

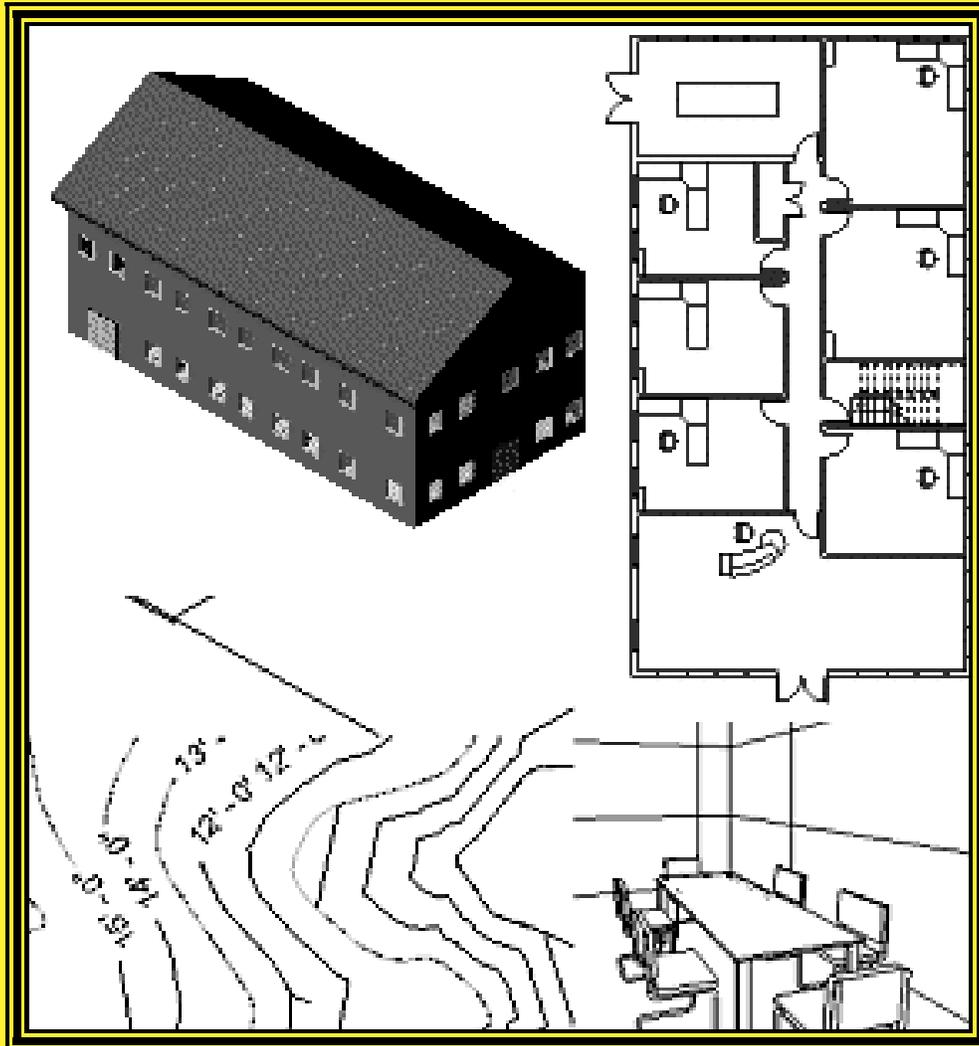
Inside:

SUPPLEMENTAL

FILES ON CD

Revit Architecture 2010 Basics:

from the Ground Up



Elise Moss

SDC

PUBLICATIONS

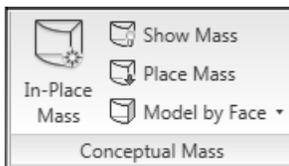
Schroff Development Corporation
www.schroff.com

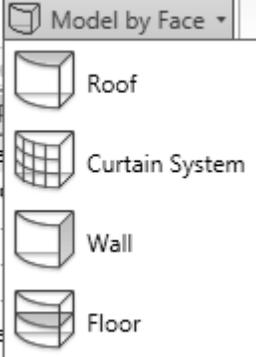
Better Textbooks. Lower Prices.

Lesson 3 Mass Elements

Mass Elements are used to give you a conceptual idea of the space and shape of a building without having to take the time to put in a lot of detail. It allows you to create alternative designs quickly and easily and get approval before you put in a lot of effort.

Massing Tools



 In-Place Mass	Creates a solid shape
 Show Mass	Controls the visibility of mass objects
 Place Mass	Inserts a mass group into the active project
	Model by Face: Converts a face into a Roof, Curtain Wall System, Wall, or Floor.

Exercise 3-1
Adding a Level

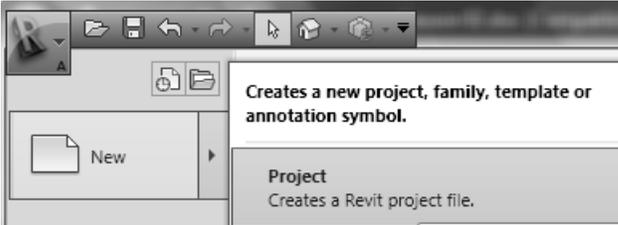
Drawing Name: default.rte [metric default.rte]
 Estimated Time: 5 minutes

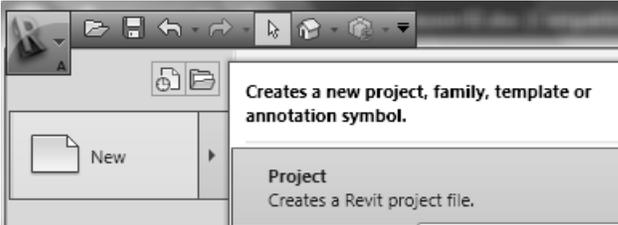
This exercise reinforces the following skills:

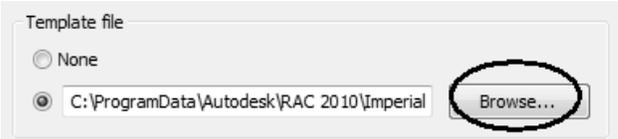
- Switching Elevation Views
- Basics
- Add a Level

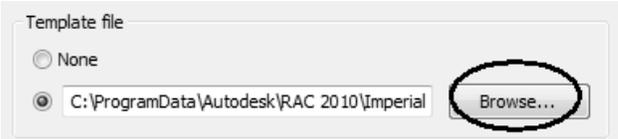
This tutorial uses metric or Imperial units. Metric units will be designated in brackets.

