

1 - Creating Your First Building Model

In this lesson, you start the project with a simple template to which you add several new levels. You then sketch the exterior and interior walls of the west wing. As you design the walls, you create, modify, and apply new wall types. After adding dimensions, you add and modify doors and windows. You then add sketched components such as floors, ceilings, stairs, and a roof. Using the mirror tool, you use the west wing to create the east wing, and then add the passageway between them. Finally, you render the model and document the project by adding schedules and views to sheets.

Exercises in this lesson:

- Creating and Modifying the Exterior Walls of the West Wing
- Adding the Interior Walls of the West Wing
- Dimensioning the Building Model
- Adding Doors and Windows
- Adding Floors and Floor Openings
- Adding a Roof and Ceiling
- Adding Multi-Level Stairs
- Creating the East Wing and Passageway
- Scheduling the Building Model
- Rendering the Building Model
- Documenting the Building Model

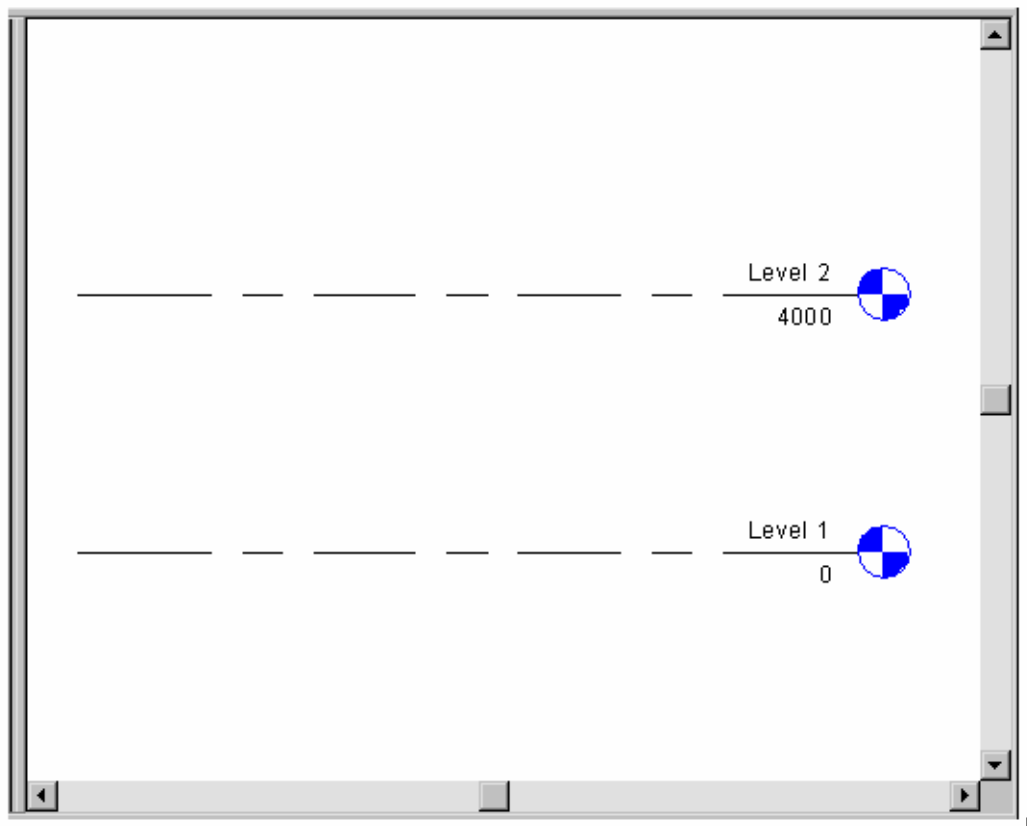
Creating and Modifying the Exterior Walls of the West Wing

In this exercise, you sketch the exterior walls of the west wing. After sketching the walls, you create a new wall type with multiple wall sweeps and reveals. You then apply the new wall type to the existing walls.

- On the File menu, click Open – navigate to the student share drive – in the TECH folder – go to REVIT folder and open student ex3.rvt.

Add new levels

1. In the Project Browser, expand Views (all), expand Elevations, and double-click North.



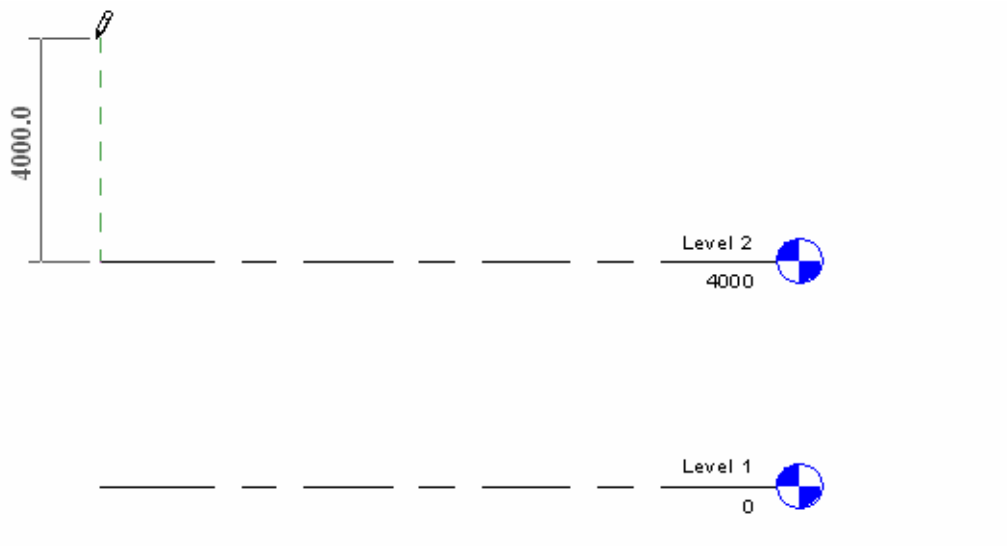
The dataset for this tutorial was created using the default template. Minor modifications have been made for training purposes.

Notice that Level 1 and Level 2 are already defined. You can add and modify levels at any time during the design process. When you create walls, you can assign a top constraint to a level or an explicit height. If you sketch the walls with a top constraint and a specified explicit height and, you can, at a later time, reassign the top constraint to a specific level. In this exercise, you define the levels first so that you can set the top constraint when you first create the walls.

