (Area Schemes)**	• URA's GFA calculations • NEA's refuse output • LTA's parking provisions	• For checks based on GFA only • Spaces will need to be manually verged for 5 types of 'IfcSpace' sub-types: 1) AREA_GFA 2) AREA_LANDSCAPE 3) AREA_CONNECTIVITY 4) AREA_STRATA 5) AREA_VERIFICATION These IfcSpace sub-types and their related parameters shall replace the URA-related area schemes for GFA calculation, Unit Plan calculation, Site Coverage computation, Site Area computation and Communal Open Space computation. Properties and other information on Space (Area Schemes) can be found on Page 305	Residential (Non-Landed) Unit *See input example on subsequent pages* SPACE (AREA SCHEME)  SPACE (USAGE) S4 - Fig 00 : Space Conceptual Illustration
2	**Space (Usage)**	• BCA's Accessibility requirements • LTA's Minimum Driveway Width • NEA's Sanitary Provisions • PUB's Minimum Platform Levels • SCDF's Exit Requirements	• For checks based on Occupancy Type, Building Typology and Space Usage • As cross-agency spaces have been harmonized and standardised, each space only require 2 'IfcSpace' properties to address their usage requirements: 1) OccupancyType 2) SpaceName Properties and other information on Space (Usage) can be found at Page 309	

Modelling Space in IFC-SG

- You may refer to the IFC-SG Resource Kit for customised plug-ins to help embed Space IFC-SG data into respective BIM software

Sanitary Appliances

By IFC Representation
- **Wash Basin**

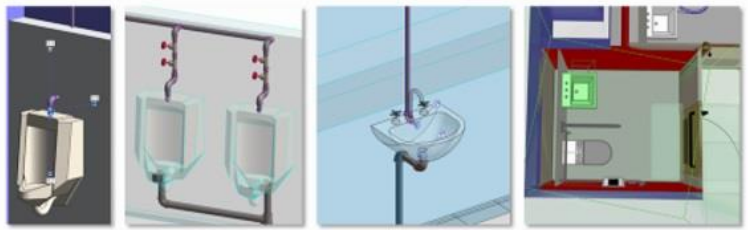
IFC Entity: IfcSanitaryTerminal
IFC SubType: WASH HAND BASIN

S/N	IFC-SG Property	Property Type	Type of Elements	Unit	Input Limitation	Examples
1	ChildrenFriendly	Boolean	-	-	Yes	TRUE / FALSE
2	Mounting	Text	-	-	No	-
3	WELS	Boolean	-	-	Yes	TRUE / FALSE

By IFC Representation
- **Water Closet**

IFC Entity: IfcSanitaryTerminal
IFC SubType: URINAL

S/N	IFC-SG Property	Property Type	Type of Elements	Unit	Input Limitation	Examples
1	AmbulantDisabled	Boolean	-	-	Yes	TRUE / FALSE
2	BarrierFreeAccessibility	Boolean	-	-	Yes	TRUE / FALSE
3	ChildrenFriendly	Boolean	-	-	Yes	TRUE / FALSE
4	PanMounting	Text	-	-	-	-
5	ToiletPanType	Boolean	-	-	Yes	TRUE / FALSE
6	WELS	Boolean	-	-	Yes	TRUE / FALSE



S4 - Fig 76 : Urinal | S4 - Fig 77 : Urinal | S4 - Fig 78 : Wash Basin | S4 - Fig 79 : Wash Basin highlighted in Green

These diagrams will help the project team have a **better understanding of the data required in the models**!

- For more IFC-SG diagrams, you can refer to **Section 4 of the COP**

What's next?

1

What Our Project Team Should Know

- Plan on how to make gateway submissions as a **team**
- Ensure each member is **clear on their own independent agency submissions**

2

What Our In-House Team Should Know

- Internal training on process and data requirements that firm needs to **sync with in-house workflows**

3

What I Should Know

- Familiarise with the COP structure, for faster reference during (1) and (2)

Firm Readiness Check

People

- **Core team to oversee firm's preparation**
  - Internal subject matter experts as "go-to" persons
- **Internal change management and training plan**
  - Setting of KPIs and tracking