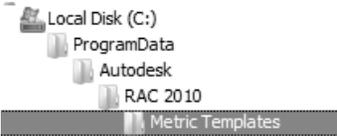
Revit uses a level to define another floor or story in a building.

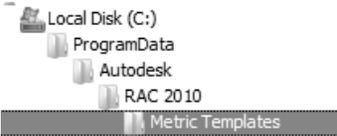
1.  Go to **New**→**Project**.

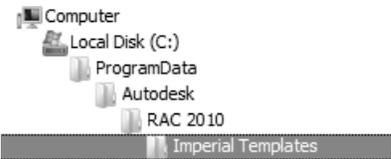


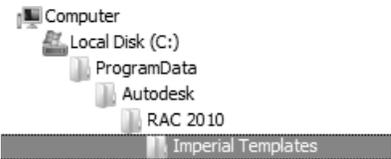
2.  Under the Template file: select **Browse**.



3.  Locate the *Metric Templates* folder under *ProgramData/Autodesk/RAC2010*.



 Locate the *Imperial Templates* folder under *ProgramData/Autodesk/RAC2010*.

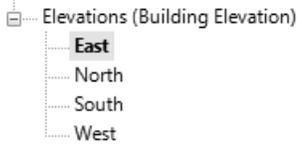
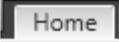
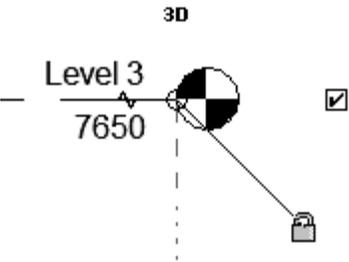


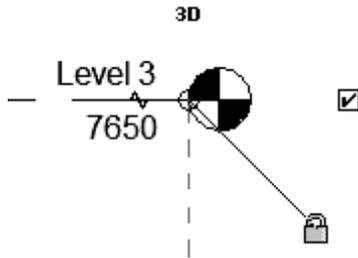
4.  Select the *DefaultMetric.rte* template for metric units.



 Select the *default.rte* template for Imperial units. Press **Open**.



5.  Double click **East** under Elevations.
This activates the East view orientation.
6.  Select the **Home** ribbon.
7.  Select the **Level** tool. (This adds a floor elevation.)
8.  Move your mouse to set an elevation of **12' [3650 mm]**.
Pick to start the elevation line.
9.  In the Options bar located on the lower left of the screen, enable **Make Plan View**.
This should be enabled if you want Revit to automatically create a floor plan view of this level. If you forget to check this box, you can create the floor plan view later using the **View Ribbon**.
-  **TIP:** Double click on the blue elevation symbol to automatically switch to the floor plan view for that elevation.
10.  Pick to place the end point to position the level indicator above the other indicators.
11. Basically, you place a new level by picking two points at the desired height.
Right click and select **Cancel** twice to exit the Level command.



Revit is always looking for references even among annotations. You will notice that your level tags snap and lock together, so when you move one to the right or left, all those in line with it will follow.

The jogged line allows the user to create a jog if desired.

If you need to adjust the position of the tag, just click on the line, three blue grips will appear. These can be clicked and dragged as needed. You can also right click on a level tag and select 'Hide annotation in view' and the tag and level line will disappear in that view only.

Hide Annotation in View is only enabled if an object is selected first.

12. Save the file as *ex3-1.rvt*.

Exercise 3-2 Adding Mass Elements

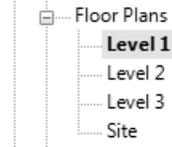
Drawing Name: *ex3-1.rvt*
 Estimated Time: 10 minutes

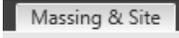
This exercise reinforces the following skills:

- Switching Elevation Views
- Add Mass

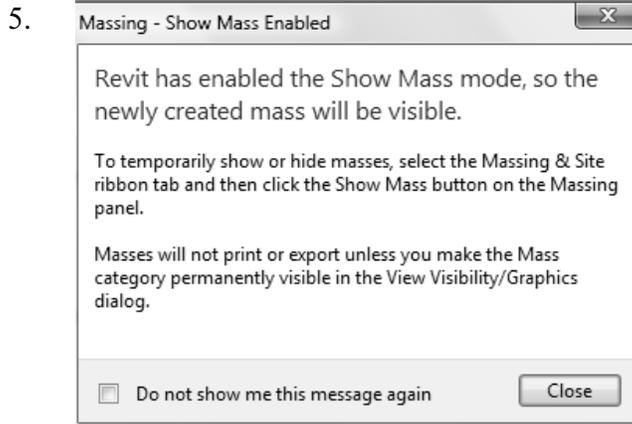
1.  Open or continue working in the file *ex3-1.rvt*.

2.  Views (all) Activate the **Level 1** view.



3.  **Massing & Site** Select the **Site & Massing** ribbon.

4.  Select the **In-Place Mass** tool.



Masses, by default, are invisible. However, in order to create and edit masses you need to see what you are doing. Revit brings up a dialog to let you know that the software is switching the visibility of masses to ON, so you can work.

