

GUIDEBOOK SERIES

GOOD PRACTICES GUIDE



First Edition | Published on Dec 2025

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PREFACE

The CORENET X Industry Guidebook is a compilation of key learning points and observations, based on projects that have been submitted to CORENET X. It is organised based on the project team's user journey and identifies key considerations for projects that are undergoing the preparation and submission process.

The CORENET X Industry Guidebook is to be referenced in conjunction with the:

1. CORENET X Code of Practice (COP)

Sets out submission requirements across agencies at each submission milestone, including the level of detail required.

2. IFC+SG Resource Kit

Provides technical templates and reference materials to support the creation of IFC+SG models.

DISCLAIMER

The CORENET X Industry Guidebook draws on case studies from live CORENET X projects. As each project differs in context and complexity, the recommended good practices are provided as guidance rather than prescriptive requirements.

CORENET X is built on the principle that successful project delivery – from design and construction to completion – depends on close collaboration among built environment professionals. Project teams are therefore encouraged to adapt the recommended practices to suit their team composition and project context.



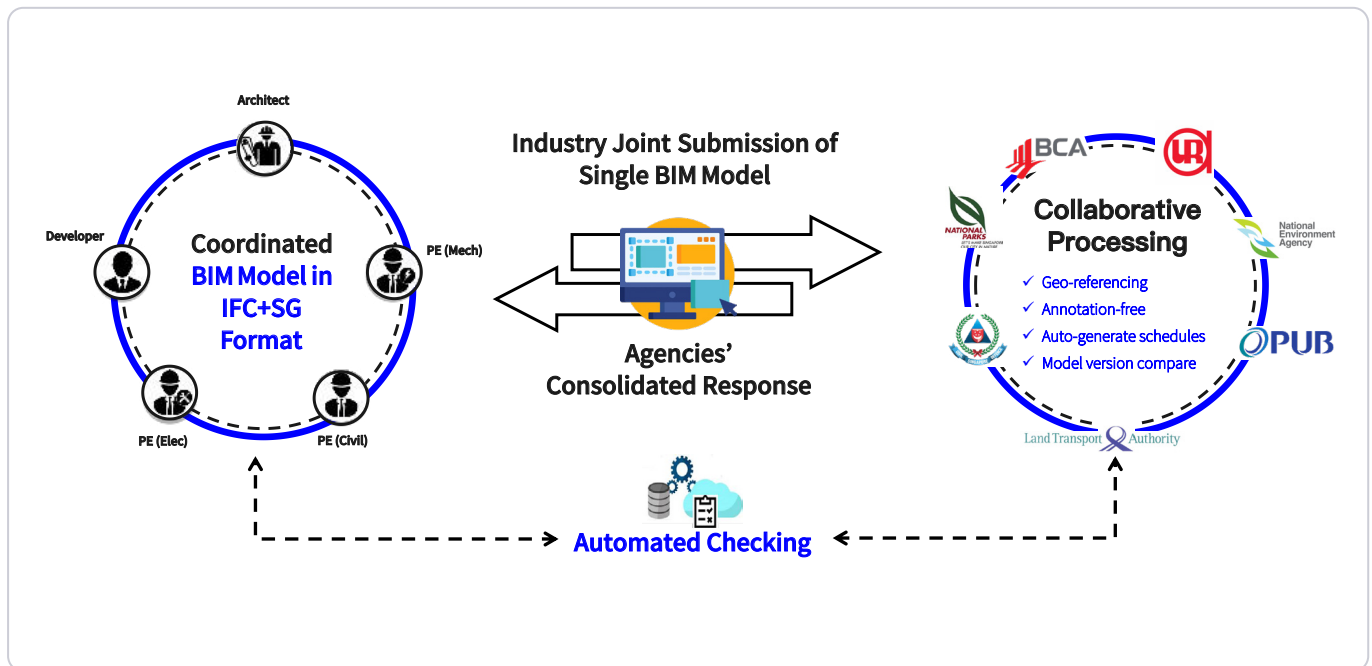
BACKGROUND

CORENET X is an innovative digitalisation platform that is set to revolutionise the regulatory approval process for building works in Singapore and redefine Government-to-Business interactions as a One-Stop Integrated Digital Shopfront. Initiated in 2018 and soft-launched on 18 December 2023, this technology-driven system leverages Building Information Modelling (BIM) and automation to create a seamless, integrated experience for industry professionals.

Under CORENET X, the current practice of consultants interacting separately with multiple agencies – occasionally with different versions of plans – will shift to one where

consultants come together, collaborate upfront to harmonise designs, and produce one coordinated BIM model. Project teams will be able to collaboratively review designs, identify potential conflicts prior to construction, and generate a coordinated BIM model for regulatory approval.

This promotes greater collaboration and productive workflows for both the industry and public agencies, complementing ongoing efforts on Integrated Digital Delivery (IDD), which is a key component of the Built Environment Industry Transformation Map.





