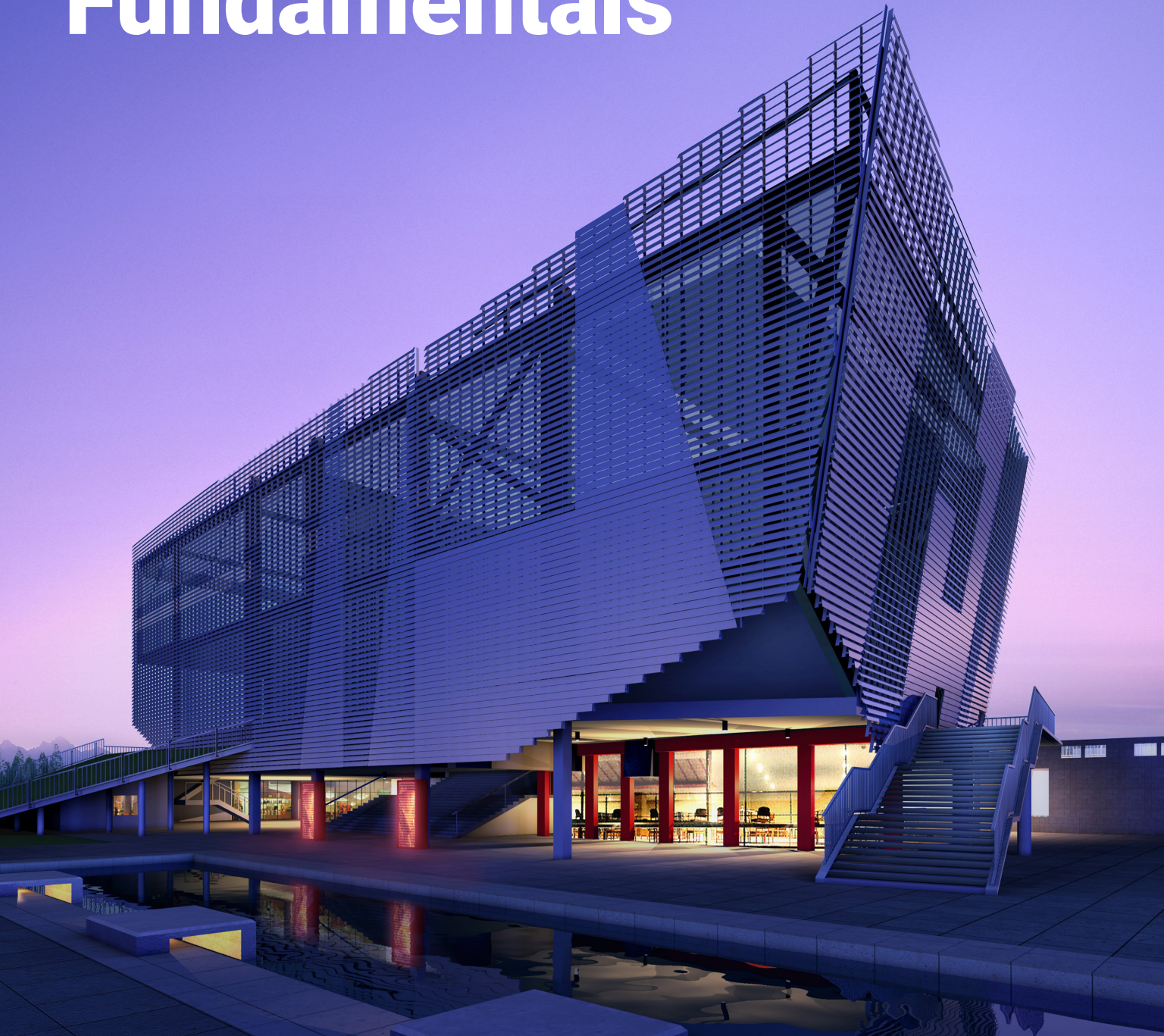


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Starting a Revit Project

Starting a Revit project begins by using a template. You can then link in a CAD file or an existing Revit model, if these are available. From there, you can add the framework for a design, including levels to define vertical heights and grids to help define the Revit elements' layout.

Learning Objectives

- Select and open a project template.
- Link and import CAD files to be used as a basis for developing a design.
- Link existing Revit models to develop and coordinate with other disciplines.
- Add and modify levels to define floor-to-floor heights and other vertical references.
- Add and modify grids to provide locations for model elements.

2.1 Selecting a Project Template

New projects are based on a project template file. The template file includes preset levels, views, and some families, such as wall styles and text styles. When using templates, most of the views are set to display only the elements specific to the template, so it is best practice to select a template that reflects your company's discipline.

- Check with your BIM manager about which template you need to use for your projects. Your company might have more than one based on the type of project you are designing.
 - Ideally, you should not start your work inside of another discipline or model. Instead, you should start from one of the default Revit templates or your company's custom template and link the architectural model into your project. If you link a Revit model into your project, you can use the monitoring and coordinating features to copy/monitor necessary items, such as walls, floors, and grids, from the architect. To learn more about Copy/Monitoring, see ASCENT's *Autodesk Revit: Collaboration Tools* guide.

How To: Start a New Project

1. In the *File* tab, expand  (New) and click  (Project), as shown in Figure 2–1, or press <Ctrl>+<N>.

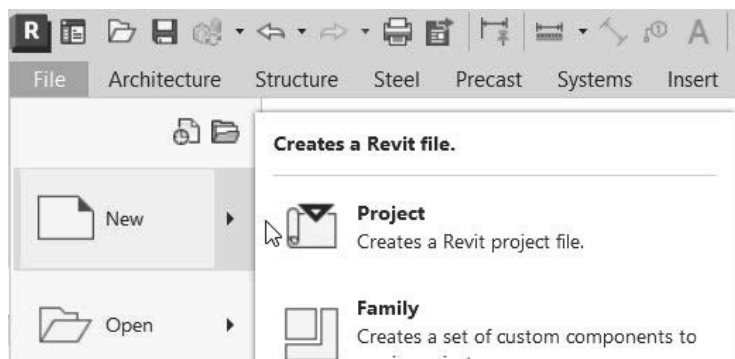


Figure 2–1

2. In the *New Project* dialog box (shown in Figure 2–2), select the template that you want to use and click **OK**.

Note: The list of template files is set in the *Options* dialog box in the *File Locations* tab. It might vary depending on the installed product and company standards.

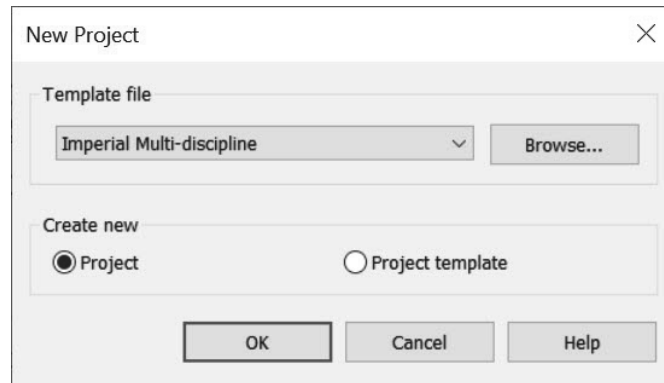


Figure 2–2



Hint: Revit Worksharing

If established by your company that worksharing is needed, you would typically want to start a worksharing project on your local network once a project has been created.

- For more information on worksharing, see **A.9 Introduction to Revit Worksharing** in **Appendix A Additional Tools for Design Development**.
- For more information about establishing and using worksets, refer to ASCENT's *Autodesk Revit: Collaboration Tools* guide.

2.2 Linking and Importing Files

CAD files can be imported or linked into a Revit project. As an example, a designer might lay out a floor plan using the standard 2D AutoCAD software, and you then need to incorporate that information into your structural model. In addition, many renovation projects start with existing 2D drawings. Instead of redrawing from scratch, link or import the CAD file (as shown in Figure 2–3) and trace over it in Revit. You can also print a hybrid drawing that is part Revit project and part imported/linked drawing.

Note: When you hover over an imported or linked CAD file, you can see in the tooltip that it is called an *Import Symbol*.

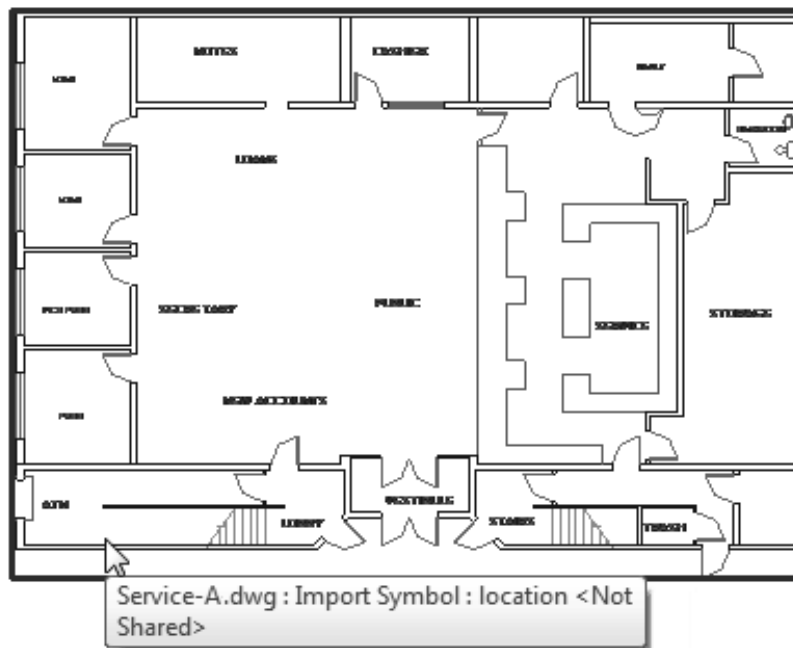




Figure 2–3

- CAD file formats that can be imported or linked include AutoCAD® (DWG and DXF), MicroStation (DGN), 3D ACIS modeling kernel (SAT), Trimble SketchUp (SKP), FormIt (AXM), 3D Shape (OBJ and STL), and Rhino (3dm).
- When linking or importing a CAD file, you can specify a level or a named horizontal reference plane in the project to position the CAD file at.
- You can specify the linking or import units (e.g., feet, meter, or US survey feet).

Linking vs. Importing

- **Link:** A connection is maintained with the original file and the link updates if the original file is updated.
- **Import:** No connection is maintained with the original file. It becomes a separate element in the Revit model.

How To: Link or Import a CAD File

1. Open the view into which you want to link or import the file.
 - For a 2D file, this should be a 2D view. For a 3D file, open a 3D view.
2. In the *Insert* tab>*Link* panel, click  (Link CAD), or in the *Insert* tab>*Import* panel, click  (Import CAD).
3. In the *Link CAD Formats* (shown in Figure 2–4) or *Import CAD Formats* dialog box, select the file that you want to import.
 - Select a file format in the *Files of type*: drop-down list to limit the files that are displayed.

Note: The dialog boxes for *Link CAD Formats* and *Import CAD Formats* are the same.

