CERTIFICATE COURSE IN BIM MODELLING

Architecture Track

Certificate Course in
BIM Modelling (Architecture Track)

Topic Overview

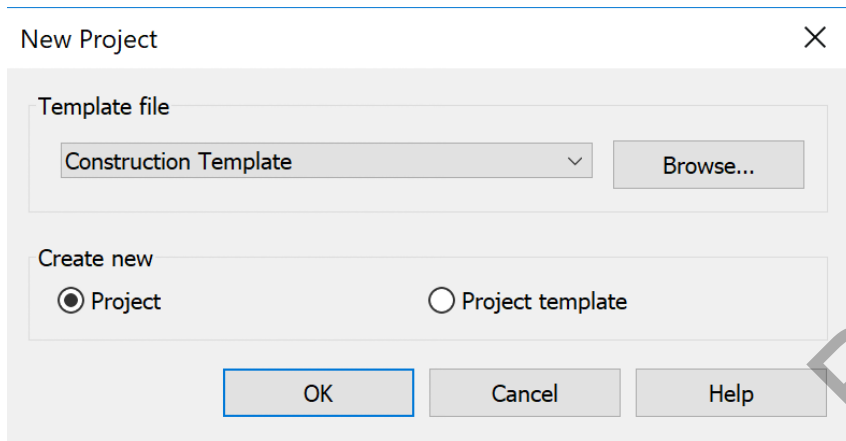|	Day 1	Day 2	Day 3	Day 4
AM	BIM Fundamentals & Revit Interface	BIM e-Submission Guidelines & Template Overview	(Assignment – 3D part finish)	(Assignment – 2D Documentation, Family)
	Starting a BIM project: Project template, Grids & Levels, Create views	Basic 3D modeling : staircase, railing, roof, ceiling		
PM	Site & Mass Modelling	(Assignment – 3D part)	Family editor interface & simple family creation	
	Basic 3D modeling : Wall, floor, ramp, doors & windows		Basic 2D elements: rooms, area, annotation, dimension, tags, coordinates, schedule, sheets, titleblock, link files, insert files, exporting files.	

DAY 1

STARTING THE BIM PROJECT
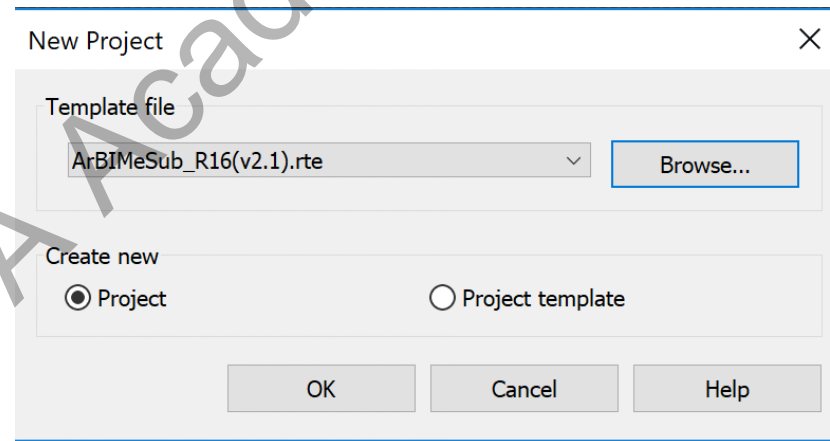
What is Template?

Revit File Extensions

.RVT = Revit Project File
.RFA = Revit Family File
.RTE = Revit Template File

- **Create** a **New Revit** file you need to load the **Template**

- Make sure to load the **correct** template

New Project ✕

Template file

| Construction Template | ⌄ | Browse... |

Create new

◉ Project   ○ Project template

| OK | Cancel | Help |

New Project ✕

Template file

| ArBIMeSub_R16(v2.1).rte | ⌄ | Browse... |

Create new

◉ Project   ○ Project template

| OK | Cancel | Help |

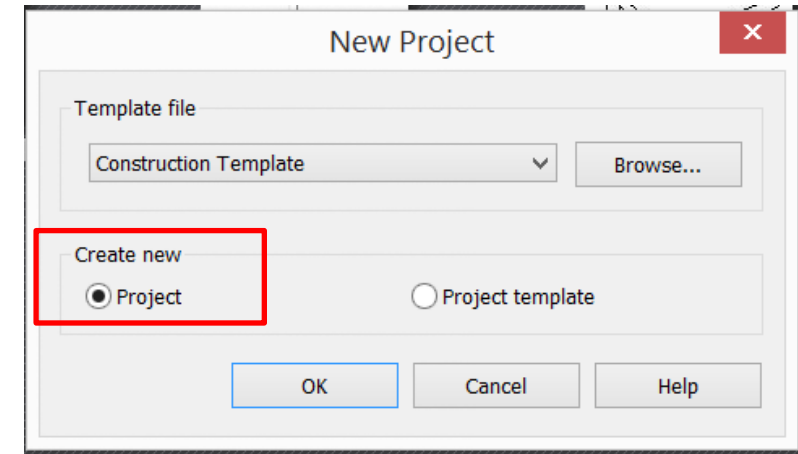- **Autodesk Construction Template**

- **BCA BIM e-Submission Template**
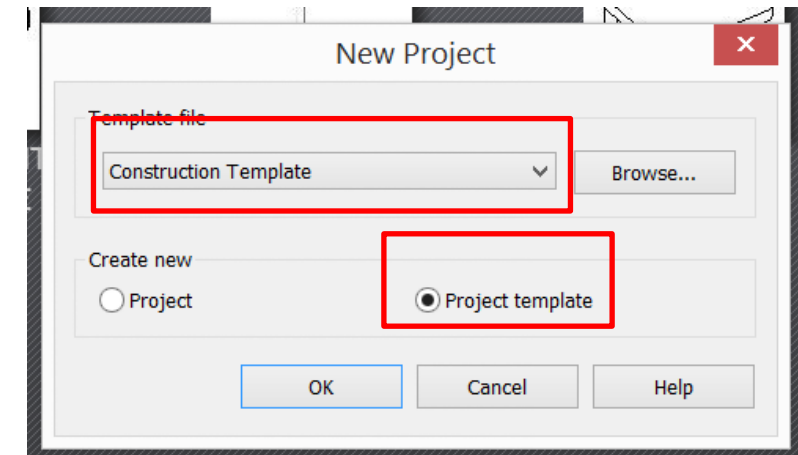
FILE FORMAT

Types of Files

PROJECT- (.rvt)
- is the single database of information for your design
- The project file contains all information for the building design, from geometry to construction data.

TEMPLATE- (.rte)
- A project template provides a starting point for a new project, including view templates, loaded families, defined settings (such as units, fill patterns, line styles, line weights, view scales, and more), and geometry, if desired.
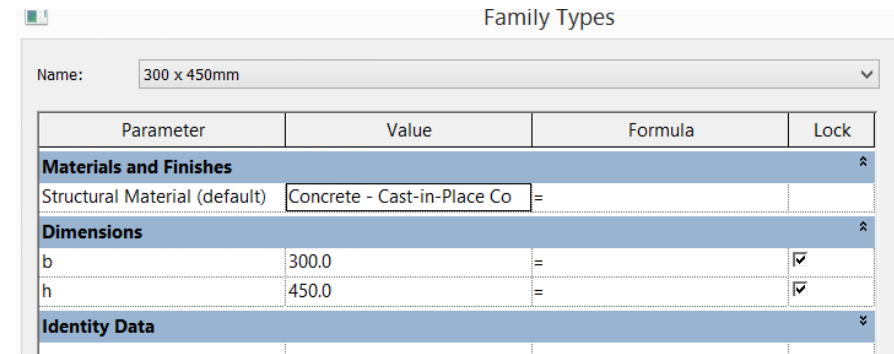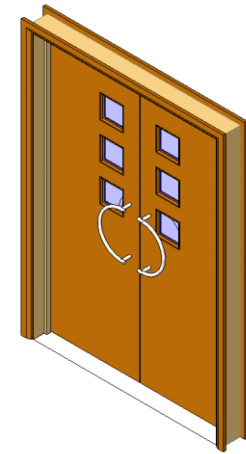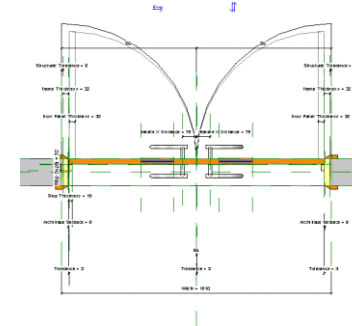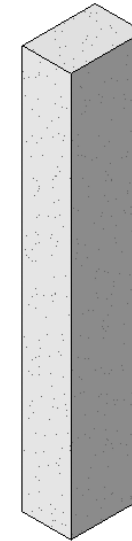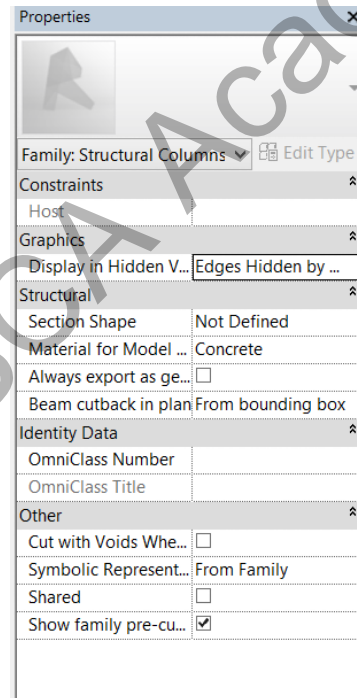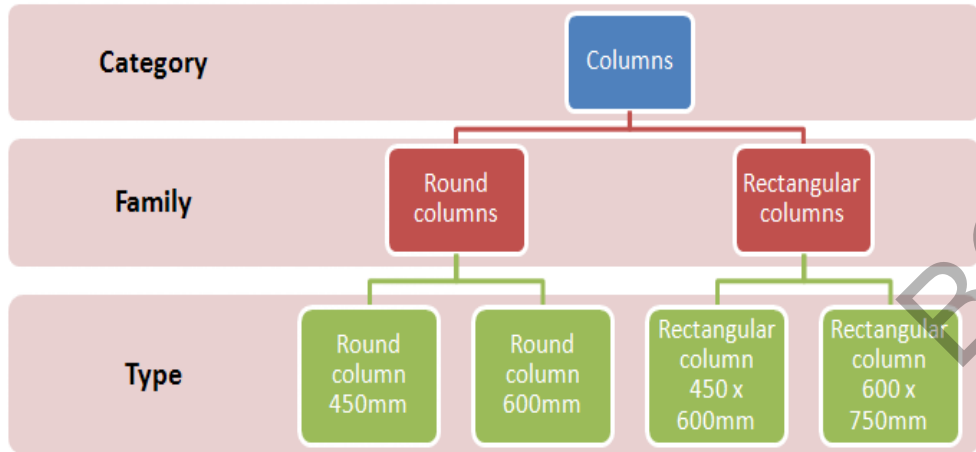
FILE FORMAT

Types of Files

FAMILY- (.rfa)
- are classes of elements in a category
- are components you use to build your model such as Door, Column, Wall, Ceiling & etc.