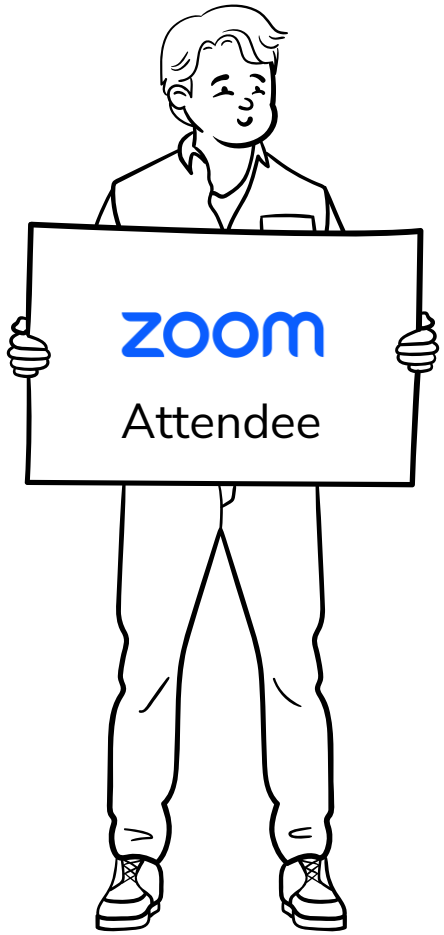
Process

- **Understand the RABW process & agencies' requirements**
  - Attend RABW training
  - Study the COP
  - Map RABW to workflow and assess impact

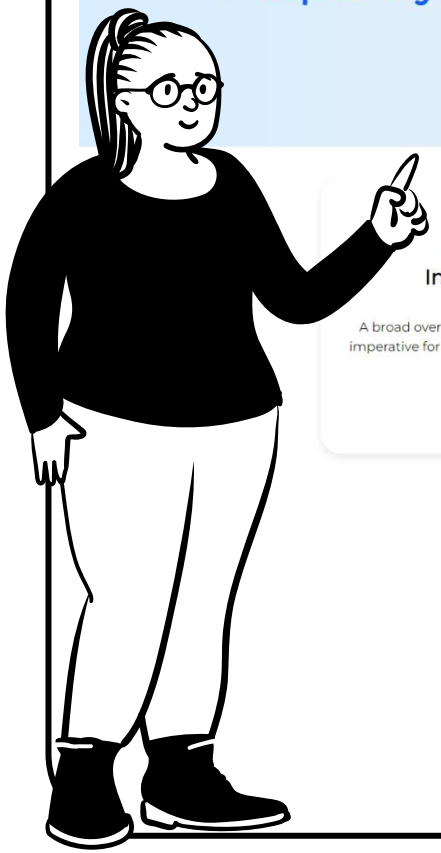
Technology

- **BIM and IFC-SG readiness**
  - Trained in IFC-SG and familiar with various IFC-SG tools
  - Create/Map internal templates to meet IFC-SG requirements

What if I have further questions beyond the CX COP?



Can you help?



CORENET X

A One-Stop Digital Shopfront for Regulatory Processes

Frequently Asked Questions (FAQs)

1

General Information

A broad overview to understanding the imperative for CORENET X transformation.

View all ›

2

New Regulatory Approval Process

Learn more about the different facets for an end-to-end CORENET X submission.

View all ›

3

New Data Requirements and Technology

Learn more about the new OpenBIM format adopted in CORENET X as well as the different technologies supporting CORENET X.

View all ›

4

Getting Ready

Find out more on CORENET X trainings and courses to equip yourselves with the necessary knowledge and skillsets.