2. On the Basics tab of the Design Bar, click Level.
3. On the Options Bar, verify that Make Plan View is selected.

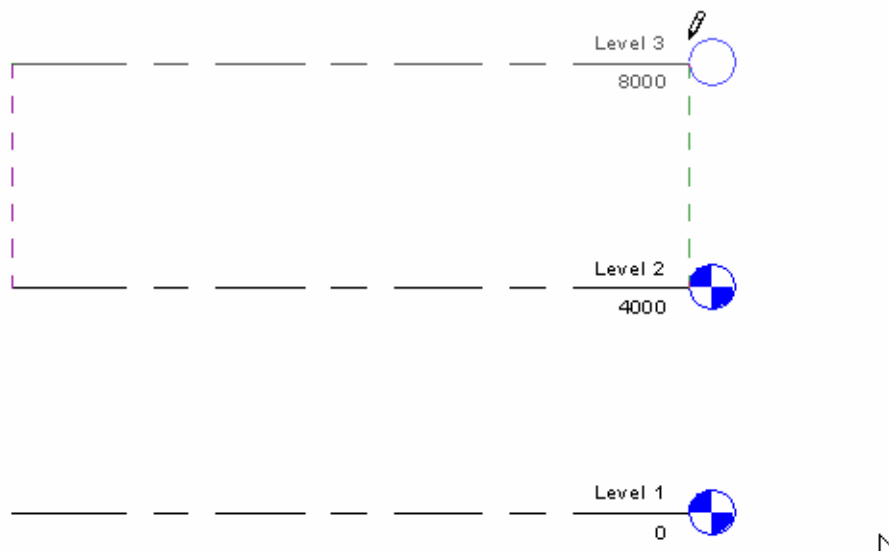
This option creates a referenced floor and ceiling plan.

4. Move the cursor above the left edge of Level 2 and click 4000 mm above it.



If you accidentally place the level at an incorrect distance, press ESC and start over. You can also edit the distance after you create the level by clicking the distance value and entering the correct distance.

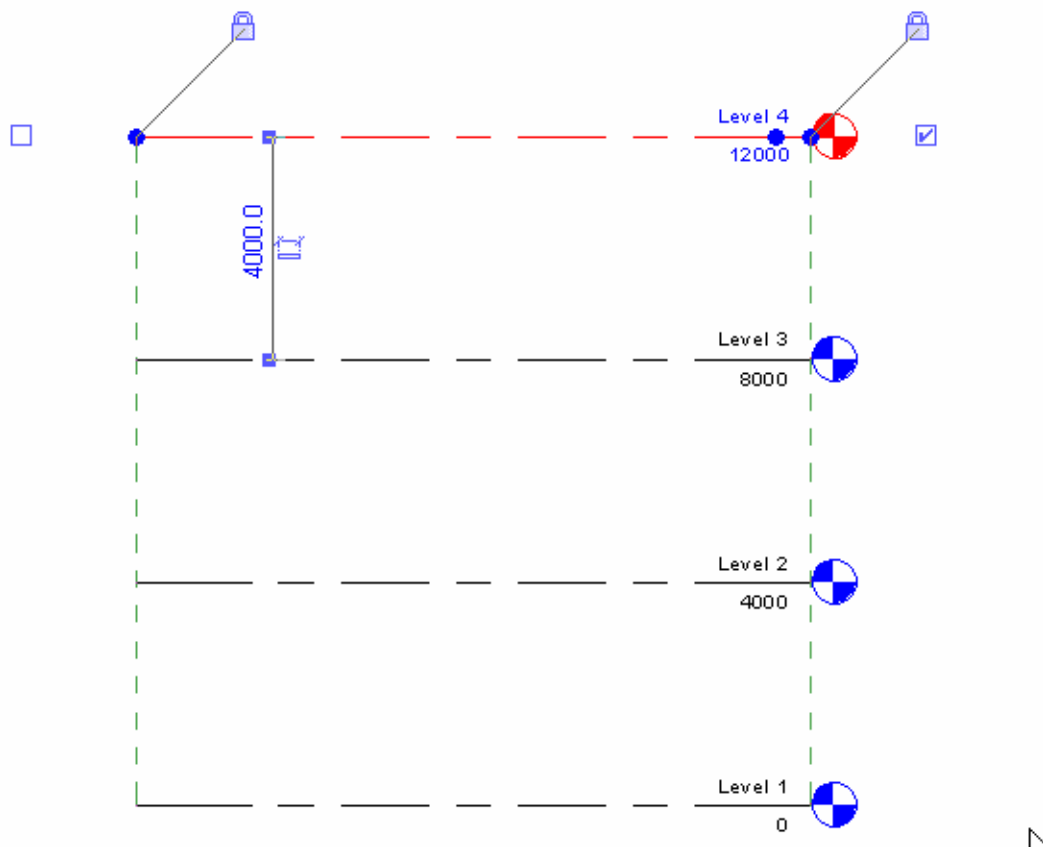
5. Move the cursor to the right until it snaps over the Level 2 head and click.



In the Project Browser, notice that a floor plan and ceiling plan have been created for Level 3.

6. On the Basics tab of the Design Bar, click Level.
7. On the Options Bar, verify that Make Plan View is selected.

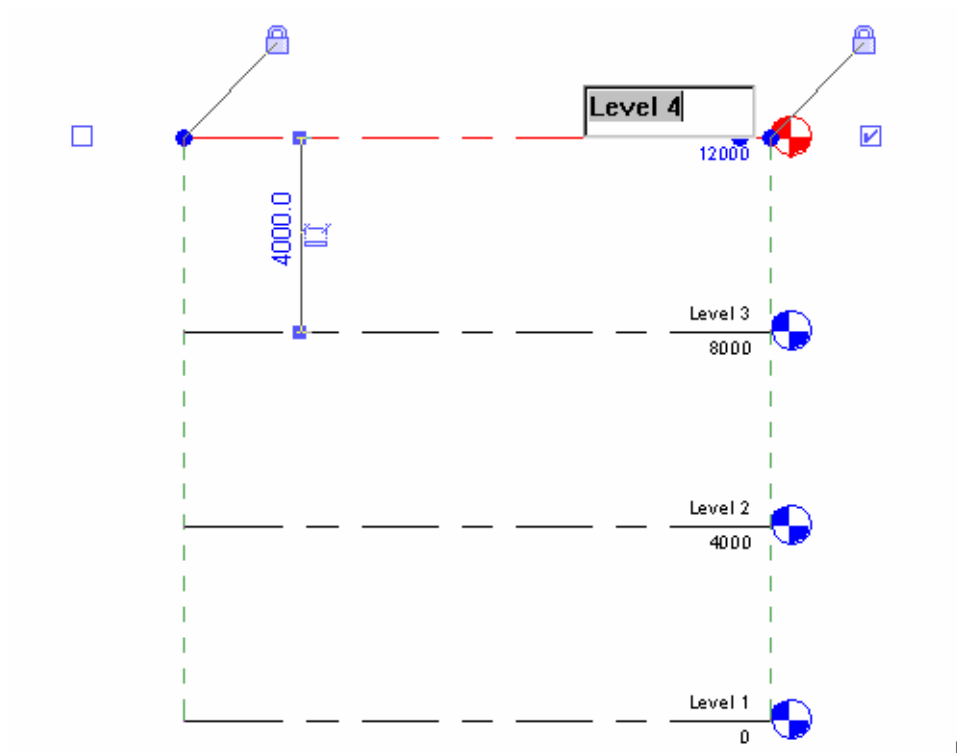
8. Using the same technique you learned in the previous steps, add Level 4 at 4000 mm above Level 3.



