

Consuming & Editing Archicad Models in Revit with IFC 2x3

A guide by buildingSMART Singapore

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1. Objective

This technical guide provides step-by-step instructions for consuming Archicad BIM models in Revit using Industry Foundation Classes (IFC) 2x3 exchange format so that the Revit user can continue to build on the models without remodelling. This is particularly useful for contractor who use Revit to build on architect's BIM models created using Archicad.

Please insert provisions for BIM interoperability below into an appropriate section of the Consultancy Agreement between the Employer and the Consultant. The following technical guide aims to assist the Employer in specifying what the Consultant is required to deliver in ensuring BIM interoperability between different modelling software. These clauses should be read in conjunction with the Employer's Information Requirements (EIR) and Client's IDD Requirements (CIR) where applicable.

2. Prerequisites & References

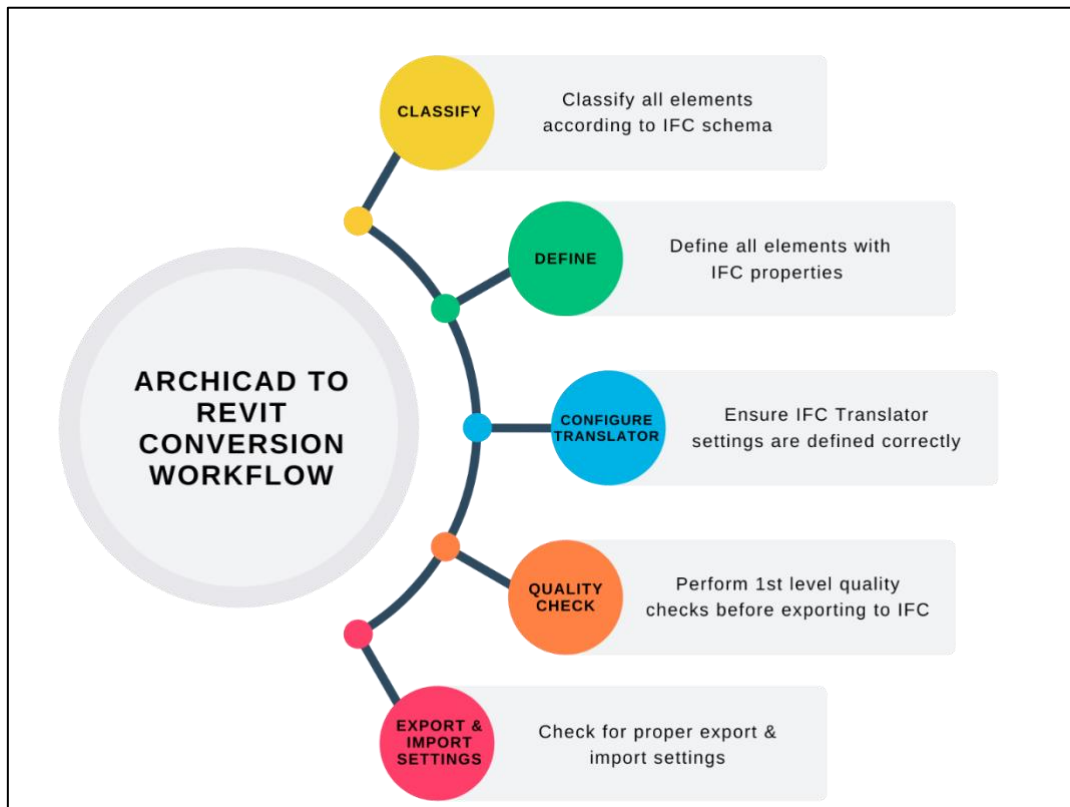
This Guide is based on the following BIM authoring tools:

- Archicad (version 22 or later recommended)
- Revit (version 2020 or later recommended)

This Guide also makes references to the following documents:

- a) Graphisoft Corenet X and IFC-SG guides
(<https://graphisoft.com/sg/solutions/corenet-x-and-ifc-sg>)
- b) IFC-SG Revit Content "How To" Guide
(https://interoperability.autodesk.com/singapore/downloads/IFC-SG_RevitContentHowToGuide_v1.0.pdf)

Please refer to the following workflow diagram for an initial guide.



3. Preparing the Archicad Model

Proper preparation of the Archicad model is essential to minimise data loss during the IFC export and subsequent IFC import into Revit. The following steps prepare Archicad model for IFC export.

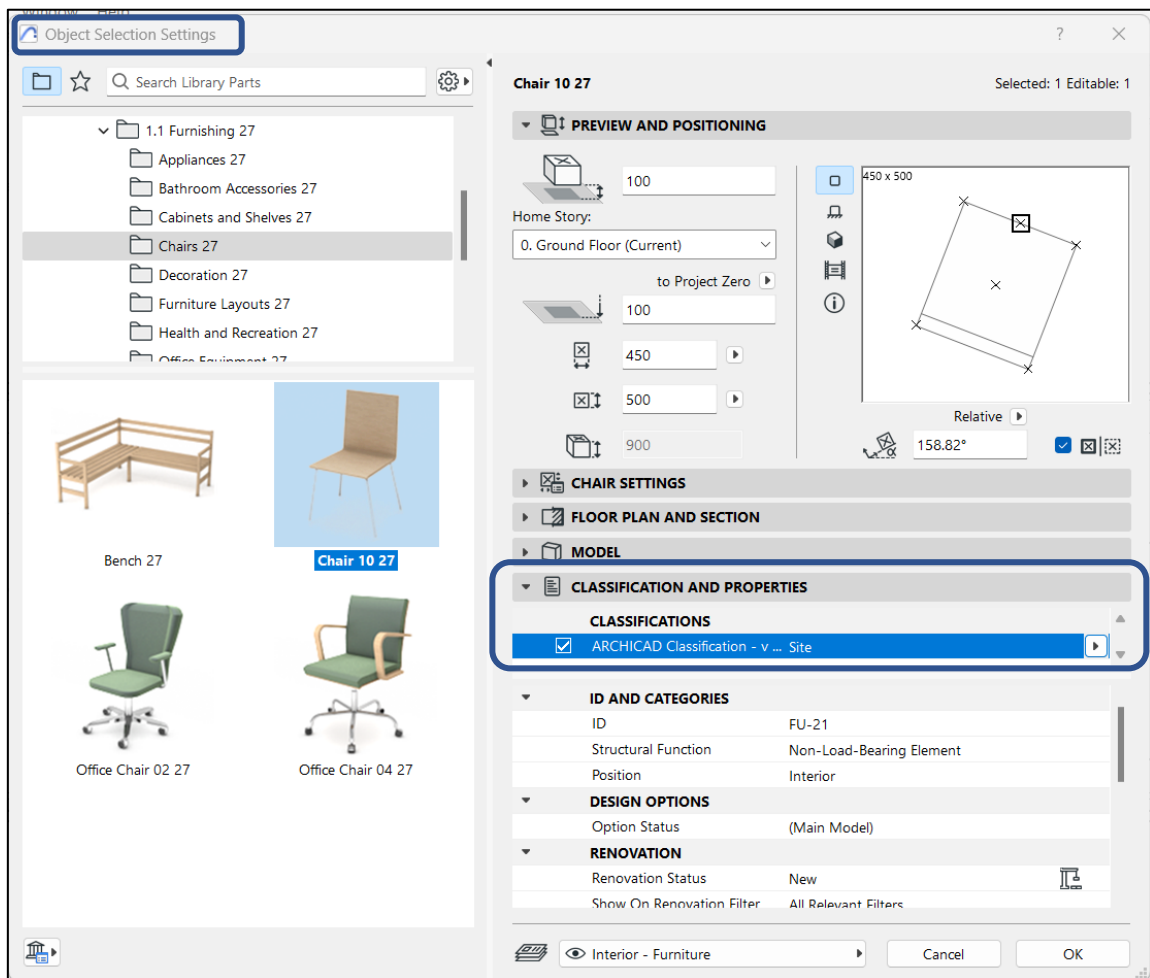
3.1 Classifying Elements

Every ArchiCAD element to be exported, must be classified.

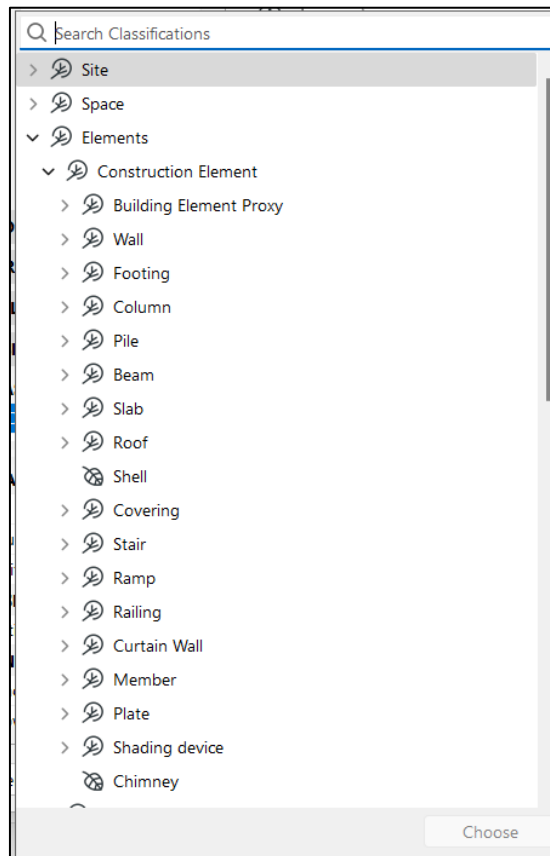
Classification is key! Here are two reasons why.

