CX’s automated model checker - Quality Check

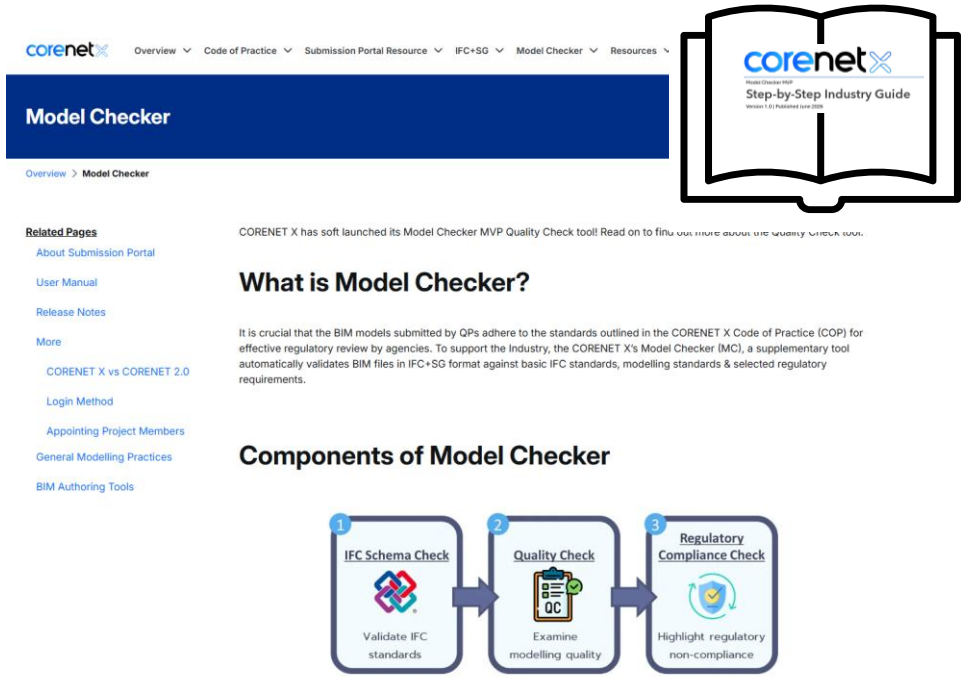
By CXTD

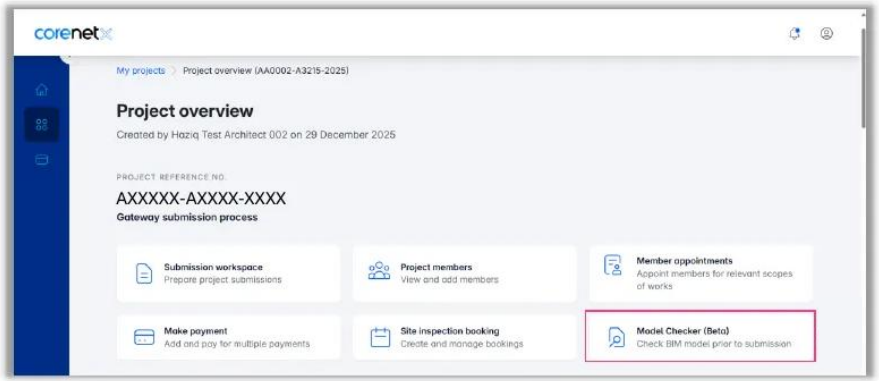
23 October 2026

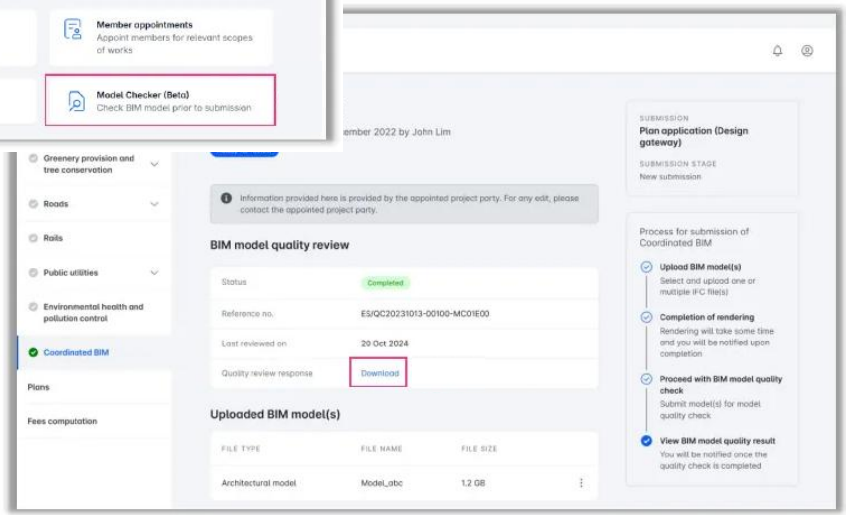
Background

https://info.corenet.gov.sg/model-checker

- CX's Model Check (MC) which is a supplementary tool that checks for compliance to code of practice
- Roll out CX's MC MVP on 2nd June is done in a progressive manner starting with 6 Quality Check rules accompanied by Step-by-Step Guide
- Available to QP in pre-submission and formal submission on CX's Submission Portal