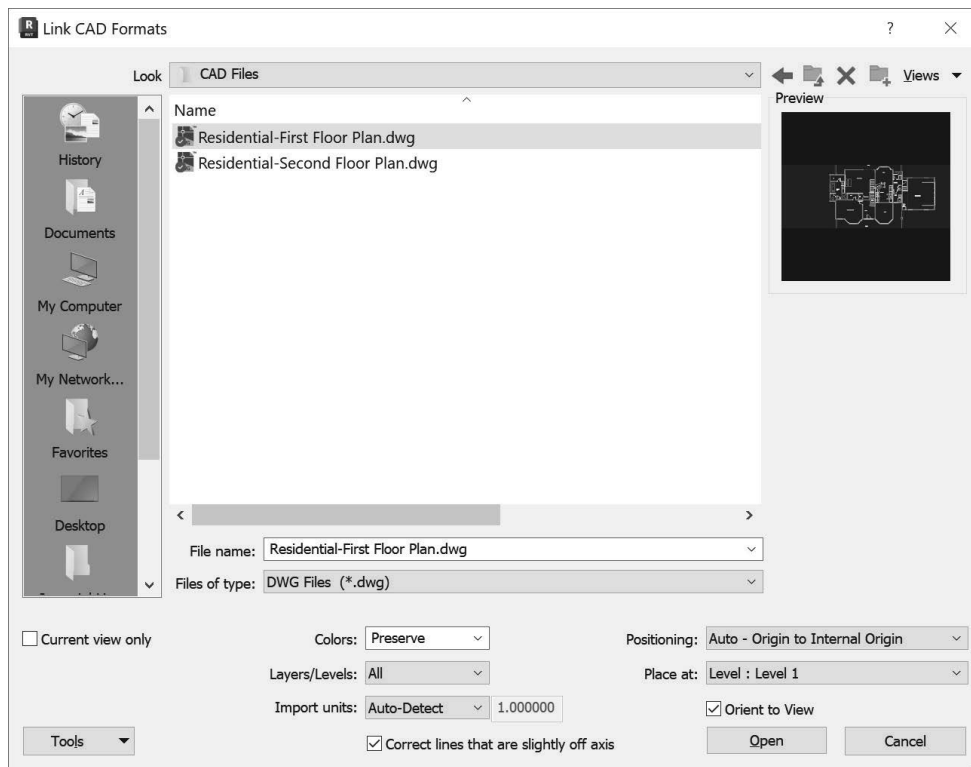


Figure 2–4

- If **Current view only** is selected, as shown in Figure 2–5, you can set all options except the *Place at* and the *Orient to View* options. The view will only display in the current view.

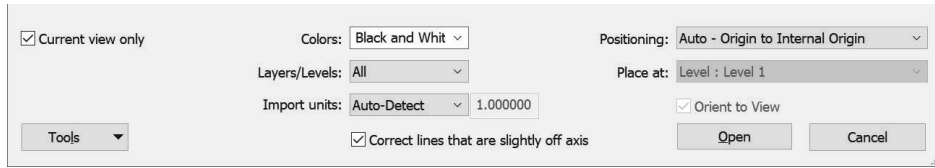


Figure 2–5

- If you would like to place the CAD file at a level or reference plane, verify **Current view only** is unchecked and set the *Place at* option, as shown in Figure 2–6.

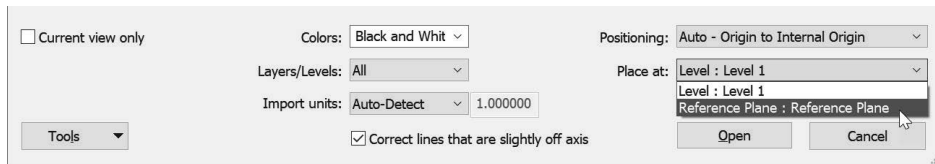


Figure 2–6

- Click **Open**.

Link and Import Options

Current view only	Determine whether the CAD file is placed in every view, or only in the current view. This is especially useful if you are working with a 2D floor plan that you only need to have in one view.				
Colors	Specify the color settings. Typical Revit projects are mainly black and white. However, other software frequently uses color. You can Invert the original colors, Preserve them, or change everything to Black and White .				
Layers/Levels	Indicates which CAD layers are going to be brought into the model. Select how you want layers to be imported: All , Visible , or Specify...				
Import units	Select the units of the original file, as required. Auto-Detect works in most cases.				
Correct lines...	If lines in a CAD file are off axis by less than 0.1 degree, selecting this option straightens them. It is selected by default.				
Positioning	Specify how you want the imported file to be positioned in the current project: <table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;"> Auto - Center to Center Auto - Origin to Internal Origin Manual - Origin Manual - Center </td> <td style="text-align: center;"> Auto - Center to Center Auto - Origin to Internal Origin Auto - By Shared Coordinates Manual - Origin Manual - Center </td> </tr> <tr> <td style="text-align: center;">Import option</td> <td style="text-align: center;">Linking option</td> </tr> </table> <p>The default position is Auto - Origin to Internal Origin.</p>	Auto - Center to Center Auto - Origin to Internal Origin Manual - Origin Manual - Center	Auto - Center to Center Auto - Origin to Internal Origin Auto - By Shared Coordinates Manual - Origin Manual - Center	Import option	Linking option
Auto - Center to Center Auto - Origin to Internal Origin Manual - Origin Manual - Center	Auto - Center to Center Auto - Origin to Internal Origin Auto - By Shared Coordinates Manual - Origin Manual - Center				
Import option	Linking option				

Place at	Select a level or named reference plane at which to place the imported file. If you selected Current view only , this option is grayed out.
Orient to View	Used to orient the CAD file on import/link.

- When a file is positioned **Auto - Origin to Internal Origin**, it is pinned in place and cannot be moved. To move the file, click on the pin to unpin it, as shown in Figure 2–7.

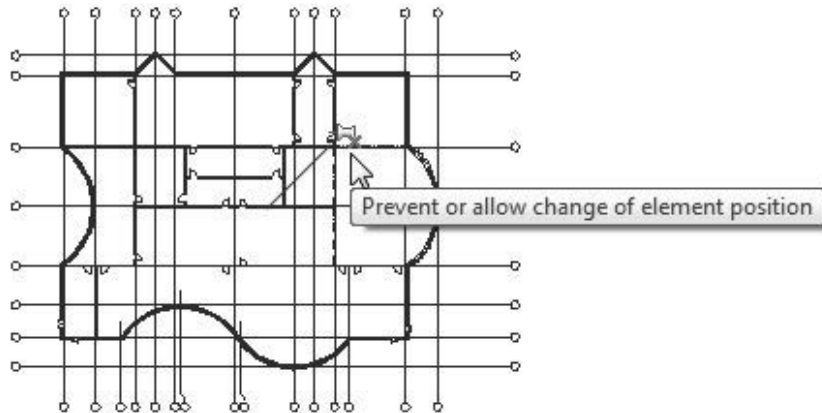


Figure 2–7

2.3 Linking in Revit Models

You can link Revit models directly into a project. These models can be an existing building that you are creating an addition to, as shown in Figure 2–8, or engineering models that you are checking to ensure that they line up with your model. They are also used for campus-like projects where the same building is repeated multiple times. They are full 3D models.

Note: A linked model automatically updates when the original file is changed.

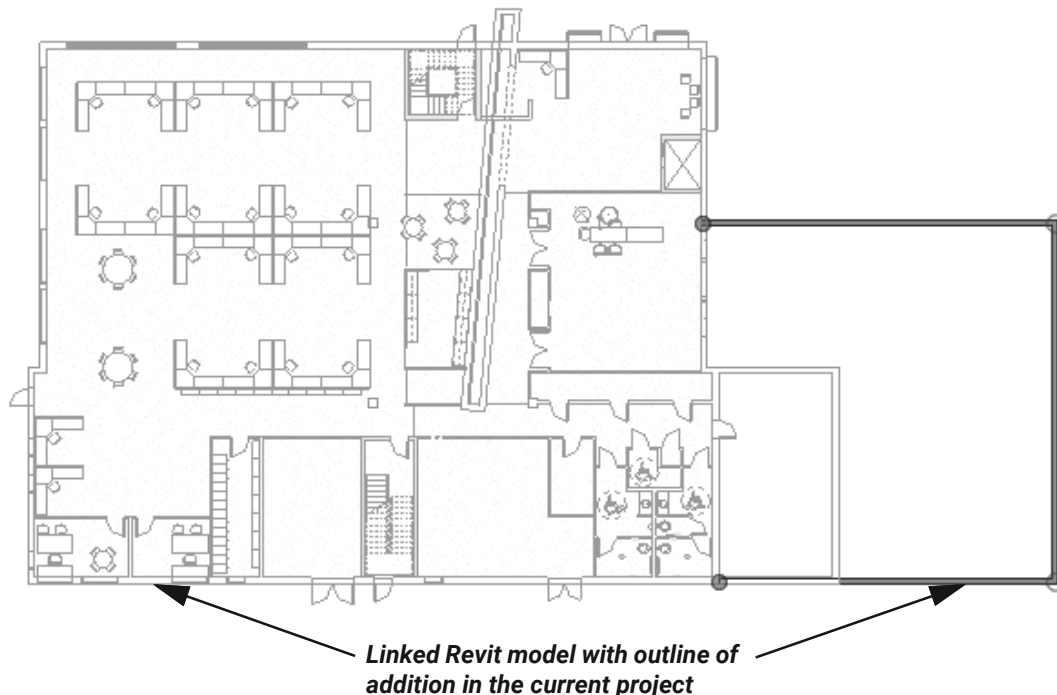



Figure 2–8

- Architectural, structural, and MEP models created in Revit can be linked into each other as long as they are from the same release cycle.
- When you use linked models, clashes between disciplines can be detected and information can be passed between disciplines.
- Revit models are always linked. They cannot be imported.

How To: Add a Linked Model to a Host Project

1. In the *Insert* tab>*Link* panel, click  (Link Revit).
2. In the *Import/Link RVT* dialog box, select the file that you want to link. Before opening the file, set the *Positioning*, as shown in Figure 2–9.

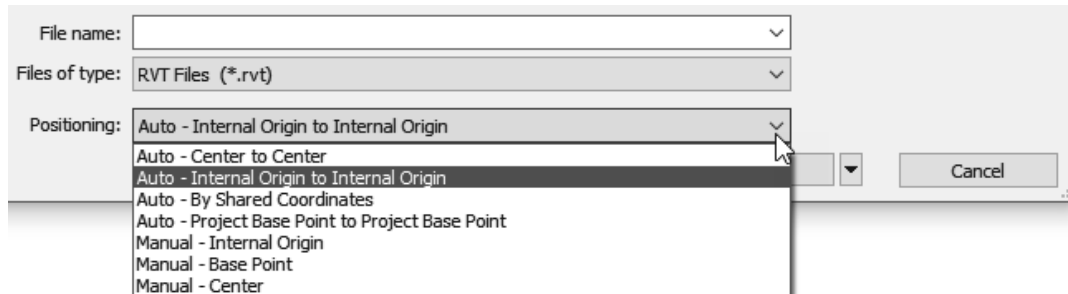


Figure 2–9

3. Click **Open**.
 4. Depending on how you decide to position the file, it is automatically placed in the project or you can manually place it with the cursor.
- As the links are loading, do not click on the screen or click any buttons. The more links present in a project, the longer it takes to load.

2.4 Modifying Imported/Linked Files

When you select an imported/linked file, you can modify it by arranging the *Foreground/Background* status, modifying its type properties, querying information about elements in the file, and deleting layers. You can also modify the *Visibility/Graphic Overrides* of each imported/linked instance.

- An imported/linked file is called an *import symbol* once it is inserted into a project, as shown in Figure 2–10.

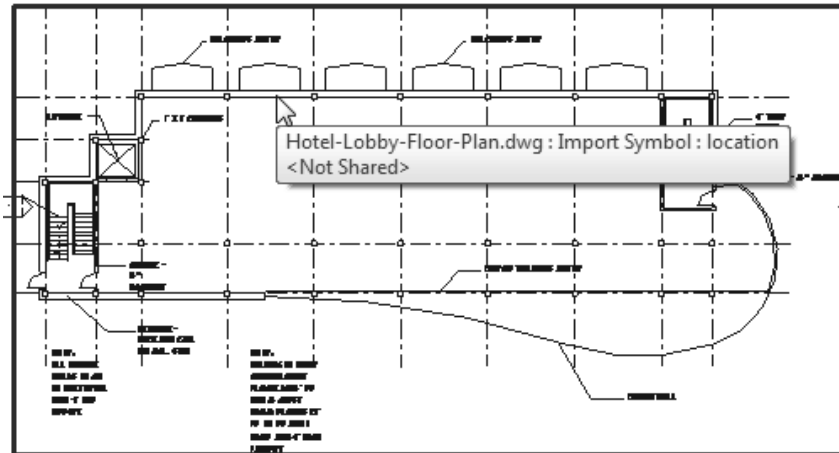


Figure 2–10

Setting an Imported or Linked File to Halftone

To see the difference between the host model elements and the linked or imported file, you can set the linked/imported file to halftone, as shown in Figure 2–11.