- 1) Appropriate properties will only appear in the element settings if the classification is correct.
- 2) IFC export Type mapping will be based on these classifications. (e.g. 'Space' will be exported as 'ifcSpace')

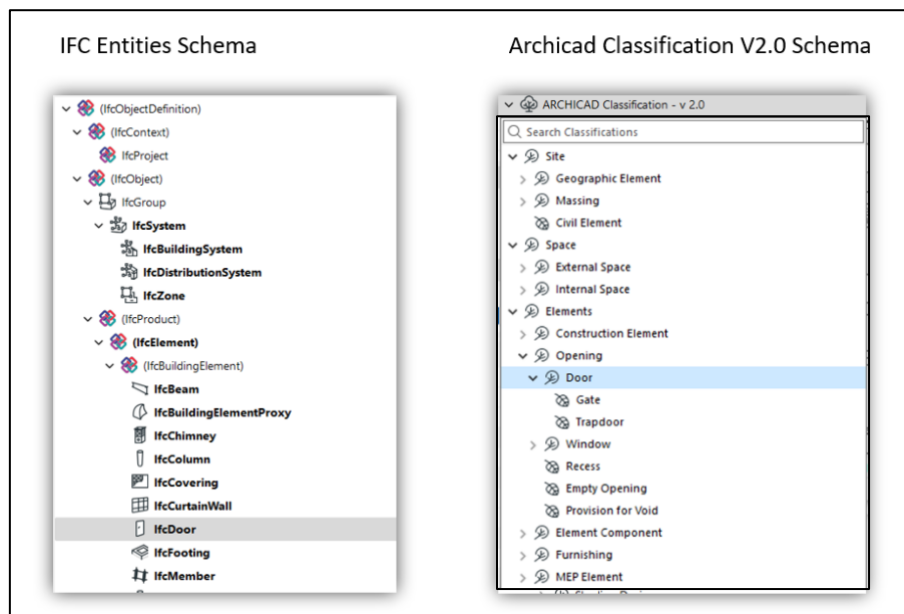
- a) Select the element and open '**Element Selection Settings**', then click on '**Classifications and Properties**' as shown.



b) Choose the appropriate classification from the drop-down list.



Each ArchiCAD element classification will have a corresponding entity within the IFC schema.

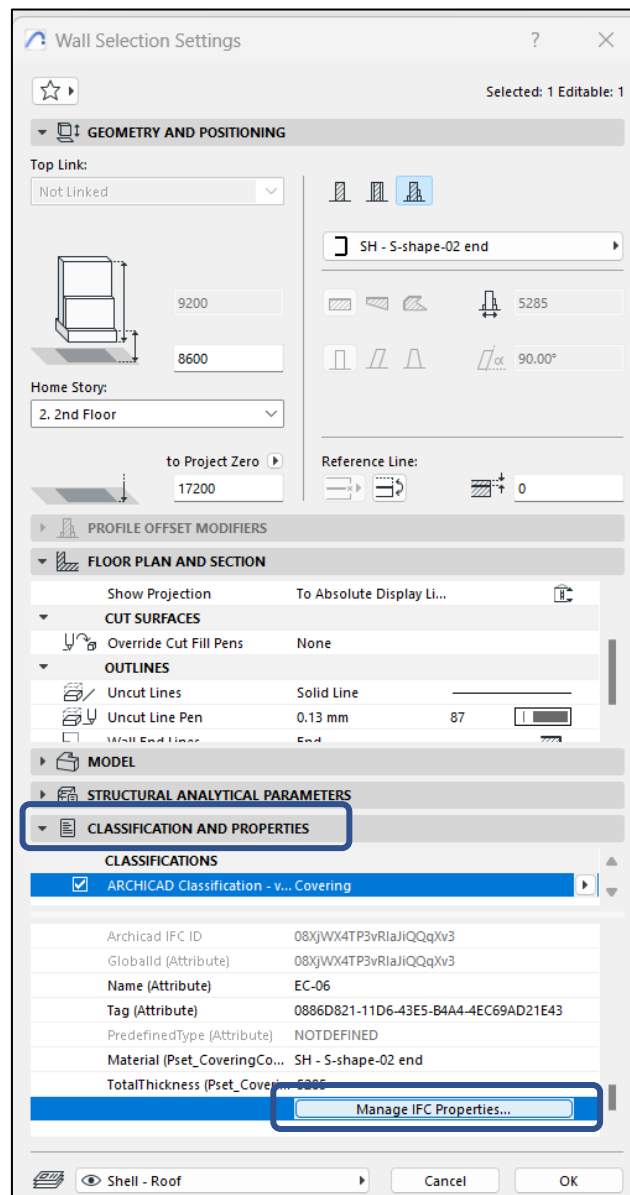


If new classification items are added to Archicad, there is a need to do a type mapping to an IFC entity. Please refer to (https://help.graphisoft.com/AC/24/int/AC24_Help/115_IFC/115_IFC-38.htm) for the steps involved.

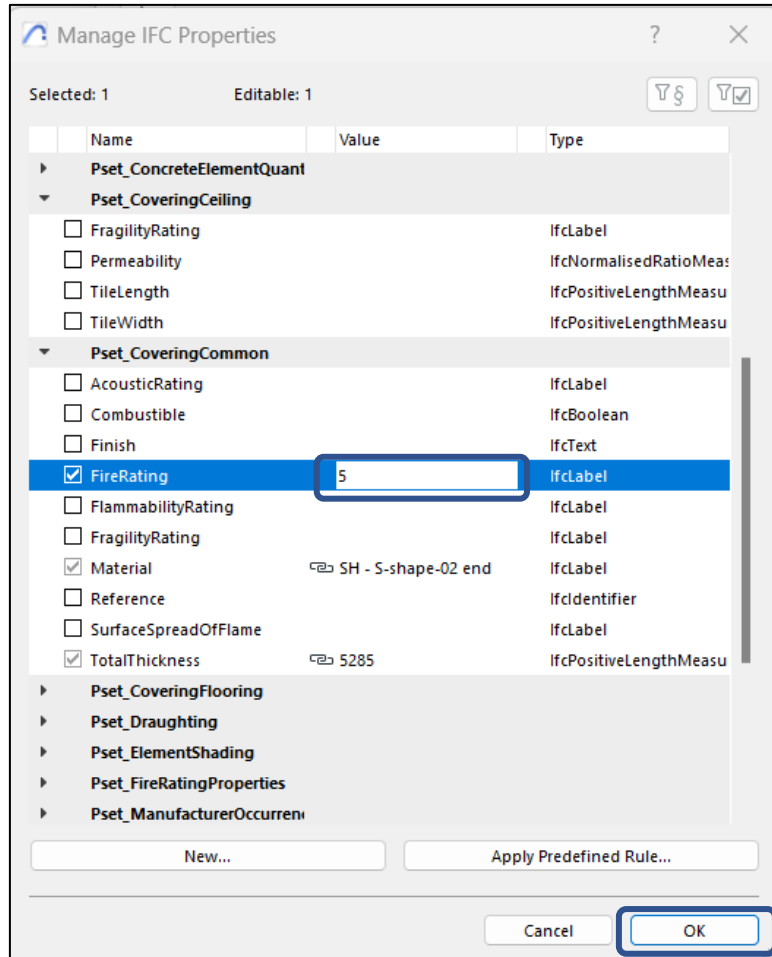
3.2 Defining the Properties

Predefined IFC properties for objects are available by default in Archicad. To populate these properties, please refer to the following steps.

- a) Select the element and open the **'Element Selection Settings'**.
- b) Within the settings, go to **'Classification and Properties'**. Click on the **'Manage IFC Properties'** button as shown.

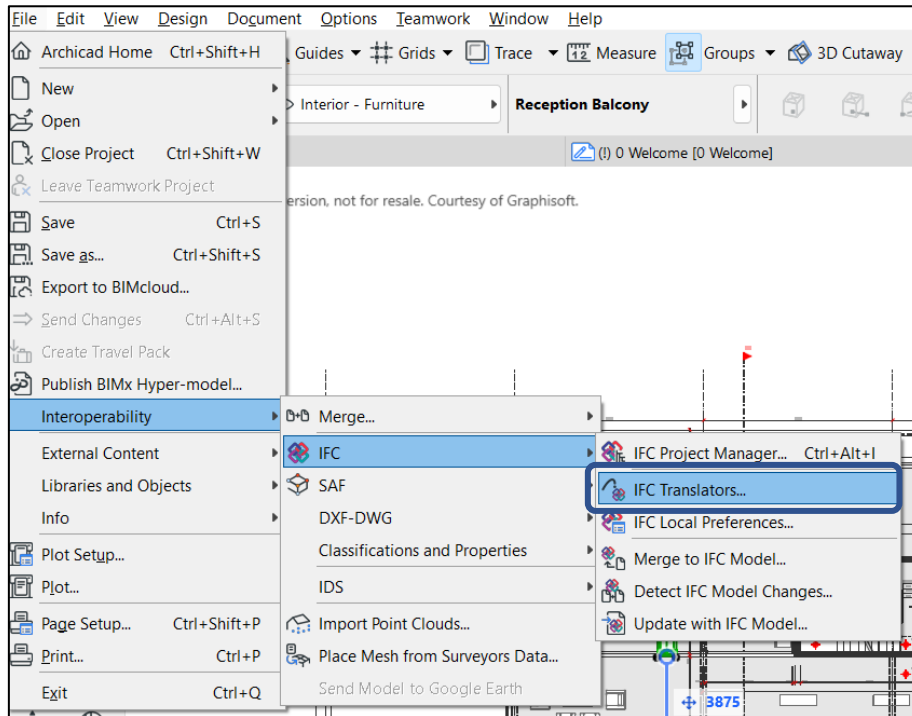


c) From the list of properties, add in the required values. After editing, click 'OK'.