FILE FORMAT

Types of Families

- **Loadable families** can be loaded into a project and created from family templates. You can determine the set of properties and the graphical representation of the family
Example: Door, Window, Column, Beam, Pipe Elbow, Valve

- **System families** are not available for loading or creating as separate files.
    - Revit predefines the set of properties and the graphical representation of system families.
    - You can use the predefined types to generate new types that belong to this family within the project
    - System families can be transferred between projects.
    Examples: Slab, Roof, Dimensions, Duct, Pipe

- **In-place families** define custom elements that you create in the context of a project. Create an in-place element when your project needs unique geometry that you do not expect to reuse or geometry that must maintain one or more relationships to other project geometry.
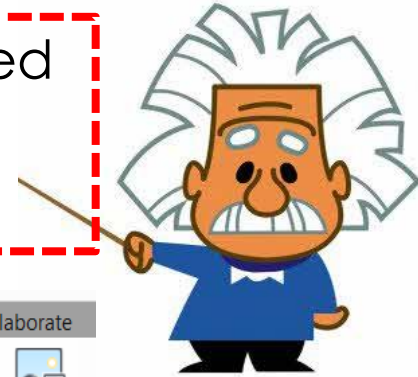
To Link CAD file

- Go to Ribbon – Insert- Link CAD

- Locate the CAD file location, always tick the "**CURRENT VIEW ONLY**"
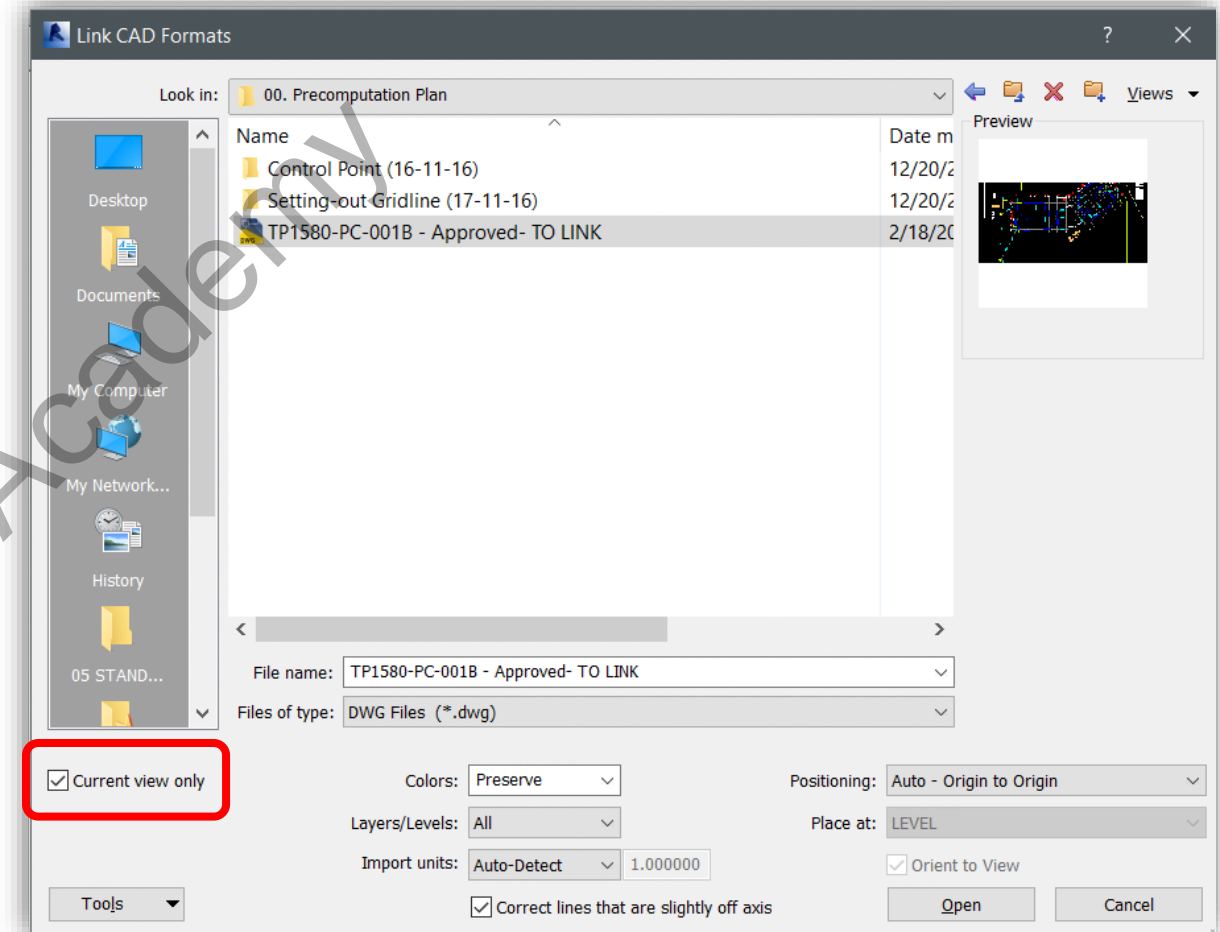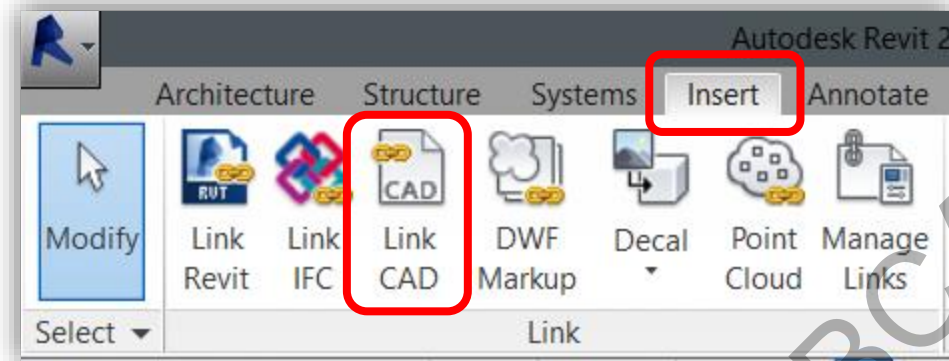
Link CAD

If you are working with an AutoCAD file that you know is going to be updated from the source designers then you will want to Link the .dwg into Revit. You will not be able to explode the .dwg content if it is linked into Revit.

Inserting Link CAD

o Go to Ribbon - Insert Tab > Link CAD
o Select the CAD file:
  o Colors = Preserve or Black and White
  o Layers= Visible or Specify
  o Import Units = (Desired Units)
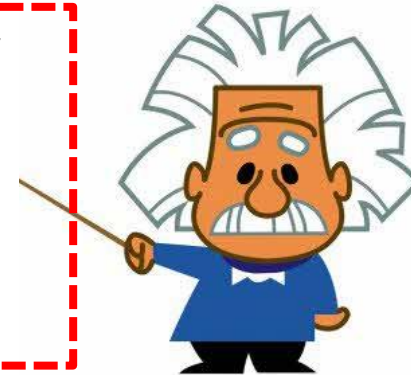o Positioning = Manual Origin / Auto Origin
o Current View Only > Ok
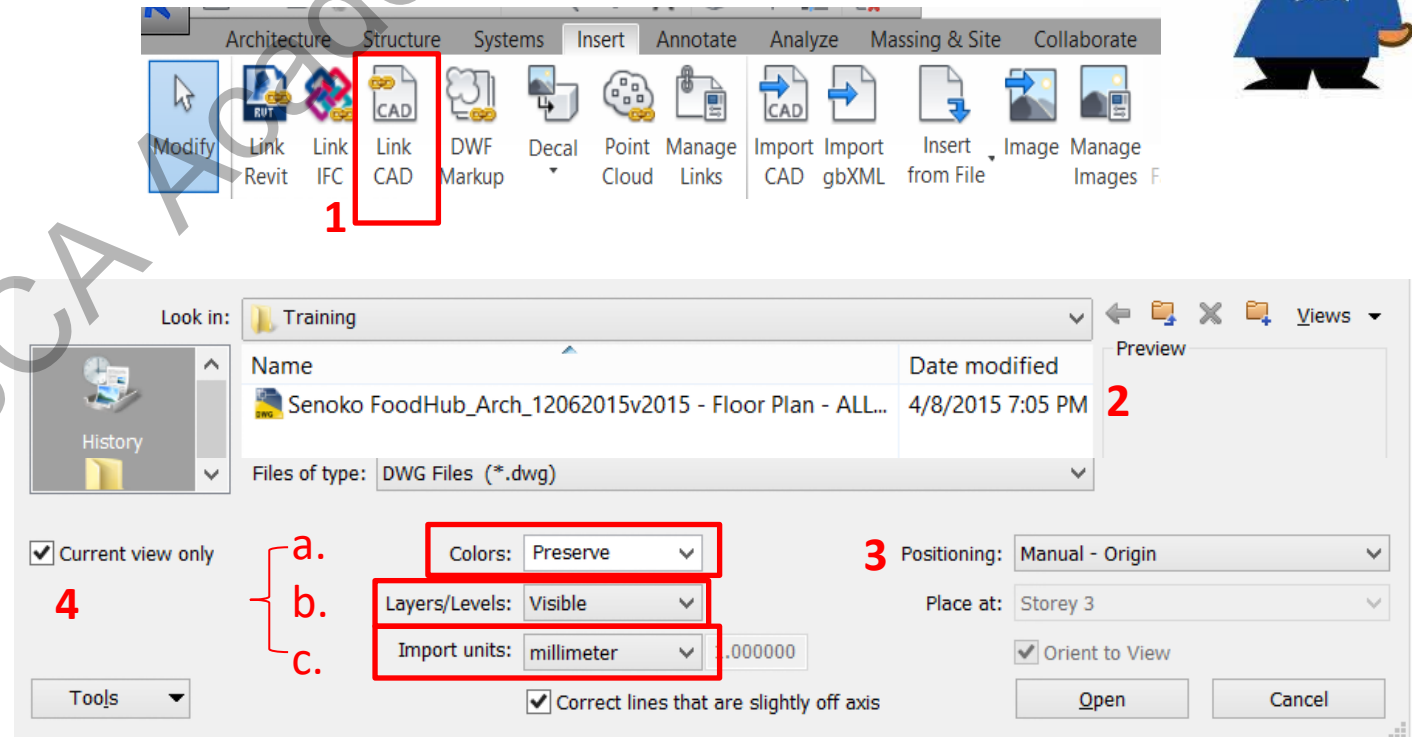
Import CAD

If you want to bring in an AutoCAD file that you know is NOT going to be updated by anyone and you want to be able to bring the .dwg file into Revit and modify it without having to go back into AutoCAD to make changes - you will want to use the Import CAD tool in Revit. In order to manipulate what you have imported from CAD, you will need to select on the object you imported and from the ribbon you will click on the Explode drop down