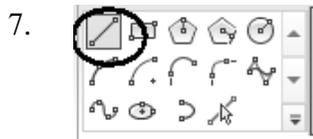
Press **Close**.

*If you don't want to be bugged by this dialog, enable the **Don't show me this message again** option.*



Enter **Level 1** in the Name field.

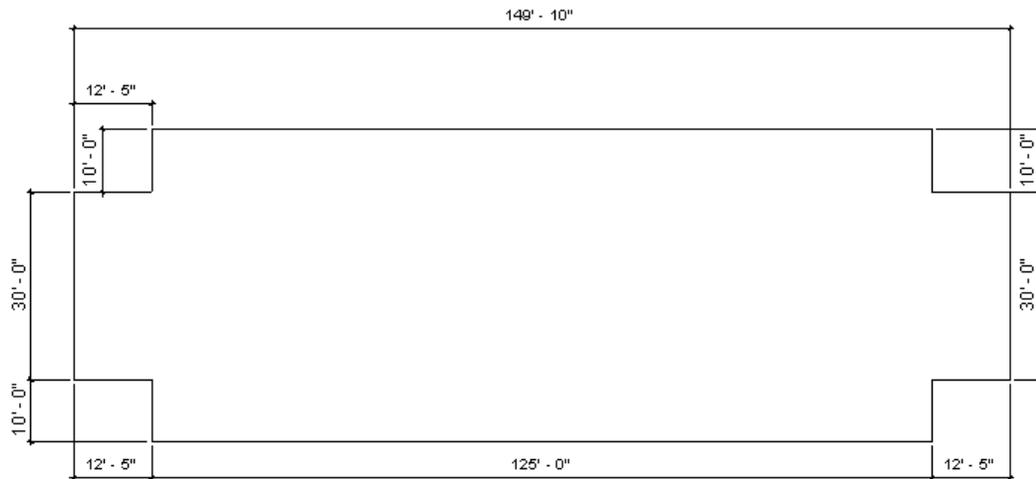
Press **OK**.

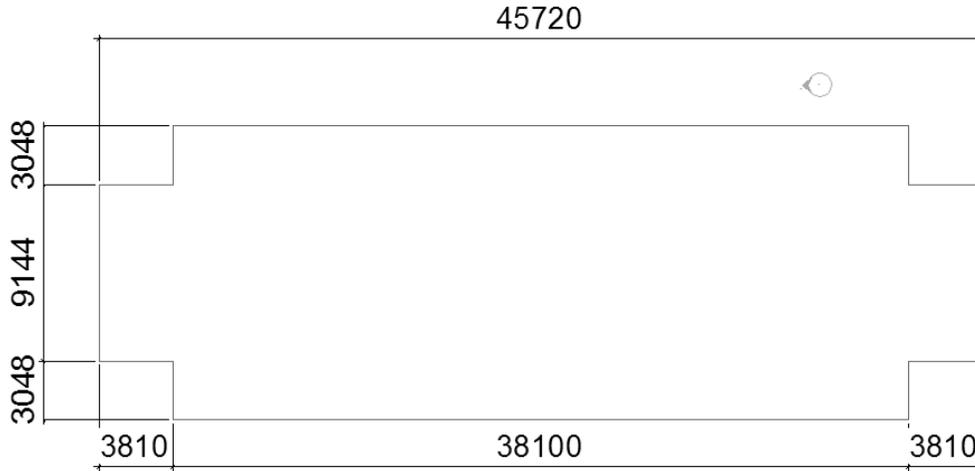


Select the Line tool.

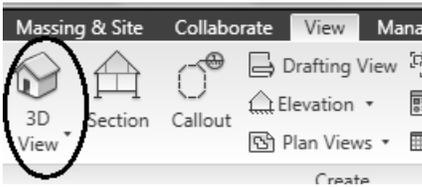


Enable **Chain** in the Options bar located on the bottom of the screen. This allows you to draw lines without always having to pick the start point.





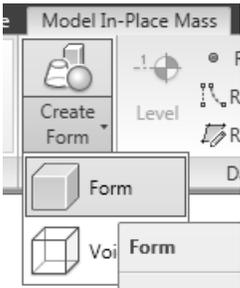
9. Create the shape shown. The top figure shows the units in Imperial units. The bottom figure shows the units in millimeters.

10.  Switch to a 3D view.

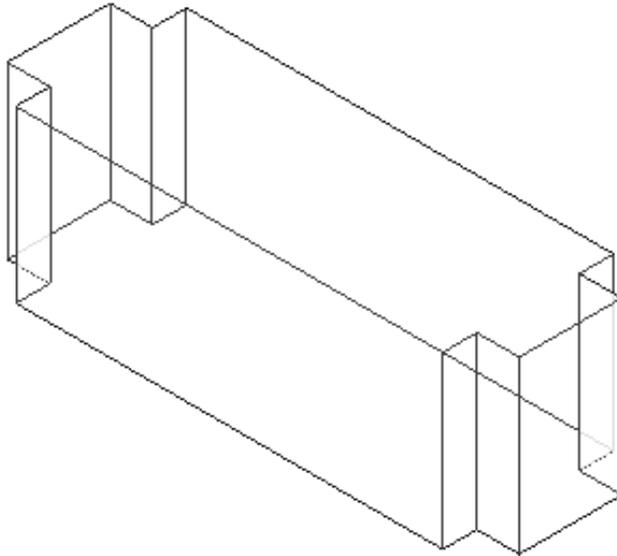
Activate the **View** ribbon and select **3D View**.

11.  Switch back to the **Massing & Site** ribbon.

12. Window around the entire figure so it is highlighted.

13.  Select the **Form** tool under **Create Form**.

14.  Select **Finish Mass**.



The Mass is created.

15. Save the file as *ex3-2.rvt*.



TIP: Object tracking will only work if the sketch objects are active and available in the current sketch. You can use **Pick** to copy entities into the current sketch.