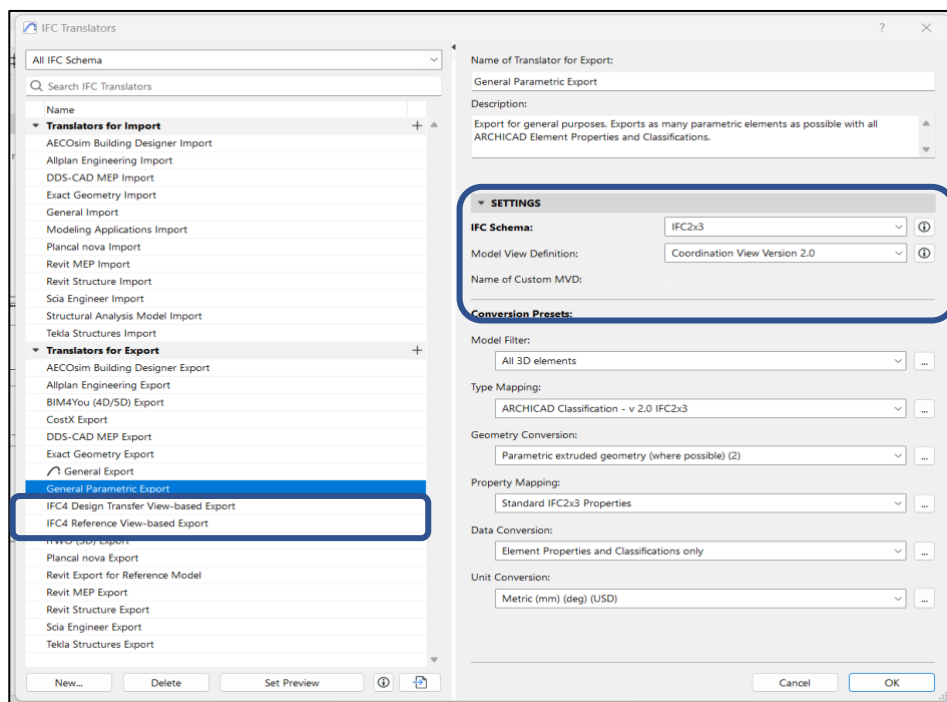


3.3 Defining IFC Translator Setting

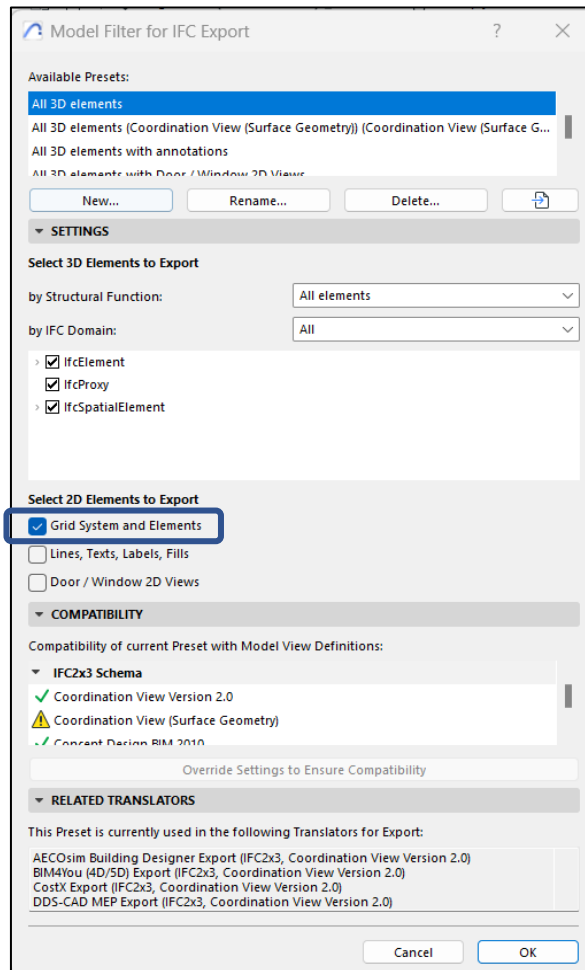
a) To define the IFC Translator setting, go to 'File' -> 'Interoperability' -> 'IFC Translators'.



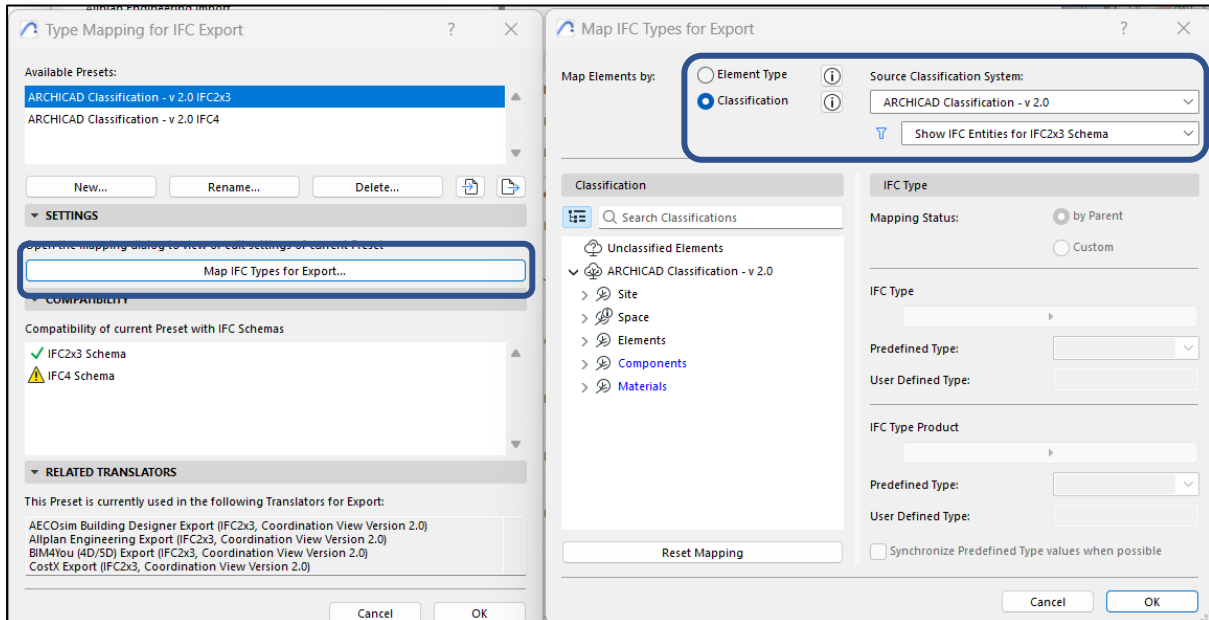
b) Under 'Translators for Export' click 'General Parametric Export'. Within 'Settings', change 'IFC Schema' to 'IFC2x3' and set 'Model View Definition' to 'Coordination View Version 2.0'. This is the most compatible version with Revit. You can follow the settings as per the image below.



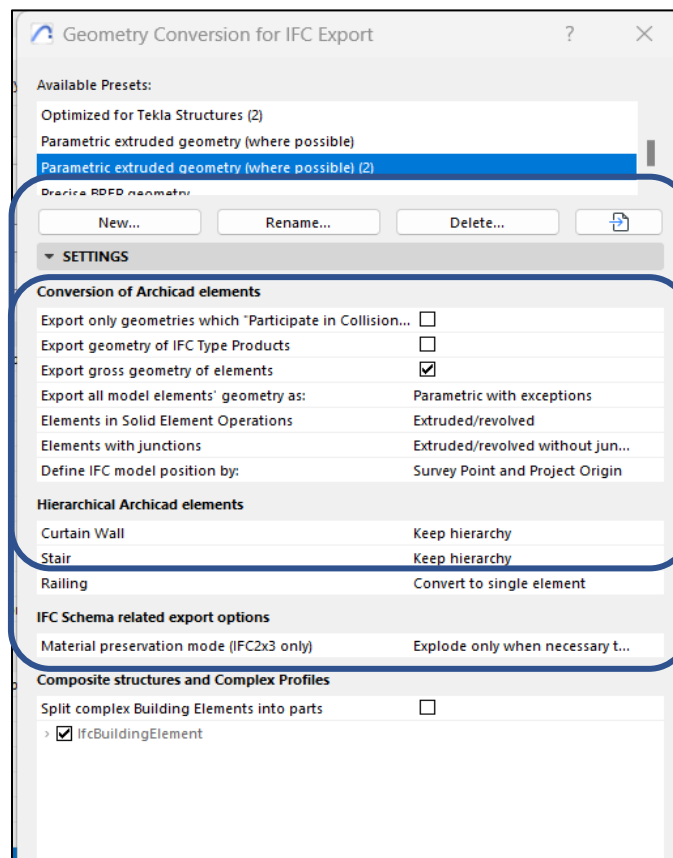
- c) On the same dialog, click additional settings under **'Model Filter'**. Check **'Grid Systems and Elements'**



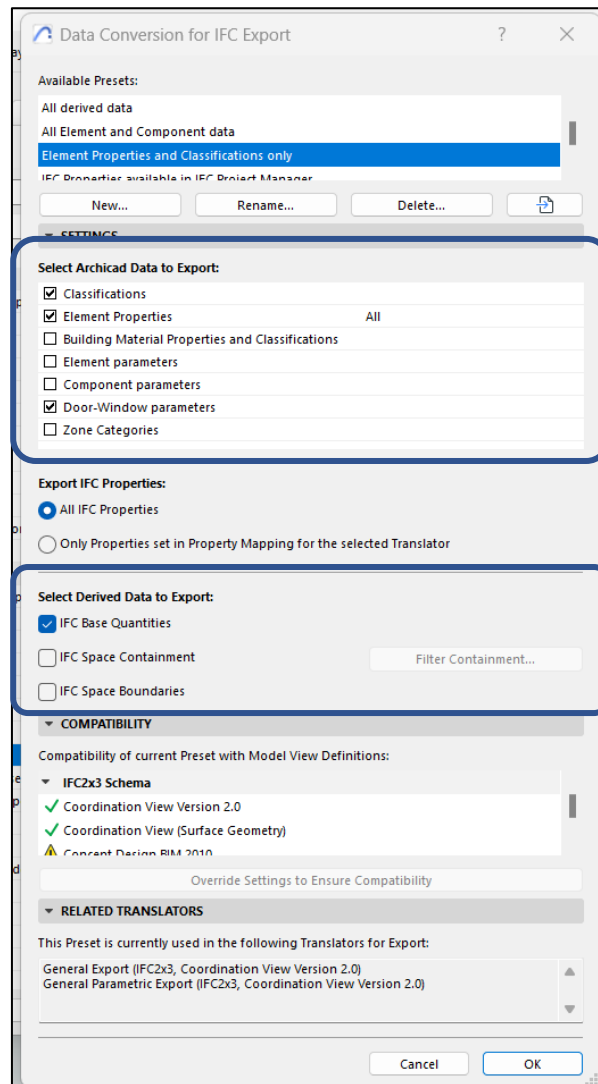
- d) Click on the additional settings under **'Type Mapping for IFC Export'**. Click on the **'Map IFC Types for Export'** button and follow the settings shown in the image below.