Importing CAD

o Go to Ribbon - Insert Tab > Import CAD
o Select the CAD file:
   o Colors = Preserve or Black and White
   o Layers= Visible or Specify
   o Import Units = (Desire Units)
o Positioning = Manual Origin / Auto Origin
o Current View Only > Ok
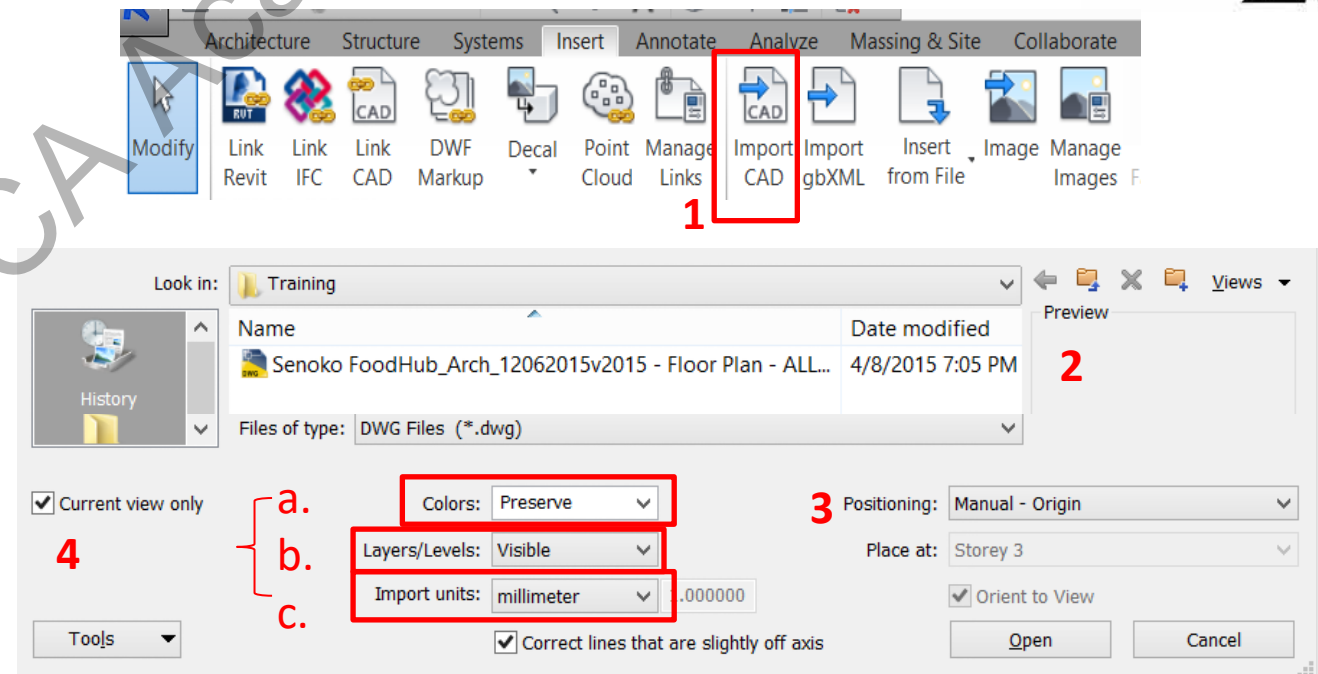
Managing Link CAD

- Select the CAD File

- Click Query

- Select CAD Line to show the Import Instance Query

- Choose Delete if you want to permanently delete the CAD layer

- Choose Hide in View if you want to Temporarily Hide the CAD layer
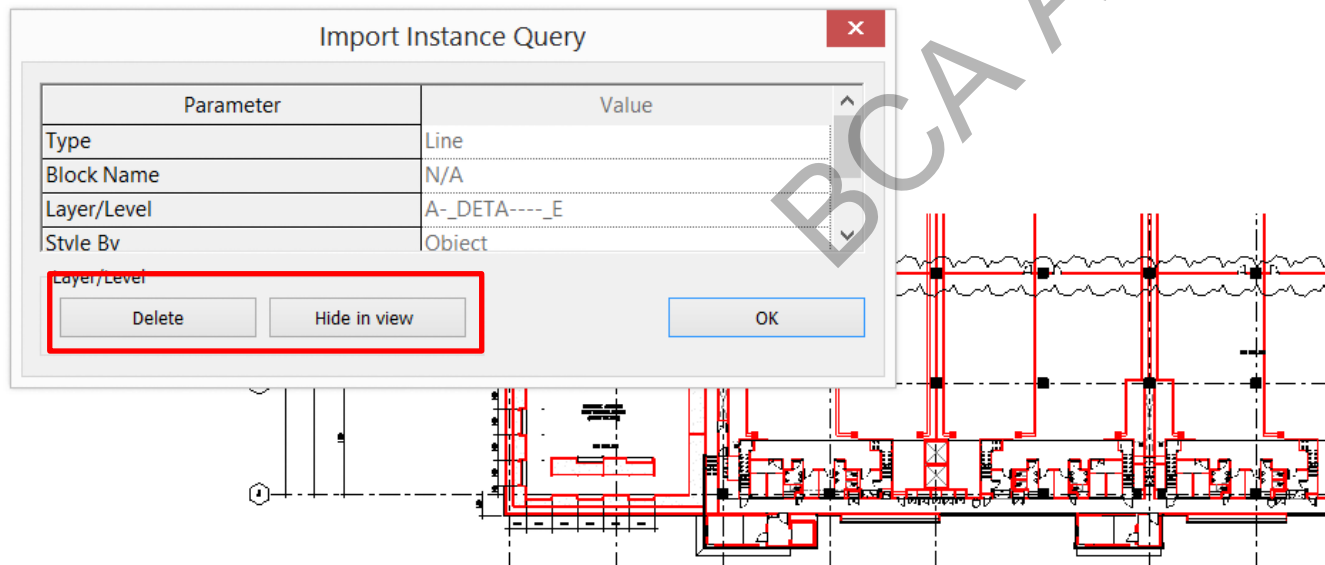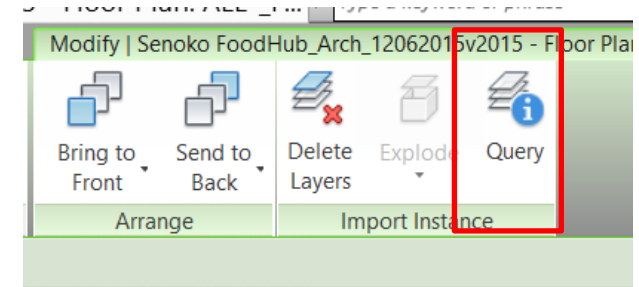
"Advisable when working with Plan"

Managing Import CAD

- Select the CAD File

- Click Explode

- Choose Partial Explode to partially disassembles the CAD

- Choose Full Explode to completely disassembles the imported CAD into lines, text and filled region (hatch)
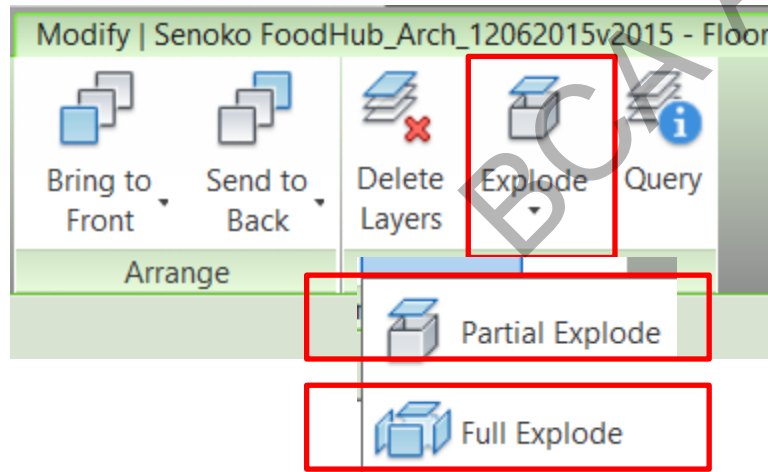
"Advisable when working with Detailing"

Boundary Line (Property Line)

- Go to Ribbon – Massing & Site – Property Line

- Create the property lines by **SKETCHING**

- Trace the boundary lines as shown on the linked cad files

- **Property line can be seen in all levels**
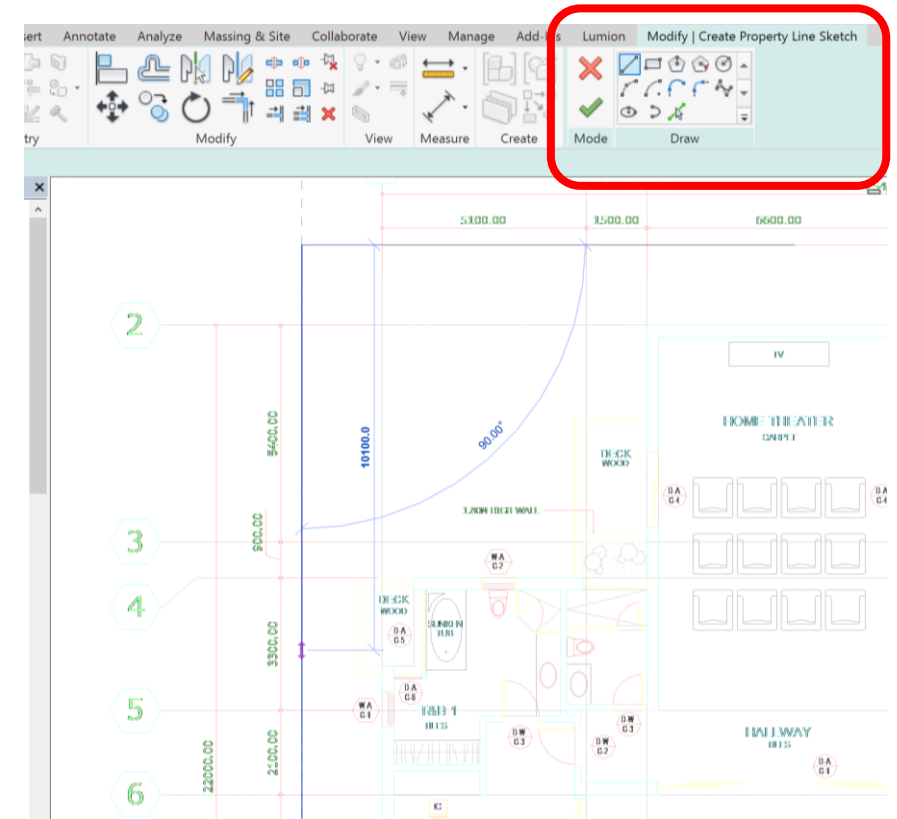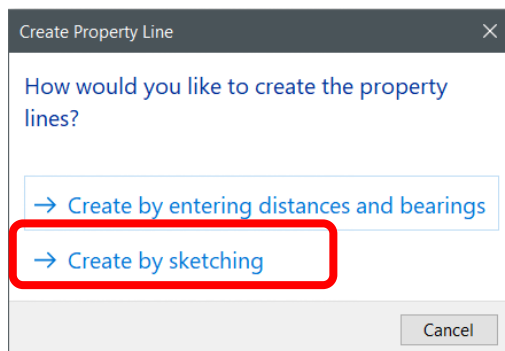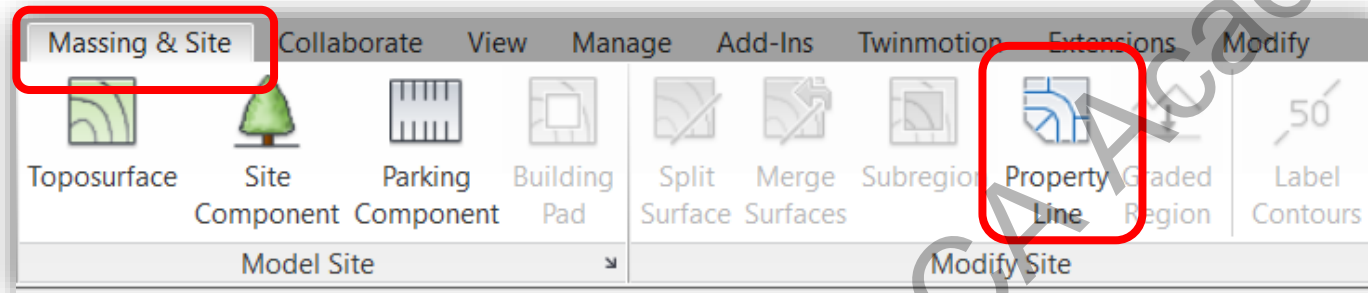
Project Location