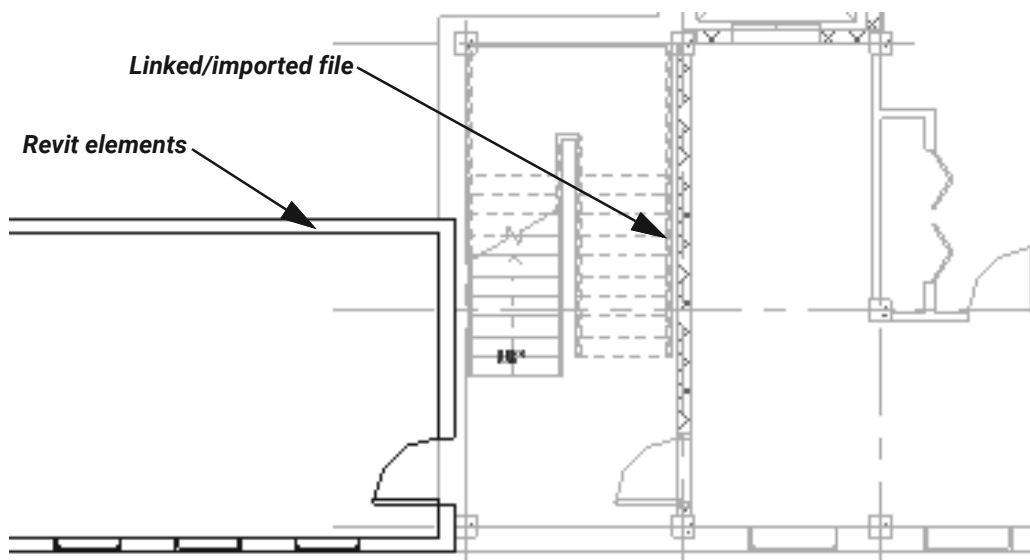


Figure 2–11

How To: Set an Element to Halftone

1. Select the imported file.
2. Right-click and select **Override Graphics in View>By Element....**
3. In the *View Specific Element Graphics* dialog box, select **Halftone**, as shown in Figure 2–12.
 - The options shown in the *View Specific Element Graphics* dialog box will depend on the element selected.

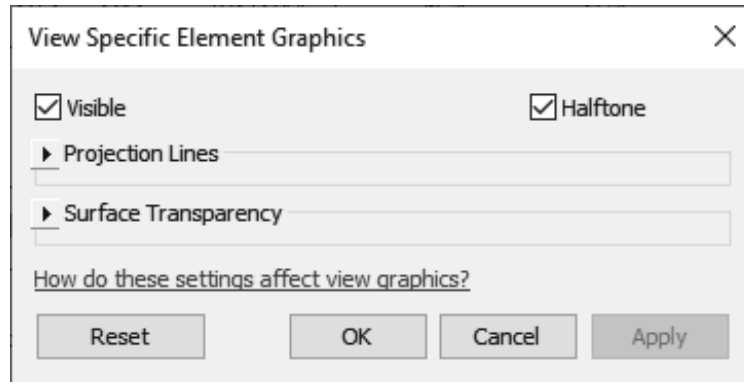


Figure 2–12

4. Click **OK**.
 - You can use this method to set any element or category to halftone.

Draw Layer

Linked CAD files are typically in the background of a view. To change this, select the CAD file in the view and in the Options Bar or in Properties, in the *Other* section, change the *Draw Layer* to **Foreground**.

- In the contextual tab>*Arrange* panel (shown in Figure 2–13), use the Arrange tools to move linked files to the front or back of the host elements.

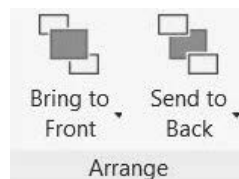



Figure 2–13

How To: Hide Individual Layers

1. In the *View* tab > *Graphics* panel, click  (Visibility/Graphics), or type **VG** or **VV** to open the *Visibility/Graphic Overrides* dialog box.
2. Switch to the *Imported Categories* tab. It displays a list for each imported instance and their layers/levels, as shown in Figure 2–14.
3. To have the linked/imported file display in halftone, check the box in the *Halftone* column.

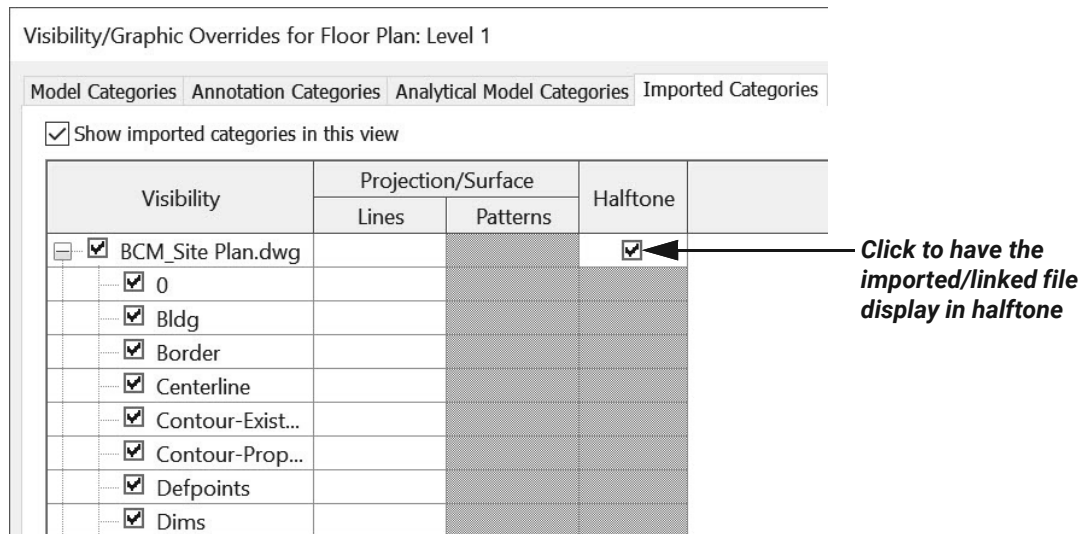



Figure 2–14

4. Click the plus sign beside the file name to expand a list of the layers or levels in that file.
5. Clear the checkmark from the individual layers that you do not want to display.
 - Typically, these layers contain similar information, such as all windows or all notes in a drawing. However, it is not as definite as using Revit elements. An item might have been misplaced on a different layer and, if so, it does not toggle off.
6. Close the dialog box.
 - To toggle off the entire file, clear the checkmark next to the file name.

Temporarily Hide/Isolate

You might want to temporarily remove linked or imported files from a view, modify the project, and then restore the elements. Instead of completely toggling the elements off, you can temporarily hide them.

Select the elements you want to hide (make invisible) or isolate (keep displayed while all other elements are hidden) and click  (Temporary Hide/Isolate). Select the method you want to use, as shown in Figure 2–15.

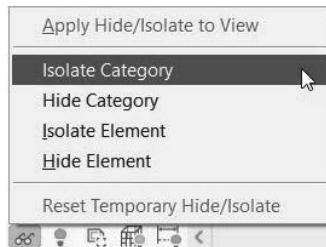


Figure 2–15

- The category or elements are hidden or isolated. A cyan border displays around the view with a note in the upper left corner, as shown in Figure 2–16. It indicates that the view contains temporarily hidden or isolated elements.

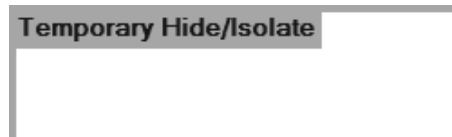



Figure 2–16

- Click  (Temporary Hide/Isolate) again and select **Reset Temporary Hide/Isolate** to restore the elements to the view.
- If you want to permanently hide the elements in the view, select **Apply Hide/Isolate to View**.
- Elements that are temporarily hidden in a view are not hidden when the view is printed.

Hide Linked or Imported Files in a View

When working in views, you can quickly hide linked or imported files. To hide the imported or linked file, select it and right-click to display the shortcut menu, then select **Hide in View** and select either **Elements** or **Category**, as shown in Figure 2–17. Alternatively, select the link in the view and type **VH** to hide the selected file in the view.

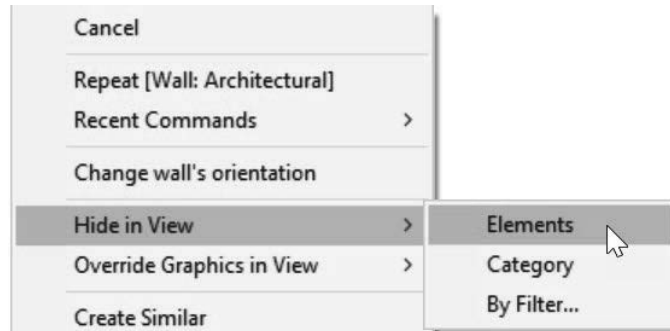





Figure 2–17

Managing Links

The *Manage Links* dialog box (shown in Figure 2–18) enables you to reload, unload, add, and remove links, and it also provides access for you to set other options. To open the *Manage Links* dialog box, in the *Insert* tab>*Link* panel, click  (Manage Links). Alternatively, you can go to the *Manage* tab>*Manage Projects* panel and click  (Manage Links).

- You can also select the link and click  (Manage Links) in the *Modify | RVT Links* tab>*Link* panel.

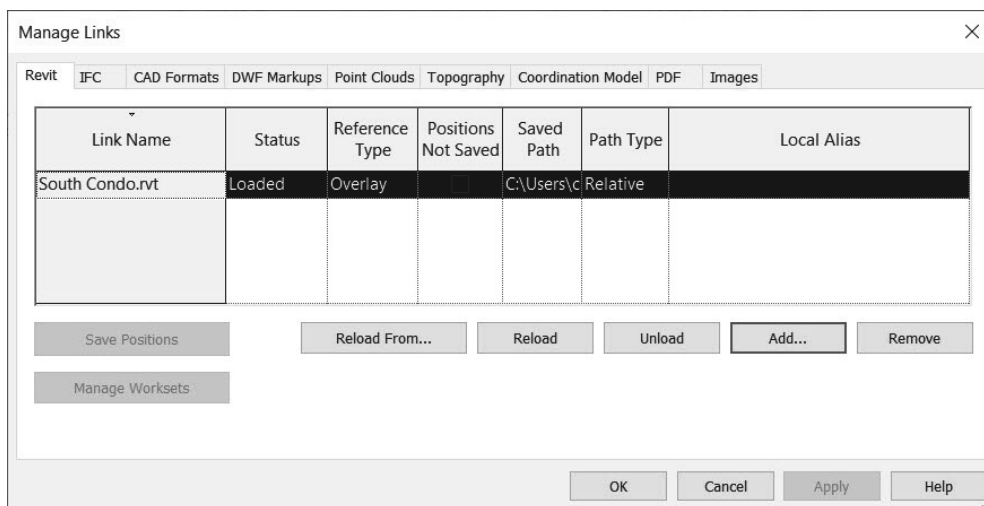


Figure 2–18

- The *Manage Links* dialog box does not show imported CAD files.
- You can manage both imported and linked images and PDFs.

The following options are available:

- **Reload From:** Opens the *Add Link* dialog box, which enables you to select the file you want to reload. Use this if the linked file location or name has changed.
- **Reload:** Reloads the file without additional prompts.
- **Unload:** Unloads the file so that the link is kept, but the file is not displayed or calculated in the project. Use **Reload** to restore it.

Note: Some of these options are also available in the Project Browser. Expand the Revit Links node, then right-click on the Revit link and select **Reload**, **Unload**, or **Reload From....**

- **Add:** Opens the *Import/Link RVT* dialog box, which enables you to link additional models into the host project.
- **Remove:** Deletes the link from the file.

Links can be nested into one another. How a link responds when the host project is linked into another project depends on the option in the *Reference Type* column.

- **Overlay:** The nested linked model is not referenced in the new host project.
- **Attach:** The nested linked model displays in the new host project.

The option in the *Path Type* column controls how the location of the link is remembered.

- **Relative**
 - Searches the root folder of the current project.
 - If the file is moved, the software still searches for it.
- **Absolute**
 - Searches the entire file path where the file was originally saved.
 - If the original file is moved, the software is not able to find it.
- Other options control how the linked file interfaces with worksets and shared positioning.

Practice 2a

Start a Project and Link Files

Practice Objectives

- Start a Revit project.
- Link a CAD file.
- Link a Revit file.
- Modify the linked files in a view.