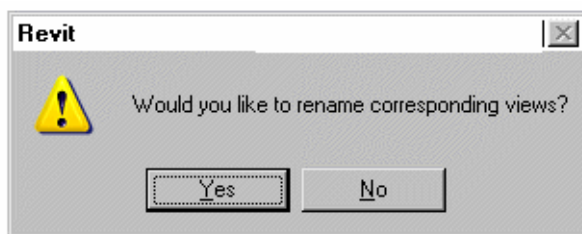
9. On the Basics tab of the Design Bar, click Modify, and select Level 4.

When you select Level 4, the level name and height value changes to blue; this indicates that you can select and edit the values.

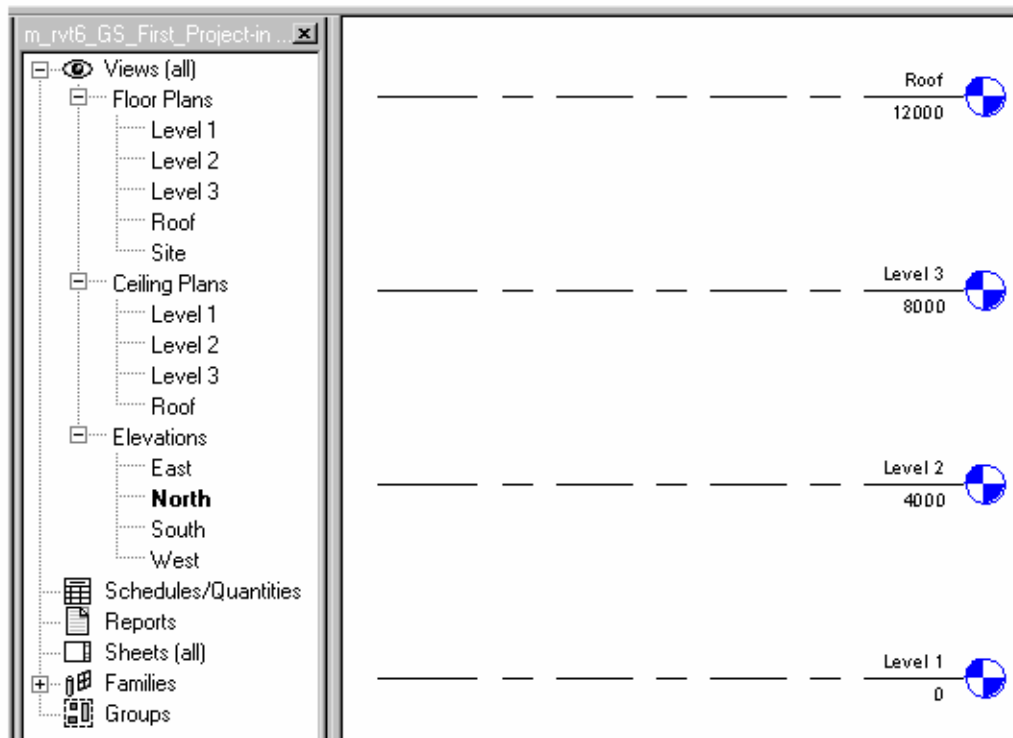
10. Click directly on the Level 4 text.



11. Enter **Roof** and press ENTER.
12. Click Yes to rename corresponding views.

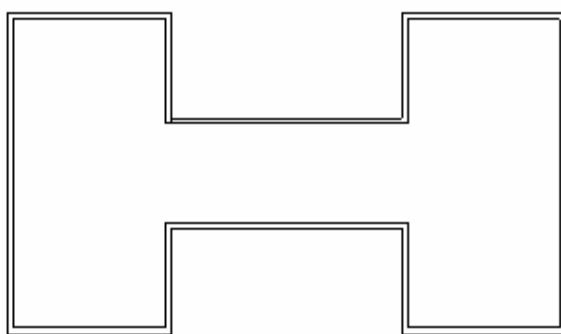


13. In the Project Browser, notice that the names of the Level 4 floor plan and ceiling plan are changed to Roof.



Sketch the exterior walls

This building model consists of an east wing, a west wing, and a curtain glass passageway connecting the two wings. You could begin the model by simply sketching the exterior walls and then continuing the design process from that point. In such a case, the floor plan would resemble the following illustration:



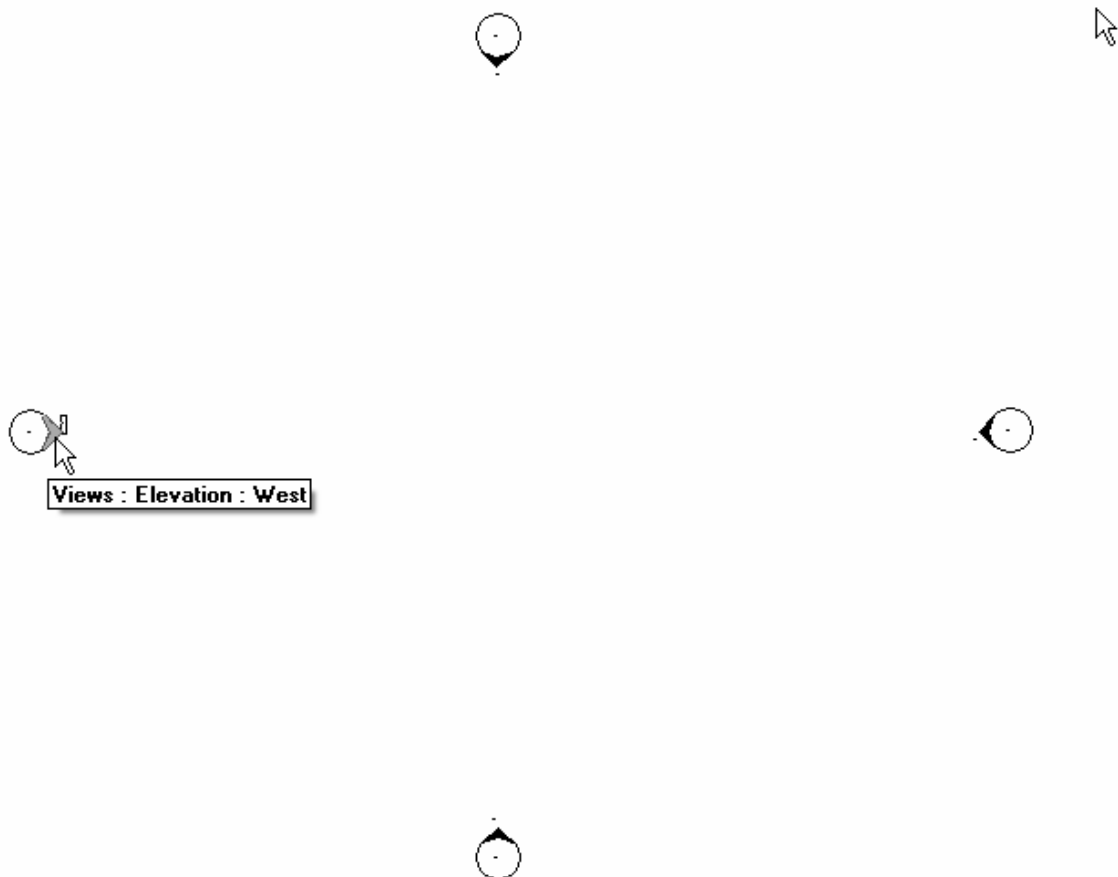
However, because the east wing is a mirror image of the west wing, you can take advantage of the parametric capabilities of Autodesk Revit by designing the majority of the west wing, mirroring it to create the east wing, and then designing the passageway to connect the two. In the steps that follow, you create the exterior walls of only the west wing.