- e) Click on the additional settings under **'Geometry Conversion for IFC Export'**. Under **'Conversion of ARCHICAD elements'**, ensure the following settings are followed.



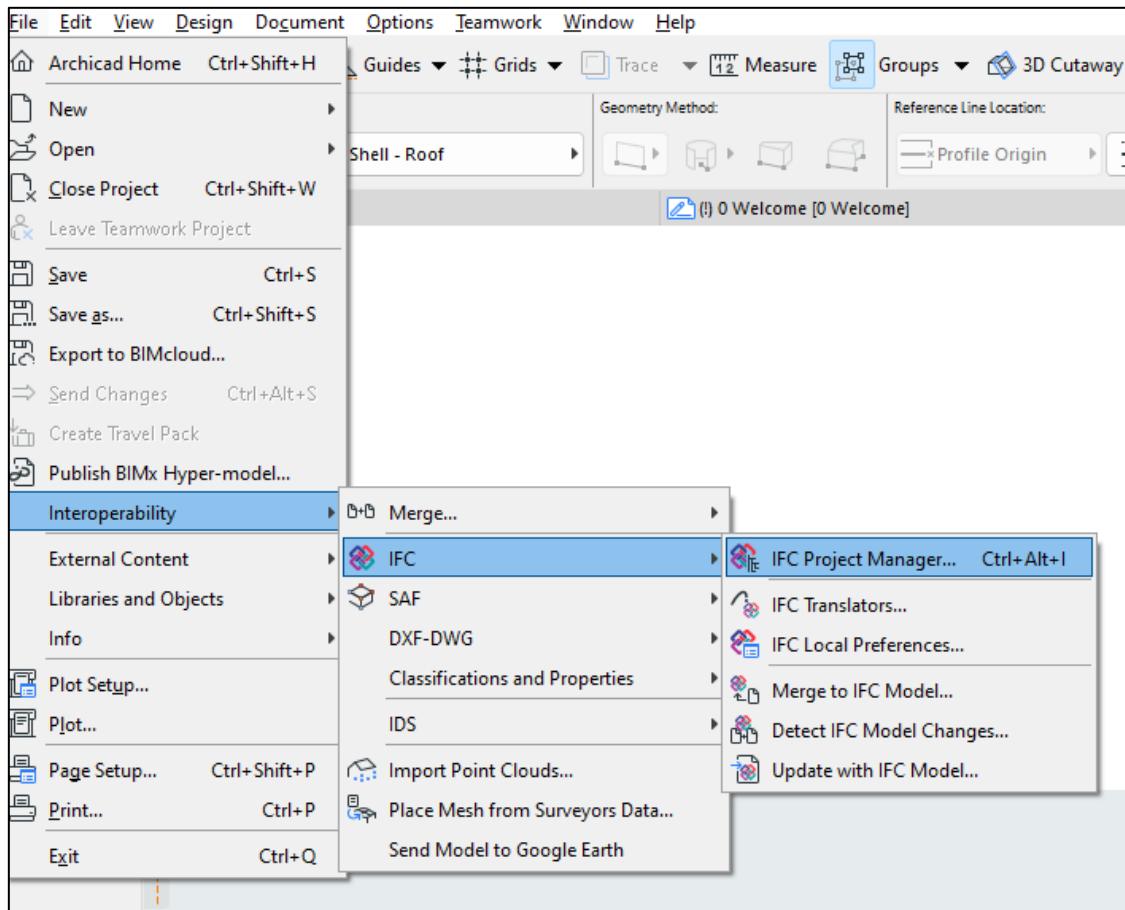
- f) Click on the additional settings under **'Data Conversion for IFC Export'**. Under **'Select ARCHICAD Data to Export'** and **'Select Derived Data to Export'**, please check the following checkboxes.



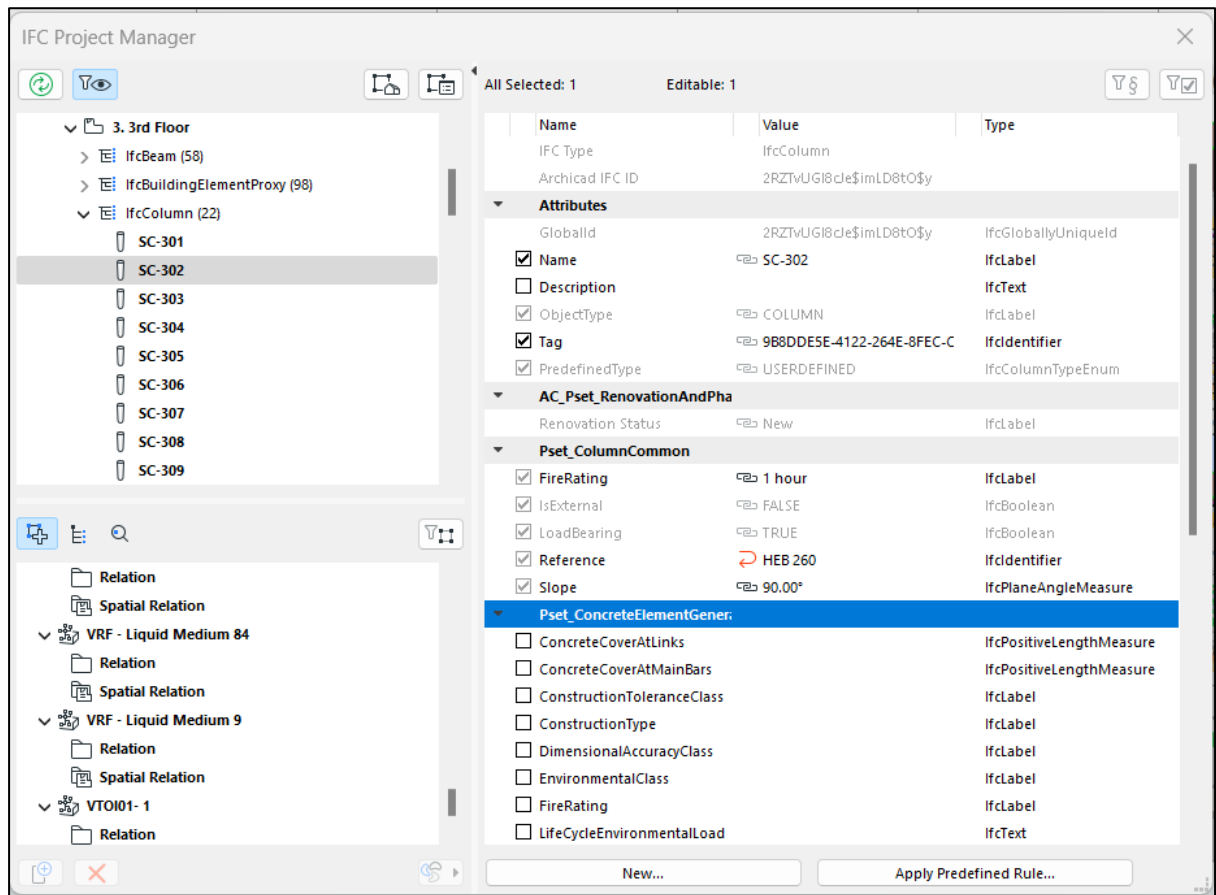
3.4 Quality Check within Archicad

The 1st level quality check should be done within Archicad before exporting to IFC. The check should ensure that **all the elements have been properly classified** via the IFC Project Manager.

- a) Navigate to '**IFC Project Manager**' by clicking on '**File**' -> '**Interoperability**' -> '**IFC**' -> '**IFC Project Manager**'.



- b) The hierarchy of the IFC schema can be found within the **IFC Project Manager**. Here, you can examine each object for its classifications and properties. At this stage, perform a quality check on your existing elements before proceeding.