SUBMISSION PREPARATION

2.1 Industry Onboarding Checklist for Submission Portal

STAGE	TASK	STATUS	REMARKS
Training	Access and complete hands-on training without an actual project through the CORENET X Training Environment .	<input type="checkbox"/>	Ensure familiarity with the system and end-to-end workflow.
Pre-registration	Identify the Project Coordinator (PC) for the project. Refer to Section 3.1 for the PC's roles and responsibilities.	<input type="checkbox"/>	Must be appointed before project setup.
	All project members – Developers, Qualified Persons (QPs) and QP Assistants (QPAs) – must be registered and authorised in the company's Corppass account.	<input type="checkbox"/>	Obtain authorisation in the company's Corppass account through the Corppass Admin (click here to find out who your company's Corppass Admin is).
	Set up "CORENET X Submission Portal" access in Corppass.	<input type="checkbox"/>	This step is required for all project members.
	Prepare required details of the project: development type, building works, project title, and address (MK/TS/Lot no.).	<input type="checkbox"/>	Get all information ready before proceeding with the registration process.
	Prepare required details of QPs: name, professional registration number, last four alphanumeric digits of NRIC, and email address.	<input type="checkbox"/>	
	Prepare required details of Developers: name, last four alphanumeric digits of NRIC, and email address of the home owner (if applicable).	<input type="checkbox"/>	
	Define and assign roles and responsibilities within the project team across disciplines. Click here for the list of roles and responsibilities that can be undertaken by the different QPs.	<input type="checkbox"/>	Outline clear roles and duties.
Account Setup	[For first time logins] Complete profile setup in the Submission Portal. Ensure that the QP's designation is filled in.	<input type="checkbox"/>	This is a one-time requirement for QPs.
	QPs to assign assistants and set project-specific access rights.	<input type="checkbox"/>	Project access for individual assistants can be customised by QPs.
Project Setup	Create project and appoint team members.	<input type="checkbox"/>	Include all required roles under each agency's subsection.

2.1 Industry Onboarding Checklist for Submission Portal

STAGE	TASK	STATUS	REMARKS
Submission and Payment	Enter submission details into the form.	<input type="checkbox"/>	Complete each section of the joint-submission form.
	→ Upload files such as cover letters, supporting documents, and 2D drawings to agency.	<input type="checkbox"/>	
	→ Identify the required deliverables by tagging each uploaded file.		
	→ Ensure that each file does not exceed 1GB.		
	→ Uploaded files should not be zipped.		
	→ Upload BIM models in the “Coordinated BIM” section.	<input type="checkbox"/>	→ The form is ready for submission when all sections display a green tick instead of a grey tick.
	→ Ensure that each file is between 800MB and 1GB.		
	→ Uploaded files should not be zipped.		→ The total size for joint submissions is capped at 10GB.
	Review sections.	<input type="checkbox"/>	Submission inputs related to fee computation can only be viewed after clicking on "Review Section".
	QPs to make declarations.	<input type="checkbox"/>	The form is ready for submission when all sections are indicated with a green tick.
	Payment of fees are to be made to the respective agencies.	<input type="checkbox"/>	Submissions will only be processed after payment has been made.
	Check the submission status or monitor the timeline in the "Submission Milestone Dashboard".	<input type="checkbox"/>	

2.2 IFC+SG Onboarding Checklist

Note: Skip to task 5 if you are not a Revit user.

S/N	TASK	STATUS	REMARKS
BIM Authoring Software and Features			
1.	Ensure that the latest Revit patch is installed.	<input type="checkbox"/>	Refer to link for details.
2.	Ensure that the latest Revit interoperability tool is installed.	<input type="checkbox"/>	Refer to link for details.
3.	Ensure that the Revit-IFC app is installed. For Revit 2025 users facing issues with activating the Revit-IFC dialogue box, uninstall the Revit-IFC app. (Refer to the link for details.)	<input type="checkbox"/>	Refer to link for details.
4.	Ensure that the latest version of the Revit-IFC exporter is installed.	<input type="checkbox"/>	Refer to link for details.
Component Creation and IFC+SG Information Population			
5.	Study the IFC+SG regulatory requirements for the different gateways.	<input type="checkbox"/>	Refer to link for details on key gateways. Refer to link for details on COP.
6.	Study the steps for preparing an IFC+SG model. Refer to the Glossary of Identified Components for additional information.	<input type="checkbox"/>	Refer to link for details.
7.	Ensure that you have downloaded the relevant IFC+SG toolkits and resource files.	<input type="checkbox"/>	Refer to link for details.
8.	Use third-party applications to support the IFC+SG model preparation.	<input type="checkbox"/>	Refer to link for details.
9.	Read through the Model Submission Good Practice Guide.	<input type="checkbox"/>	Refer to link for details.
10.	Read through the Geo-Referencing and Coordination Across Disciplines Good Practice Guide	<input type="checkbox"/>	Refer to link for details.
11.	Read through the Block and File Management Good Practice Guide	<input type="checkbox"/>	Refer to link for details.