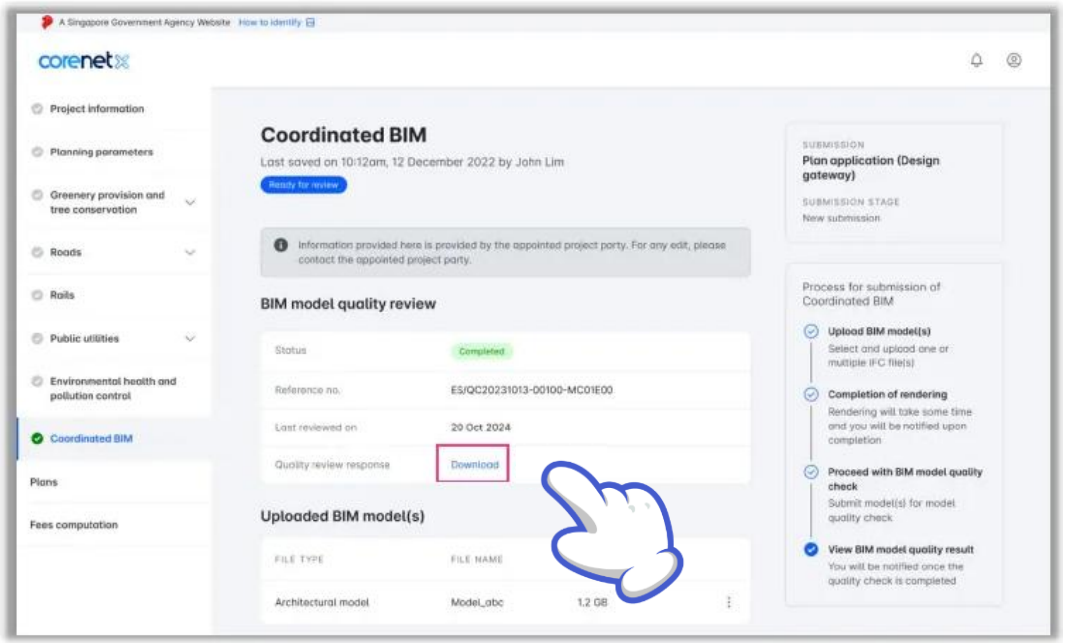


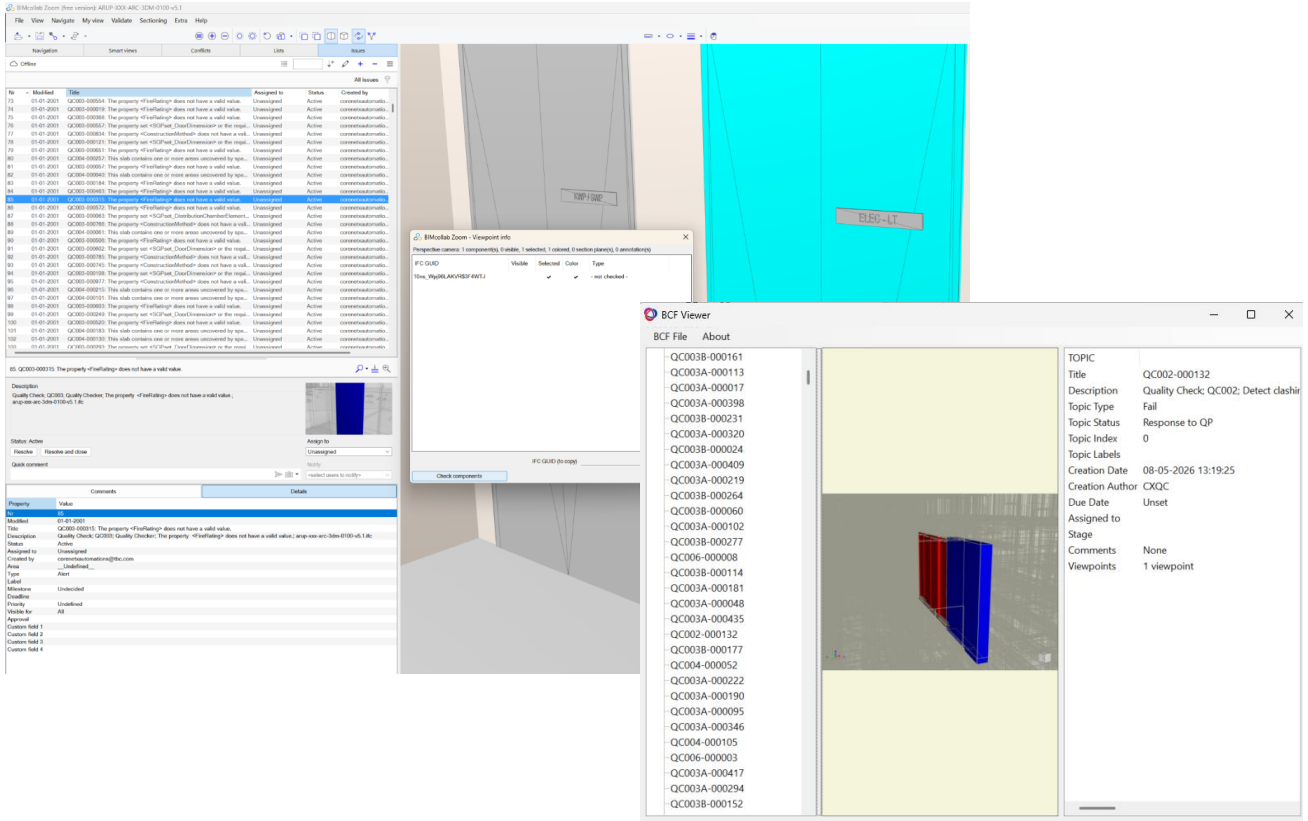




View QC Result

- QC results are returned to QPs in open BIM Collaboration Format (bcfzip)
- Can be opened in native modelling software (via plugin), IFC BIM viewer such as BIMVision/ BIMCollab/Solibri, and BCF viewer





Observation

- QC results are return to QPs in open BIM Collaboration Format (bcfzip)
- Can be opened in native modelling software (via plugin), IFC BIM viewer such as BIMVision/ BIMCollab/Solibri, and BCF viewer