Exercise 3-3

Modifying Mass Elements

Drawing Name: *ex3-2.rvt*
Estimated Time: 30 minutes

This exercise reinforces the following skills:

- Show Mass
- Align
- Modify Mass
- Mirror
- Create Form
- Save View

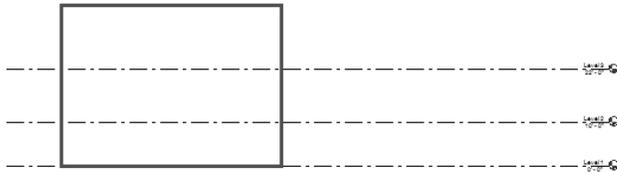
A short video of this exercise is available on my website to help users with this exercise. Access at www.mossdesigns.com/ex3-3-revit.avi.

1. Open *ex3-2.rvt*.



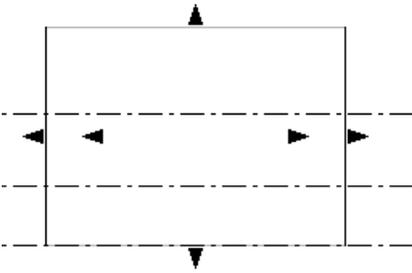
If you don't see the mass, click **Show Mass** on the Massing & Site ribbon to turn mass visibility ON.

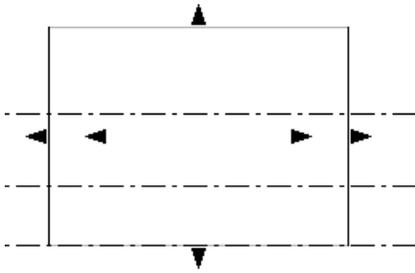
2.  Elevations (Building Elevation) Activate the **East** Elevation.



We see that top of the building does not align with Level 3.

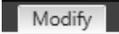
To adjust the horizontal position of the level lines, simply select the line and use the grip to extend or shorten it.

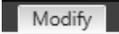
3.  Select the mass so the grips are activated.



4.  Select **Edit In-Place**.

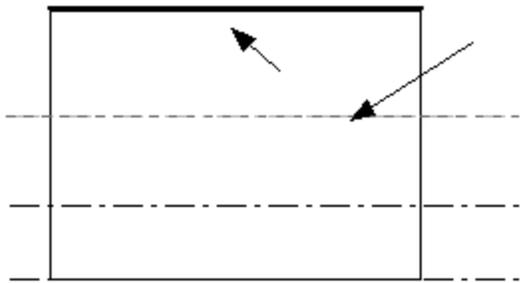


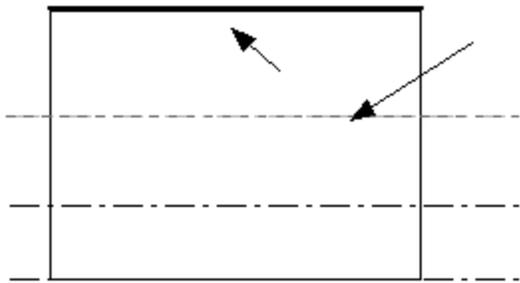
5.  Make sure that **Modify** is enabled.

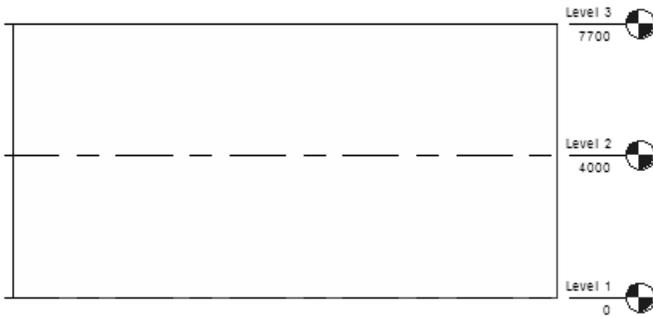


6.  Select the **Align** tool.



7.  Select the top level line (Level 3) then select the top of the extrusion.
Right click and select **Cancel** to exit the Align command.

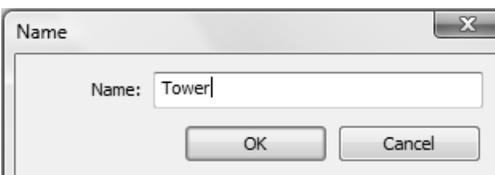


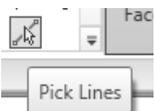
8.  The top of the extrusion now aligns to level 3.

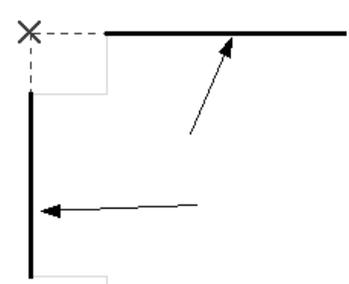
9.  Select the **Finish Mass** tool in the upper right of the Massing & Site ribbon.

10.  Activate **Level 2** under Floor Plans.

11.  Select **In-Place Mass**.

12.  Name the new mass **Tower**.
Press **OK**.

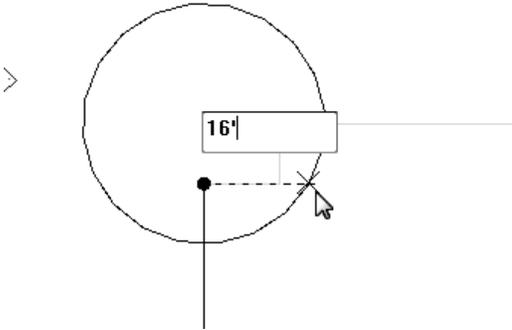
13.  You can use object tracking to locate the intersection between the two corners.
To activate object tracking, enable the **Pick Lines** tool. Then select the two lines you want to align with.