2.2 IFC+SG Onboarding Checklist

S/N	TASK	STATUS	REMARKS
12.	Read through the MEP Services Good Practice Guide.	<input type="checkbox"/>	Refer to link for details.
13.	<p>Before submitting, review the exported federated IFC files.</p> <p>When using an IFC Viewer (BIMVision or BIMCollab Zoom), ensure that it is the latest build. (Note: Registration may be required, but both viewers are free.)</p> <p>Download BIMVision here. Download BIMCollab Zoom here.</p> <p>Essential Points for Model Quality:</p> <ul style="list-style-type: none"> → Ensure that IFC models can be federated together, as intended. → Ensure that components are exported to the correct IFC entity, and subtyped with the relevant IFC+SG properties and property sets. → Ensure that there is only one IFCSite per IFC file when exporting with linked files. → For Revit Users: In the Revit IFC exporter, select Additional Content>>Linked Files>>Export in the same IFCSite. → Ensure that there are no unreferenced items by checking that all elements created in Revit are referenced to a level datum. <ul style="list-style-type: none"> • If you notice any unreferenced items, locate and resolve their referencing issues. • For Revit Users: If you encounter a warning while opening an IFC file in BIMVision, download the log and use the element ID (tag) or Global Unique Identifier (GUID) to locate the elements in Revit. → Ensure that all level datums are aligned across models. Each datum must have a unique name and a unique associated GUID. To avoid confusion, datum names should also incorporate their GUIDs (with the same Finished Floor Level). 	<input type="checkbox"/>	Refer to link for details.



KEY TAKEAWAYS AND BEST PRACTICES

3.1 Project Planning and Coordination

ROLES OF COORDINATION

Effective coordination is fundamental to the success of any project. However, achieving it can be challenging as miscommunication among stakeholders often leads to delays and tension. Successful project delivery therefore relies on deliberate and structured coordination across several aspects. The four key forms of coordination that every project team should actively manage are:

1. Overall project management
2. Design coordination
3. Submission coordination
4. Other types of coordination

In CORENET X, design coordination and overall project coordination are critical components of successful building projects. Given the number of stakeholders involved, it is essential not to underestimate their importance. Without close coordination among stakeholders, even seemingly minor matters involving QPs, builders, or specialised sub-builders can escalate into significant issues.

Overall Project Coordination

This involves collaboration among the various project parties to ensure that all relevant inputs are provided and necessary actions are carried out in a timely manner. This includes overseeing overall project schedules and understanding the interdependencies between different submissions, as well as between submissions and site activities.

Design Coordination

Design coordination ensures that the design and planning of building works are well-integrated and meet all necessary requirements. The party overseeing design coordination is responsible for ensuring submission quality as well as highlighting or resolving any design conflicts.

GOOD PRACTICE



ENSURE CLARITY IN THE SCOPES OF WORK

Depending on the contractual agreement and project team setup, the developer or another appropriate party should provide clarity over who will lead the design coordination and overall project coordination. These responsibilities do NOT fall on a single individual or firm. Rather, it is a collective responsibility.

It is important to identify:

1. The overall lead coordinator(s); and
2. A representative from each firm who will work with the lead coordinator(s) and ensure alignment within their respective teams.



Planning a Project



COMMON PITFALLS

Lack of Clarity on the Scope of Work

When there is no consensus on who should act as the lead coordinator – for example, when both the architect and builder assume that the other is responsible – coordination gaps can occur.

Poor Design Coordination

Lack of discussion among QPs on design changes can have downstream implications. For example, a layout change by the architect may require the civil and structural (C&S) engineer to redo structural calculations and the mechanical and electrical (M&E) engineer to redesign the services.

Unclear Overall Project Coordination

When the overall project coordinator is not clearly identified, specialist QPs – particularly those engaged under the builder – may be uncertain about the submission process or how to furnish additional documents to agencies. Main QPs may also assume they are not responsible for assisting or verifying the specialist's submission. This lack of clarity can lead to delays in the approval process.



Planning a Project

3.2 Timeline Management

The new regulatory approval process introduces a fundamental shift in project scheduling and planning. Early planning and achievable timelines are now essential components for successful project delivery.


Project teams should establish a well-structured timeline that allocates sufficient time for design development and coordination. This includes setting clear design freeze milestones to minimise rework and streamline the approval process. Learnings from live projects have demonstrated that projects with adequate design periods consistently achieve better outcomes, while compressed schedules often result in submission quality issues that require extensive revisions.

To ensure successful project delivery, developers and project teams should:

- Allocate realistic time frames for design development
- Factor in sufficient coordination periods between disciplines
- Establish clear design freeze milestones
- Build in adequate time for internal reviews before submissions
- Account for potential revision cycles in the project schedule

This proactive approach to timeline management helps teams deliver coordinated, high-quality submissions that align with regulatory requirements and facilitate smoother approvals.