Manage

- Location
- Coordinates ▾
- Position ▾

Coordinates
- Acquire Coordinates
- Publish Coordinates
- Specify Coordinates at Point
- Report Shared Coordinates

Position
- Relocate Project
- Rotate True North
- Mirror Project
- Rotate Project North

Project Base Point
Shared Site:
N/S   -1300.327815178764
E/W   -59.785186904771
Elev   0.000000000000
Angle to True North   0.00°

Survey Point - Internal
Shared Site:
N/S   0.000000000000
E/W   0.000000000000
Elev   0.000000000000

Integration Collaboration
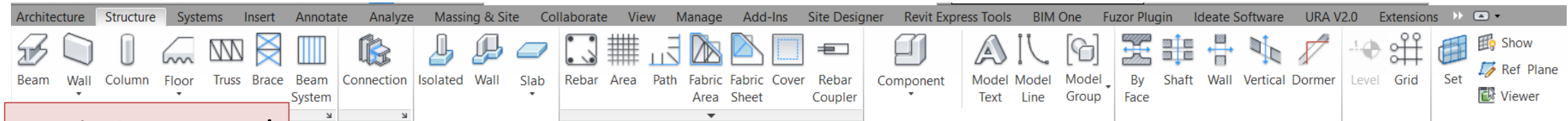
Revit Structural
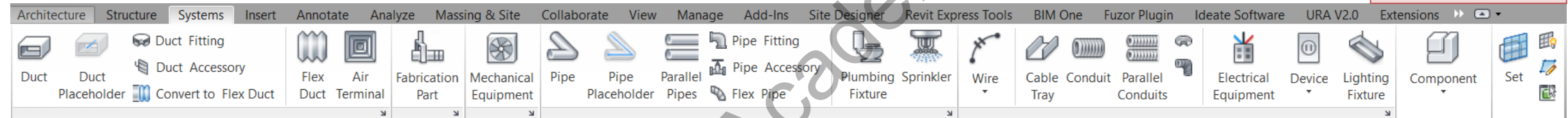
Revit MEP
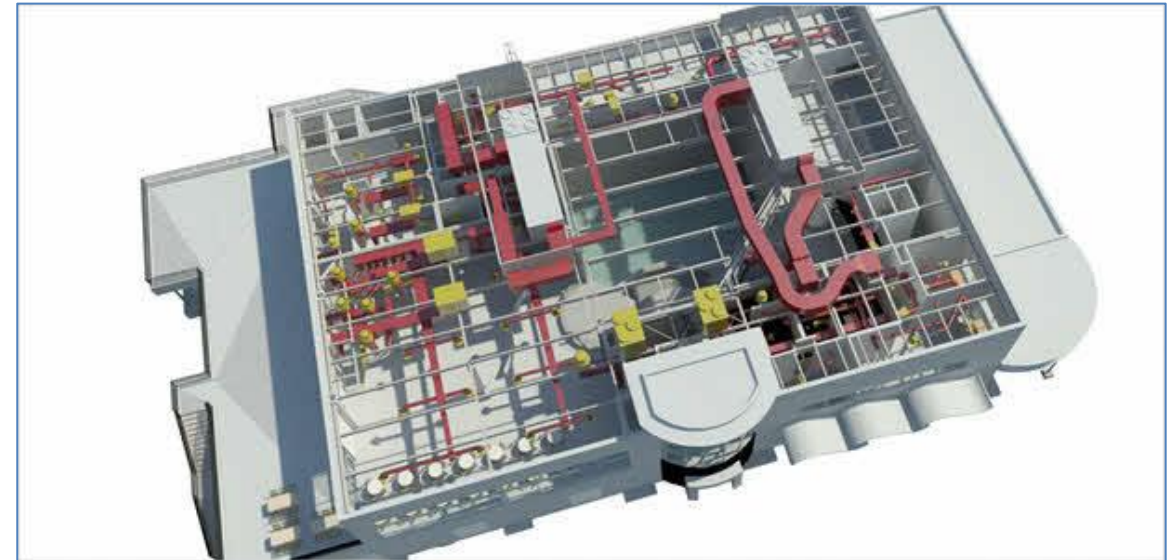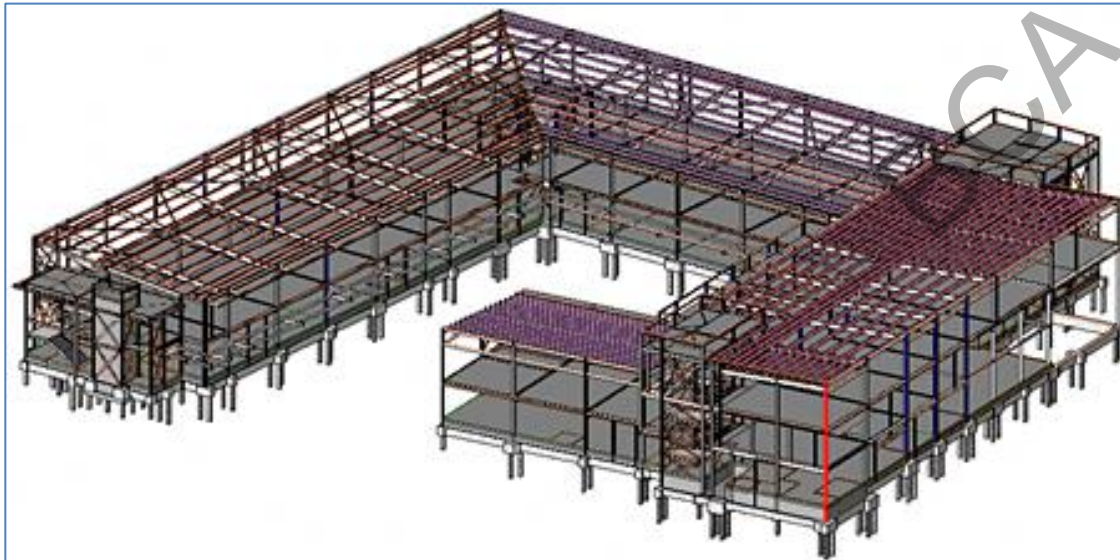
Gridlines

How to set-up the project's gridlines

- Go to Ribbon – Architecture – Datum, pick **Grid** [Grid]

- Sketching Grid (Draw, Pick Lines, Line, Arc and Offset)

- Selecting Grid Type

- Changing Grid Number

- Locking Grid Lines

Notes: Make sure NOT to create the gridlines by picking the link cad as the gridlines from cad file may not be parallel to each other.
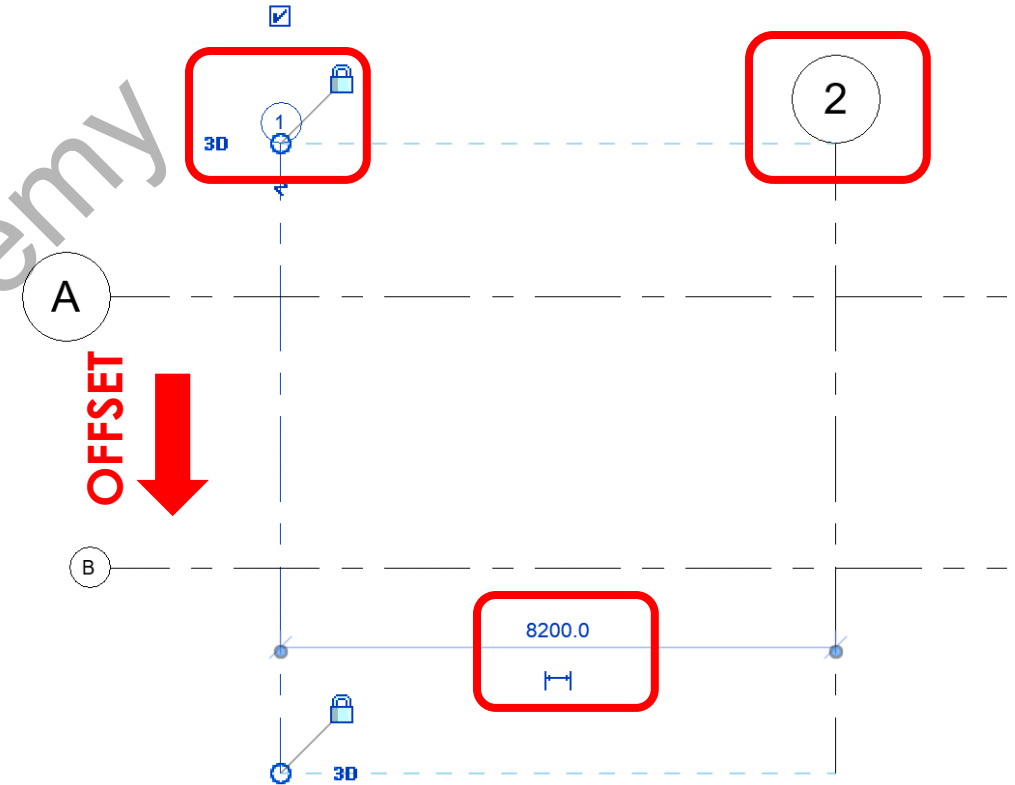
Levels

How to set-up the project's levels

- Go to **Section** or **Elevation View**

- Go to Ribbon – Architecture – Datum, pick **Level**

- Sketching Level (Draw, Pick Lines and Offset)

- Selecting Level Type

- Setting Level Height

- Locking Level Lines

- Datum Extents and Visibilities
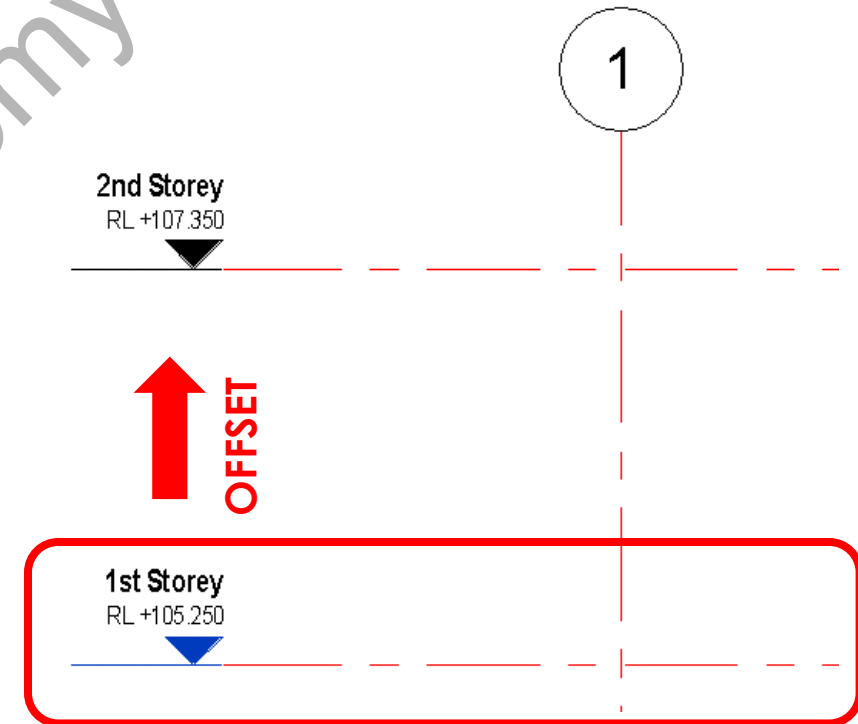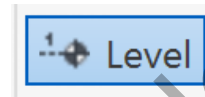
Notes: Make sure NOT to create the levels by picking the link cad as the levels from cad file may not be parallel to each other.