In this practice, you will start a Revit project, then import floor plans created in AutoCAD and use them as a base layout for the first floor lobby and for a typical guest floor. You will then link in a Revit model that includes a standard poolhouse and platform for the building. Figure 2–19 shows the completed practice.

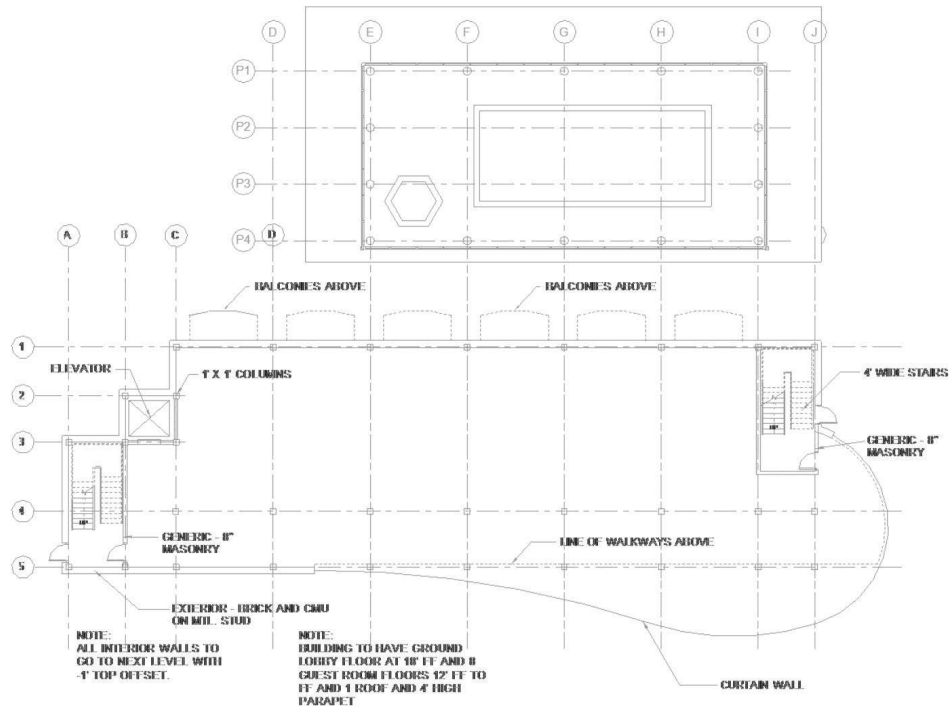






Figure 2–19

Task 1: Start a project.

1. On the Home screen, click the **New** button under the *MODEL* section. Alternatively, in the *File* tab, expand  (New) and click  (Project).
2. In the *New Project* dialog box, click **Browse....**

3. In the *Choose Template* dialog box, navigate to the practice files *Templates* folder, select **Imperial-Arch Template**, and click **Open**.
4. In the *New Project* dialog box, click **OK**. (There are no elements in this file, only datums and basic views.)
5. In the *File* tab, expand  (Save As) and select  (Project). In the *Save As* dialog box, navigate to the practice files folder and name the project as **Hotel-Start.rvt**. Click **Save**.
6. Review the Project Browser and note that the project has default floor plan, ceiling plan, and elevation views. By default, the **Floor Plans: Level 1** view is open and displays in bold in the Project Browser, as shown in Figure 2–20.

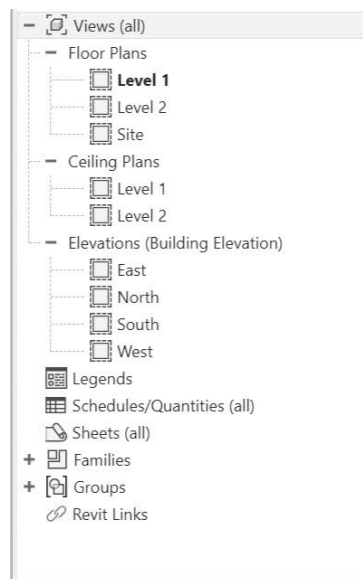



Figure 2–20

Task 2: Link a CAD file.

1. In the *Insert* tab>*Link* panel, click  (Link CAD).
2. In the *Link CAD Formats* dialog box, navigate to the practice files *CAD Files* folder and select the file **Hotel-Level-1.dwg**, then set the following options:
 - Select **Current view only**
 - *Colors*: **Black and White**
 - *Layers/Levels*: **All**
 - *Import Units*: **Auto-Detect**
 - *Positioning*: **Auto - Origin to Internal Origin**
3. Click **Open**. The linked CAD file is placed in the project on the **Floor Plans: Level 1** view.

4. Select the linked CAD file. It is a single imported symbol and pinned in place because it was imported origin to internal origin.
5. With the linked CAD file still selected, in Properties, in the *Other* section, change the *Draw Layer* to **Foreground**. Alternatively, this can be set in the Options Bar.

Note: As you are drawing walls, floors, ceilings, and roofs within your project, you will want to change how the DWG is displaying in your view from *Foreground* to *Background*, depending on what you need to see.

6. With the CAD file still selected, right-click in the draw area and select **Override Graphics in View>By Element....**
7. In the *View Specific Element Graphics* dialog box, select **Halftone** and click **OK**.
8. Click in an empty space in the view to release the selection. The linked file displays in halftone, as shown in Figure 2–21.

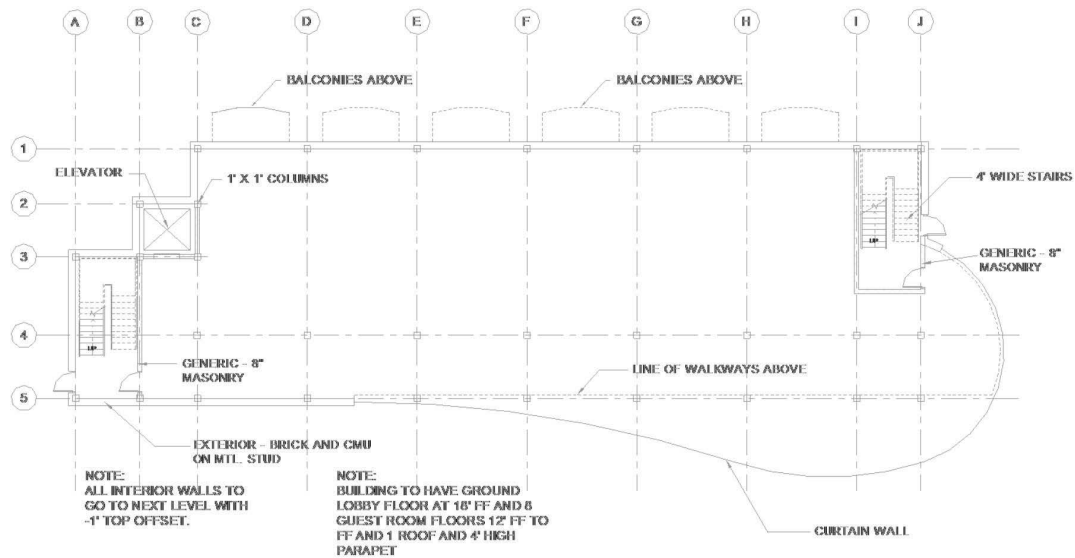





Figure 2–21

9. Open the **Floor Plans: Level 2** view. The CAD file linked in Level 1 does not display because you specified to link the CAD file with **Current view only** selected.
10. Link the CAD file **Hotel-Level-2.dwg** using the options that were used for Level 1.
11. Override the graphics and set the linked file to **Halftone**.
12. Save the project.

Task 3: Link in a Revit file.

1. In the Quick Access Toolbar, click  (Default 3D View). Neither of the linked CAD files display in this view.

2. In the *Insert* tab>*Link* panel, click  (Link Revit).
3. In the *Import/Link RVT* dialog box, navigate to the practice files *Revit Link Files* folder and select **Hotel-Pool.rvt**. Verify that the *Positioning* is set to **Auto - Internal Origin to Internal Origin** and click **Open**.
4. In the View Control Bar, change the *Visual Style* to  (Shaded).
5. Select one of the levels and type **VH** to hide in view.
6. Type **ZF** to fit all the model to the view or **ZA** to zoom all, as shown in Figure 2–22.

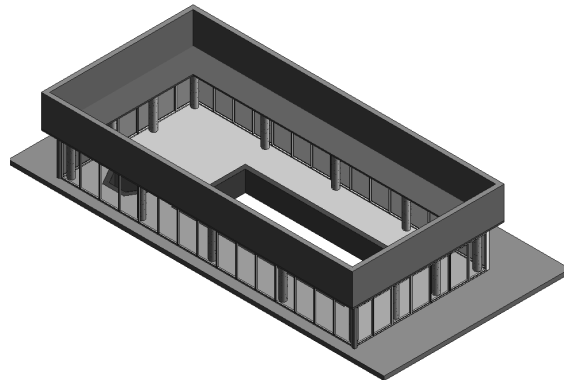



Figure 2–22

7. Along the top of the view window, select the *Level 1* tab to switch back to this view. Both the linked CAD file and linked Revit file display in this view.
8. In the *View* tab>*Graphics* panel, click  (Visibility/Graphics), or type **VG** or **VV** to open the *Visibility/Graphic Overrides* dialog box.
9. Click on the *Revit Links* tab. Next to **Hotel Pool.rvt**, check the checkbox for **Halftone**, as shown in Figure 2–23.

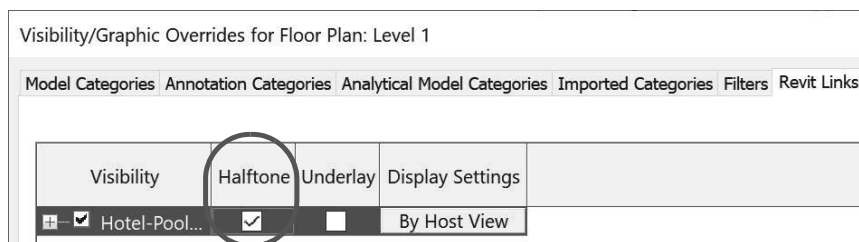


Figure 2–23

10. Click **OK**.
11. Save and close the project.

End of practice

2.5 Setting Up Levels

Levels define stories and other vertical heights, such as the first and second floor reference heights shown in Figure 2–24. The default template includes two levels, but you can define as many levels in a project as required. They can go below 0'-0" in the negative (for basements) as well.

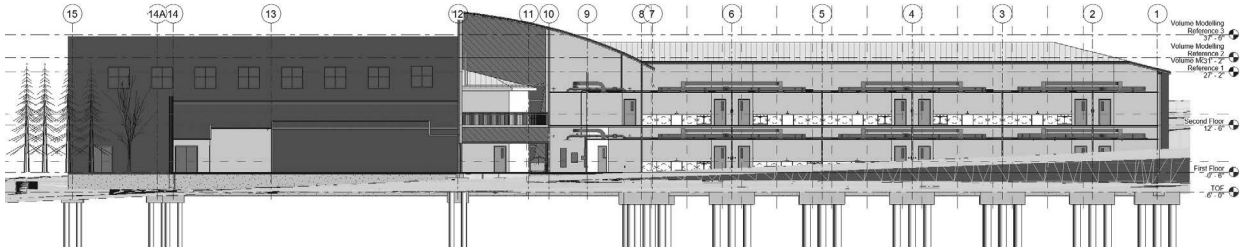



Figure 2–24

- You must be in an elevation or section view to define levels.
- Once you constrain an element to a level, it moves with the level when the level is changed.

How To: Create Levels

1. Open an elevation or section view.
2. In the *Architecture* tab > *Datum* panel, click  (Level), or type **LL**.
3. In the Type Selector, set the level head type, if needed.
4. In the *Modify | Place Level* tab > *Plan Views* panel, check **Create Plan View**, as shown in Figure 2–25.

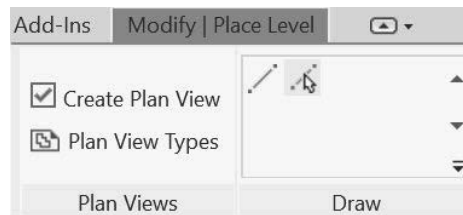


Figure 2–25

5. Click **Plan View Types** to select or unselect the types of views to create when you place the level. Figure 2–26 shows the *Plan View Types* dialog box.