GOOD PRACTICE



SEEK ALIGNMENT AND AGREEMENT ON TIMELINES

The project timeline should be jointly agreed upon by all members of the project team, with adequate buffers built in for preparation, design, and coordination. Time for activities such as pre-submission consultations or waivers should also be allocated, where required.



COMMON PITFALLS

Insufficient Time Catered for Submission Preparation

Project timelines should be planned to allow for proper sequencing of works and approval processes, ensuring that quality is not compromised.

For example, unrealistic schedules may pressure QPs to rush submissions, increasing the likelihood of mistakes, which could impede approval processing and result in unnecessary rework.

Late Submission of Waiver

Some QPs may assume – based on past CORENET 2 practices – that waiver applications can be submitted later on in the process, and may expect agencies to accept them.

Under CORENET X, project teams are expected to plan ahead and allow sufficient time for waiver applications or pre-submission consultations, where deviations from requirements are anticipated.




Planning a Project

3.3 Design Changes

DESIGN FREEZE

As with any project, the overall timeline may be significantly impacted if designs are not finalised early enough to facilitate effective multi-disciplinary coordination. While some degree of change is inevitable, frequent design revisions will negatively affect project schedules – particularly when design changes are introduced partway during the review and coordination process. Such changes often necessitate a reset of the review process, causing delays in the timeline.


GOOD PRACTICE 

MINIMISE FREQUENT DESIGN CHANGES

Frequent design changes during a project can result in inefficient and abortive work. It is therefore important to establish a clear deadline and implement a design freeze. Doing so provides greater certainty for project teams, enabling effective coordination and timely plan approvals.

EARLY BUILDER INVOLVEMENT

If the project team intends to involve the builder in providing design inputs (i.e. value engineering), the builder should be engaged during the early stages rather than during the later phases of design coordination.

GOOD PRACTICE 

INVOLVE THE BUILDER EARLY

Builders are key stakeholders in any project. Engaging builders early allows their inputs to be incorporated during the design and planning stages, helping to avoid any delays or revisions that may arise later on.



COMMON PITFALLS

Frequent Design Changes During Submission

Developers making changes throughout the submission process will result in new designs being submitted during resubmissions. This prolongs the approval timeline.

Builder's Inputs Introduced Late in the Design Phase

Despite intentions to involve the builder early, they are often engaged only when the design is near completion. This late inputs can cause redesigns by consultants, resulting in inefficient and abortive work.



Planning a Project

3.4 Dependencies That Affect Site Progress

It is important to identify dependencies across submissions and understand their impact on site progress.

Recognising these dependencies allows the project team to more effectively plan the project timeline and better navigate the submission process.

SUBMISSIONS FOR DEMOLITION AND NEW ERECTION


Demolition and new erection proposals can proceed concurrently. Demolition submissions require a joint application made to both BCA and the Urban Redevelopment Authority (URA). BCA will approve the demolition submission only if URA has granted approval for the demolition or has authorised the redevelopment of the site.

GATEWAY PROCESS

The Design Gateway (DG) marks the start of the regulatory approval process and consists of URA's Provisional Permission and the relevant Developmental Control clearances from other agencies. DG submission is essential before proceeding to the Piling Gateway (PG) and Construction Gateway (CG).

PG Dependency with DG	<ul style="list-style-type: none"> → PG draft submission may only be created after the creation of DG draft submission. → PG submission may be initiated while DG submission is being processed. → PG submission will only be approved after DG submission has cleared.
CG Dependency with DG	<ul style="list-style-type: none"> → CG draft submission may only be created after the creation of DG draft submission. → CG submission will only be approved after DG submission has cleared.

GOOD PRACTICE



UNDERSTAND DEPENDENCIES TO OPTIMISE SCHEDULING

Plan the project timeline by identifying submission dependencies. While earlier submissions are under review, teams can finalise subsequent submissions and commence preparatory work. This will require close coordination among all consultants.



LEARNING POINT

Optimising Workflow

Agencies review and update processes based on insights gained from live CORENET X submissions, relieving time pressure by reducing dependencies between submissions and improving overall workflow efficiency.

DEPENDENCIES BETWEEN SUBMISSIONS AND SITE PROGRESS

It is important to take note of submissions that affect site progress and account for the time required for off-site activities, such as the fabrication of precast components.

If the project is eligible for Part Structural Plan (ST) submission,

- Plan your Part ST packages well. Pre-submission consultation is required to discuss your Part ST planning.
- The CG submission must include complete structural, architectural, and MEP models, along with detailed structural calculations for part 1 and calculations by Accredited Checkers/Accredited Checking Organisations (AC/ACO).
- Structural submissions for the remaining parts of the project may be submitted as independent ST submissions.
- As the CG submission is a joint submission that is coordinated across disciplines, it must be approved before the remaining Part ST submissions can be cleared.

Differences Between CG Submission and Remaining Part ST Submissions:

- Part ST submissions for the remaining portions of the project are submitted independently and drafts can be created at any time.
- Part ST submissions may be initiated while CG submission is being processed.
- Approval for these submissions will only be granted once CG submission – which serves as the overall coordinated plan/model – has been cleared.