14. In the Project Browser under Floor Plans, double-click Level 1.

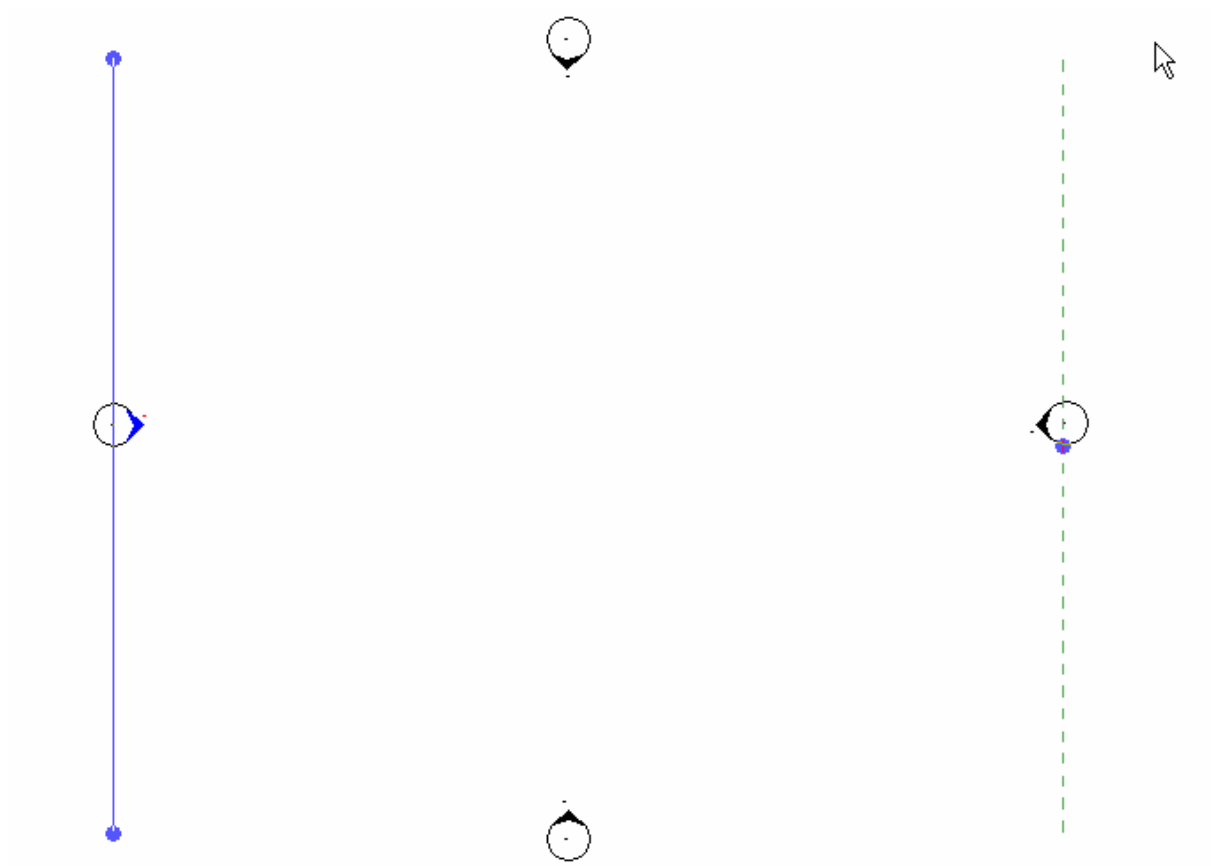
In this view, there are four elevation symbols, which define the East, West, North, and South elevation views.

15. Move the cursor over the left elevation symbol and then over the elevation arrow. Do not click the symbol.

The name of the elevation view is displayed in a tool tip or in the status bar at the bottom of the drawing window.



16. In the drawing area, click the Elevation: West symbol.



Two lines, which control the clip planes of the West elevation view, are displayed. The solid line on the left has two handles, one on each end. These handles control the left and right clip planes of the elevation view. The dashed line to the right controls the far clip plane.

Tip: You can turn off the visibility of the elevation symbols by using the Visibility/Graphics command. Later in this tutorial, you use this command to modify the view.

17. On the Basics tab of the Design Bar, click Wall.

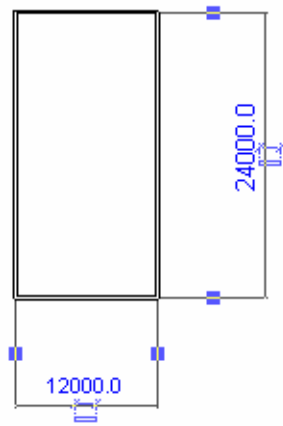
18. In the Type Selector, select Basic Wall: CW 102-85-215p.

19. In the Options Bar, specify the following options:

- Specify Roof for Height.
- Verify that Wall Centerline is selected for Loc Line.
- Select the Rectangles drawing tool.