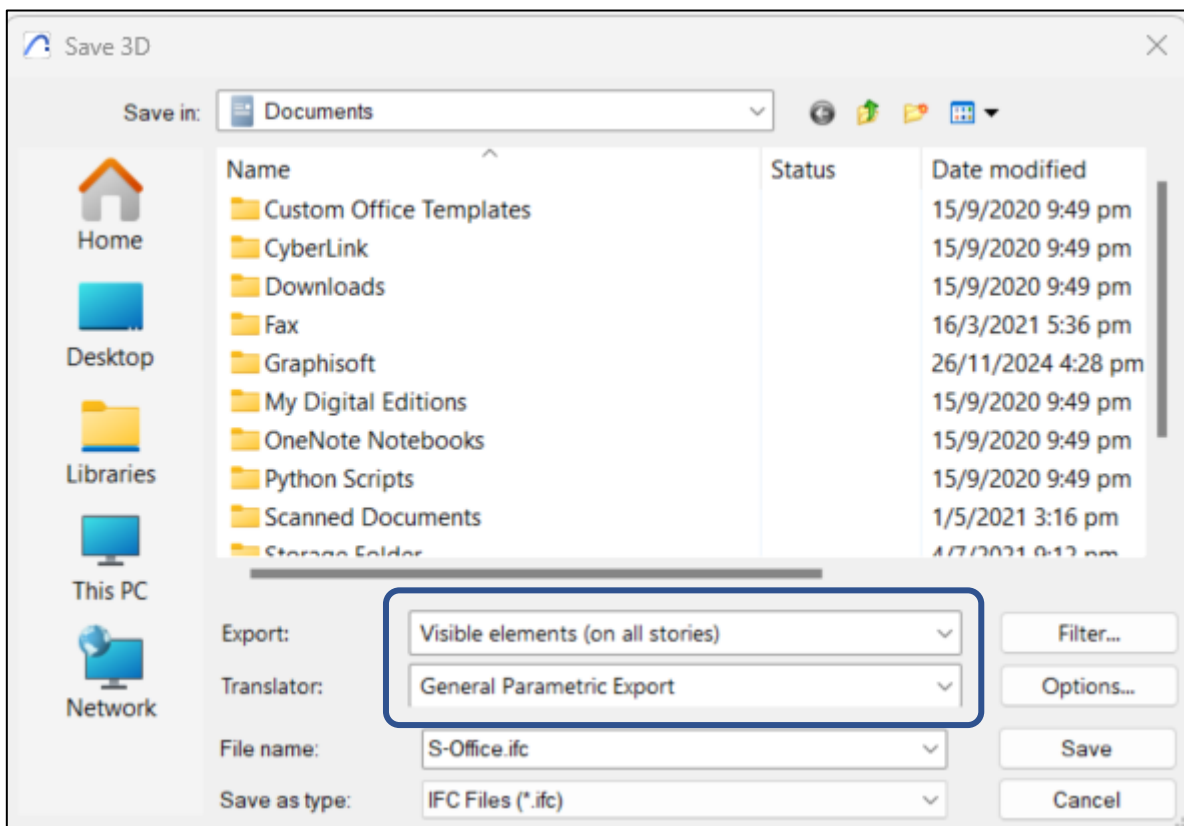


- c) If you wish to use graphical overrides to perform a quick filter of objects not classified, please refer to <https://graphisoft.com/sg/solutions/corenet-x-and-ifc-sg> for the guides and materials required.

4. Exporting IFC

4.1 IFC Export Settings from Archicad

1. Go to File → Save as → IFC File
2. Configure export settings:
 - **Visible elements (on all stories)** for the **Export**
 - **General Parametric Export** for the **Translator**



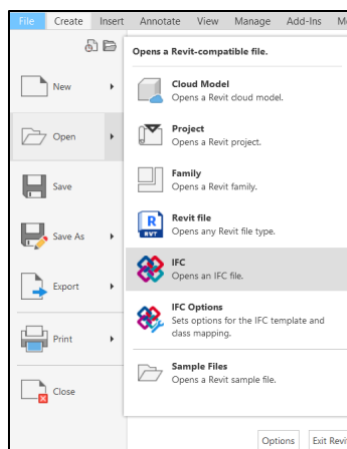
6. IFC Import to Revit

When importing IFC files into Revit, Revit converts each element from the IFC file into a native Revit object, which can be time-consuming. The steps provided in this guide help ensure the resulting model maintains good quality standards.

6.1 Import Configuration

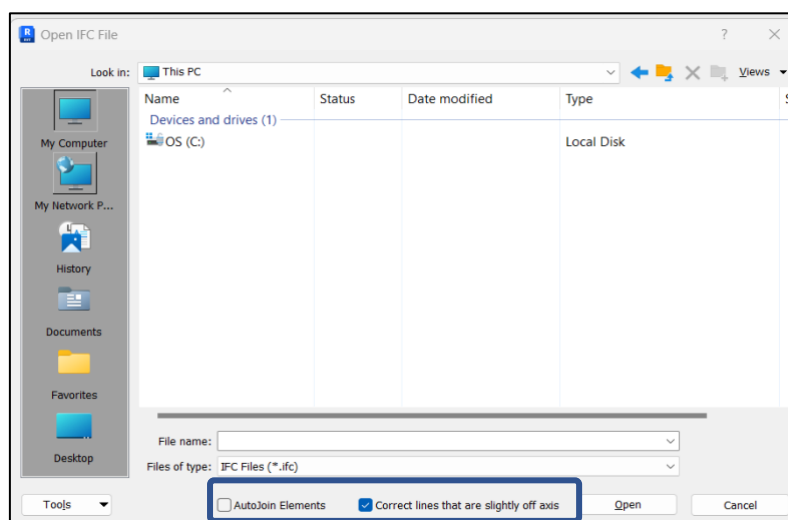
1. Open Revit

2. Go to **'File' -> 'Open' -> 'IFC'**



3. Configure import settings:

- Disable **'Auto-Join Elements'** as it leads to undesirable results for complex structures and long export times.
- Ensure **'Correct lines that are slightly off axis'** is checked.



6.2 IFC Mapping to Revit

IFC class mapping in Revit controls how IFC elements are translated into native Revit families and categories. It maps IFC entities like ifcWall to Revit categories like Walls, based on a mapping schema file. It also determines which elements become Revit families or generic models.

Some IFC classes don't have direct Revit equivalent classes, and complex ones may default to Generic Models. Custom IFC entities might need manual mapping, and this can be done by customising the import mapping file via the **'Import IFC Options'**. For example, the IFC type can be defined in Archicad for Slabs so that Revit user can assign to the proper Revit Category and Revit Sub-Category.

| IFC Class Name | IFC Type | Revit Category | Revit Sub-Category |
|-------------------------|----------|-------------------------|--------------------|
| IfcReinforcingMeshType | | Structural Fabric Areas | |
| IfcRoad | | Roads | |
| IfcRoof | | Roofs | |
| IfcRoofType | | Roofs | |
| IfcSanitaryTerminal | | Plumbing Fixtures | |
| IfcSanitaryTerminalType | | Plumbing Fixtures | |
| IfcSensor | | Specialty Equipment | |
| IfcSensorType | | Specialty Equipment | |
| IfcSite | | Site | |
| IfcSlab | | Floors | |
| IfcSlab | BASESLAB | Structural Foundations | |
| IfcSlab | FLOOR | Floors | |
| IfcSlab | LANDING | Stairs | Landings |
| IfcSlab | ROOF | Roofs | |
| IfcSlabType | | Generic Models | |
| IfcSlabType | BASESLAB | Structural Foundations | |
| IfcSlabType | FLOOR | Floors | |
| IfcSlabType | LANDING | Stairs | Landings |
| IfcSlabType | ROOF | Roofs | |

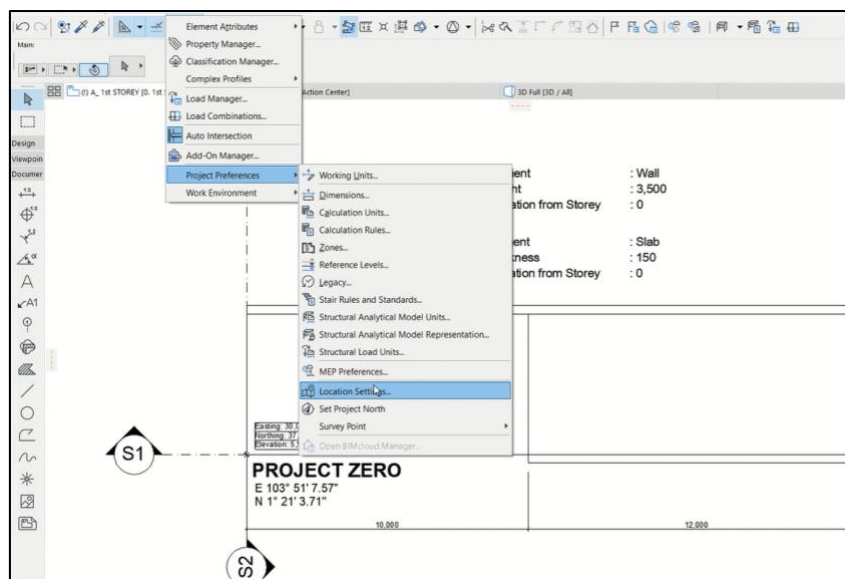
7. Geo-referencing in Archicad and Revit

This section goes through how to set up the project location in both Archicad and Revit, as well as how to use IFC file format to exchange the two file formats while retaining the geo-referencing values.