Note: If you have *Structural Tabs and Tools* turned off in *Revit Options>User Interface*, you will not see the *Structural Plan* in the *Plan View Types* dialog box.

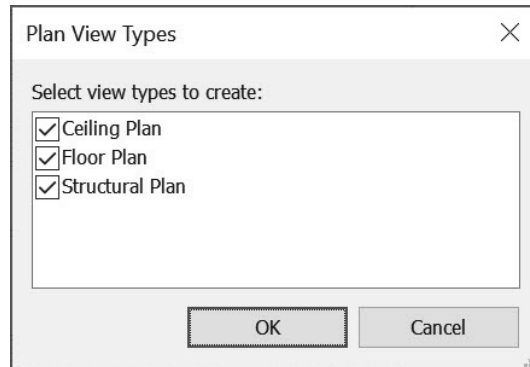





Figure 2–26

6. In the *Modify | Place Level* tab>*Draw* panel, click either  (Pick Lines) to select an element or  (Line) to sketch a level.
7. When using **Pick Lines**, ensure that you do not place levels on top of each other or other elements by mistake. Continue adding levels as needed.
- Level names are automatically incremented as you place them. This automatic numbering is most effective when you use names such as Floor 1, Floor 2, etc. (as opposed to First Floor, Second Floor, etc.). In addition, this makes it easier to find the view in the Project Browser.
 - A fast way to create multiple levels is to use the  (Pick Lines) option. In the Options Bar, specify an *Offset*, select an existing level, and then pick above or below to place the new level, as shown in Figure 2–27.

Note: You specify above or below the offset by hovering the cursor on the needed side.

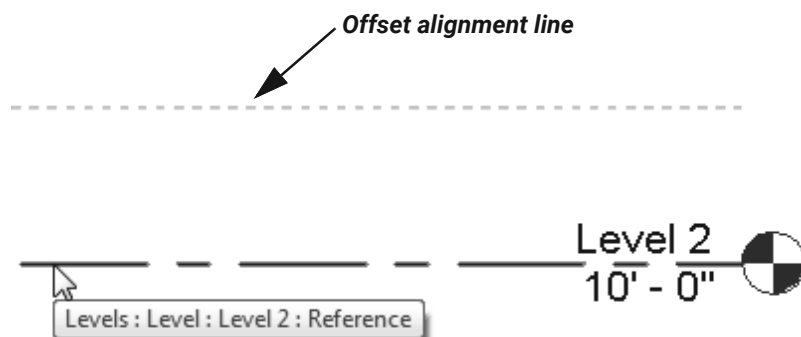



Figure 2–27

- When using the  (Line) option, alignments and temporary dimensions help you place the line correctly, as shown in Figure 2–28.

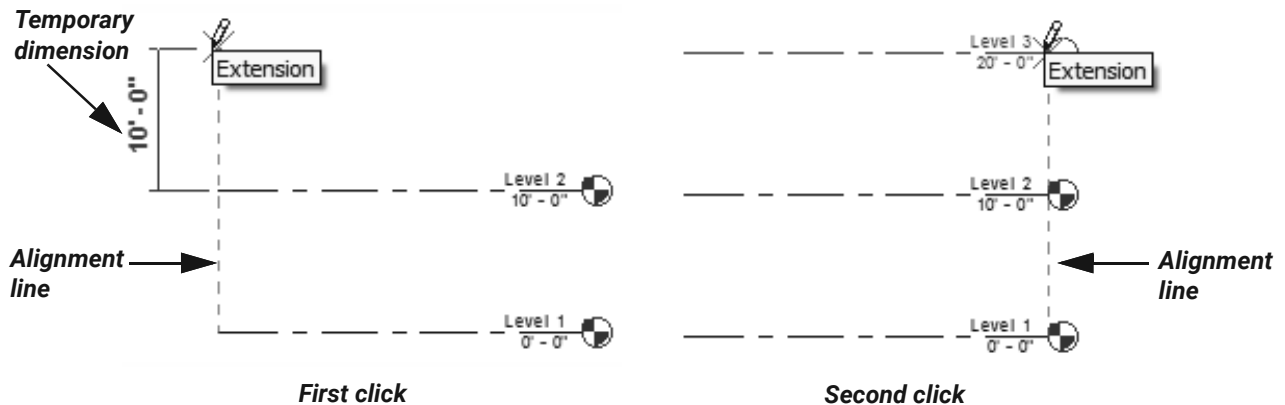



Figure 2–28

- Sketch the level lines from left to right or right to left to keep consistent.
- You can also use  (Copy) to duplicate level lines. The level names are incremented but a plan view is not created. These are called **reference levels**.
- Levels display in the default 3D view. They can be modified and copied, but cannot be created in this view.
- Levels can be hidden in any view.

Modifying Levels

You can change levels using standard controls and temporary dimensions, as shown in Figure 2–29 to the levels' appearance. You can also make changes to the name and height of the level by selecting on the individual items in the view as well as change these in Properties. You can change just the name of the level in the Project Browser but not the height.

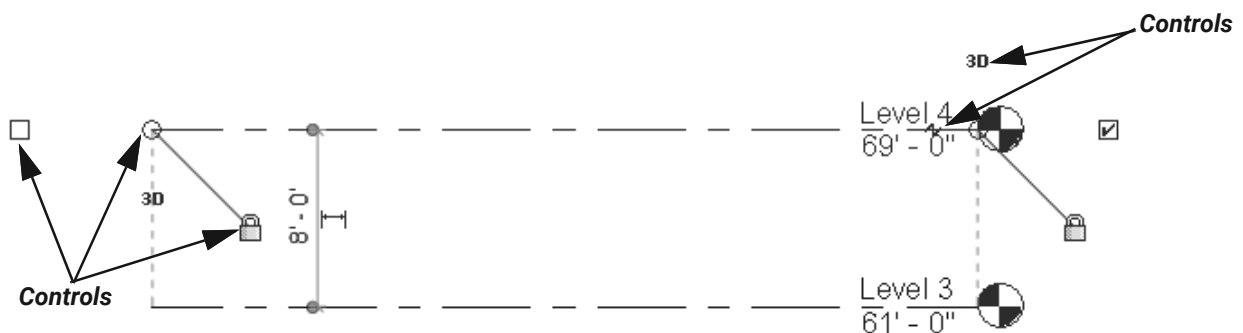






Figure 2–29

- (Hide/Show Bubble) displays on either end of the level line and toggles the level head symbol and level information on or off.
- (Switch to 3d/2d extents) controls whether any movement or adjustment to the level line is reflected in other views (3D) or only affects the current view (2D).
-  (Modify the level by dragging its model end) at each end of the line enables you to drag the level head to a new location.
-   (Create or remove a length or alignment constraint) controls whether the level is locked in alignment with the other levels. If it is locked and the level line is stretched, all of the other level lines stretch as well. If it is unlocked, the level line stretches independent of the other levels.
- Click  (Add Elbow) to add a jog to the level line, as shown in Figure 2–30. Drag the shape handles to new locations as needed. This is a view-specific change.

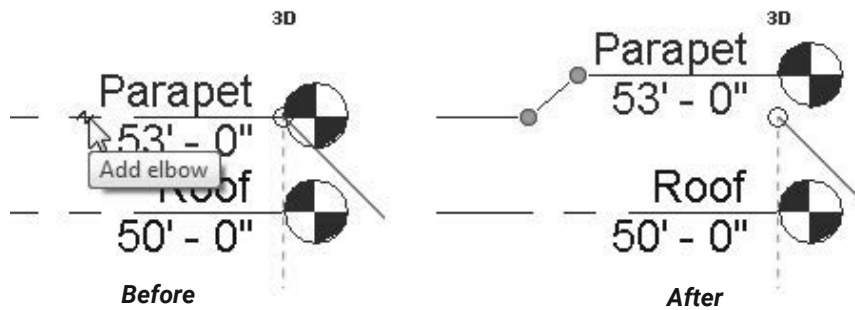


Figure 2–30

- To change the level name or elevation, double-click on the information next to the level head, or select the level and modify the *Name* or *Elevation* fields in Properties, as shown in Figure 2–31.

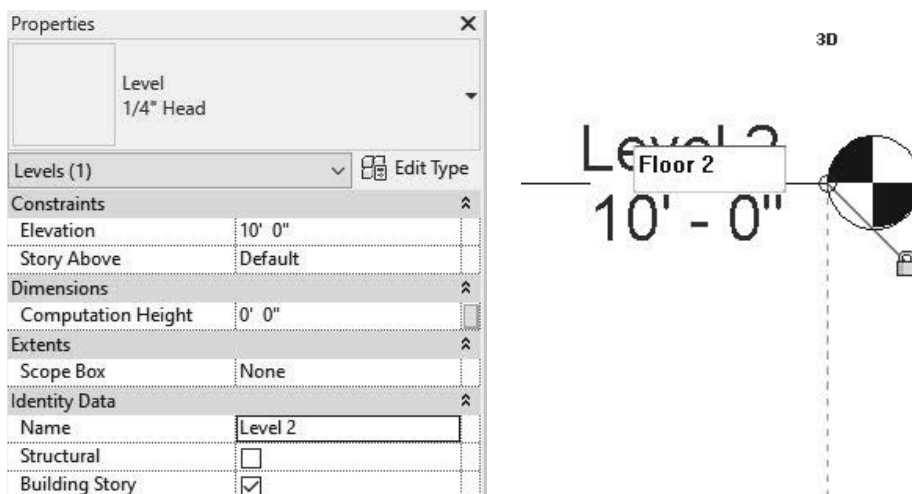


Figure 2–31

- When you rename a level, an alert box opens, prompting you to rename the corresponding views, as shown in Figure 2–32.

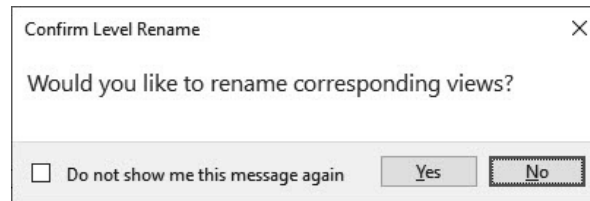


Figure 2–32

- The view is also renamed in the Project Browser.

Hint: Modifying Measurements

For imperial measurements (feet and inches), the software uses a default of feet. For example, when you type **4** and press <Enter>, it assumes **4'-0"**. For a distance such as 4'-6", you can type any of the following: **4'-6"**, **4'6**, **4-6**, or **4 6** (the numbers separated by a space). To indicate distances less than one foot, type the inch mark (") after the distance, or enter **0**, a space, and then the distance.

- If you delete a level, the views related to that level are also deleted. A warning displays, as shown in Figure 2–33.

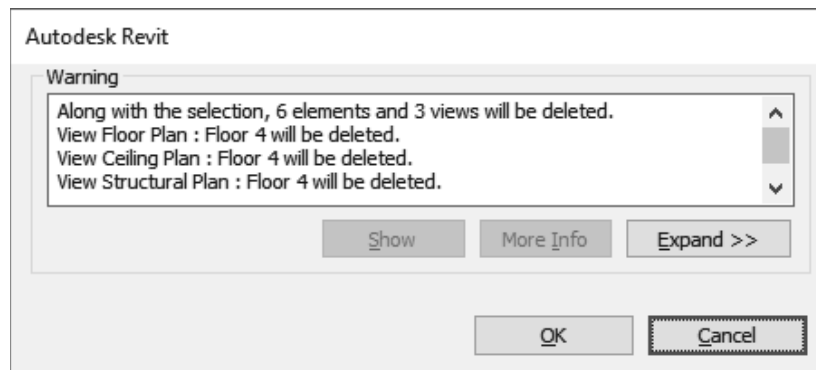


Figure 2–33

Hint: Copying Levels and Grids from Other Projects

Levels and grid lines can be added by drawing over existing levels or grids in an imported or linked CAD file. They can also be copied and monitored from a linked Revit file. Some projects might require both methods.

Creating Plan Views

By default, when you place a level, plan views for that level are automatically created. If **Make Plan View** was toggled off when adding the level, or if the level was copied, you can create plan views to match the levels.

- Level heads with views are blue and level heads without views are black, as shown in Figure 2–34.