GOOD PRACTICE



CONSIDER DEPENDENCIES WHEN PLANNING THE PROJECT SCHEDULE

Discuss with your QP (Structural) and builder to plan project schedules. If extensive off-site activities are involved and lead time is required, consider catering sufficient time to include the scope of off-site activities early in the submission timeline.



COMMON PITFALLS

Off-site Activities Not Accounted for in Project Plan

Failing to allocate sufficient time for submissions related to off-site activities, such as precast components, can lead to project delays.



Making a Submission

3.5 Navigating the Submission Portal

In line with digitalisation efforts, CORENET X is adopting greater automation for form filling and data entry, moving away from wet-ink signatures. With this shift, many workflows will be digitalised and streamlined under the new system.

As part of this transition, it is important to distinguish between the CORENET X Submission Portal and CORENET 2, which are separate systems with distinct functions. Understanding this distinction is crucial, as confusion between the two can result in administrative delays.

KEY CHANGES MADE UNDER CORENET X

1. Most project team members are now required to use CORENET X, including those who previously did not interact with CORENET 2. This includes team members such as Developers, Accredited Checkers, Resident Engineers, and Resident Technical Officers.
2. Project members accessing the CORENET X Submission Portal on behalf of their firms are required to use a Singpass Business account.
3. The appointment of project members by the developer or builder (for Design & Build projects) has been fully digitalised to eliminate manual form filling and wet-ink signatures. The Project Coordinator (typically the lead QP, often the Architect) prepares the necessary information, while the developer must log in to the CORENET X Submission Portal to authorise this process.

GOOD PRACTICE



ENSURE READINESS BEFORE ONBOARDING TO CORENET X

1. For project members using Singpass Business, work with your firm's Corppass Admin to ensure your account is set up to access CORENET X.
2. Once a project is created, log in to ensure that you can access the project.
3. Always ensure that your professional registration details are up-to-date.



COMMON PITFALLS

Did Not Set Up Singpass Business Early

To use Singpass Business, the firm must have a Corppass account. The Corppass Administrator grants access through the Corppass portal to individuals who need to interact with CORENET X on the firm's behalf. Many project members overlook this step or are unaware of the identity of their Corppass Administrator. Additionally, larger organisations may require internal clearance which would further delay access and project submission.

Overlooking Steps in the Onboarding Process

Some project members overlook the mandatory first login after receiving their invitation link. Even though the Project Coordinator inputs all members' details, each individual must still complete this initial login to be formally added to the project. This requirement is a key part of the system's security design, which captures each member's digital identity for future authentication.

Failure to Update Professional Registration

The system validates the professional registration details for all relevant project members. In some cases, delays occur when licensed builders fail to update the Accredited Person's (AP) and Technical Controller's (TC) details in the system.

PLAN THE PROJECT TOP/CSC JOURNEY EARLY

Under CORENET 2, many forms allow project members to declare and sign manually, after which the QP collates and submits these documents to the respective agencies. With CORENET X, these processes will instead be fully digitalised, and project members will be required to log in via Singpass Business to make their declarations online.

As some of these members may not have previously used the CORENET 2 platform, it is important to ensure that all parties are informed of the new CORENET X requirements early on. This will minimise potential delays arising from unfamiliarity or miscommunication.

Given that construction projects often span several years, there may also be long periods of inactivity between a member's initial involvement with the CORENET X Submission Portal and later project stages, such as at the Temporary Occupation Permit/Certificate of Statutory Completion (TOP/CSC) stage. This gap may lead to delays if project members are unaware of the actions required of them at the TOP/CSC stage.

For instance, some Professional Engineers (PE) may continue to assume that the Certificate of Supervision (COS) for the Lightning Protection System must be submitted via hard copy, as this was previously the case under CORENET 2.

GOOD PRACTICE



PLAN AHEAD FOR TOP/CSC

As the project nears completion, it is important to start the preparations early and inform the relevant project members of the necessary actions required.

The CORENET X Submission Portal provides a TOP/CSC status dashboard that tracks the progress of technical clearances and required documentations. Use the dashboard to guide the planning and coordination of your TOP/CSC process.



COMMON PITFALLS

Overlooked Involvement of PE

The project team may overlook the involvement of the PE in submitting the COS for the Lightning Protection System, resulting in delays as the TOP/CSC process cannot proceed until the submission is completed.

Delayed TOP Submission to BCA After Technical Clearances

As BCA acts as the gatekeeper for technical agencies before the issuance of the overall TOP/CSC, some project teams only submit BCA-related TOP requirements at a very late stage.

Under CORENET X, the project team should clear BCA's TOP requirements concurrently with other technical clearances to facilitate a more streamlined and timely TOP/CSC process.



Making a Submission

3.6 Submission Processes and Statutory Responsibilities

To support coordinated workflows, CORENET X consists of both joint and independent submissions. It is important that all project members understand their roles clearly to ensure a seamless submission process.