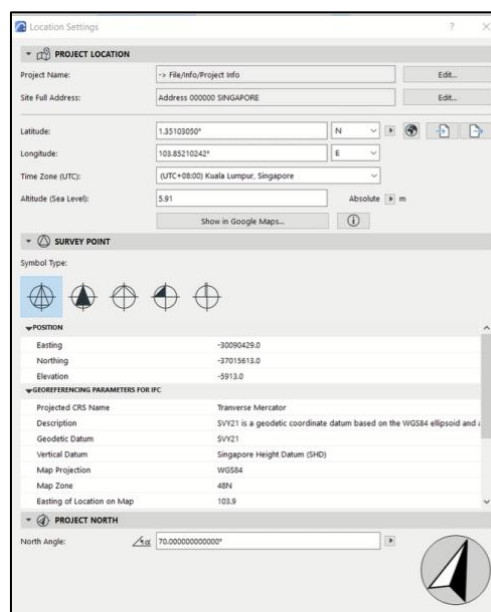
7.1 Adding geo-referencing values to Archicad

Add reference points to the model via the following steps:

- 1) Go to **Options -> 'Project Preferences' -> 'Location Settings'**

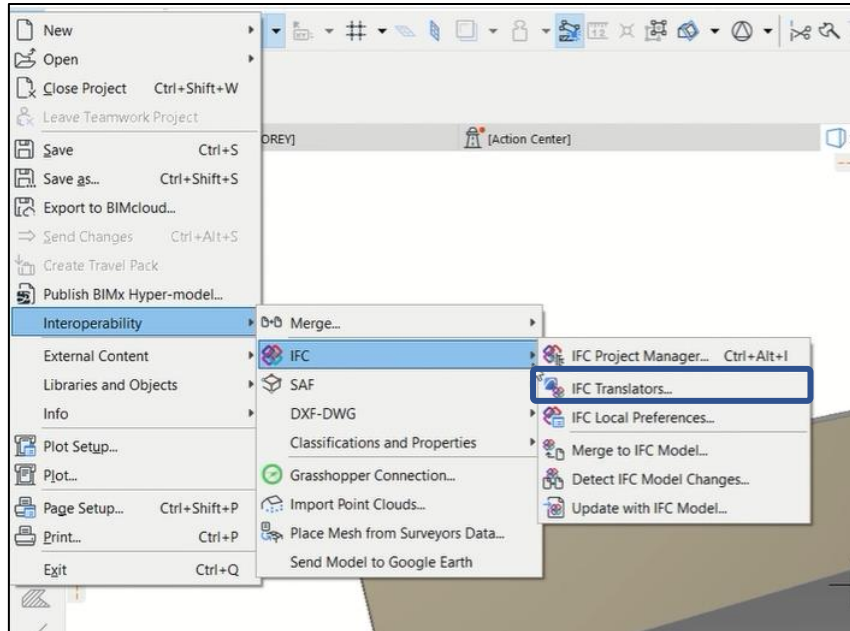


- 2) Fill in details within the Project Location and Survey Point section

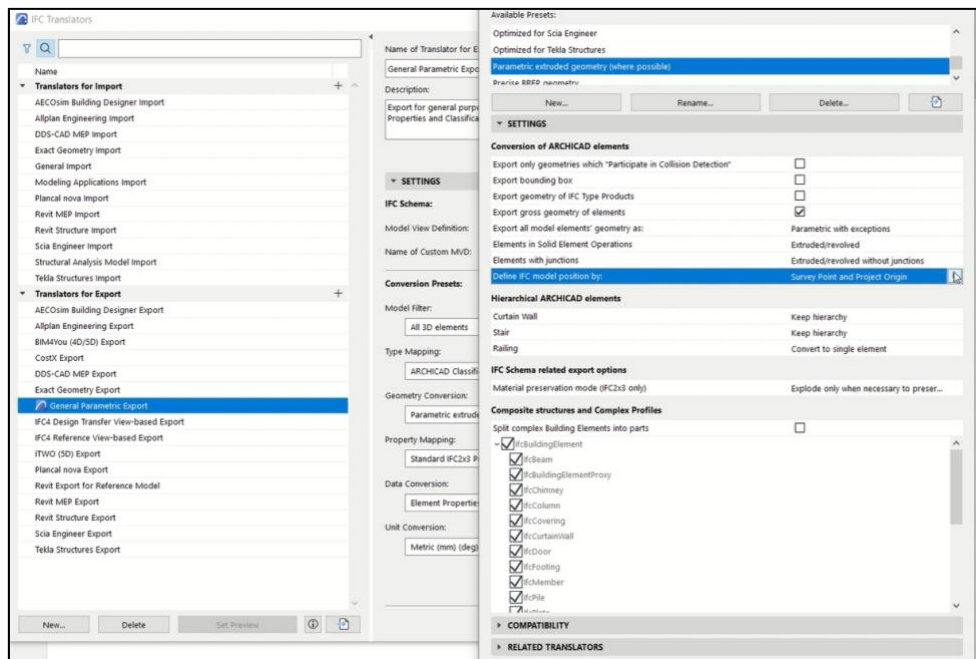


7.2 IFC Export Settings in Archicad

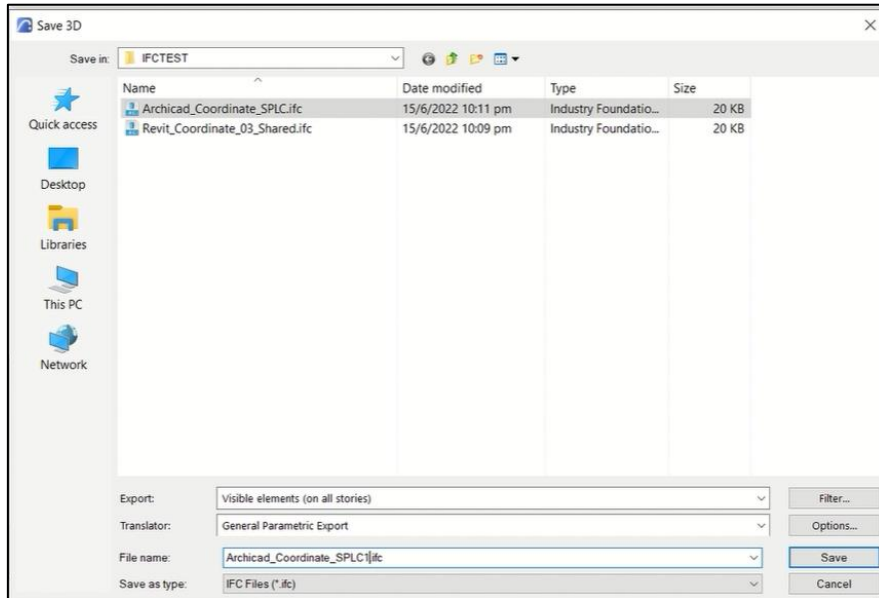
To ensure the best conversion results, we need to have the right import settings. Go to **'File' -> 'Interoperability' -> 'IFC' -> 'IFC Translators'**.



Under IFC Translators, go to **'General Parametric Export' -> 'Geometry Conversion'** and ensure **'Define IFC model position by'** is set to **'Survey Point and Project Origin'** so that it goes into the right location in Revit.

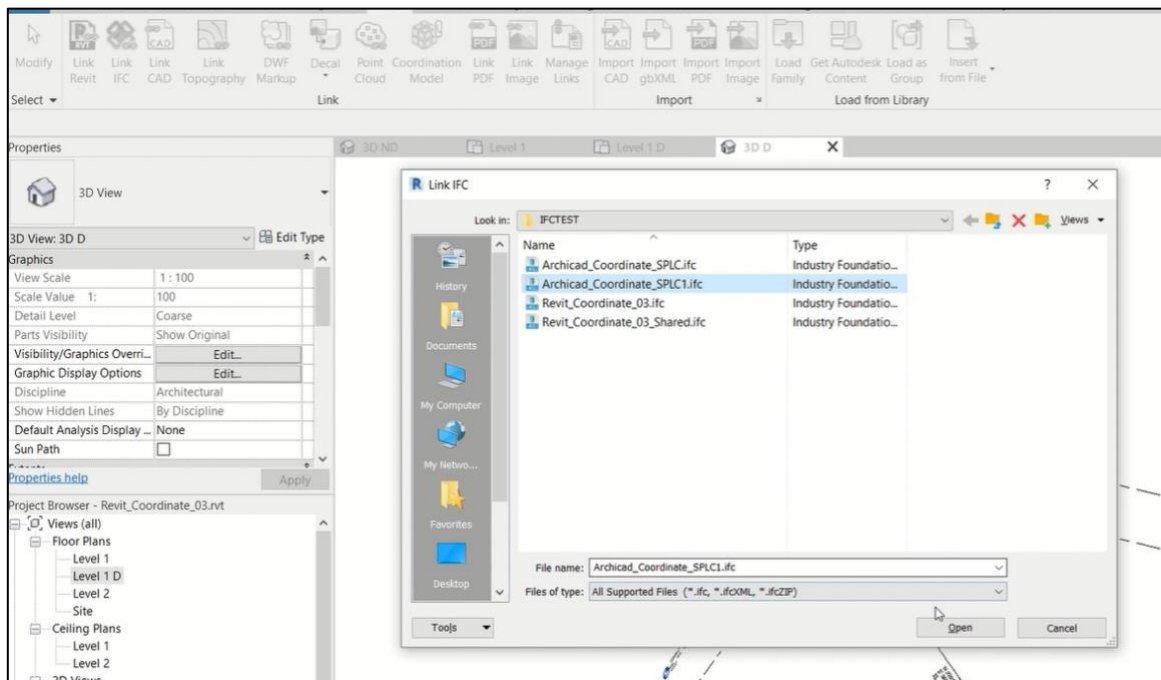


Use the following settings to save the file as IFC.