Create Views

Open Level 1
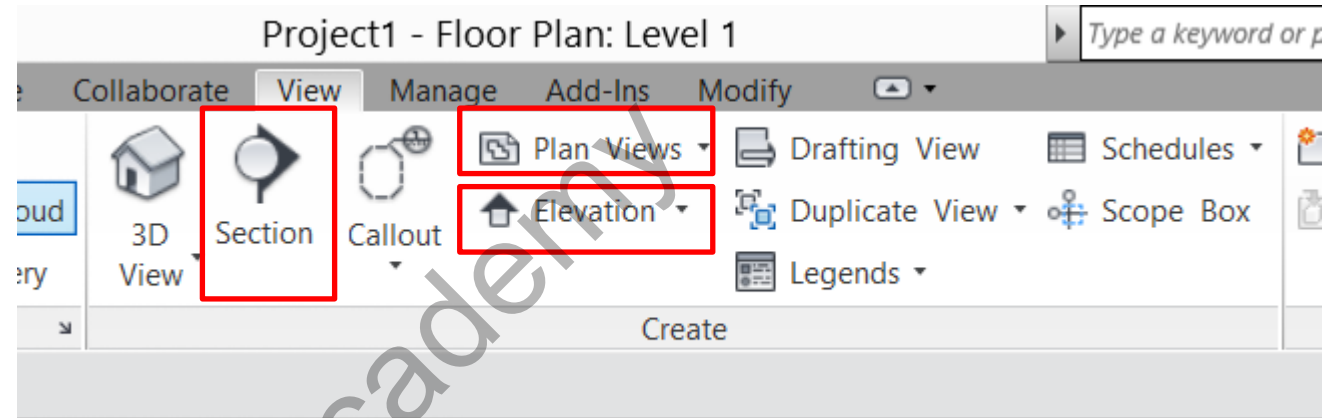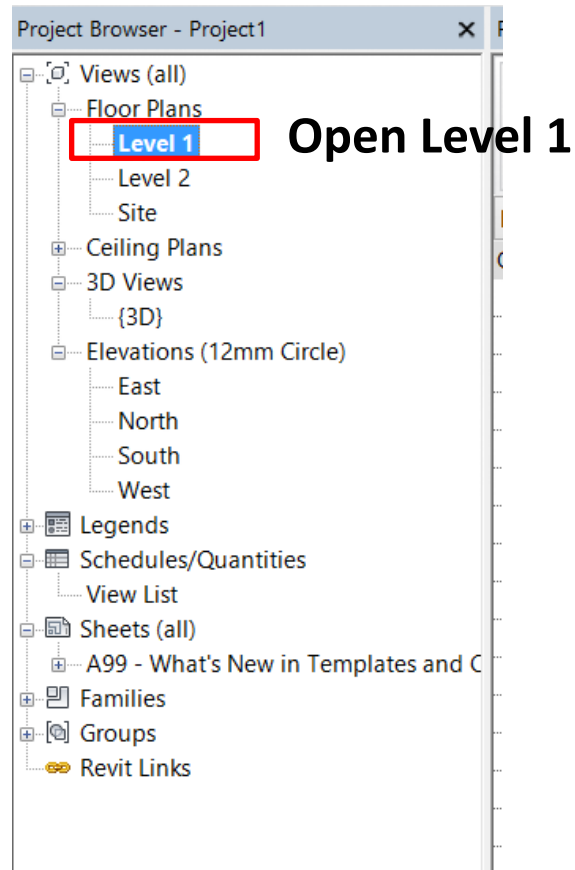
- Go to Ribbon – Architecture – View, pick **the following options:**
  - Create Plan Views
  - Create Section
  - Create Elevation

Create Views
Duplicate Views

View

Plan Views ▾ | Drafting View | Schedules ▾ | Sheet | Title Block | Matchline
3D View | Section | Callout | Elevation ▾ | Duplicate View ▾ | Scope Box | View | Revisions | View Reference | Switch Windows | Close Hidden
Legends ▾ | Guide Grid | Viewports ▾

Create | Sheet Composition | Windows

Project Browser - Day_05 Training ✕

- ⊟ [O] Views (all)
  - ⊟ Floor Plans
    - **Level 1**
    - Lev...
    - Site...
    - T.O...
    - T.O...
    - T.O...
  - ⊞ Ceiling...
  - ⊟ Elevati...
    - East...
    - Nor...
    - Sou...

Open
Close
Find Referring Views...

Apply Template Properties...
Create View Template From View...

Duplicate View ▶
Convert to independent view
Apply Dependent Views...
Save to Project as Image...

Duplicate
Duplicate with Detailing
Duplicate as a Dependent

1. **Project Browser**   or
2. **Views > Select**
3. **Right Click (Context View) >**
   Duplicate View
       a. **Duplicate**
       b. **Duplicate with Detailing**
       c. **Duplicate as Dependent**

1. **View Tab >**
2. **Duplicate View**
       a. **Duplicate**
       b. **Duplicate with Detailing**
       c. **Duplicate as Dependent**

Important:
Each view must have a unique name

Duplicate, Creates a view that contains only the model geometry of a current view
Duplicate with Detailing, Creates a view that includes the model geometry and view specific elements of a current view
Duplicate as Dependent, Create a view that is dependent on the original view
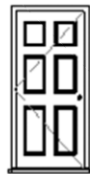
Create Views

Legends

Create a list of building components and Annotation used in a project

1. View Tab > Legends
2. New Legend View and add value for name and value for a scale
3. Drag model and annotation family types from the Project Browser into the Legend View.
4. To create the legend view, use the detailing tools on the Annotate Tab. The detailing tools include Detail Lines, Text and Dimension

Create Views

Drafting Views

Create a view showing details that are not directly showing in the building model

1. View Tab > Drafting View
2. New Drafting View, and enter a value for Name and select a value for scale
3. In the Project Browser, expand Drafting Views to see the newly created drafting view in the list
4. To create the drafting view, use the detailing tools on the Annotate Tab. The detailing tools include Detail Lines, Insulation, Masking Region, Filled Region, Text and Dimension
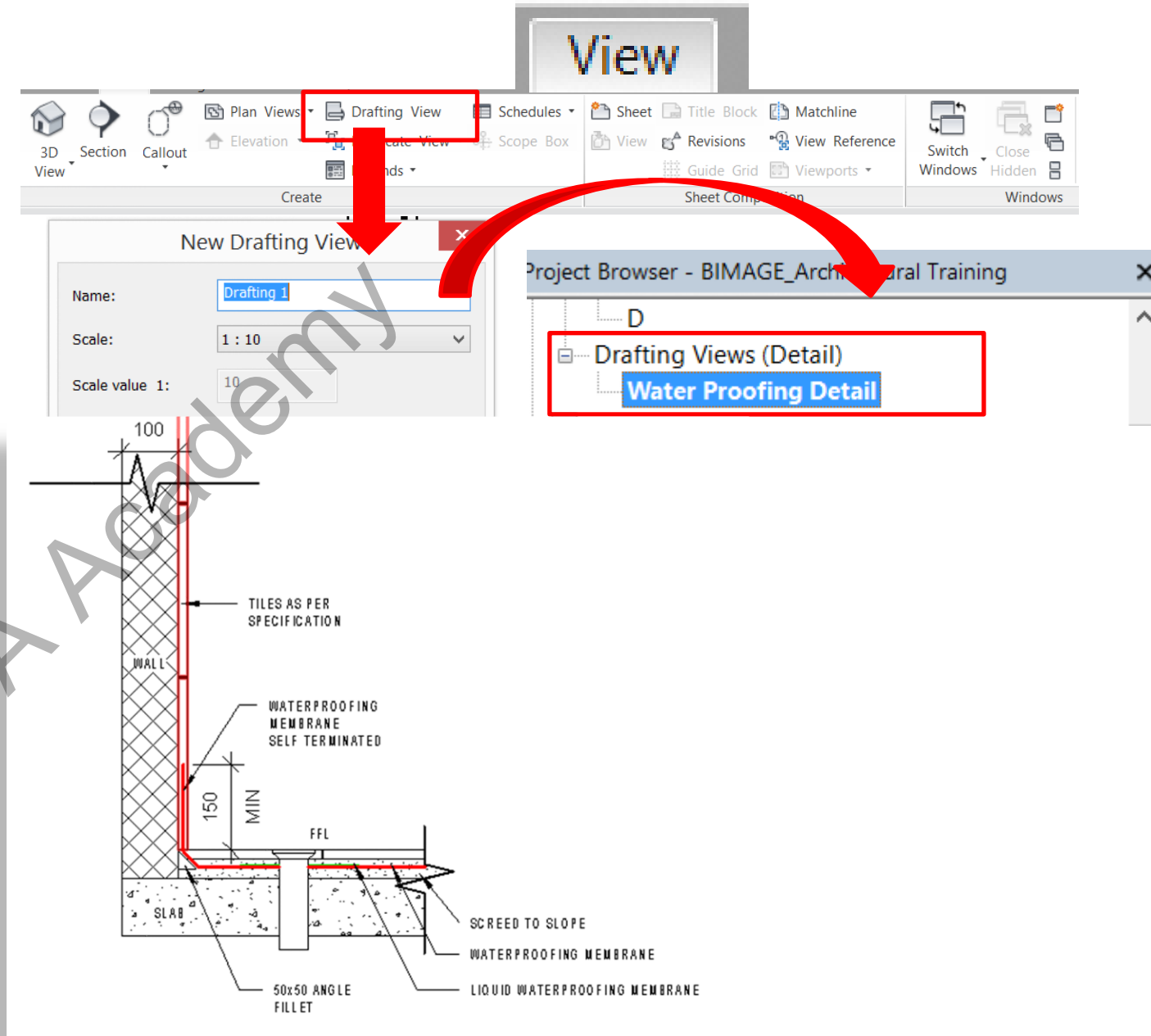
Create Views