Quality Check Overview

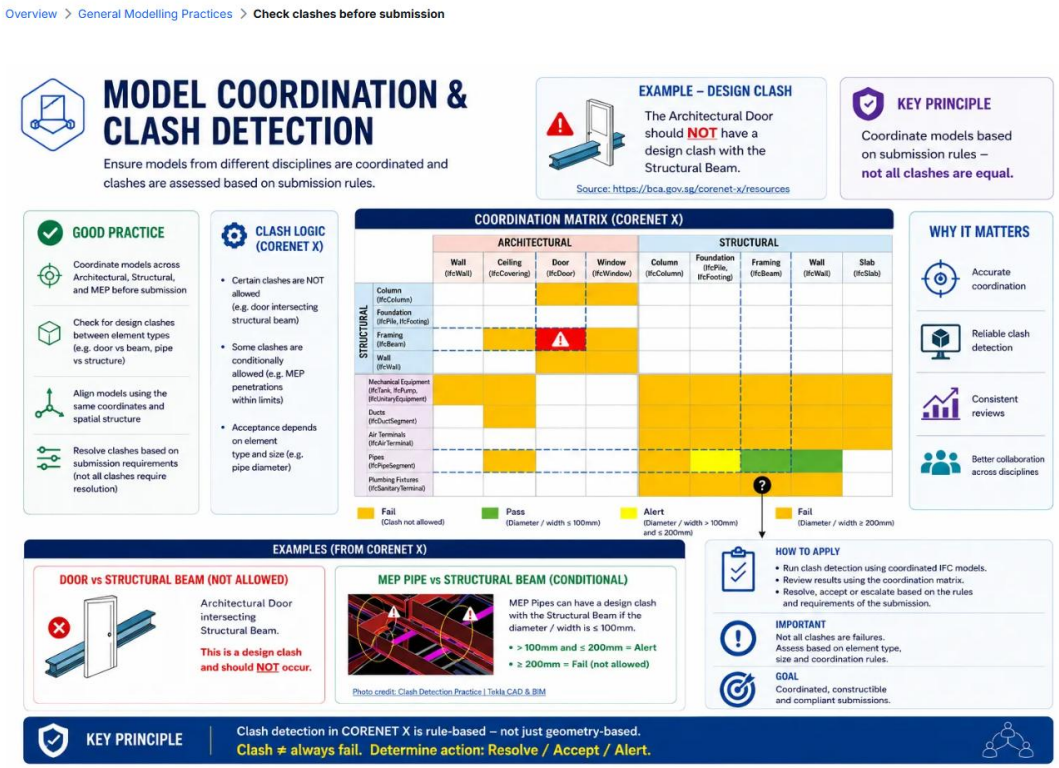
	Brief description and purpose of check	Why it matters
QC001	**Building Storey Naming** Checks if building storeys follow typical naming convention.	So PO doesn't need to second guess the make-up of the building and nature of the building storey e.g. what is lower ground? Ist a basement then? What is 6th storey upper? Looks like a mezzanine
QC002	**Clash Detection** Checks for significant clashes between selected entities especially structural elements.	To have assurance that works among all disciplines are coordinated to reduce resubmission/ amendment/ waiver downstream e.g. shift an IC because it clash into a pile
QC003	**Modelling inputs following IFC+SG in COP** Checks that parameters are correctly provided as per Section 4 of Code of Practice	So PO understand the design intent/ provision e.g. fire rating, GFA type, ventilation mode of the space
QC004	**Completeness of room tagging** Checks that rooms/spaces are properly modelled and tagged in BIM models	To have assurance that spaces are properly populated and indicated for PO to gain basic understanding of the building usage e.g. PO would not be able to differentiate an office from a store room and will not be able to review the submission if the space info is not indicated
QC005	**Alignment of BIM Model Coordinates** Checks that the submitted BIM models contain the same coordinates to help ensure good federation of coordinated BIM models	So PO could review the submission with full context e.g. PO can check headroom requirement if the structural model and MEP model are sitting neatly with architectural model
QC006	**Level Consistency** Verify that same level name has the same FFL, and vice versa for clarity to project team and Agencies	So PO will not get confused with conflicting information e.g. MPL is declared differently from architectural model and structural model