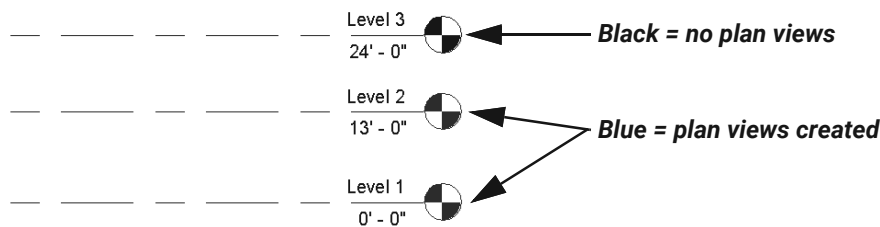


Figure 2–34

Note: Typically, you do not need to create plan views for levels that specify data, such as the top of a storefront window or the top of a parapet.

How To: Create Plan Views

- In the *View* tab > *Create* panel, expand  (Plan Views) and select the type of plan view you want to create, as shown in Figure 2–35.

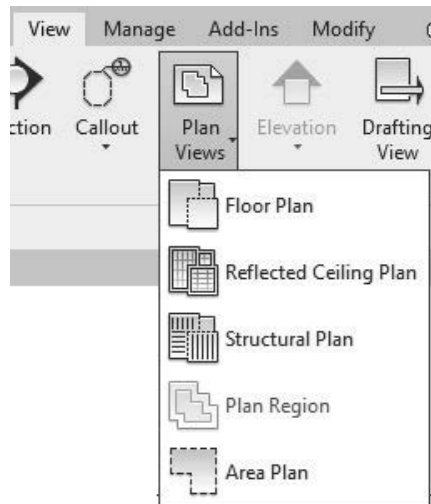


Figure 2–35

2. In the *New Plan* dialog box (shown in Figure 2–36), select the levels for which you want to create plan views. Hold <Ctrl> to select more than one level.
 - Clear **Do not duplicate existing views** to create a copy of an existing view.

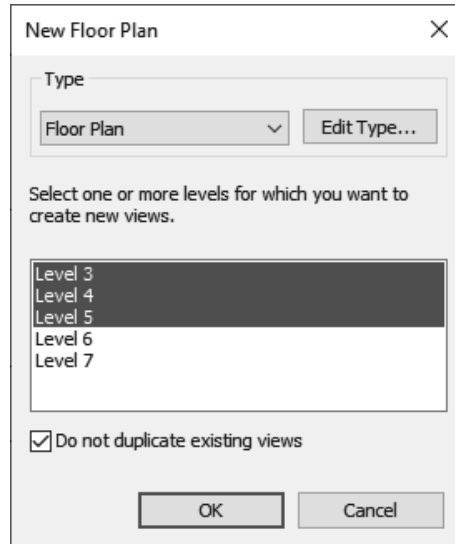


Figure 2–36

3. Click **OK**.
 - Once a plan view is made from a level, you can double-click on the level head to open the related floor plan view. You create other plan views similar to creating a floor plan. Ceiling plans are typically created by default when you add a level with a view. If you do not want a level to have a ceiling plan, you can right-click on its name in the Project Browser and select **Delete**, as shown in Figure 2–37.

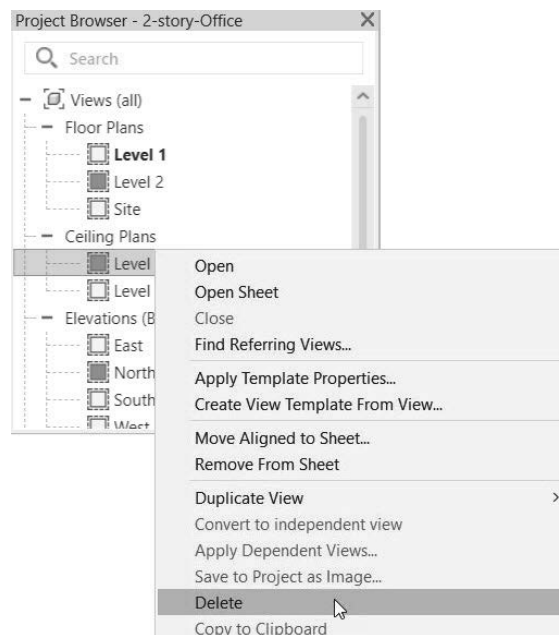


Figure 2–37

Practice 2b Set Up Levels


Practice Objectives

- Add and modify levels
- Create a plan view.

In this practice, you will set up the levels required in the hotel project, including the floors, top of the footing, basement, and parapet levels. Figure 2–38 shows the completed practice, though you should see the linked Revit model on your screen. (The RVT link has been hidden in the figure below for clarity.)



Figure 2–38

1. Open the project **Arch-Levels.rvt** from the practice files folder.
2. In the Project Browser, open the **Elevations (Building Elevation): North** view. You will see your project's **Level 1** and **Level 2** levels, as well as the Level 1 and Level 2 levels and grid lines that are part of the linked Revit file.
3. Select the linked Revit file.
4. In the View Control Bar, expand  (Temporary Hide/Isolate) and select **Hide Element**. This toggles off the linked Revit file.
5. Zoom in on the level names.
6. Slowly click twice on the name *Level 1* and rename it to **Floor 1**, as shown in Figure 2–39. Press <Enter>.

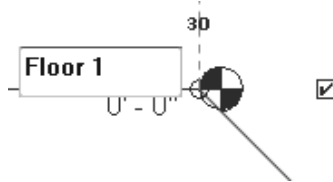




Figure 2–39

7. In the *Confirm Level Rename* dialog box, click **Yes** or press <Y> when prompted to rename the corresponding views and note that in the *Floor Plans* section, the view name has changed.
8. Repeat the process and rename *Level 2* as **Floor 2**. (Rename the corresponding views.) Click on the height of Floor 2. Change it from **10'-0"** to **18'-0"** and press <Enter>.

Note: *Instead of typing the hyphen, just press <spacebar> between the feet and inch.*
9. Click  (Modify).
10. In the *Architecture* tab>*Datum* panel, click  (Level).
11. In the *Modify | Place Level* tab>*Plan Views* panel, check **Create Plan View**, then click **Plan View Types**.

12. In the *Plan View Types* dialog box, uncheck **Structural Plan** to deselect it (so that only **Ceiling Plan** and **Floor Plan** are selected), as shown in Figure 2–40. Click **OK**.

Note: If you have *Structural Tabs and Tools* turned off in *Revit Options>User Interface*, you will not see the *Structural Plan* in the *Plan View Types* dialog box.

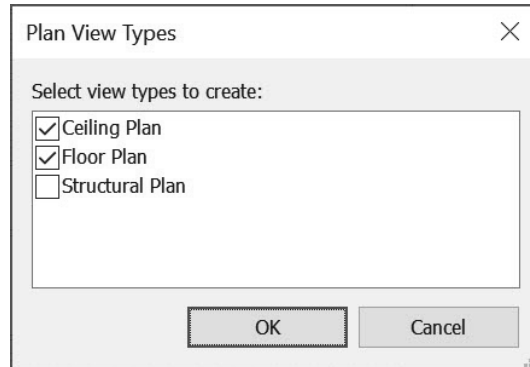







Figure 2–40

13. In the *Modify | Place Level* tab>*Draw* panel, click  (Pick Lines). In the Options Bar, set the *Offset* to **12'-0"**.
14. Hover the cursor over the level line of **Floor 2** and move the cursor slightly upward until you see the dashed alignment line display above the **Floor 2** level. Click to create the new level **Floor 3**.
15. Create additional levels until there are a total of nine levels, all with the *Offset* of **12'-0"**.
16. Click  (Modify) and select the **Floor 9** level.
17. Rename *Floor 9* as **Roof**. (Rename the corresponding views.)
18. Click  (Modify).
19. Start the **Level** command again.
20. In the *Modify | Place Level* tab>*Draw* panel, click  (Pick Lines).
21. In the *Modify | Place Level* tab>*Plan Views* panel, uncheck the **Create Plan View** option.
22. In the Options Bar, set the *Offset* to **5'-0"**. Create one additional level above the **Roof** level. This level does not need a plan view.
23. Click  (Modify).

24. Rename the top level as **Parapet**, as shown in Figure 2–41.

Note: You do not get the request to rename corresponding views because you unchecked **Create Plan View**, so no view was created when the level was placed in the view. The *Parapet* level head is black as opposed to blue like the rest of the levels. A black level head means that there are no views created for this level.

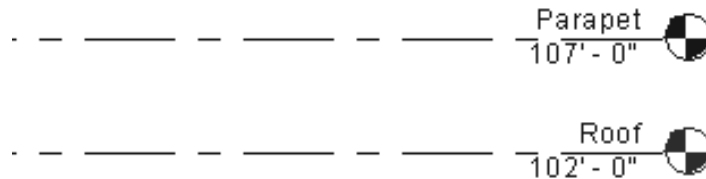






Figure 2–41

25. Click  (Modify).
26. Zoom and pan to the Floor 1 level.
27. Select the Floor 1 level line. In the *Modify | Levels* tab>*Modify* panel, click  (Copy).
28. In the Options Bar, verify **Multiple** is checked.
29. In the view, click Floor 1's level line for the copy start point. For the second point, click below Floor 1 (the distance does not matter right now as you will set this in the next few steps).
30. Click again below the level you just placed to make two new levels below Floor 1.
31. Click  (Modify) to end the command.
32. Select the level below Floor 1. In Properties, in the *Identity Data* section, type **Basement** next to *Name*. In the *Constraints* section, set the *Height* to (negative) **-10'-0"**.
33. In Properties, click **Apply**, or move your cursor into the drawing area to apply the changes.
34. Rename the level below Basement to **T.O. Footing** and set the height to (negative) **-12'-0"**, as shown in Figure 2–42.
35. You can modify the levels for clarity by selecting the level and clicking the  (Add Elbow) control between the level name and height.

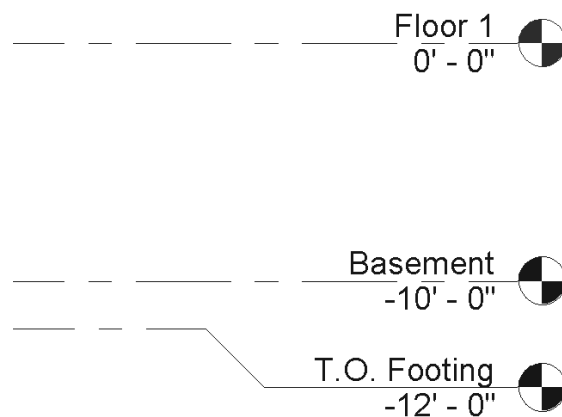






Figure 2–42

36. In the View Control Bar, select  (Temporary Hide/Isolate) and select **Reset Temporary Hide/Isolate**.
37. Select the Floor 1 level line. Select  (Drag the extents of the level in the model) and drag the level over until it is far enough away from the linked model. The other levels will follow because of the alignment constraint.
38. Zoom out to display the entire project.
- Note:** Because the Basement and T.O. Footing were copies of Floor 1, you need to create a floor plan view. Note that these two views' level heads are black as opposed to the rest of the levels that have views created.
39. In the View tab>Create panel, expand  (Plan Views) and select  (Floor Plan).
40. In the New Floor Plan dialog box, select **Basement** and **T.O. Footing**, as shown in Figure 2–43. (Hint: Use <Ctrl> to select the two levels.)

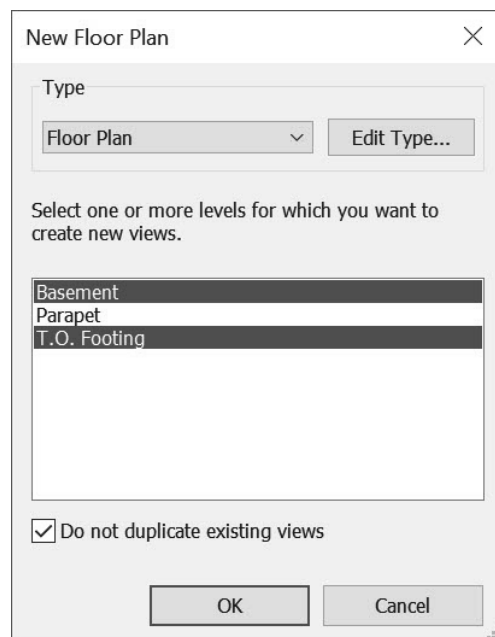








Figure 2–43

41. Click **OK**. The floor plan views now show in the Project Browser and the T.O. Footing view (or the last view to be created) becomes the active view.
42. Create a new ceiling plan view. In the View tab>Create panel, expand  (Plan Views) and select  (Reflected Ceiling Plan).
43. In the New RCP dialog box, select **Basement** and click **OK**.
44. Select the *Floor 1* tab above the view window to make it the active view.
45. Close any open views by going to the Quick Access Toolbar and clicking  (Close Inactive Views).