Callout

1. View Tab > Callout

2. Create Rectangular Callout or Sketch the Callout

3. In the Project Browser, expand the Floor Plan to see the newly created callout and Rename the view

To Reference the Callout to a Drafting View do the following

4. Create callout in the reference view name from the drop down list and select the desired Drafting View

☑ Reference other view: <New Drafting View> ∨
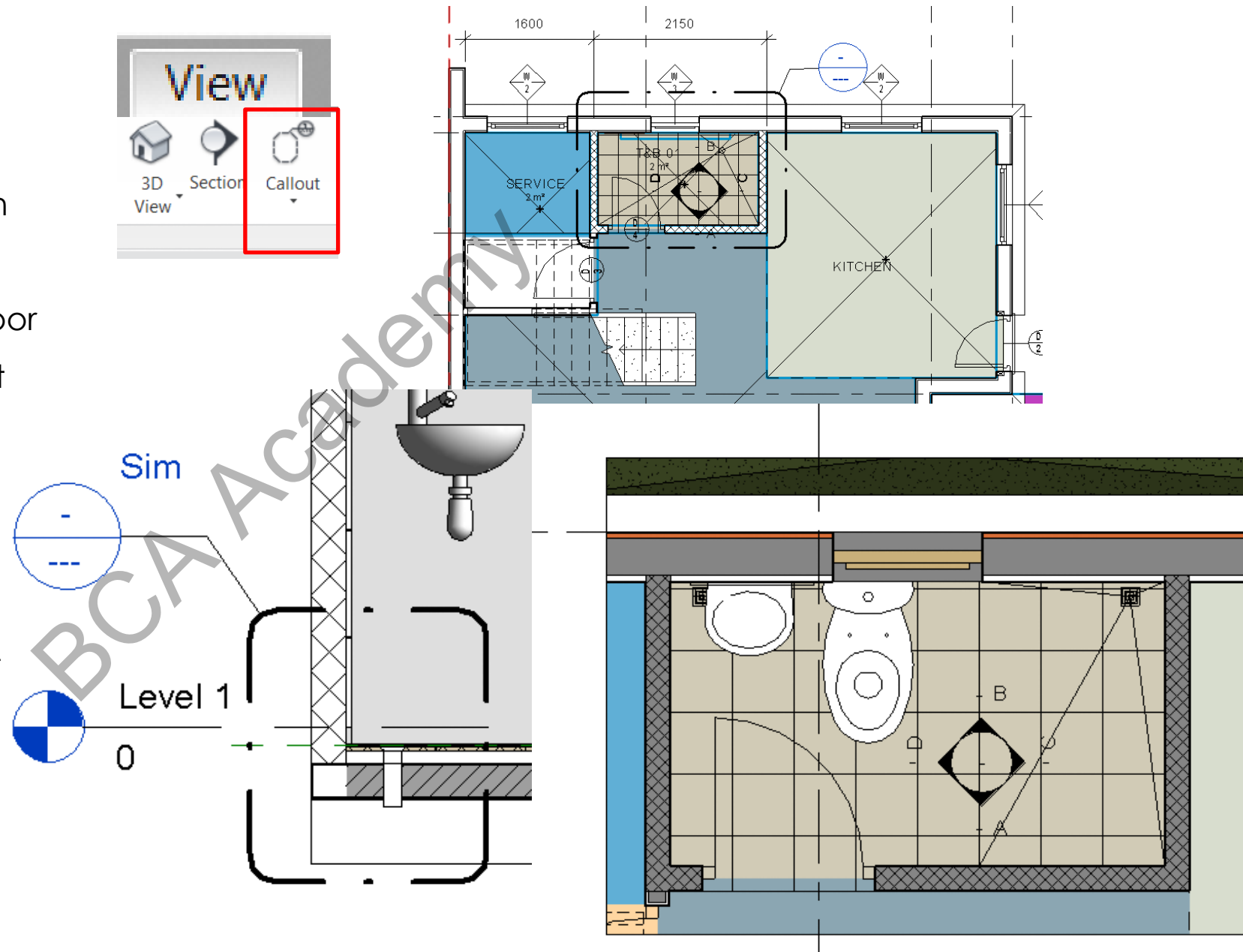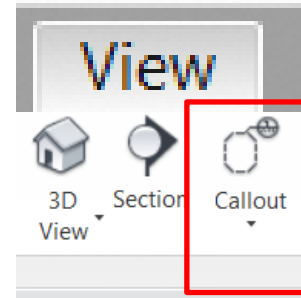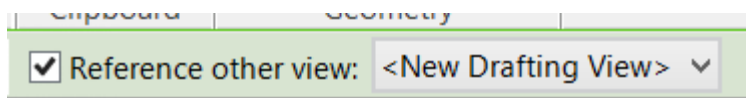
Create Views

Elevation

1. View Tab > Elevation

2. To create additional elevation highlight the circle or square of the elevation symbol and click the elevation symbol display with check box option to create view
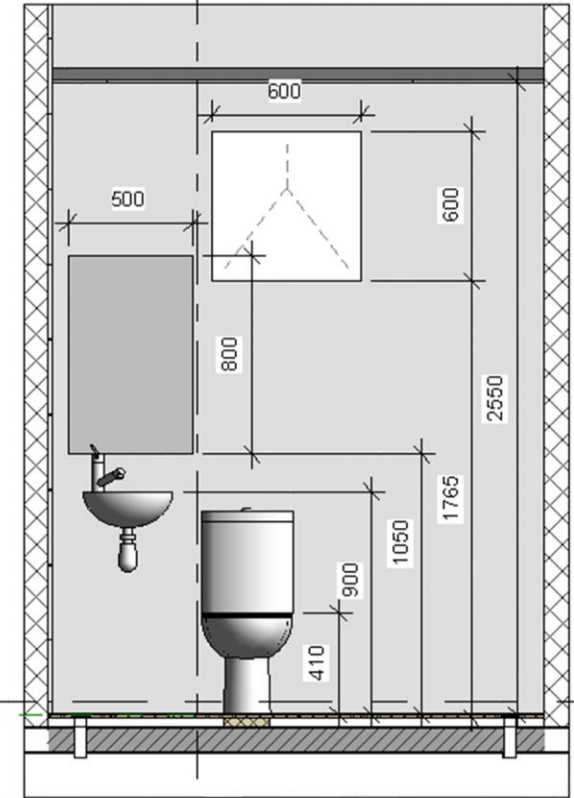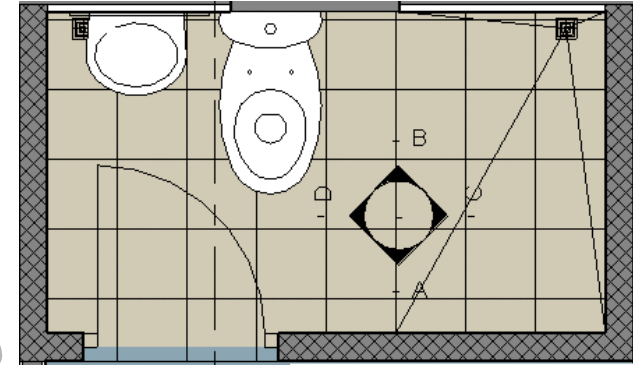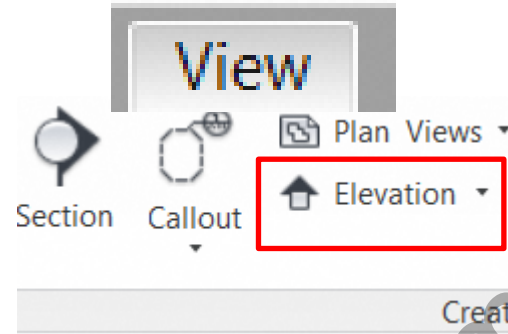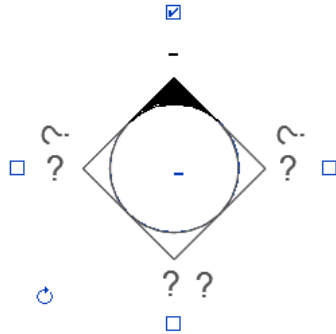
Create Views

3D View (Camera)

1. Open plan, section or elevation view

2. View Tab > 3D View drop down > Camera

3. Click once in the drawing area to place the camera, and click again to place the target point

4. In the Project Browser , expand the 3D Views to see the newly created 3D view and Rename

To move the camera to change the view do the following

5. Open the perspective 3D view

6. In the Project Browser, right-click the perspective 3D view name, and select Show Camera.
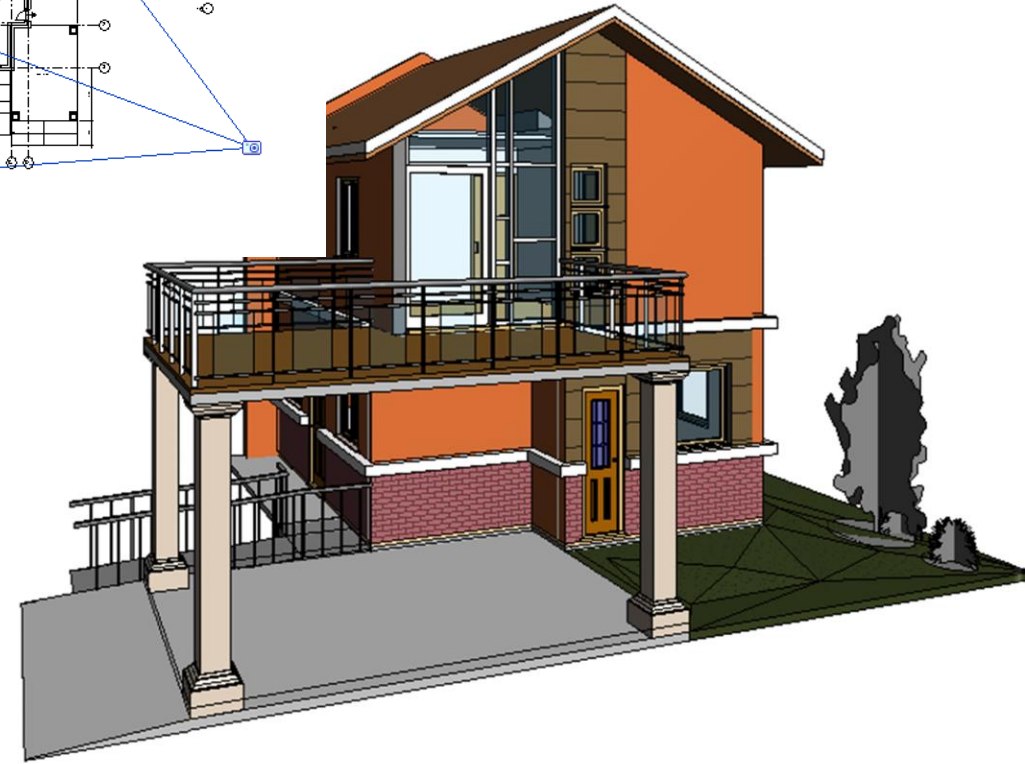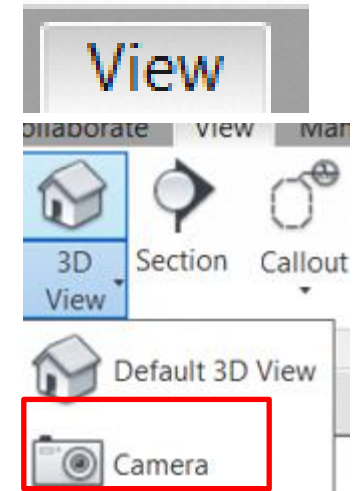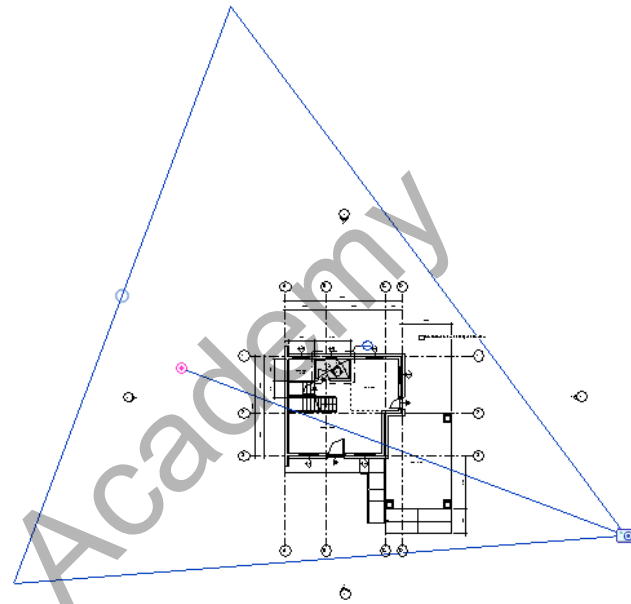
Create Views

3D View (Walkthrough)

1. Open plan, section or elevation view

2. View Tab > 3D View drop down > Walkthrough

3. Place the cursor in a view, and click to place a key frame

4. Move the cursor in the desired direction to draw the path

5. Click again to place another key frame, place the key frames anywhere, but cannot change their position during creation of the path.