14.  Select the two lines indicated to be used for object tracking to locate the center of the circle.

15.  Select the **Circle** tool.

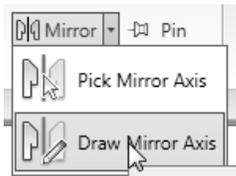
16.  When you see the large X and the tooltip says Intersection, you will have located the intersection.

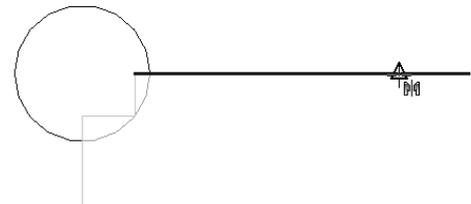
Pick to locate the center of the circle at the intersection.

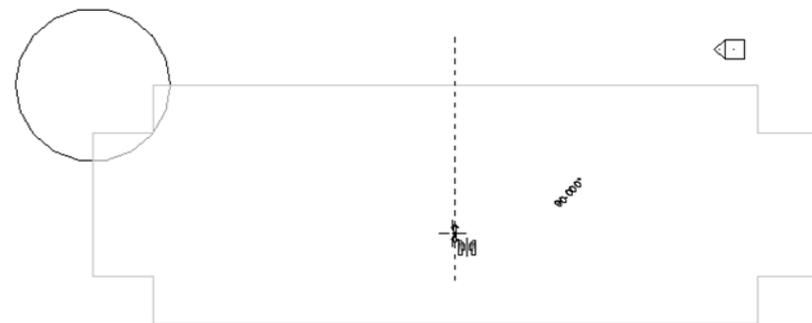
17.  Enter a radius of **16'-0"** [4880].

When you used the Pick Line tool, you copied those lines into the current sketch. You need to delete those two lines or you will get a warning error because they create a self-intersecting profile.

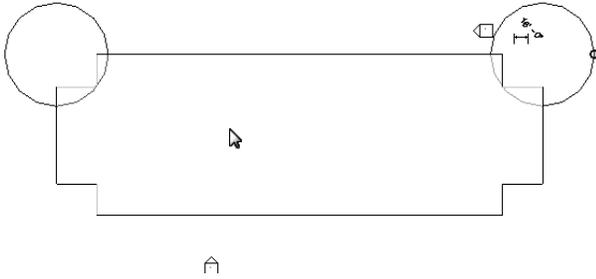
18. Select the two copied lines. Right click and select **Delete**.
 19. Select the circle sketch so it is highlighted.

20.  Select the **Draw Mirror Axis** tool under the **Mirror** tool.

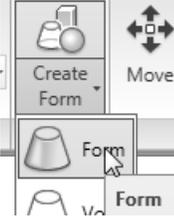
21.  Locate the midpoint of the small horizontal line and pick.

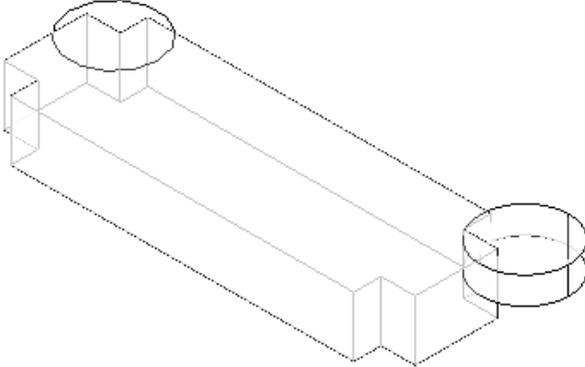
22. 

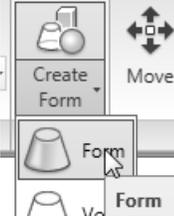
Bring your mouse down in the Vertical direction and pick for the second point of the mirror axis.

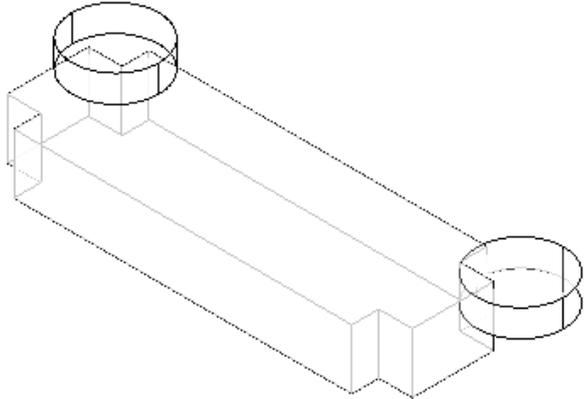
23.  The circle sketch is mirrored.

24.  Switch to a 3D view using the Project Browser.

25.  Select one of the circles so it is highlighted.
Select **Create Form**→**Form**.

26.  The circle is extruded.

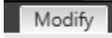
27.  Select the remaining circle so it is highlighted.
Select **Create Form**→**Form**.

28.  Both circles are now extruded.

29. Select **Finish Mass**.



30. Select the **Modify** ribbon.

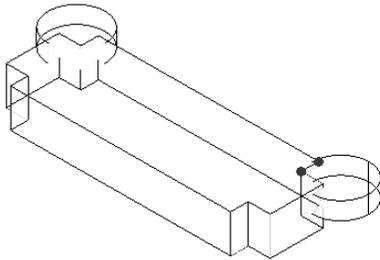


31. Select the **Join** tool.



Select the two masses to join them into a single mass.

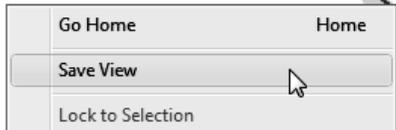
32. The two masses are joined into a single mass.