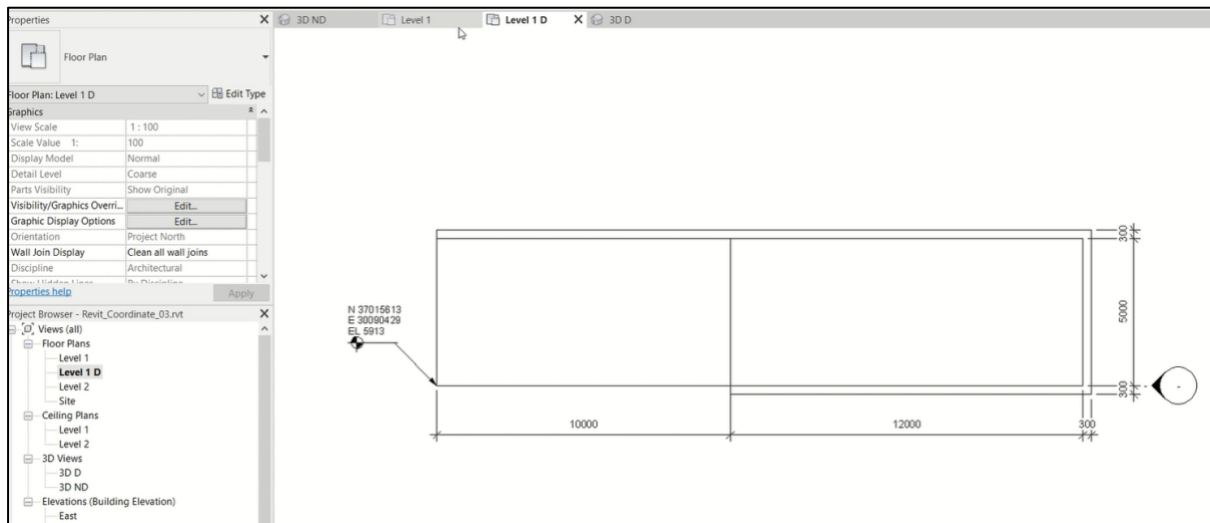


7.3 Importing IFC to Revit for referencing

To import the exported IFC file, click on **'Link IFC'** and select the appropriate IFC file as shown below.

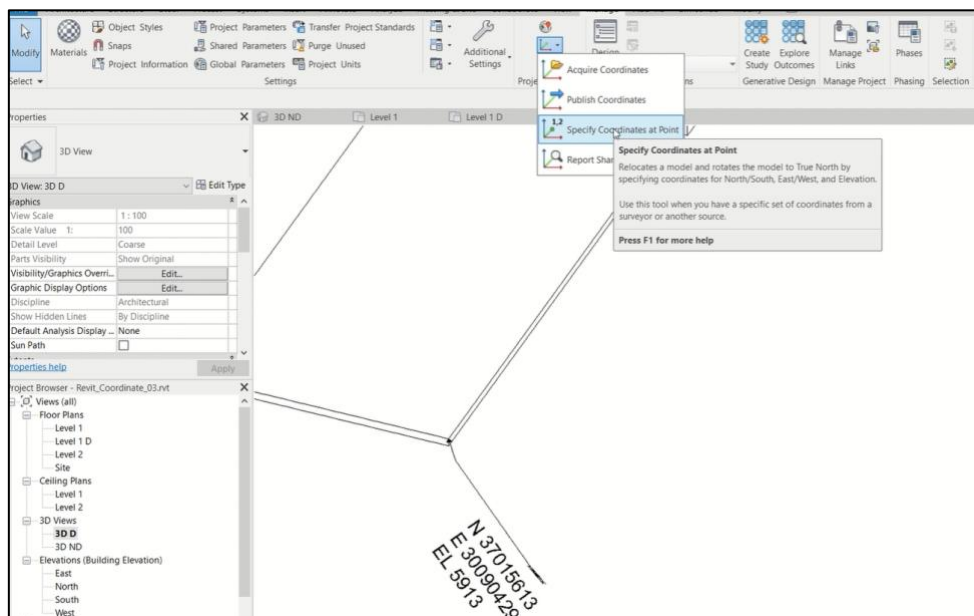


Now, you can verify the reference points in Revit.



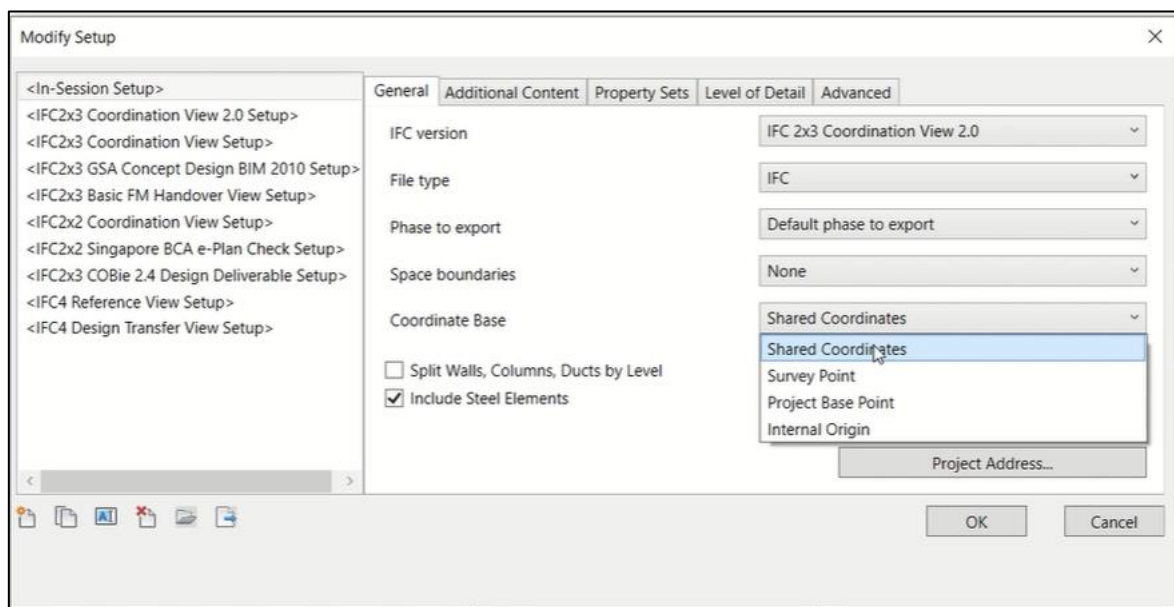
7.4 Adding geo-referencing points in Revit

To add geo-referencing points in Revit, click on **'Specify Coordinates at a Point'** and fill in the necessary details in the pop up tab.

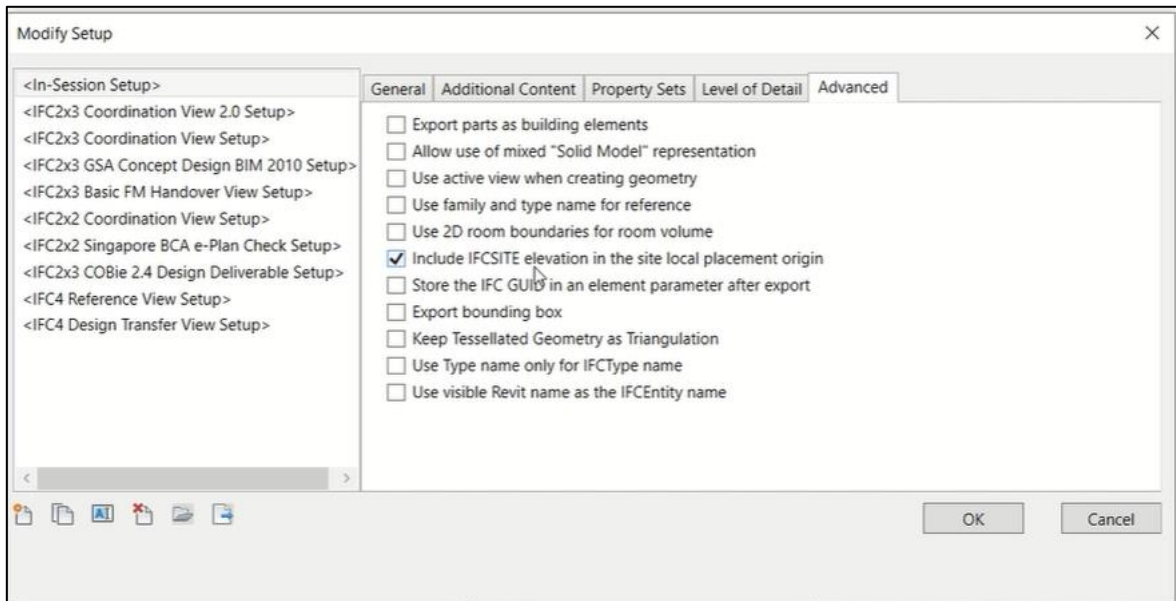


7.5 IFC Export settings in Revit

To export from Revit to IFC, click on **'File' -> 'Export' -> 'IFC' -> 'Modify Setup'** and ensure that the **Coordinate Base is Shared Coordinates**, as shown below.

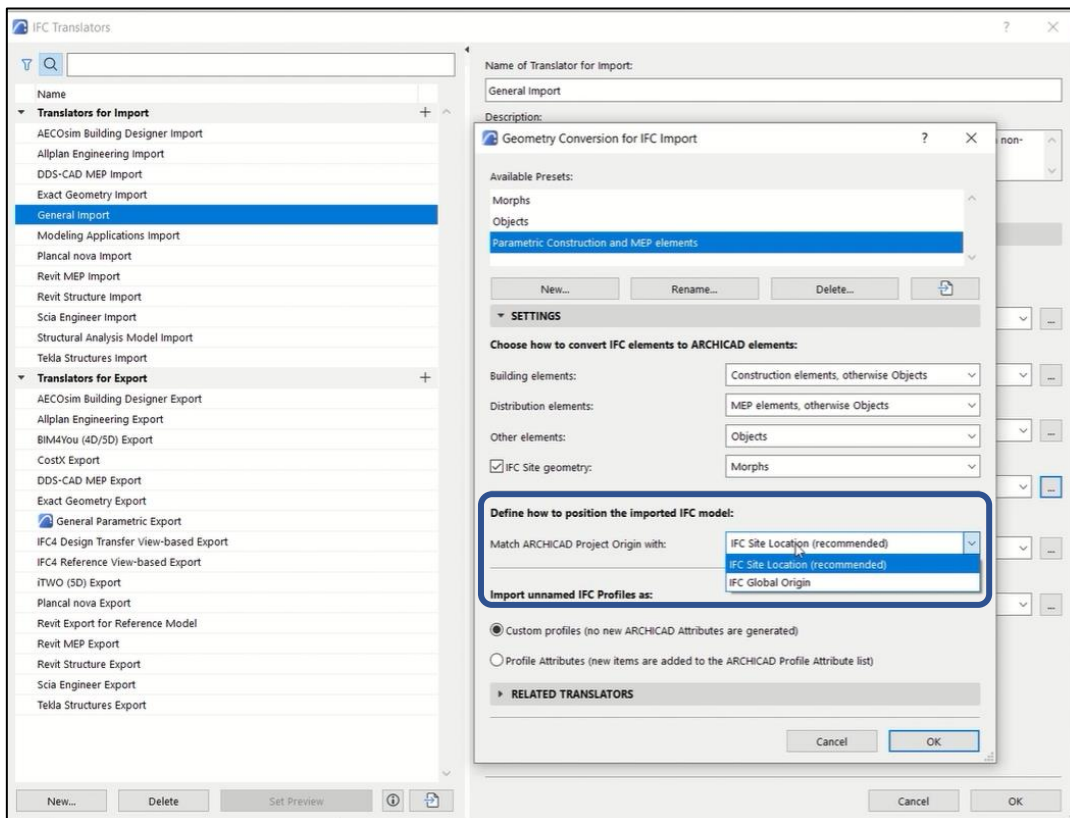


Ensure that in the **'Advanced'** tab, the following option is checked.