6. You can edit the key frames after finishing the path.
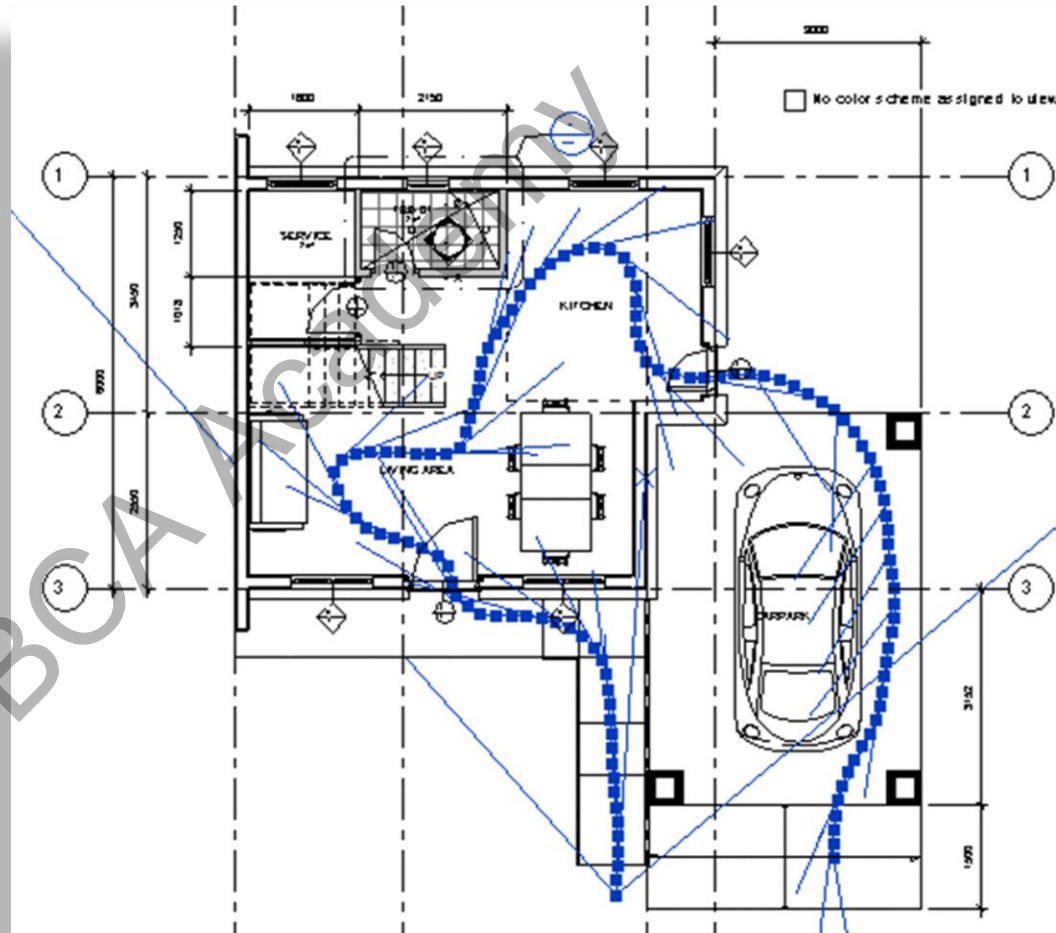
To Link CAD file

Manage Links (Revit, CAD & Others)
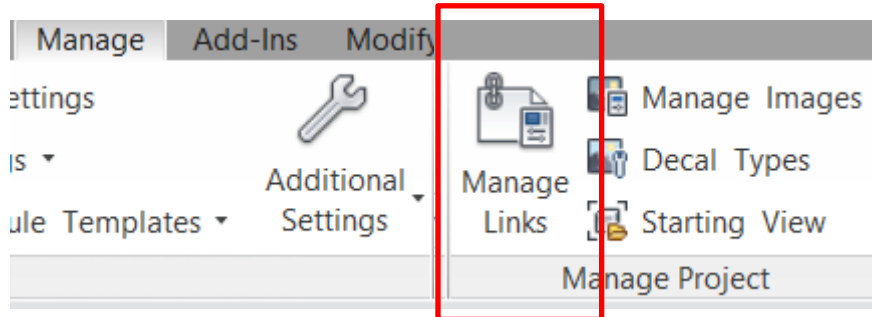
The Manage Links dialog has tabs for Revit models, IFC links, CAD Formats, DWF Markups, and Point Clouds. Under the tabs are columns that provide information about the link.
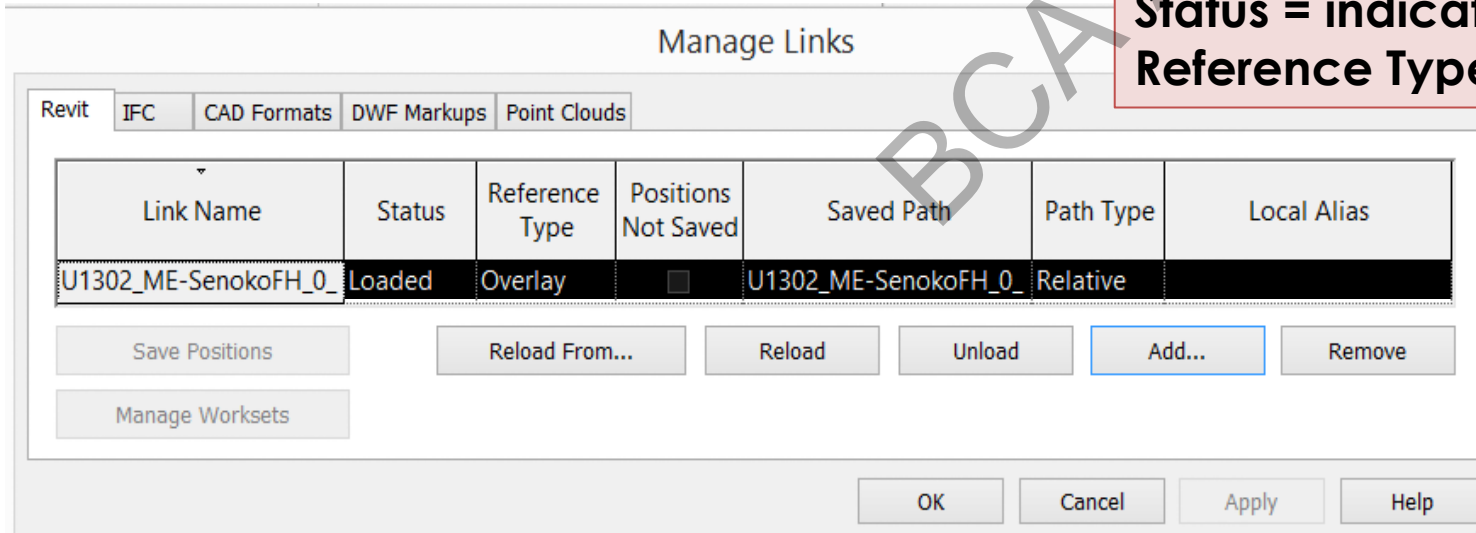
Important:
Link Name = Indicates the Link File Name
Status = indicates if the file is Loaded or Not Loaded
Reference Type = Overlay or Attachment

Visibility Setting

Visibility / Graphics Overrides (VV / VG)

Control the visibility and graphic display of model elements, datum elements, and view-specific elements for each view in a project

To turn On or Off the Elements or Annotation

Override the line graphics weight, colour & pattern

Set Transparency

Halftone
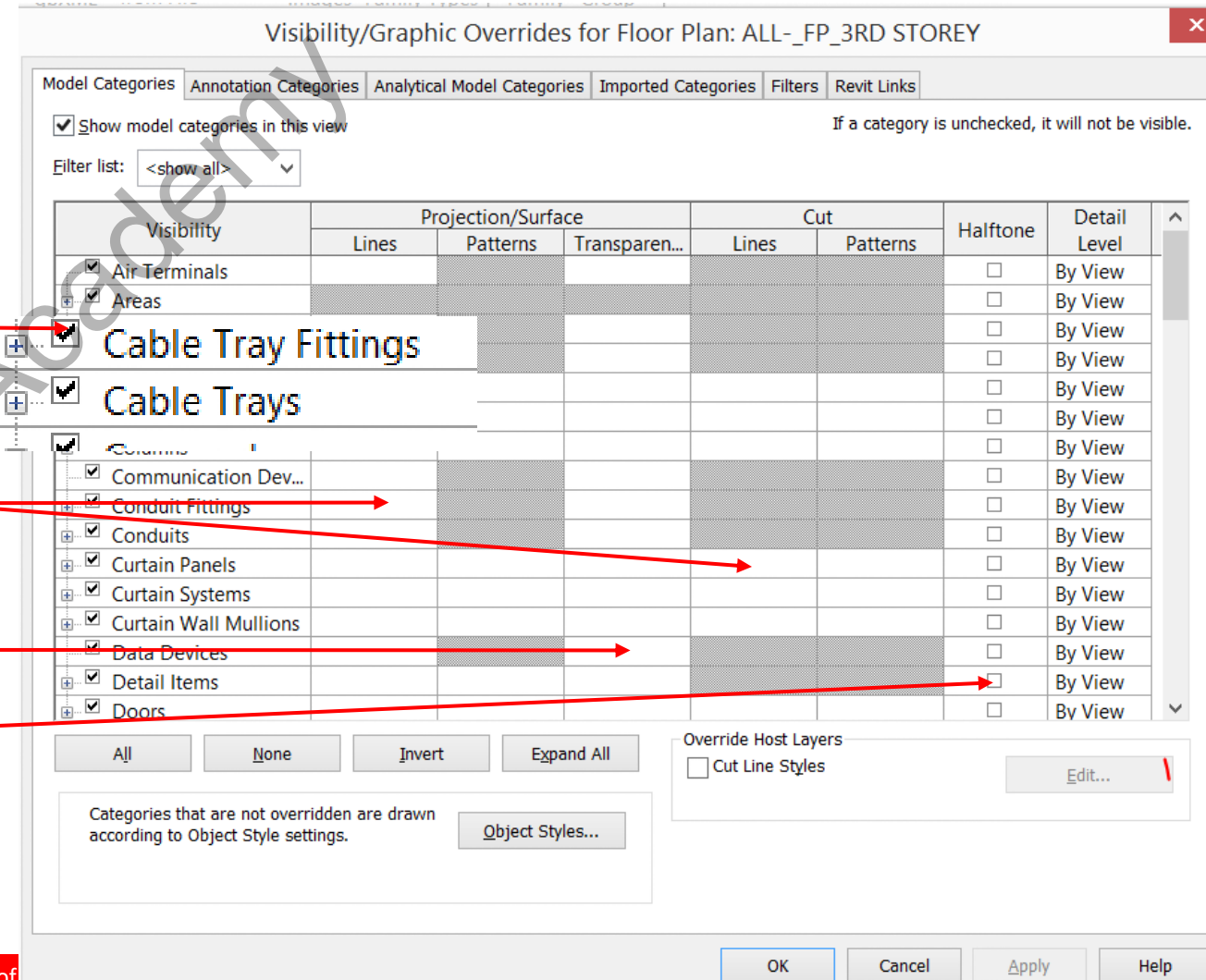
Visibility Setting

Custom Setting to Display of Link Model

Override the display settings of link models - While "custom" is selected, select the view in the linked model which you want to use the display settings for the linked model in the current host view