View all ›

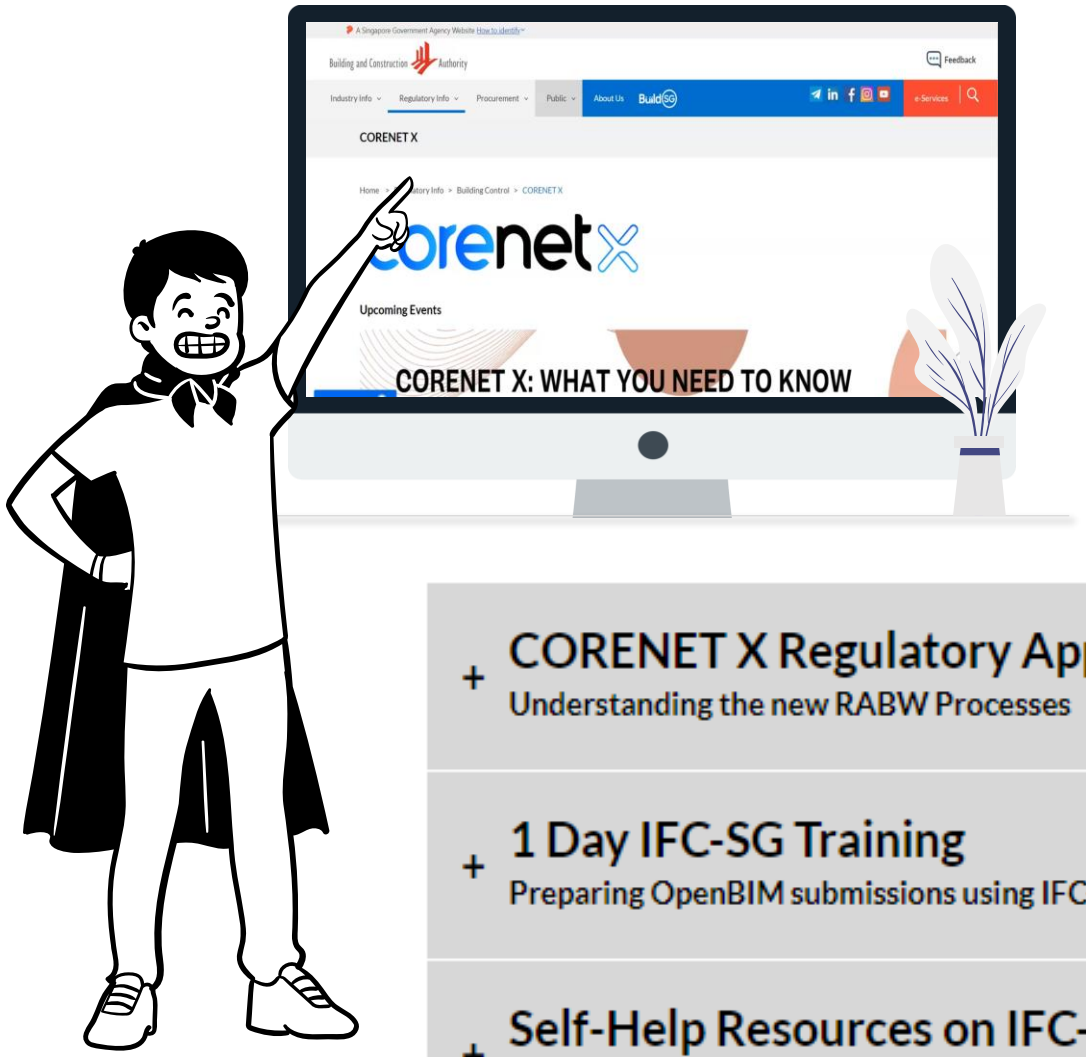
5

Specific Agency Queries and Others

Find out more on specific agency-related queries.

View all ›

What else can I do to get ready?



Scan here to access CORENET X website or go to https://go.gov.sg/cx

+ **CORENET X Regulatory Approval for Building Works (RABW) Course**
  Understanding the new RABW Processes

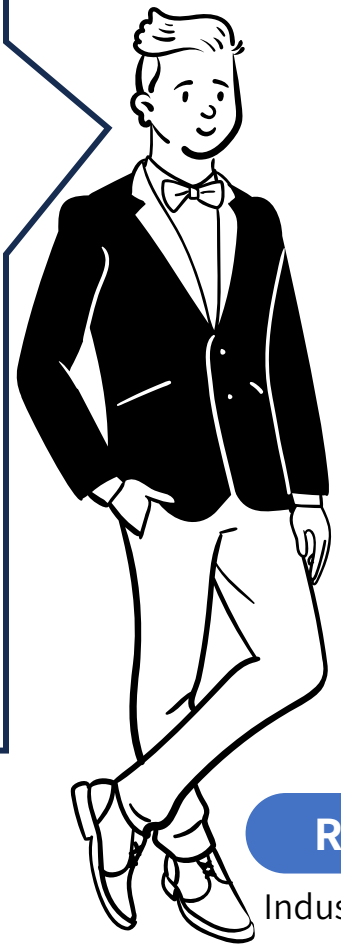
+ **1 Day IFC-SG Training**
  Preparing OpenBIM submissions using IFC-SG

+ **Self-Help Resources on IFC-SG**
  Learn by yourself with these resources

Are you ready for your first CX Submission?

My firm has carried out 1), 2) and 3)

- ✓ 1 Project Team
- ✓ 2 In-house Team
- ✓ 3 Self



Robin
Industry Professional

Questions?

Reach out to us anytime at our new helpdesk!

https://go.gov.sg/cxenquiry

Robin made sure his firm is ready for CX submissions before 2025.

Robin is fast.

Be like Robin.

Pulse Check by WSP | KORN FERRY

corenetX

Are you ready for CORENET X?

You are invited to participate in our upcoming CORENET X Pulse Check Survey. Your input will help us provide the support you need during the transition period.

We look forward to hearing from you!

This pulse check survey is conducted by WSP and Korn Ferry, who are appointed by BCA to facilitate a seamless transition to CORENET X.

CORENET X is a multi-agency effort by

KORN FERRY

wsp

People

Process

Technology

Thank you

Reach out to us anytime at our new helpdesk!