Quality Check Overview

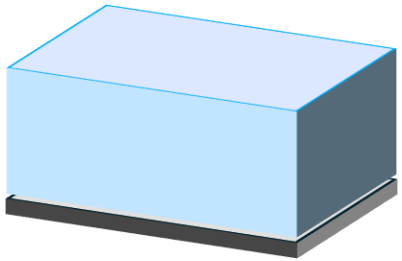
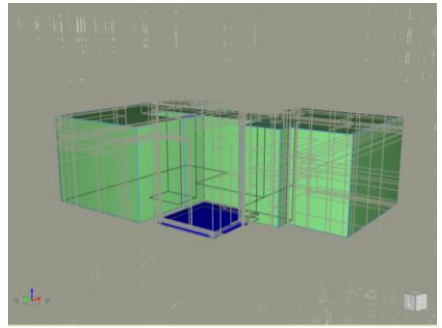
	Brief description and purpose of check	What need to be done
QC001	**Building Storey Naming** Checks if building storeys follow typical naming convention.	Name a building storey with logical and clear manner following standard naming conventions.
QC002	**Clash Detection** Checks for significant clashes between selected entities especially structural elements.	Make sure all disciplines' model are updated and coordinated.
QC003	**Modelling inputs following IFC+SG in COP** Checks that parameters are correctly provided as per Section 4 of Code of Practice	Use IFC+SG interoperability tool to set up the file and ensure the values are filled up in accordance to COP.
QC004	**Completeness of room tagging** Checks that rooms/spaces are properly modelled and tagged in BIM models	Ensure every habitable space (indoor or outdoor), functional space (shaft/maintenance) and fully enclosed space is to be tagged with a room.
QC005	**Alignment of BIM Model Coordinates** Checks that the submitted BIM models contain the same coordinates to help ensure good federation of coordinated BIM models	Set up the model with recommended method.
QC006	**Level Consistency** Verify that same level name has the same FFL, and vice versa for clarity to project team and Agencies	Coordinate among project team to ensure the same set of FFL and storey naming are used across disciplines.