46. Open the **Default 3D** view.
47. Because you hid the levels when linking in the models, you need to unhide them. In the View Control Bar, click  (Reveal Hidden Elements).
48. Using your mouse wheel, zoom out so you can see the level lines.
49. Select one level and in the *Modify | Levels* tab>*Reveal Hidden Elements* panel, click  (Unhide Category).
50. In the View Control Bar, click  (Close Reveal Hidden Elements).
51. In the Project Browser, select the **Roof** view in the *Ceiling Plans* section. Right-click and select **Delete** to delete the view.
52. Save and close the project.

End of practice

2.6 Creating Grids

Grids are annotation elements that display in most views, including plan, ceiling, section, and elevation views. They help organize your design when developing a layout and describe the pattern and location for columns, as shown in Figure 2–44. Grids can be multi-segmented, arcs, or straight lines, and they can be hidden in the view if needed.

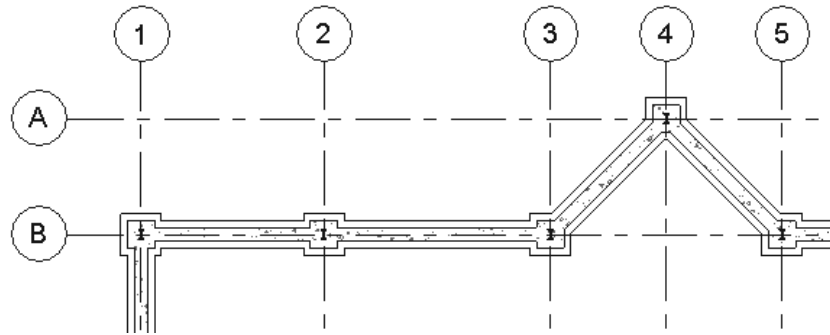


Figure 2–44

Each line or arc in a grid is a separate entity and can be placed, moved, and modified individually.

Grids cannot be drawn in a 3D view but grids can be displayed in a 3D view, perspective view, or in a 3D view with a selection box, and when you click on a grid, the surface contour displays.

Note: If you are upgrading a model to the 2024 version, you will need to turn on the grids.

How To: Create a Grid



1. In the *Architecture* tab > *Datum* panel, click  (Grid), or type **GR**.
2. In the Properties Type Selector, select the grid type, which will control the size of the bubble and the linestyle.
3. In the *Modify | Place Grid* tab > *Draw* panel (shown in Figure 2–45), select the draw method you want to use.



Figure 2–45

4. In the Options Bar, set the *Offset* if needed.

5. Start drawing grid lines.

- Grids can be sketched at any angle, but you should ensure that all parallel grids are sketched in the same direction (e.g., from left to right or from bottom to top).
- When using the Multi-Segment tool (shown in Figure 2–46), sketch the line and click  (Finish Edit Mode) to complete the command.

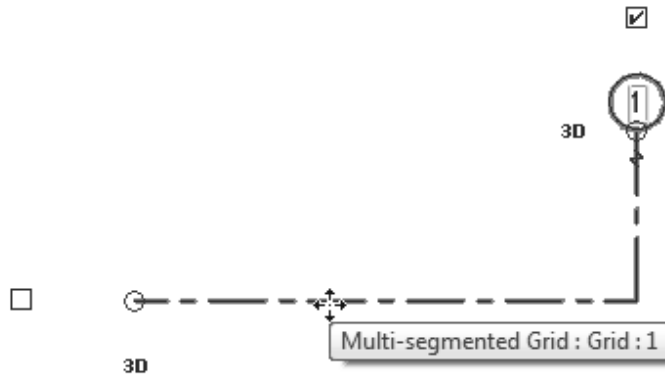


Figure 2–46

How To: Show Grids in 3D

1. Open a 3D or perspective view and press <Esc> twice to verify nothing is selected.
2. In Properties, click **Edit...** next to *Show Grids*, as shown in Figure 2–47.

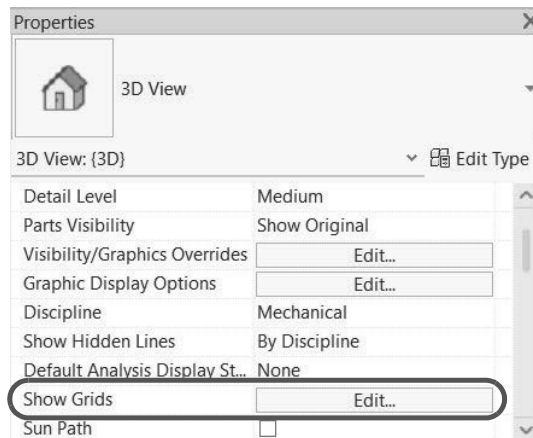


Figure 2–47

3. In the *Show Grids* dialog box, select the level(s) that you want the grids to display at in the 3D view, as shown in Figure 2–48.



Figure 2–48

4. Click **OK**.
5. (Optional) To display the grids on the bottom of a section box, in Properties, verify that **Section Box** is selected, and click **Edit...** next to *Show Grids*.
6. In the *Show Grids* dialog box, select only the **Project Grids On Section Box** option, as shown in Figure 2–49, and click **OK**.

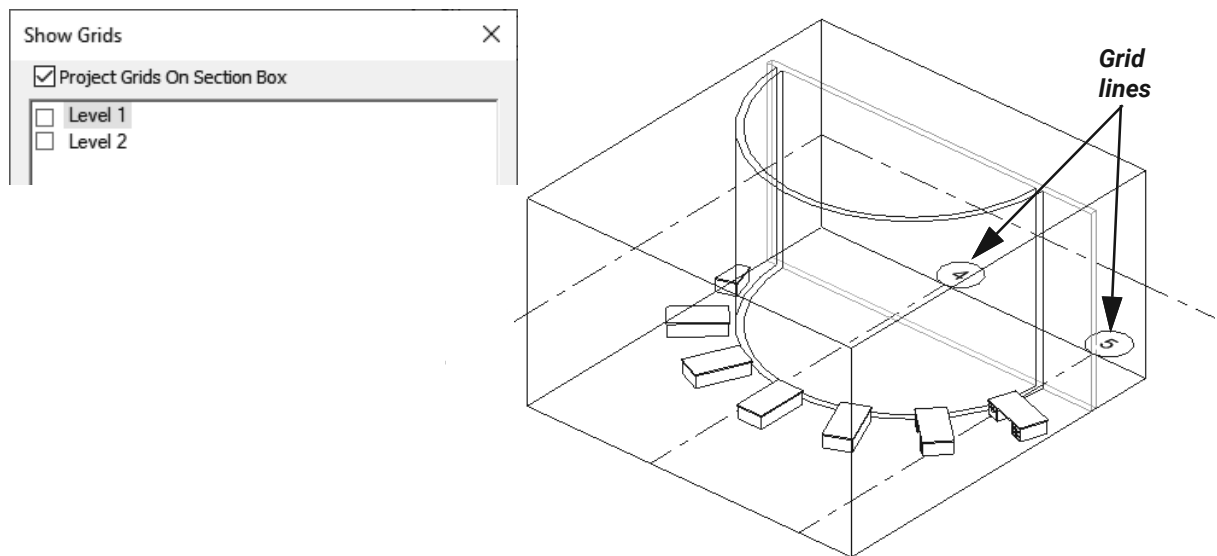


Figure 2–49

Modifying Grid Lines

Grid lines, like levels, are data elements. You can modify grid lines using controls, alignments, and temporary dimensions in the view (as shown in Figure 2–50). You can change the bubble type using the Type Selector.

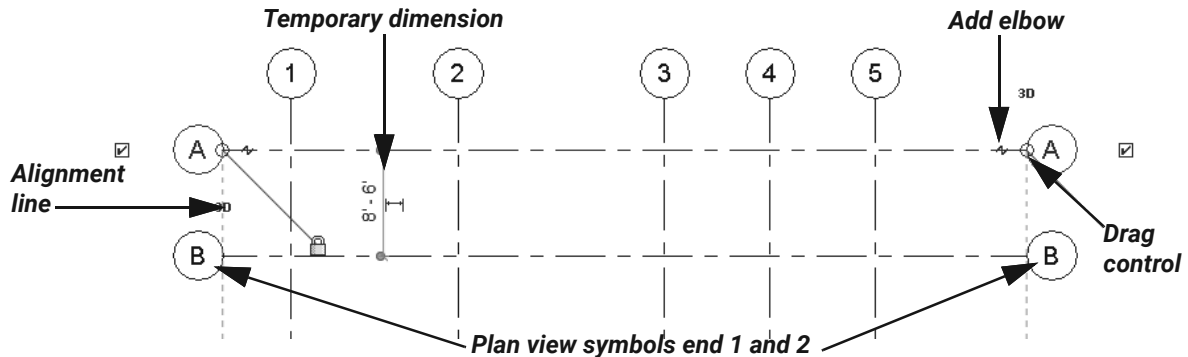



Figure 2–50

- Grid numbers can be numbers, letters, or a combination of the two. To modify a grid number, double-click on the number in the bubble and type the new letter/number. You can also change the grid number by entering a new *Name* in Properties.
- Grid numbers increment automatically.
- In a 3D view, you can modify the grid line name and adjust the grid line and grid distance.
 - Click the  (Drag the extents of the grid in the model) control to lengthen the grid line.
 - Modify the temporary dimension (as shown in Figure 2–51) to change the grid line's distance from another grid line.

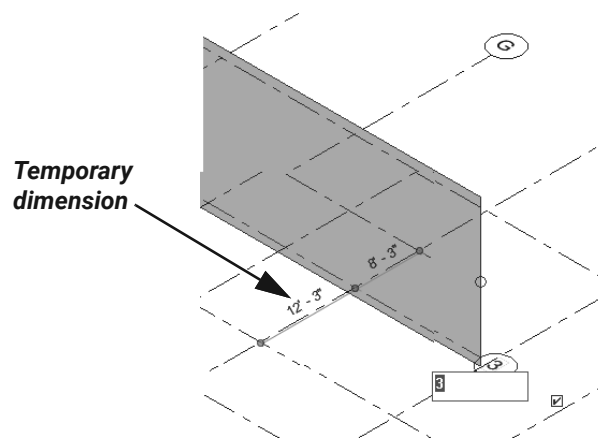


Figure 2–51

- Change the grid line name by selecting the bubble and typing in a new name; alternatively, the name can be changed in Properties.

- In the *Type Properties* dialog box, change the way the grid **Plan View Symbols Ends** display, as shown in Figure 2–52. The first pick point is plan view symbol end 1 and the second pick point is plan view symbol end 2.

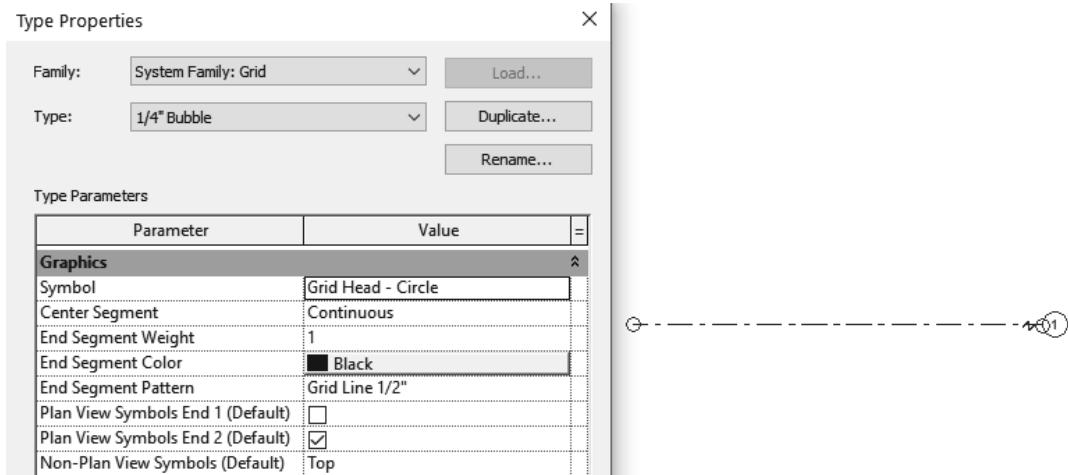



Figure 2–52

Hint: Propagating Datum Extents

If column grids do not display in a view, this might be due to adding a level after the grid lines were added. To display the grid lines in plan views, select the grid lines in a view in which they are displayed. In the *Modify | Grids* tab > *Datum* panel, click  (Propagate Extents). In the *Propagate datum extents* dialog box (shown in Figure 2–53), select the views to project the grid lines to.