RVT Link Display Settings

| Basics | Model Categories | Annotation Categories | Analytical Model Categories | Import Categories | Worksets |

○ By host view   ○ By linked view   ● Custom

Linked view:	Floor Plan: 3RD STOREY_FIRE PROTECTION
View filters:	<By host view>
View range:	<By host view>
Phase:	<By host view> (New Construction)
Phase filter:	<By host view> (Show All)
Detail level:	<By host view> (Fine)
Discipline:	<By host view> (Coordination)
Color fill:	<By host view>
Object styles:	<By host model>
Nested links:	<By parent link>

Architecture   Structure   Systems   Insert   Annotate   Analyze   Massing & Site   Collaborate   View

Visibility/ Graphics   Show Hidden Lines   Render

View Templates   Filter   Remove Hidden Lines   Render in Cloud   3D View   Section   Ca

Thin   Cut Profile   Render Gallery

VV / VG

Graphics

Visibility/Graphic Overrides for Section: yp_Section 1

| Model Categories | Annotation Categories | Analytical Model Categories | Imported Categories | Filters | Revit Links |

Visibility	Halftone	Underlay	Display Settings
☑ rac_advanced_sample_project.rvt	☐	☐	By Host View

Visibility Setting
View Range

Top: Elements above this height will not be displayed

Cut Plane: Height that cut through elements (doors, windows etc)

Properties ☒

Extents	⌃
Crop View	☐
Crop Region Vis...	☐
Annotation Crop	☐
View Range	Edit...
Associated Level	Level 2
Scope Box	None
Depth Clipping	No clip

View Range

Sample View Range

Key

1: Primary Range Top
2: Primary Range Cut plane
3: Primary Range Bottom
4: View Depth Level
5: Primary Range
6: View Depth
7: View Range

"Object Style"

"Beyond" linestyle

Primary Range

		Offset:	
Top:	Associated Level (Level 2)	Offset:	2300.00
Cut plane:	Associated Level (Level 2)	Offset:	1500.00
Bottom:	Associated Level (Level 2)	Offset:	0.00

View Depth

		Offset:	
Level:	Associated Level (Level 2)	Offset:	0.00

Learn more about view range

Hide >>   OK   Apply   Cancel
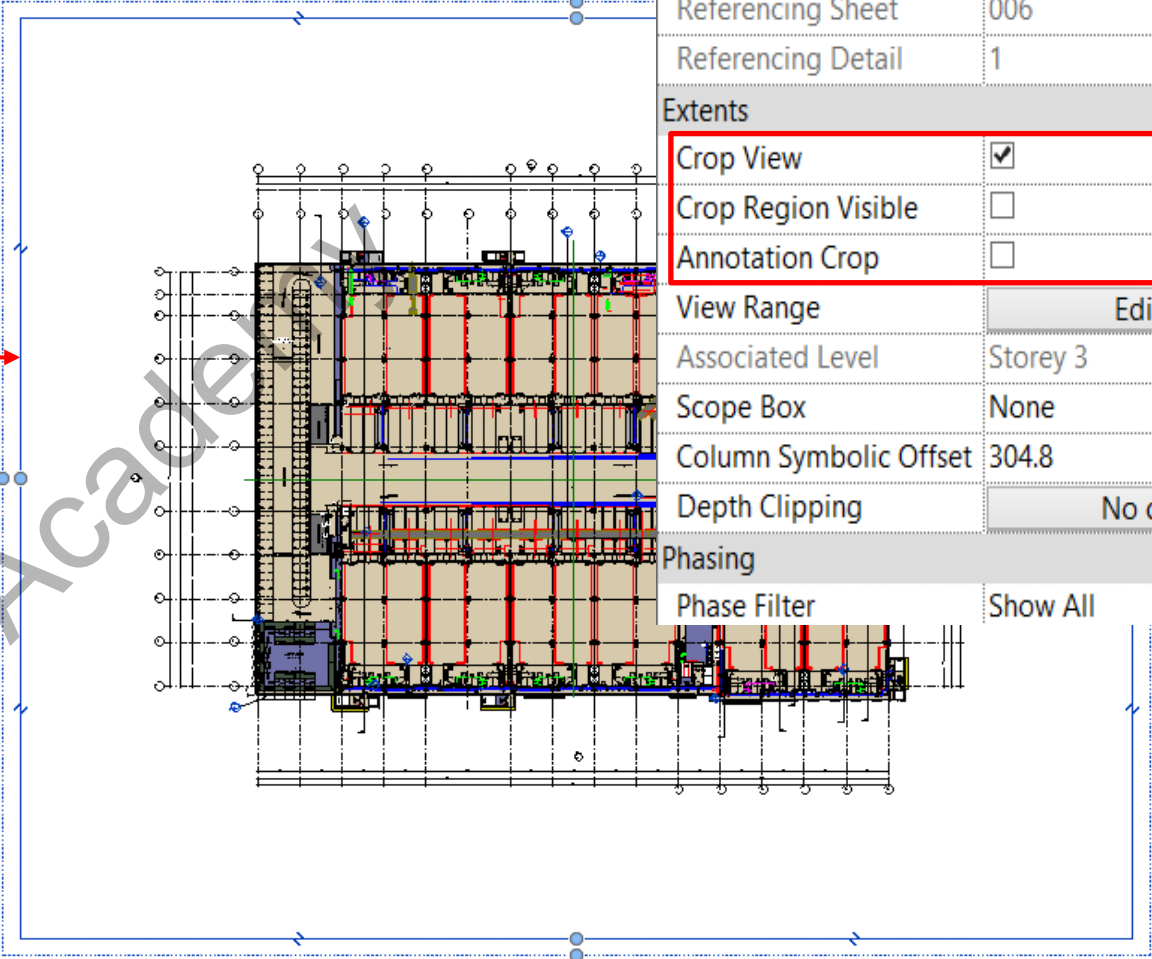
Visibility Setting
Crop View

Crop Region Visible
The model crop region crops model elements, detail elements (such as insulation and detail lines), section boxes, and scope boxes at the model crop boundary

Annotation Crop
An annotation crop region fully crops annotation elements when it touches any portion of the annotation element, so that no partial annotations are drawn. Annotations (such as symbols, tags, keynotes, and dimensions) that reference hidden or cropped model elements do not display in the view, even if they are inside the annotation crop region.

Sheet Name	3RD STOREY FLOOR PLAN
Referencing Sheet	006
Referencing Detail	1
Extents	
Crop View	☑
Crop Region Visible	☐
Annotation Crop	☐
View Range	Edit..
Associated Level	Storey 3
Scope Box	None
Column Symbolic Offset	304.8
Depth Clipping	No clip
Phasing	
Phase Filter	Show All

Visibility Setting

Section Box

(drag controls)
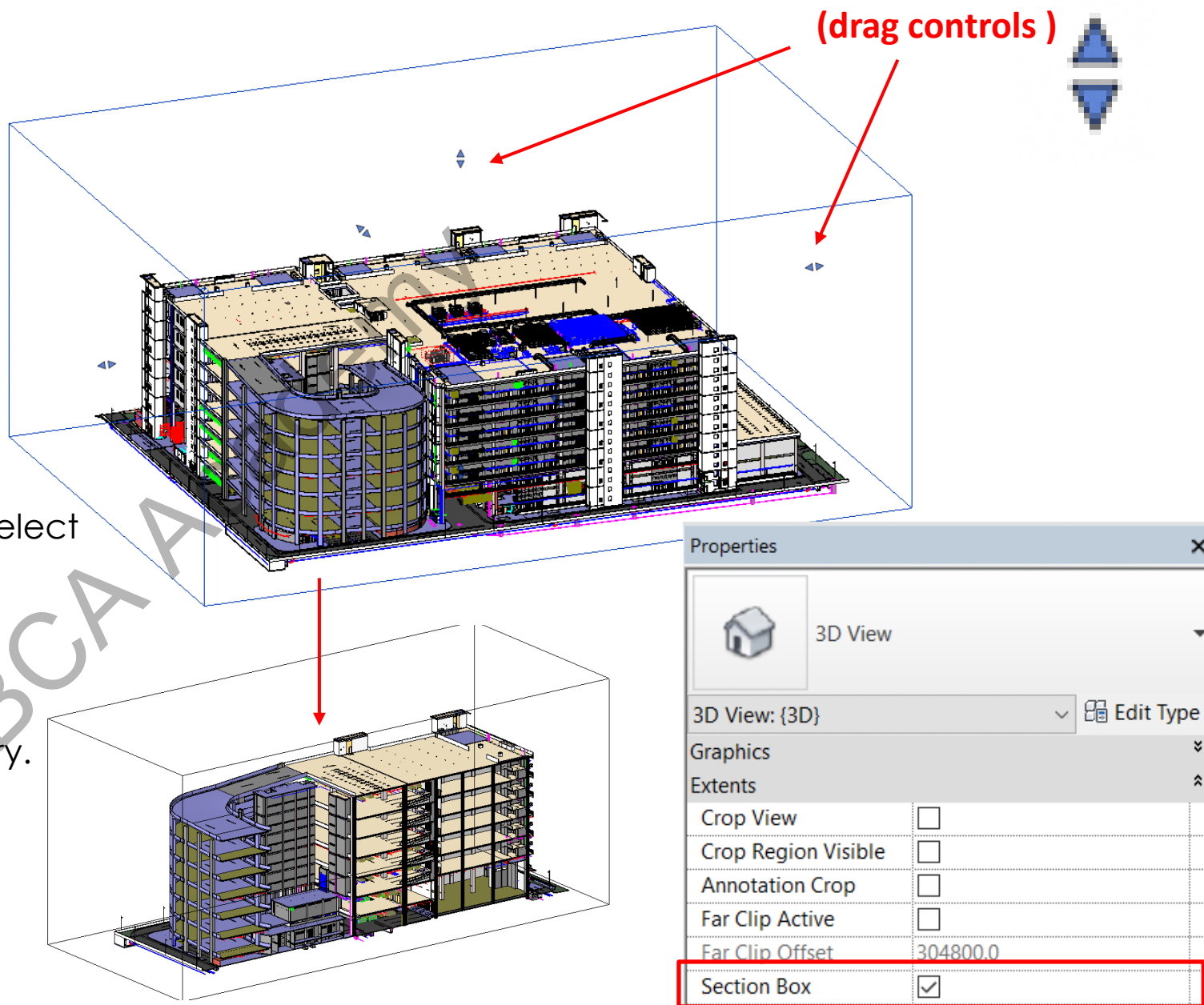
You can use a section box to clip the viewable portion of a 3D view. When you enable a section box in a 3D view, the only change to the view is the addition of the section box.

- Open a 3D view.

- On the Properties palette, under Extents, select the Section Box option.

- Click OK.

- Select the section box and use the drag controls to modify the extents, as necessary.

The section box is not considered a crop region, and therefore it is not affected when you use the Crop Region Visible command.

Properties		
3D View		
3D View: {3D}		Edit Type
Graphics		
Extents		
Crop View	☐	
Crop Region Visible	☐	
Annotation Crop	☐	
Far Clip Active	☐	
Far Clip Offset	304800.0	
Section Box	☑	

Save as Base File

After setting-up the correct Boundary Line, Gridlines & Levels, MAKE SURE TO REMOVE ALL LINK CAD FILES, then SAVE as the **PROJECT'S BASEFILE**.