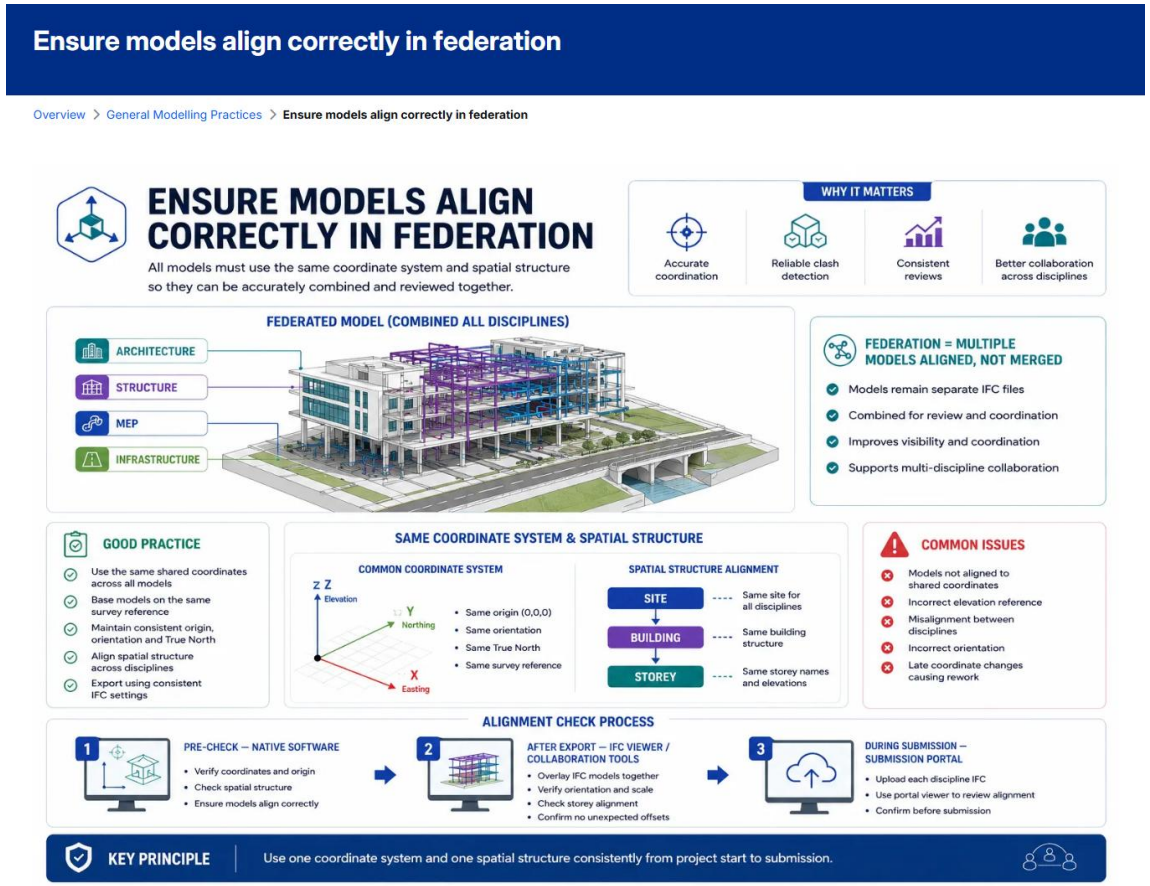
<table>
<tr><td>Rule Group</td><td>QC01 - Building Storey Naming</td></tr>
<tr><td>Details of

Auto-check</td><td>
• This rule checks if building storeys follow typical naming convention as per typical industry practice and alert QP if there is deviation.
<table>
<tr><th>Naming Convention</th><th>Valid Example</th><th>Invalid Example</th></tr>
<tr><td>Above-ground floors:</td><td>• Storey 1, Level 20
• 1st Storey, 20th Level</td><td>• Storey 1st, Level MPL
• 20 Level, Loft Storey
• 2nd Story, 1st Floor
• Level one</td></tr>
<tr><td>Mezzanine floor for above-ground floors</td><td>• Storey 1 Mezzanine 2
• Level 20 Mezzanine
• 1st Storey Mezzanine 2
• 20th Level Mezzanine</td><td>• Mezzanine Level 1,
• 4th Storey Mezzanine A</td></tr>
<tr><td>Split floor for multi-storey car park building</td><td>• 2nd Storey 2A</td><td>• 2nd Storey 3A
• 2nd Storey A</td></tr>
<tr><td>Below-ground floors</td><td>• Basement 1</td><td>• Upper basement
• Basement A
• 1st basement
• B1
• Basement mezzanine
• Basement carpark</td></tr>
<tr><td>Attic floors</td><td>• Attic
• Attic Storey</td><td>• Attic A
• Attic 1
• 1st Storey Attic
• Lower Attic</td></tr>
<tr><td>Roof floors</td><td>• Upper Roof
• Lower Roof Storey
• Roof</td><td>• Upper Roof 1
• Roof Lower</td></tr>
<tr><td>Differentiate storeys between blocks/ datum</td><td>• 1st Storey_club house
• 4th Storey_Tower A
• 1st Storey_SFL
• 1st Storey_MPL</td><td>• Block 1 – 2nd Storey
• 2nd Storey Block A&C</td></tr>
</table>
</td></tr>
<tr><td>Feedback</td><td>• Include other common naming conventions: allow block name to be in front, allow placeholder storey due to modelling constrains</td></tr>
</table>