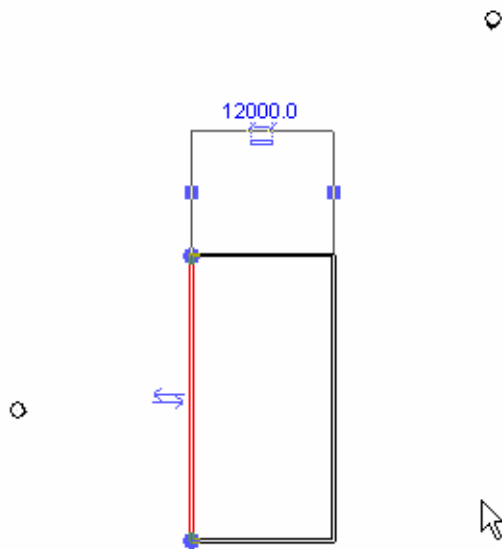
20. Sketch the rectangle by clicking the upper left corner to specify the rectangle starting point. Move your cursor down and to the right until the rectangle is 12,000 mm wide and 24,000 mm long, and click to complete the rectangle as shown.

Because the west wing is later mirrored to the right, make sure you sketch the rectangle just to the right of the west elevation symbol.



21. On the Basics tab of the Design Bar, click Modify.

22. Select the west wall of the rectangle.

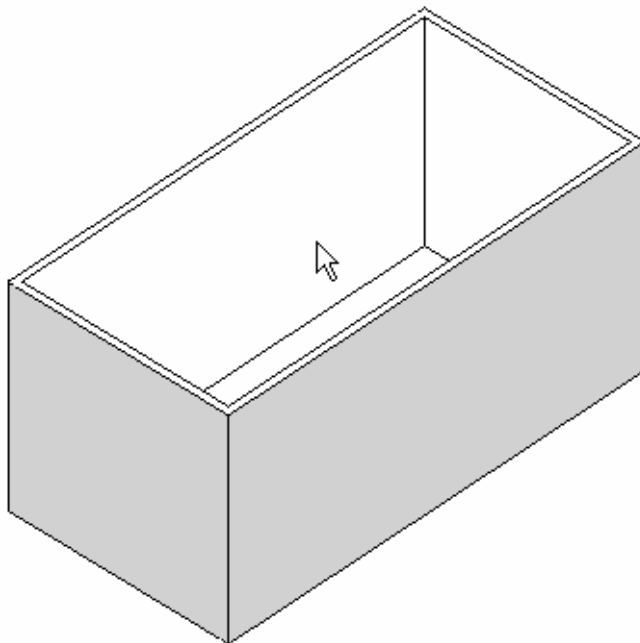


The selected wall is red, and flip arrows are on the exterior face of the wall. By clicking the arrows, you can flip the wall orientation.

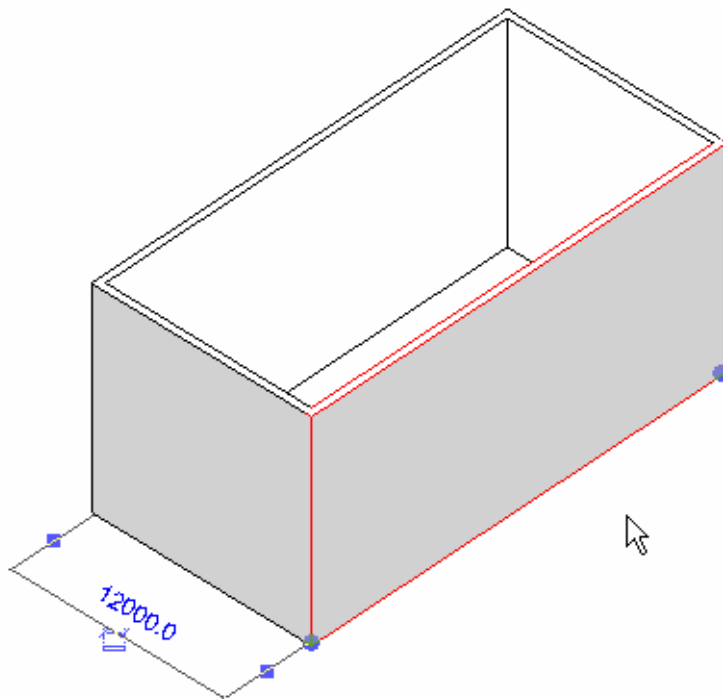
23. Click the arrows once to set the exterior face of the wall on the inside of the rectangle. Click the arrows a second time to return the exterior face to the outside of the rectangle.

The dimension that displays is called a temporary dimension. Temporary dimensions are sketching aids. If you click the dimension value, you can change it.

24. On the View toolbar, click. 

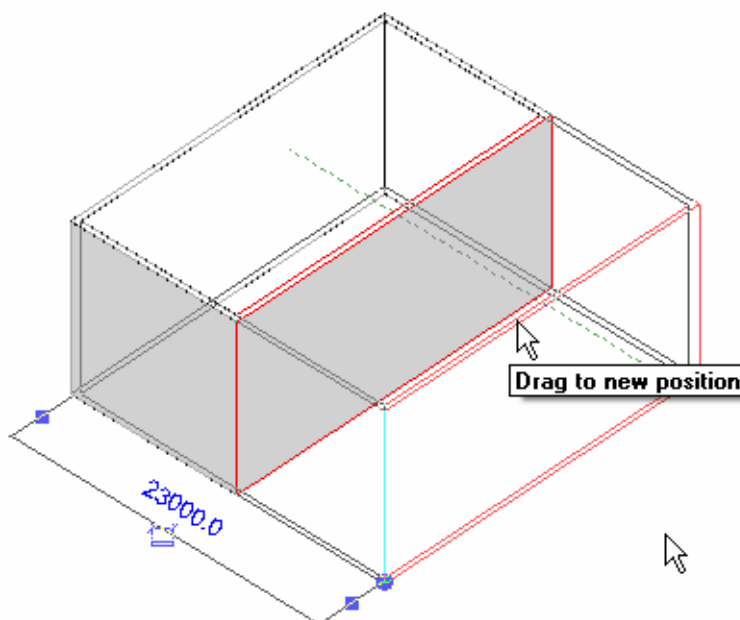


25. Select the 24000 mm wall on the right.



Notice that a temporary dimension displays.

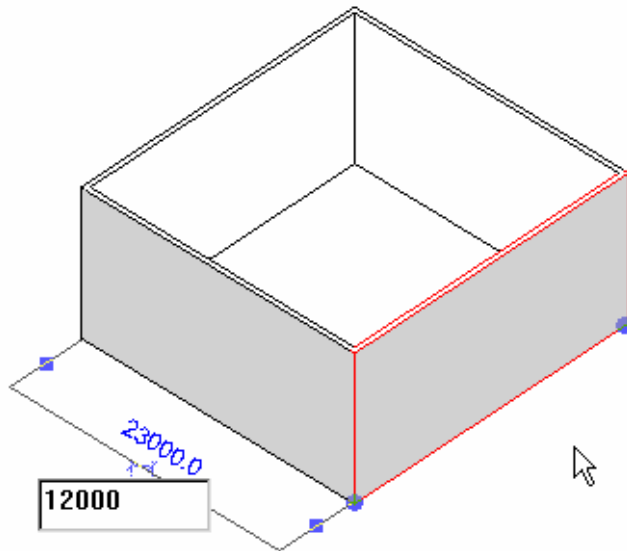
26. Drag the wall to the right and release the mouse button when the width of the rectangle is approximately double the original size.