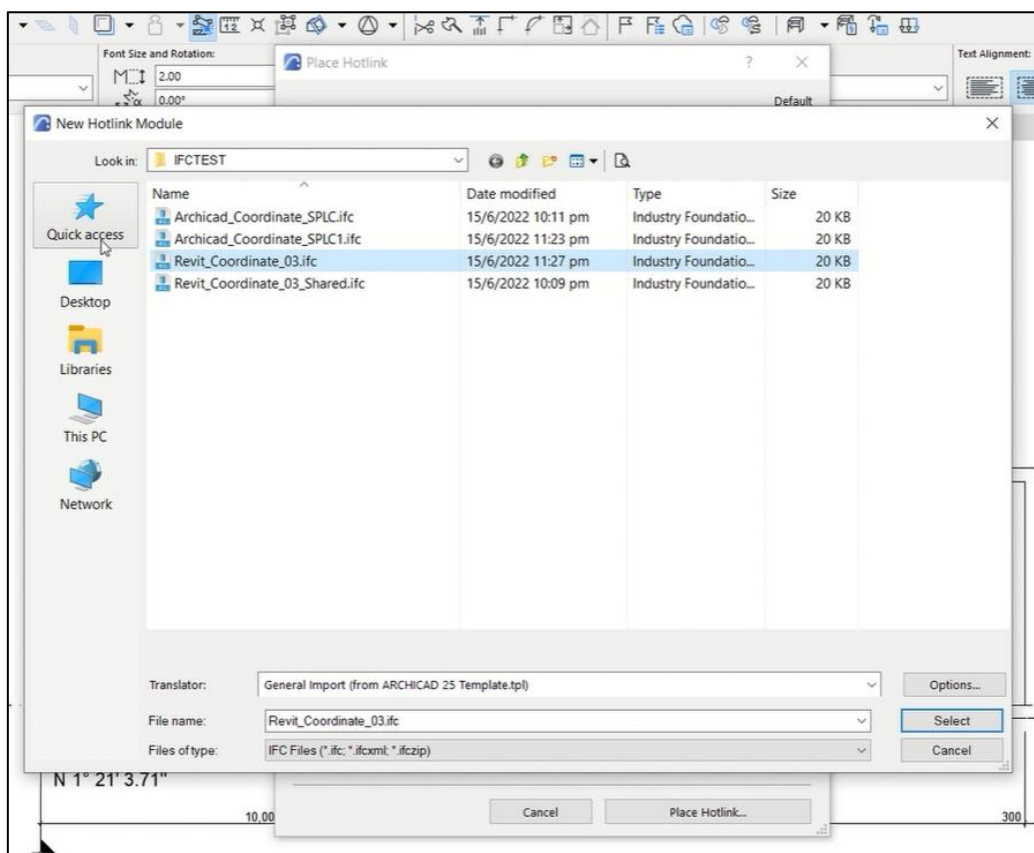
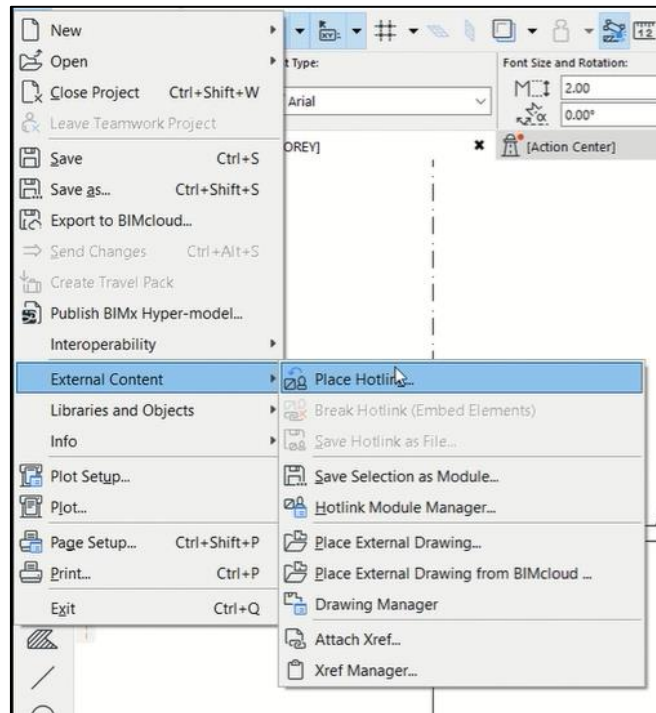


7.6 Importing IFC to Archicad

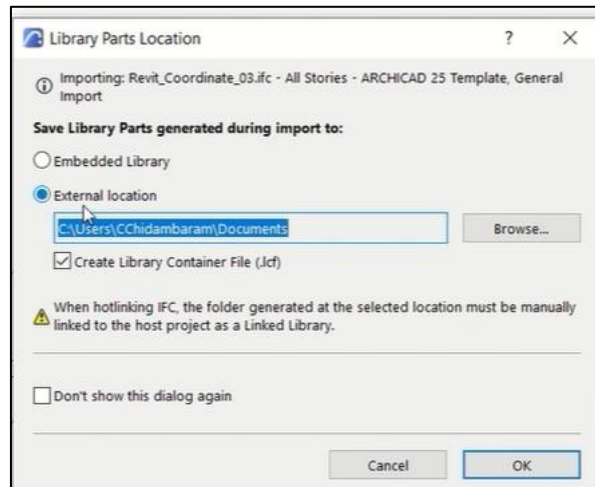
In Archicad, go back to **'IFC Translators'** and ensure that **'IFC Site Location'** is selected as shown below.



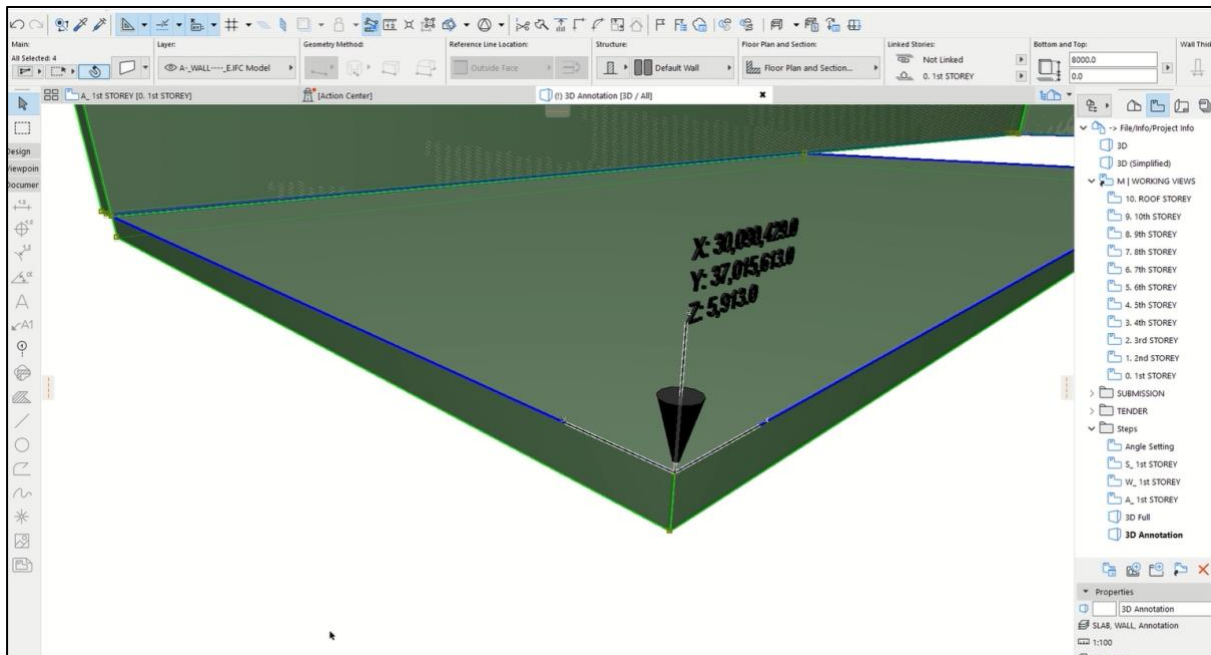
Click on 'File' -> 'External Content' -> 'Place Hotlink' and select the relevant IFC file, as shown below.



Ensure that external location is selected as shown below.



Check through the Revit file and you should find that the coordinates match with the original Archicad file.



For a full detailed walk-through of this, please refer to the video in this [link](#).