TYPE OF SUBMISSION	WHO IS INVOLVED
Gateway Submission	
Gateway Submission (e.g. DG, PG, CG)	<ul style="list-style-type: none"> → One or more QPs → One or more agencies
Direct Submission Process (DSP) – Joint Plan Submission	<ul style="list-style-type: none"> → One or more QPs → One or more agencies
Independent Submission	
Joint Independent Submissions (e.g. Demolition, External Works)	<ul style="list-style-type: none"> → One or more QPs → One or more agencies
Agency-specific Joint Independent Submission (e.g. ST Plan and Permit, Completion of Works)	<ul style="list-style-type: none"> → One or more project members → Submission to one agency
Agency-specific Independent Submission	<ul style="list-style-type: none"> → One QP → Submission to one agency



COMMON PITFALLS

Lack of Clarity Over Agency Submissions

In many cases, the project and submission setup will be handled by the QPA. However, the QPA may not always be clear on the agreed scope of work and the statutory responsibilities for each team member. Since the assigned scope determines access rights within the submission portal, it is paramount to establish clarity early in the process.

Sending Multiple Requests to the Developer for Member Appointments

The system sends notifications when action is required. For instance, when the QPA submits appointment requests for each newly added member separately, it can result in the developer receiving multiple email notifications. This can cause unnecessary email clutter.

ASSIGNING STATUTORY RESPONSIBILITIES TO PROJECT MEMBERS

As a digital platform facilitating regulatory submissions, CORENET X requires clear attribution of inputs from each professional involved. To enable this, the Submission Portal requires that all professionals be identified, added to the project, and assigned their statutory responsibilities. This includes specifying the types of plans or submissions that they are responsible for to the respective agencies.

This process is overseen by the Project Coordinator, a designated system role responsible for managing the administrative setup of the project. Once the list of professionals and their roles is ready, the Project Coordinator will initiate the formal appointment process by forwarding the list to the developer – or builder, depending on the project – who will then appoint the roles in accordance with the respective Acts and Regulations.

Following this, the system will automatically apply access controls based on each project member’s appointed responsibilities. For example, an Architect will not be able to create or amend a Structural Submission, as this will fall under the responsibilities of the Professional Engineer.

GOOD PRACTICE



ENSURE EARLY ALIGNMENT ON SUBMISSION PREPARATION AND RESPONSIBILITIES

Align with the project team early to ensure clarity on each project member’s scope of responsibility, as this directly impacts access to relevant aspects of the submission. You may refer to this [link](#) to guide your project.

Before initiating the appointment process, the individual preparing the submission should ensure that all the necessary information is in place. Once ready, the system will consolidate the requests and send only one email notification to the intended party.

DIGITAL SIGNING

CORENET X uses Singpass for login and user identification. All actions and declarations made within the system will be identified through this digital identity.

However, for plans and documents such as calculations that are prepared outside the system, Netrust Digital Signing is still required to maintain file integrity during upload and submission.

GOOD PRACTICE



RENEW AND USE YOUR NETRUST CERTIFICATE FOR DIGITAL SIGNING

Ensure that the Netrust Digital Signing Certificate is renewed on time to avoid issues during submission. All plans and documents intended for approval must be digitally signed with a Netrust token.



COMMON PITFALLS

Missing Digital Signatures

Plans and documents are important items for regulatory submissions and must be digitally signed by the QP using a Netrust token. This step is often overlooked, which can delay the approval process.

Expired Netrust Digital Signing Certification

Netrust provides digital signing certificates to registered professionals. It is important to ensure that these certificates remain valid as expired certificates can disrupt the digital signing process and cause submission delays.

Excessively Long File Paths

Files located in multiple levels of sub-folders can cause errors during encryption e.g. XX\XX\XX\[File Name]



Making a Submission

3.7 Ensuring Submission Quality

Submission quality plays a pivotal role in ensuring timely approvals through CORENET X. Well-prepared submissions that meet all requirements enable efficient processing and reduce the need for clarifications. This will help reduce unnecessary iterations and prevent prolonged delays in the processing timeline.

RESPONDING TO WRITTEN DIRECTIONS (WDS)

Responding accurately to WDs is key to smooth and timely approvals. When preparing for resubmission, the project team should ensure that all documents are complete and every previous comment has been properly addressed.

Avoid generic replies such as “complied with” or “noted”, as they often lead to additional queries. Instead, provide detailed responses that clearly explain how each issue was resolved and where supporting changes can be found.

CONDUCTING VISUAL MODEL QUALITY CHECKS BEFORE SUBMISSION

Pre-submission model checks are a crucial quality control measure. Project teams should carry out a systematic visual inspection, which includes reviewing the model from multiple angles and ensuring that the models federate correctly. This initial check can help identify obvious issues, reducing the likelihood of receiving WDs and ensuring a smoother approval process.

For detailed model quality checks, please refer to [Section 3.11](#).