Rule Group	**QC02 - Clash Detection**
Details of Auto-check	• This rule checks for significant clashes between selected entities especially structural elements, based on Clash Detection matrix in CX COP. • 1 issue result will be generated per pair of clash. • The result will be pegged to one of the Structural element if the clash involves one or more structural elements. If there are no Structural elements involved, the result will be pegged to Architectural element or MEP element. • This check allows 1mm modelling tolerance. https://info.corenet.gov.sg/ifc-sg/modelling---authoring/GeneralModellingPractices/check-clashes 
Feedback	

Rule Group	**QC03 - Modelling inputs following IFC+SG in COP**
Details of Auto-check	• Checks that parameters are correctly provided as per Section 4 of Code of Practice **Error Type 1: required property is not provided**  The property set <SGPset_Material> or the required property <MaterialGrade> is not found **Error Type 2: property with input limitation is assigned an unrecognised value/ format**  The property <BeamSpanType> does not have a valid value **Error Type 3: property is mapped to wrong Property Set**  The property <SpaceName> is found under the wrong property set **Error Type 4: property Set is mapped to wrong Ifc element**  The property set <SGPset_Door> is found under the wrong IFC element **Error Type 5: Ifc object type is mapped to wrong ifc element**  the element (VENTILATIONSLEEVE) is not mapped to the valid ifc Entity
Feedback	• Introduce differentiated checksets by gateways • Summarise result. Review list of requirement • Set cap to each data being checked to have even spread • Alternative result format for easier sorting, filtering and grouping

Rule Group	**QC04 - Completeness of room tagging**
Details of Auto-check	• Checks that rooms/spaces are properly modelled and tagged in BIM models • ifcSpace.SPACE is checked against all ifcSlabs. The space must be in contact with slab • Areas occupied by structural elements (columns, walls, etc.) are automatically excluded from this coverage requirement      TOPIC Title QC004-000099 Description Quality Check; QC004; Space mapping; This slab contains one or more areas uncovered by spaces. Total remaining area: 2.806m^2.; Topic Type Alert
Feedback	• Allow tolerance • Summarise result per floor

Rule Group	QC05 - **Alignment of BIM Model Coordinates**
Details of Auto-check	• This rule checks that the submitted BIM models under the same submission contain the same geo-referencing coordinates in each of the models to help ensure good federation of coordinated BIM models https://info.corenet.gov.sg/ifc-sg/modelling---authoring/GeneralModellingPractices/federatemodel  Cartesian (x, y, z) coordinates of the models are not the same Cartesian (x, y, z) coordinates of Model A are (123.45, 67.89, 104.00) Cartesian (x, y, z) coordinates of Model B are (123.45, 67.89, 104.00) Cartesian (x, y, z) coordinates of Model C are (823.45, 67.89, 104.00) Cartesian (x, y, z) coordinates of Model D are (123.45, 67.89, 104.00) Cartesian (x, y, z) coordinates of Model E are (123.45, 107.89, 104.00)
Feedback	• Improve presentation of results

Rule Group	**QC06 - Level Consistency**
Details of Auto-check	• This rule checks that the same level name in different models for the same submission has the same FFL, which comprises 2 sub-checks: 1. Levels with the same name in different models of the same submission have the same FFL.  There are 2 no.s of "1st storey" with different Finished Floor Levels (0.000m (from models archi_01, C&S_01), 104.300m (from models sanitary_01)). 2. The same FFL is tagged to the levels with the same name in all models of the same submission.  23rd storey Mezz (from models archi_01) and 23rd storey (from models C&S_01, sanitray_01) contain the same Finished Floor Levels of 80.950m.
Feedback	• Improve presentation of results

What can be done to achieve better quality?

- Have a BIM manual that caters for CX BIM submission
- Have a project BEP and BIP and follow it (https://info.corenet.gov.sg/ifc-sg/modelling---authoring/GeneralModellingPractices)
- Be updated with CX COP to understand requirement
- Conduct thorough in-house QC before submission (make use of software's own tool, plug-ins and other tools)
- Use pre-submission check on Submission Portal