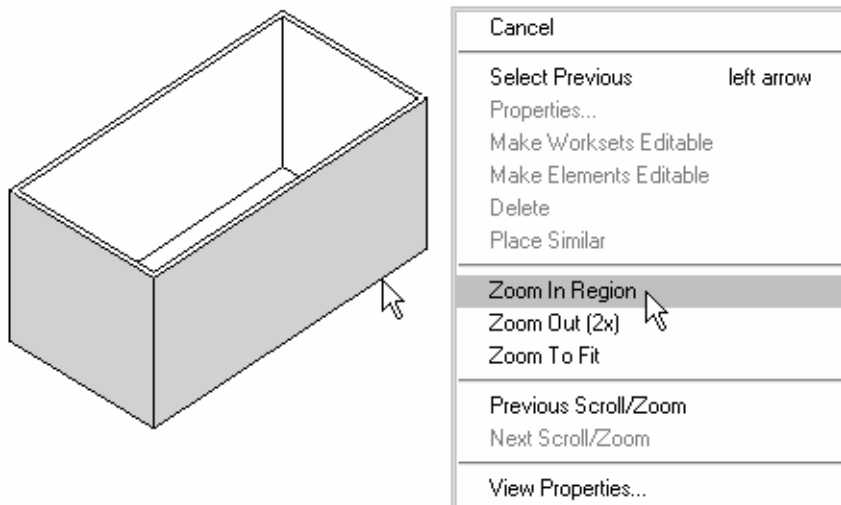
27. Click the temporary dimension value and reset the rectangle width to 12000 mm.

Tip: When entering a value, you do not need to include the unit of measure symbols. For example, if the project unit of measure is millimetres, you can enter 12000 and

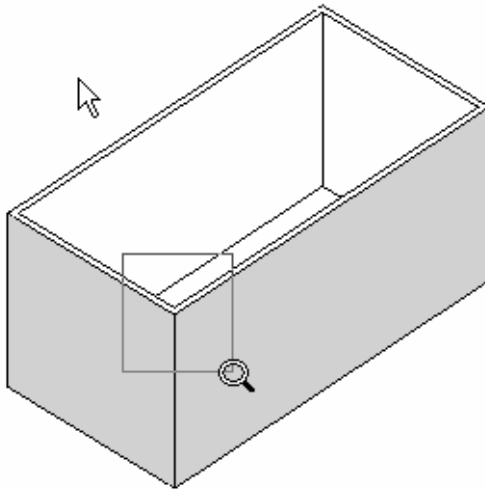
press ENTER. You do not need to enter 12000 mm. However, if you enter a value in a different unit of measure, include the symbol so that the value is calculated to the project unit of measure. For example, if you enter 12m, the dimension value is calculated to 12000 mm.



28. Right-click in the empty space of the drawing area and click Zoom In Region.

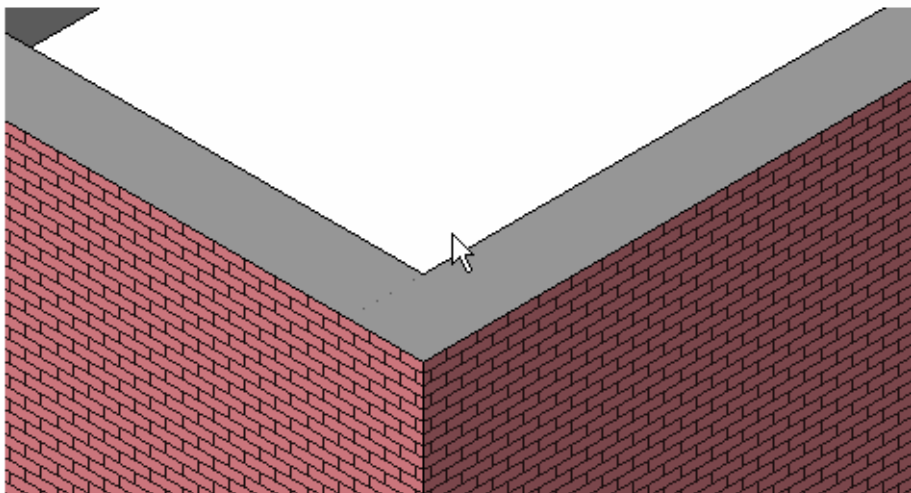


29. Draw a region around the corner, as shown.



The brick surface pattern displays.

30. On the View menu, click Shading with Edges.



31. On the keyboard, enter ZF, which is the shortcut key for Zoom to Fit.

Notice that the brick surface pattern becomes solid fill after you zoom to fit.

32. On the View menu, click Hidden Line.

Create and apply a new wall type

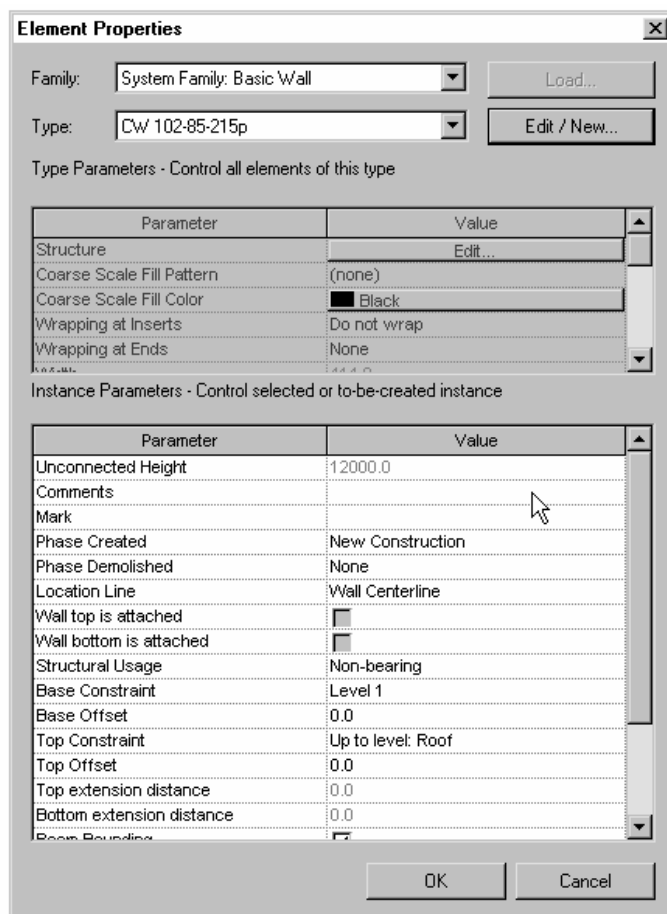
33. Select the long wall on the right.