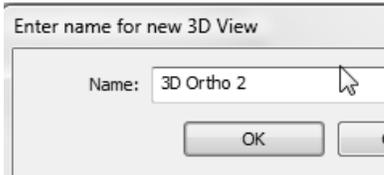
33. Use the View Cube located in the upper right of the screen to orbit the model.



34. To save the new orientation, right click on the View Cube and select **Save View**.



35. Enter **3D Ortho 2** for the name of the view.



Press **OK**.

36. The **Saved** view is now listed in the Project browser under 3D Views.



37. Save the file as *ex3-3.rvt*.



- Pick on a mass element to activate the element's grips. You can use the grips to change the element's shape, size, and location.
- You can only use the **View→Orient** menu to activate 3D views when you are already in 3D view mode.

Exercise 3-4

Creating Wall by Face

Drawing Name: ex3-3.rvt
 Estimated Time: 15 minutes

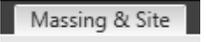
This exercise reinforces the following skills:

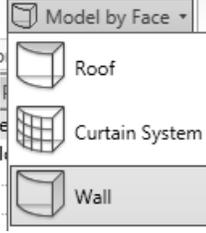
- Wall by Face
- Trim
- Show Mass

You can add doors and windows to your conceptual model to make it easier to visualize.

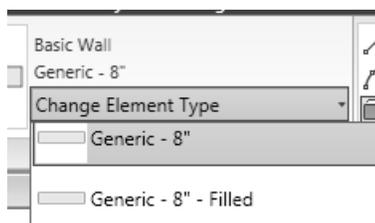
1. Open *ex3-3.rvt*.

2.  Activate the **SAVED** view under 3D Views.

3.  Activate the **Massing & Site** ribbon.

4.  Select **Model by Face**→**Wall**.

5. Under **Change Element Type**, you can set the wall type.

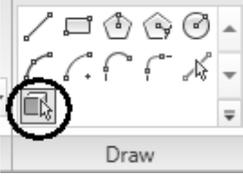


Imperial:

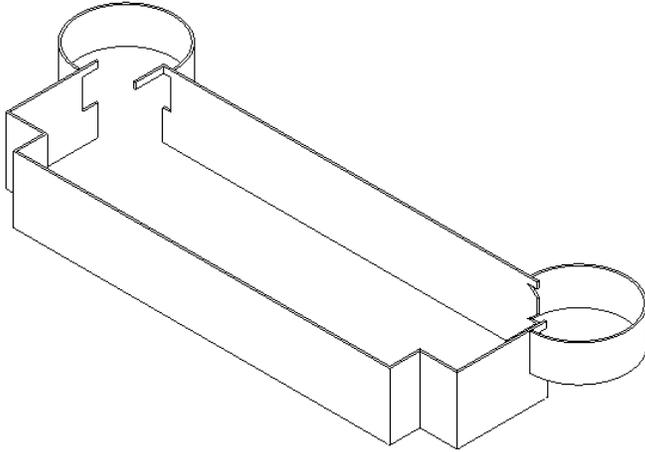
Set the Default Wall Type to:
Basic Wall: Generic- 8 in.

Metric:

Set the Default Wall Type to:
Basic Wall: Generic- 200 mm.

6.  Enable **Pick Faces** in the ribbon

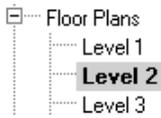
7.



Select each wall and cylinder. The cylinder will be halved by the walls, so you will have to select each half.

You will have to do some cleanup work on the corners where the towers are.

8.



Activate **Level 2** under Floor Plans.

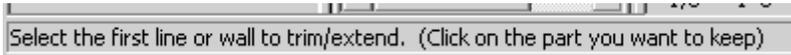
9.



Select the **Trim** tool from the Modify ribbon to clean up where the tower joins with the walls.

When you select to trim, be sure to select the section you want to keep.

10.

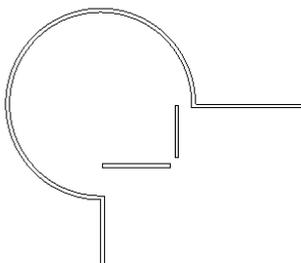


Note that you have some instructions in the lower left of the screen to assist you.

11. Disable **Show Mass** so you only see the walls.

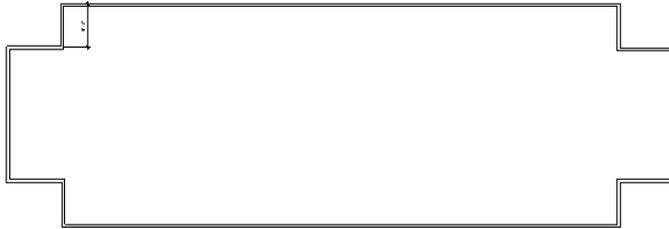


12. Trim the walls as shown on Level 2.



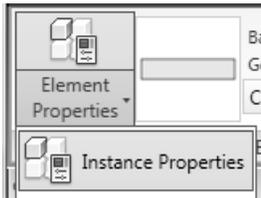
To erase any small sections of walls, simply select and press the Delete key.

13.



On Level 1, you should only see the walls with no towers.

14.



Select the wall.

Select **Element Properties**→**Instance Properties**.

15.

Constraints	
Location Line	Wall Centerline
Base Constraint	Level 1
Base Offset	0' 0"
Base is Attached	<input type="checkbox"/>
Base Extension Distance	0' 0"
Top Constraint	Up to level: Level 2
Unconnected Height	10' 0"

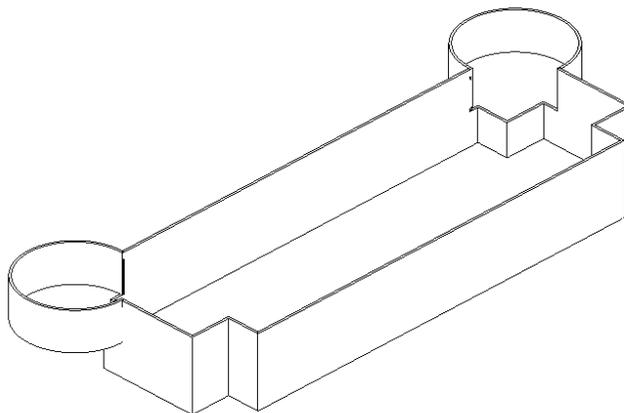
Create walls that have a Base Constraint of Level 1 and a Top Constraint of Level 2 at the upper corners of the building.