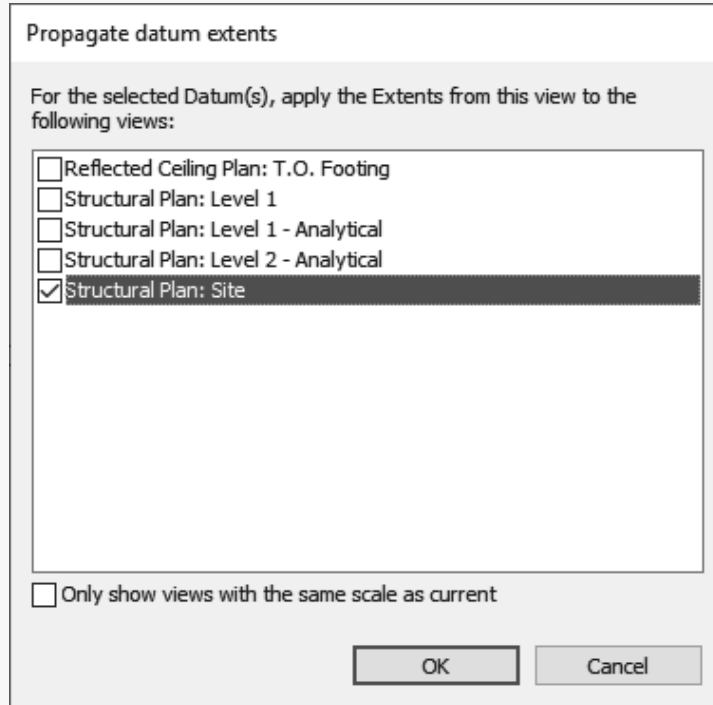



Figure 2–53

- This also works for levels.
-  (Propagate Extents) is particularly useful to make grid lines display the same in all views.




Practice 2c



Add Grids

Practice Objectives

- Add and modify grid lines.
- Modify grid properties in a 3D view.

In this practice, you will place grid lines using the linked CAD model as a guide. You will then turn grid lines on in a 3D view.

1. Open the project **Arch-Grids.rvt** from the practice files folder.
2. From the Project Browser, open the **Floor Plans: Floor 1** view.
3. Select the linked Revit file with the pool (**Hotel-Pool.rvt**). In the View Control Bar, expand  (Temporary Hide/Isolate) and select **Hide Element**.
4. In the *Architecture* tab>*Datum* panel, click  (Grid).
5. In the *Modify | Place Grid* tab>*Draw* panel, click  (Pick Lines).
6. Select grid line A from the linked DWG file to create a grid line in the Revit model.
7. Press <Esc> twice.
8. Zoom in to the new grid line. Click inside the bubble, type **A**, and press <Enter>.

Note: If you zoom in to the bubble and click on the number or letter, you can change the value without exiting the command.
9. Start the **Grid** command again and use **Pick Lines** to continue selecting the vertical grid lines displayed in the imported file. The letters automatically increment.
10. Click the first horizontal grid line, press <Esc> twice, and change the letter in the bubble to **1**.
11. Start the **Grid** command again and use **Pick Lines** to continue selecting the horizontal grid lines. The numbers automatically increment.
12. Click  (Modify) to end the command.
13. Select the CAD file (**Hotel-Level-1.dwg**). In the View Control Bar, expand  (Temporary Hide/Isolate) and select **Hide Element**.

14. Only the grids should now display, as shown in Figure 2–54. Check the lengths of all grid lines. Modify the length by dragging the ends if needed.

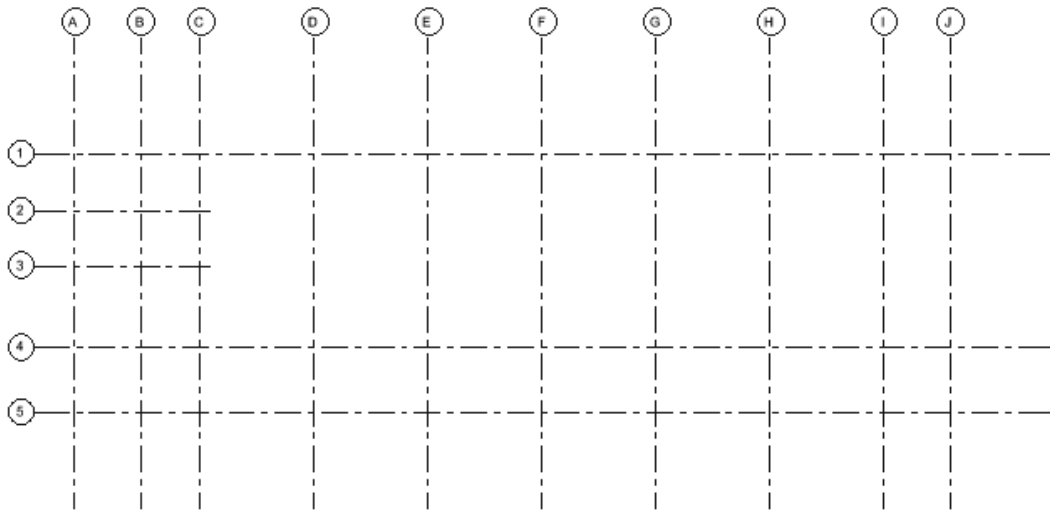





Figure 2–54

15. In the View Control Bar, select  (Temporary Hide/Isolate) and select **Reset Temporary Hide/Isolate**.
16. Open the default 3D view by selecting the tab at the top of the view. Note that you do not see the grids.
17. Click  (Modify).
18. In Properties, in the *Graphics* section, click **Edit...** next to *Show Grids*.
19. In the *Show Grids* dialog box, select **Floor 1** and click **OK**.
20. The grids now display. Select the linked Revit file with the pool (**Hotel-Pool.rvt**).

21. In the View Control Bar, expand  (Temporary Hide/Isolate) and select **Hide Element** to see the grids unobstructed as shown in Figure 2–55.

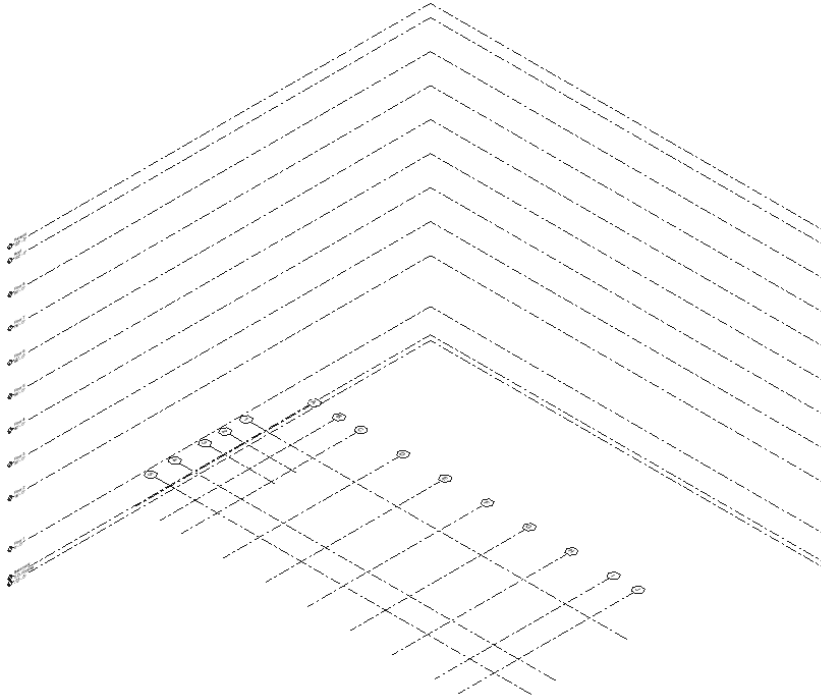



Figure 2–55

22. In the View Control Bar, select  (Temporary Hide/Isolate) and select **Reset Temporary Hide/Isolate**.
23. Save and close the project.

End of practice

Chapter Review Questions

1. What type of view do you need to be in to add a level to your project?
 - a. Any non-plan view.
 - b. As this is done using a dialog box, the view does not matter.
 - c. Any view except for 3D.
 - d. Any section or elevation view.

2. How do you line up grid lines that might be different lengths, as shown in Figure 2–56?

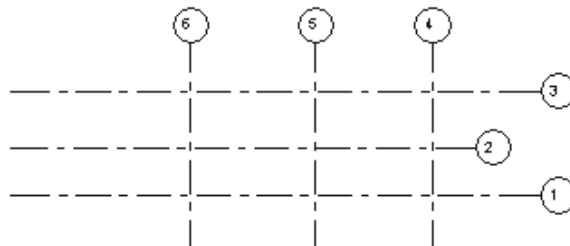




Figure 2–56

- a. Use  (Trim/Extend Multiple Elements) to line them up with a common reference line.
 - b. Select the grid line and use the drag control to line up with the other grid lines.
 - c. Select the grid line, right-click and select **Auto-Align**.
 - d. In Properties, change the *Length* and then use  (Move) to get them into position.
-
3. Grids can be displayed in a 3D view.
 - a. True
 - b. False

 4. Which of the following types of CAD formats can you import into Revit? (Select all that apply.)
 - a. .DWG
 - b. .XLS
 - c. .SAT
 - d. .DGN

5. Imported CAD files cannot be reloaded in the *Manage Links* dialog box.
 - a. True
 - b. False











6. To modify linked CAD files, you need to open what dialog box?
 - a. Type Properties
 - b. Link CAD
 - c. Manage Links
 - d. Insert from File

7. When creating a new level, you have to change all corresponding views.
 - a. True
 - b. False

8. Where can you change a level's name?
 - a. In the Options Bar.
 - b. Within the plan view and in the Options Bar.
 - c. In the Project Browser, in Properties, or in an elevation view by clicking on the level's name.
 - d. You cannot change the name after the level has been placed in the view.

9. You can set the imported DWG to be in the foreground or background throughout the project's life cycle.
 - a. True
 - b. False

Command Summary

Button	Command	Location
	Grid	<ul style="list-style-type: none"> • Ribbon: <i>Architecture</i> tab><i>Datum</i> panel • Shortcut: GR
	Import CAD	<ul style="list-style-type: none"> • Ribbon: <i>Insert</i> tab><i>Import</i> panel
	Import PDF	<ul style="list-style-type: none"> • Ribbon: <i>Insert</i> tab><i>Import</i> panel
	Level	<ul style="list-style-type: none"> • Ribbon: <i>Architecture</i> tab><i>Datum</i> panel • Shortcut: LL
	Link CAD	<ul style="list-style-type: none"> • Ribbon: <i>Insert</i> tab><i>Link</i> panel
	Link PDF	<ul style="list-style-type: none"> • Ribbon: <i>Insert</i> tab><i>Link</i> panel
	Link Revit	<ul style="list-style-type: none"> • Ribbon: <i>Insert</i> tab><i>Link</i> panel
	Multi-Segment (Grid)	<ul style="list-style-type: none"> • Ribbon: <i>Modify Place Grid</i> tab><i>Draw</i> panel
	Propagate Extents	<ul style="list-style-type: none"> • Ribbon: <i>Modify Grids</i> or <i>Modify Levels</i> tab><i>Datum</i> panel
	Temporary Hide/Isolate	<ul style="list-style-type: none"> • View Control Bar