GOOD PRACTICE



CONDUCT QUALITY CHECKS PRIOR TO SUBMISSION

Project teams should conduct comprehensive quality checks on all documents, drawings, and models before submission to ensure document completeness and accuracy. When responding to comments, provide clear and specific responses that detail the changes made and where they can be found to facilitate efficient processing.



COMMON PITFALLS

Lack of Clarity in WD Responses

Some project teams fail to fully address agency comments even after two submission rounds. This lack of clarity has resulted in additional working sessions, extended processing timelines, and possibly delayed approvals.

Skipping Model Checks Prior to Submission

Project teams who skip quality checks often submit models with avoidable errors. Such errors hinder the agency’s review process and typically result in WDs. Examples include:

- Incomplete models (e.g. a missing roof) as a result of the QP forgetting to attach files.
- Federation errors causing model components (e.g. a drain) to appear “floating” above the ground.
- Federation issues resulting in disjointed tower blocks and podiums.

Such issues can usually be identified through basic visual inspections. Project teams should always perform these checks and resolve errors before submissions to prevent avoidable delays.



Making a Submission

3.8 Providing the Right Level of M&E Details

The level of M&E details required varies depending on the project typology. Close coordination across disciplines – particularly among the Architect, C&S Engineer, and M&E Engineer – is important. A development's functionality depends on a wide range of services, ranging from sewerage and sanitary routing to ventilation. Therefore, M&E services are an important aspect that should not be overlooked, even as the building form is being finalised.

UNDERSTANDING WHAT IS NEEDED FOR REGULATORY SUBMISSION

While it may seem ideal to provide every single piece of information, overly detailed models can lead to system performance issues and longer processing times. Therefore, it is important to strike a balance between the level of information available and the optimal level to be provided.

To do this effectively, project teams must understand the rationales behind each regulatory requirement and provide only the relevant details needed to support regulatory compliance.

Modelling Regulated M&E Aspects

M&E components requiring regulatory approval must be included in the submission and modelled in accordance with the CORENET X COP.

The following are examples of such regulatory requirements:

- Drainage Aspects, Public Utilities Board (PUB)
- Sewerage and Sanitary, PUB
- Exhaust for Carparks, Toilets, and Kitchens, National Environment Agency (NEA)

During the early stages, some project teams may prefer to model all M&E services for better coordination. This includes internal systems like Air Conditioning and Mechanical Ventilation (ACMV) piping, water supplies, and sewerage routing. Provision of these services and detail routing will affect factors such as ceiling height and carpark headroom, which are tied to compliance with regulatory requirements from BCA and the Land Transport Authority (LTA).

While it is possible to submit all M&E models, it can result in excessively large BIM models. These models will take much longer to export to IFC+SG format, particularly for extensive development projects, which can delay the submission process. To manage this, project teams should continue coordinating in their native BIM environment, only exporting the necessary elements for regulatory submission to IFC+SG.



COMMON PITFALLS

Excessive Model Details Leading to Long Export Times

Large IFC+SG models with unnecessary details can result in prolonged export durations, delaying the submission process.

Managing M&E Services in BIM Models

It is not necessary to combine all M&E services from separate BIM models into a single, large BIM file. Effective coordination across disciplines can be achieved through model federation using the BIM authoring software and model viewers.

Typically, different M&E services are modelled in separate files to allow for effective management of each service. If the team prefers to combine multiple M&E services into one BIM file, QPs should assess whether the model size remains manageable and whether subsequent collaborations with other disciplines and version control will be sustainable.

GOOD PRACTICE



SUBMIT ONLY WHAT IS NEEDED

To manage file size and reduce export time, the model conversion process to the openBIM format (i.e. IFC+SG) should include only the essential M&E details required for regulatory review.

CORENET X does not aim to front-load requirements, but instead ensures that all disciplines are coordinated during the design stage and when seeking approval from authorities. This helps prevent situations where one aspect is overlooked, leading to issues and costly reworks during construction.



Modelling for IFC+SG

3.9 Model Federation

CORENET X requires joint submissions to facilitate collaboration and to ensure all design aspects are well-coordinated. As CORENET X adopts the IFC+SG standard, it is essential that models federate accurately and without issue.

A federated model integrates discipline-specific models, such as architectural, structural, mechanical, electrical, and plumbing into a single coordinated digital environment. These models are not merged into a single file, but rather linked together to allow cross-discipline coordination and review. This multi-disciplinary integration helps identify design clashes, ensure spatial consistency, and improve overall model accuracy.

For regulatory agencies, the federated IFC+SG model serves as a single source of truth, allowing different authorities to review a project from a unified perspective. This streamlines regulatory compliance checks, improves transparency, avoids duplicated effort, and enables faster and more accurate regulatory approvals across agencies. It is critical to set up and agree on a common project reference point so that all discipline models are aligned correctly within the federated environment.