34. On the Options Bar, click. 

The Element Properties dialog box displays the parameters of the selected component. The lower half of the dialog box contains the instance parameters, which control the selected component or components. If you change an instance parameter, it has no effect on components that are not selected. For example, if you changed the Top Offset of the wall, only the wall that you selected would change.

In the upper half of the dialog box, you can see the list of type parameters, which control all components of the same type. Although you can scroll through the list of type parameters, you cannot modify them within this dialog box. For example, if you wanted to modify the wall structure, you would click Edit/New to access the type parameters. You could then make changes to the wall structure as needed. However, any changes made to the type parameters would be applied to all components of the same type. If your intent is to modify only the structure of the selected components, click Duplicate to create a new compound type. You can then make changes to the type parameters without inadvertently modifying the components of the original type.

In the steps that follow, you add horizontal sweeps of soldier course brick to the wall structure. To accomplish this, you create a new wall type, modify it, and then apply it to the remaining walls.



The screenshot shows the 'Element Properties' dialog box for a wall component. It is divided into two main sections: 'Type Parameters' and 'Instance Parameters'.

Type Parameters - Control all elements of this type

Parameter	Value
Structure	Edit...
Coarse Scale Fill Pattern	(none)
Coarse Scale Fill Color	Black
Wrapping at Inserts	Do not wrap
Wrapping at Ends	None

Instance Parameters - Control selected or to-be-created instance

Parameter	Value
Unconnected Height	12000.0
Comments	
Mark	
Phase Created	New Construction
Phase Demolished	None
Location Line	Wall Centerline
Wall top is attached	☐
Wall bottom is attached	☐
Structural Usage	Non-bearing
Base Constraint	Level 1
Base Offset	0.0
Top Constraint	Up to level: Roof
Top Offset	0.0
Top extension distance	0.0
Bottom extension distance	0.0
Room Bounding	☐

Buttons: OK, Cancel

35. In the Element Properties dialog box, click Edit/New.

In this case, the original wall type and structure needs to remain unchanged. Therefore, you must create a new wall type before altering the wall structure.

36. Click Duplicate.

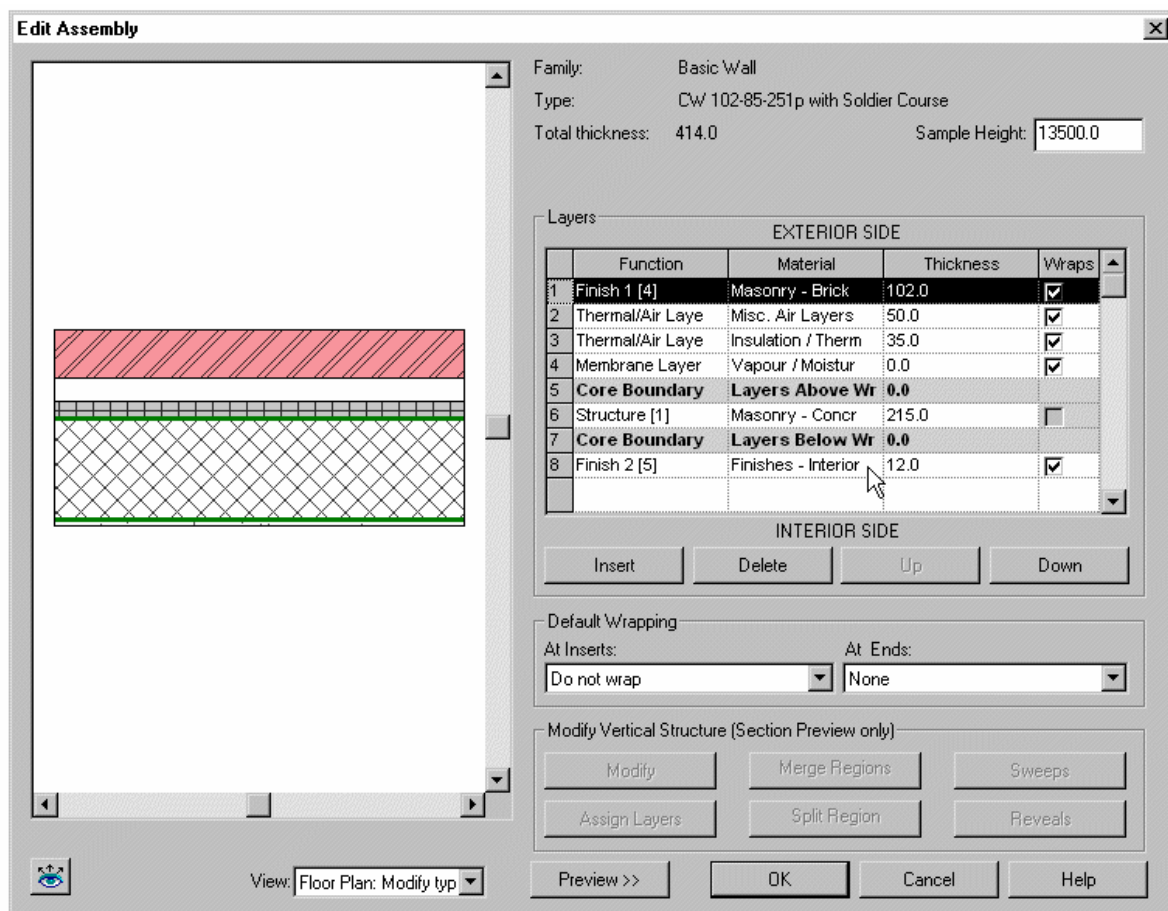
37. Enter *CW 102-85-215p with Soldier Course* for the Name and click OK.

38. Under the Value column for Structure, click Edit.

39. Enter **13500** for Sample Height.

The sample height is the height of the wall in the preview pane. You can specify the sample height to any value you want, but you should specify a value high enough to allow you to create the desired wall structure. The sample height does not determine the height of any walls in the project.

40. In the lower left corner of the Edit Assembly dialog box, click <<Preview.

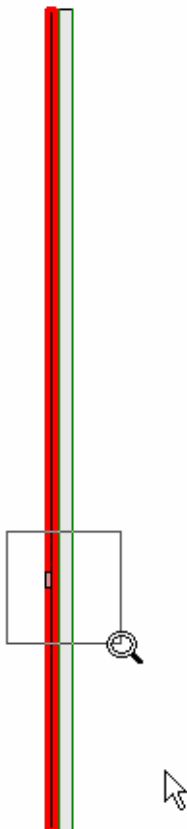


Because you are not in a view that allows the vertical modification of the wall structure, the tools under Modify Vertical Structure are inactive.