This is only for the four walls that are below the towers.

Towers will have a base constraint of Level 2 and top constraint of Level 3.

The remaining walls will have a base constraint of Level 1 and Top Constraint of Level 3.

There will be small sections of walls that will also have these constraints on the east and west sides.



16. Save as *ex3-4.rvt*.

Exercise 3-5
Adding Doors and Windows

Drawing Name: ex3-4.rvt
Estimated Time: 30 minutes

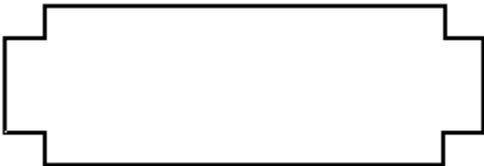
This exercise reinforces the following skills:

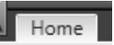
- Basics
- Door
- Load from Library
- Window
- Array
- Mirror
- Shading

You can add doors and windows to your conceptual model to make it easier to visualize.

1. Open *ex3-4.rvt*.

2.  Activate **Level 1** under Floor Plans.

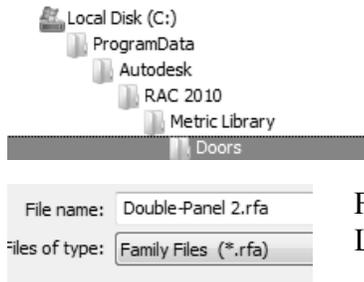
3.  Level 1 should appear like this.

4.  Activate **Home ribbon**.

5.  Select the **Door** tool.

6.  Select **Load Family**.

7.  Browse to the **Doors** folder under the Imperial or Metric library. Use Imperial if you are using Imperial units or use Metric if you are using Metric units.

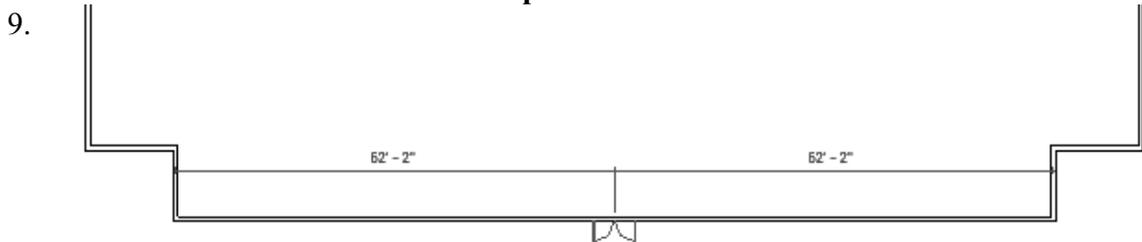


For Imperial Units:
Located the *Double-Panel2.rfa* file.

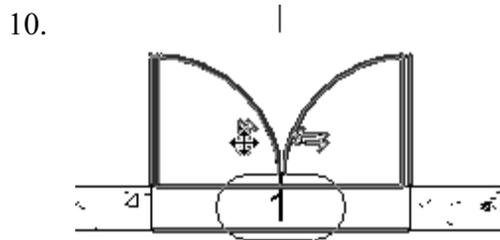
8. File name:
Files of type:

For Metric Units:
Locate the *M_Double-Panel 2.rfa* file.

Press **Open**.



Place the door so it is centered on the wall as shown.



If you press the space bar before you pick to place, you can control the orientation of the door.

After you have placed the door, you can flip the door by picking on it then pick on the vertical or horizontal arrows.



Return to the **Home** ribbon.



Pick the **Window** tool.



Select **Load Family**.

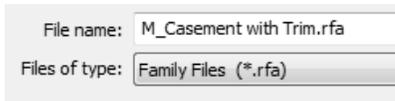


Browse to the **Windows** folder under the Imperial or Metric library. Use Imperial if you are using Imperial units or use Metric if you are using Metric units.



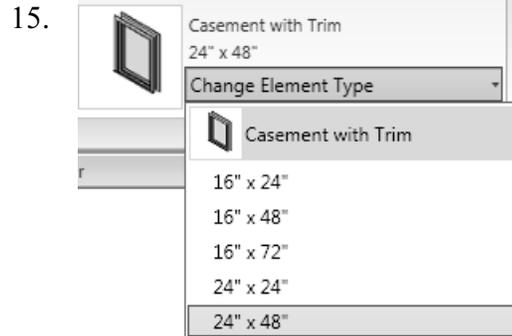


For Imperial Units:
Locate the *Casement with Trim.rfa* file.

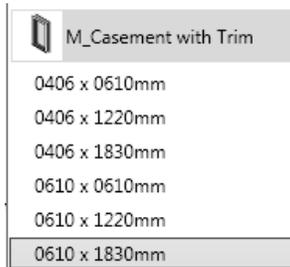


For Metric Units:
Locate the *M_Casement with Trim.rfa* file.

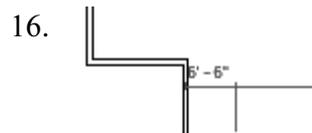
Press **Open**.



For Imperial Units:
From the drop-down list, select the 24" x 48" size for the Casement with Trim window.