GOOD PRACTICE



ESTABLISH AND MAINTAIN A COMMON REFERENCE POINT

Establish a common project reference point at the start of the project, and ensure all discipline models align to the same coordinate system for accurate federation. If any changes are made to the reference point, promptly communicate these updates to all BIM teams to maintain coordination accuracy across all models.



COMMON PITFALLS

Lack of Coordination in Initial Setup

When project teams fail to define and document a common coordinate system at the start of the project, each discipline may model using different reference points and orientations. This can cause significant coordination issues downstream.

Poor Communication on Reference Point Changes

If changes to the project reference point are made without notifying all stakeholders, some teams may continue working with outdated coordinates, resulting in misaligned models.



Modelling for IFC+SG

3.10 Alignment of Levels and Zones

For CORENET X submissions, it is crucial to ensure that storey names and heights (i.e. “Z” values), especially Finished Floor Levels (FFLs), are consistently and uniquely defined across all discipline-specific BIM models, including architectural, structural, and MEP models. Each storey should also retain a unique and consistent GUID across all models to support data integrity and accurate model referencing.

For example:

- File A (Architecture):
"1st Storey" - GUID: 3f7c4e8a-9b2d-11ed-a8fc
- File B (Structure):
"1st Storey" - GUID: 8d2e5f9b-3c4a-12fg-b9de
- File C (MEP):
"1st Storey" - GUID: 2k7h4j5l-6m8n-09op-q1rs

Storey names and FFL values must be identical across all models to ensure accurate stacking, seamless coordination, and effective regulatory checks within the CORENET X platform. Any discrepancies can lead to translation misalignment, confusing presentation, or delays in regulatory approval.

To avoid this, project teams must establish and adhere to a standardised storey naming convention, FFL reference, and GUID management strategy. This set standard has to be applied uniformly, immediately at project kick-off.

GOOD PRACTICE



STANDARDISE STOREY NAMING, FFLS, AND HEIGHTS

To define and maintain a centralised standard for storey naming, height (“Z” value) and FFL should be applied consistently across all disciplines and throughout the project. Using shared reference files helps prevent discrepancies and ensures alignment across all models.



COMMON PITFALLS

Lack of Communication Within Project Team

Inconsistent storey names and FFL across models are often caused by poor communication between disciplines and the absence of a shared storey reference. Additionally, changes made in isolation without notifying others can lead to discrepancies across models.

Lack of Standardised Workflow to Manage Storey or FFL Changes

Without a clear process to manage changes in storey names, FFLs, and heights, project teams may introduce inconsistencies across models among different disciplines.

3.11 Enhancing Model Quality for CORENET X Submissions

Across CORENET X submission gateways, poor modelling quality frequently leads to non-compliance with the COP and IFC+SG requirements.

Common issues include missing components, unreferenced objects, incorrect IFC entity assignments, incomplete property sets, and inappropriate IFC object subtypes.

These issues frequently cause failed compliance checks, leading to WDs for model corrections, which results in avoidable delays and reworks. To avoid this, rigorous quality assurance must be adopted throughout model development and prior to submission. This will ensure full compliance with IFC+SG standards and COP, thereby supporting smooth regulatory approvals.

Conducting model quality checks before submission helps project teams identify and resolve issues such as missing components, incorrect IFC+SG classifications, or incomplete property sets early on.

This proactive approach minimises the risk of non-compliance and prevents unnecessary reworks or WDs from agencies. When combined with the use of IFC+SG validator tools and collaborative workflows, this gateway-specific understanding supports timely regulatory approvals.

GOOD PRACTICE



COORDINATE EARLY TO STRENGTHEN MODEL QUALITY

Early and close collaboration among all project disciplines is essential, with BIM modelling teams jointly planning modelling workflows to avoid siloed efforts that could lead to inconsistent outputs.

An open mindset is also crucial to adapt to updated workflows that are aligned with IFC+SG requirements. Throughout the process, QPs must stay engaged with the BIM modelling team to ensure that models reflect the design intent and meet regulatory expectations.



COMMON PITFALLS

Lack of Early Coordination Among Disciplines

BIM modelling teams across different disciplines often work in silos, leading to misaligned workflows and inconsistent model outputs.

Resistance to Adopting New BIM Workflows

Project teams may attempt to apply outdated practices to current CORENET X requirements.

Weak Collaboration Between QPs and BIM Teams

When QPs are not actively engaged with the BIM modelling team, there is a risk of misinterpreting design intent or overlooking compliance issues.



ANNEX

4.1 Annex A – Useful Resources and Links

S/N	ITEM	LINK
1.	CORENET X Website	https://go.gov.sg/cx
2.	CORENET X Code of Practice	https://go.gov.sg/cxcodeofpractice
3.	CORENET X Helpdesk	https://go.gov.sg/cxhelpdesk
4.	Training Courses	https://go.gov.sg/cxtrainingcourses
5.	Training Environment for Simulated Hands-on	https://go.gov.sg/cxtrainingenv
6.	Frequently Asked Questions	https://go.gov.sg/cxfaq