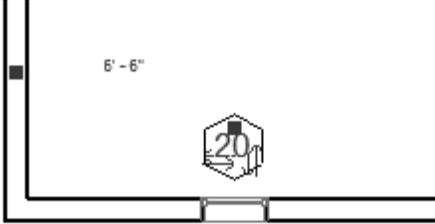
For Metric Units:
From the drop-down list, select the 0610 x 1830 mm size for the M_Casement with Trim window.



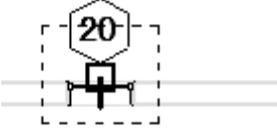
Place the window **6'-6" [3000 mm]** from the inner left wall.

Dimensions in Revit work differently. Revit uses *temporary* dimensions and *permanent* dimensions. Permanent dimensions are the parametric dimensions attached to each object. You can modify these dimensions by clicking on the object. Temporary dimensions are the dimensions you place using the Dimension tool or typing 'DI'. The dimension values of temporary dimensions can only be modified by changing the permanent dimensions.

If you want to define the position of an object using a dimension that doesn't appear when you pick the object, you can apply a temporary dimension using the Dimension tool. This will add a permanent dimension to the object that can then be used to position the object.

17.  Pick the window so it is highlighted.

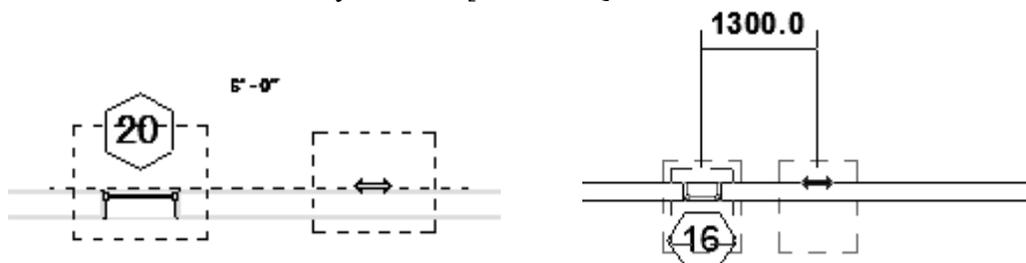
18.  Array Select the **Array** tool.

19.  Select the midpoint of the window as the basepoint for the array.

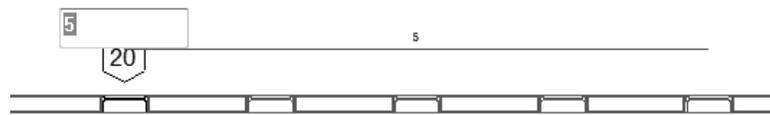
20. 

Set the array quantity to **5** on the options bar located on the bottom of the screen.

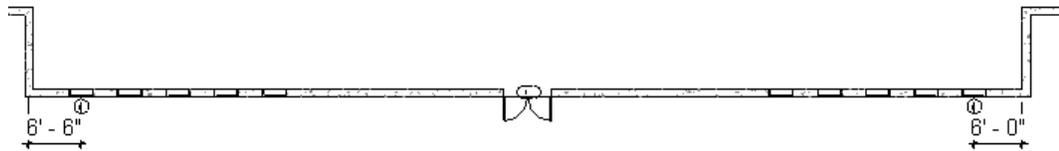
Set the distance for the array to **6' 0" [1300 mm]**.



21. You should see a preview of the array.



Press **ENTER** to accept.



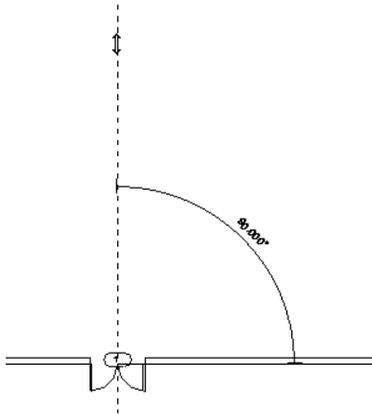
22.  Window around the entire array to select all the windows.

The array count will display.

23. Use the **Mirror**→**Draw Mirror Axis** tool to mirror the windows to the other side of the wall opposite the door.

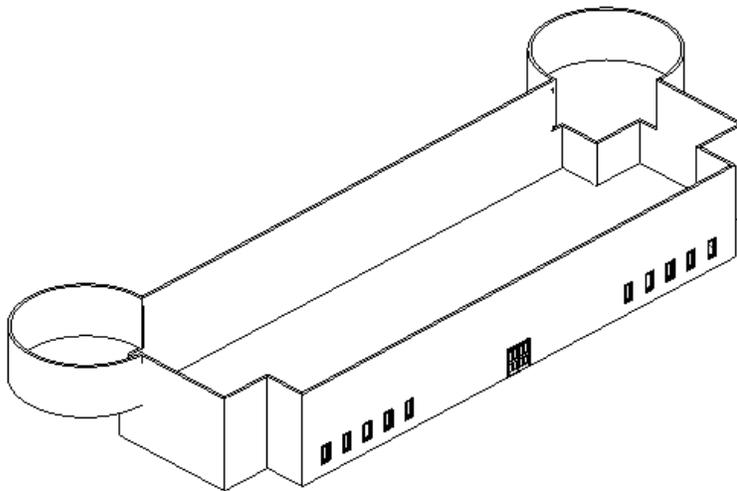


24. Select the center of the door as the start point of the mirror axis.
Move the cursor upwards at a 90 degree angle and pick a point above the door.



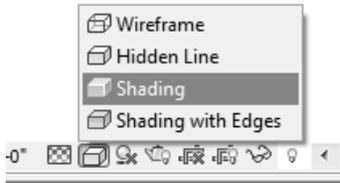
25. Left pick anywhere in the graphics window to complete the command.

- 26.



Switch to a **3D** View.

27. Set the Model Graphics Style to **Shading**.



We have created a conceptual model to show a client.

28. Save the file as *ex3-5.rvt*.