41. Below the Preview Pane, select Section: Modify type attributes for View.
42. Under Modify Vertical Structure, click Sweeps.
43. Click Add.
44. In the Wall Sweeps dialog box, make the following modifications:
 - Select M_Wall Sweep-Brick Soldier Course: 2 Bricks for Profile.
 - Select Masonry - Brick Soldier Course for Material, and click OK.
 - Enter 4000 mm for Distance.
 - Verify that Bottom is selected for From.
 - Verify that Exterior is selected for Side.
 - Enter -50.0 mm for Offset.

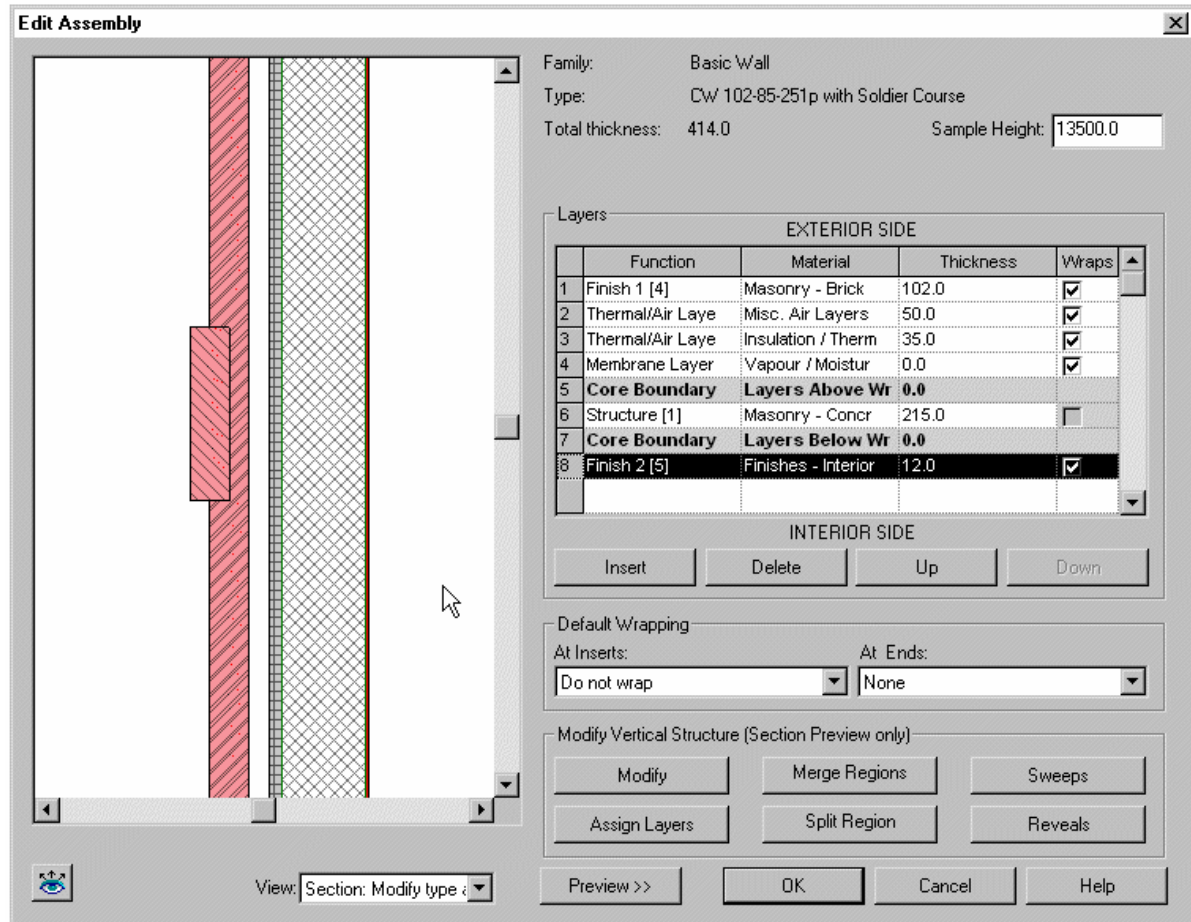
Ensure that the offset is negative.

45. Click OK.
46. Right-click in the preview area, click Zoom in Region, and draw a region around the soldier course.



47. Under Layers, select the bottom layer. This should be the interior finish layer.

When you select a layer, the corresponding layer is highlighted in the preview area. By selecting the interior finish layer, the soldier course displays more distinctly within the exterior finish layer.



48. Click Sweeps.

49. Click Add.

This creates a second wall sweep.

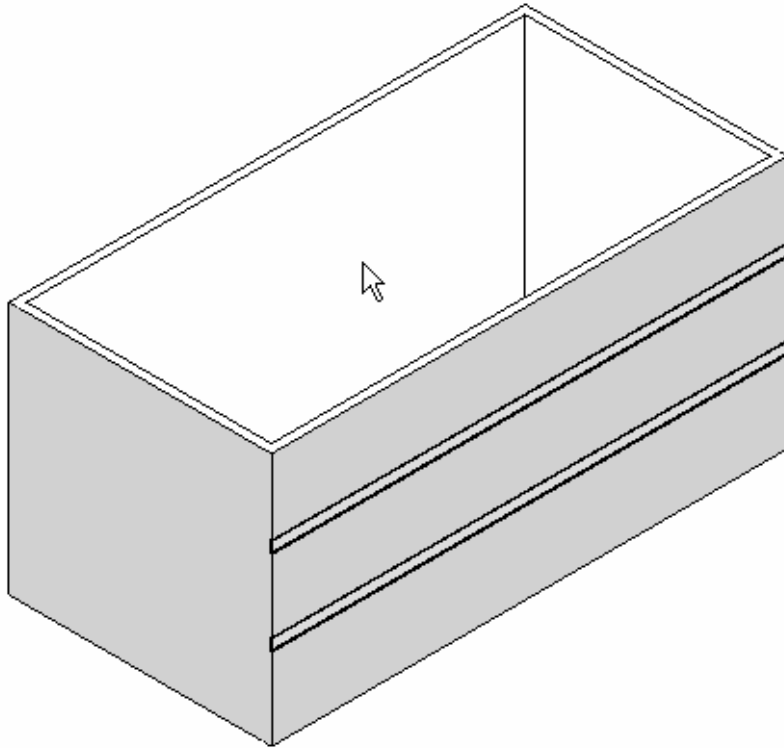
50. For the second wall sweep, modify the settings as follows:

- Select M_Wall Sweep-Brick Soldier Course: 2 Bricks for Profile.
- Select Masonry - Brick Soldier Course for Material, and click OK.
- Enter 8000 mm for Distance.
- Verify that Bottom is selected for From.
- Verify that Exterior is selected for Side.
- Enter -50.0 mm for Offset.

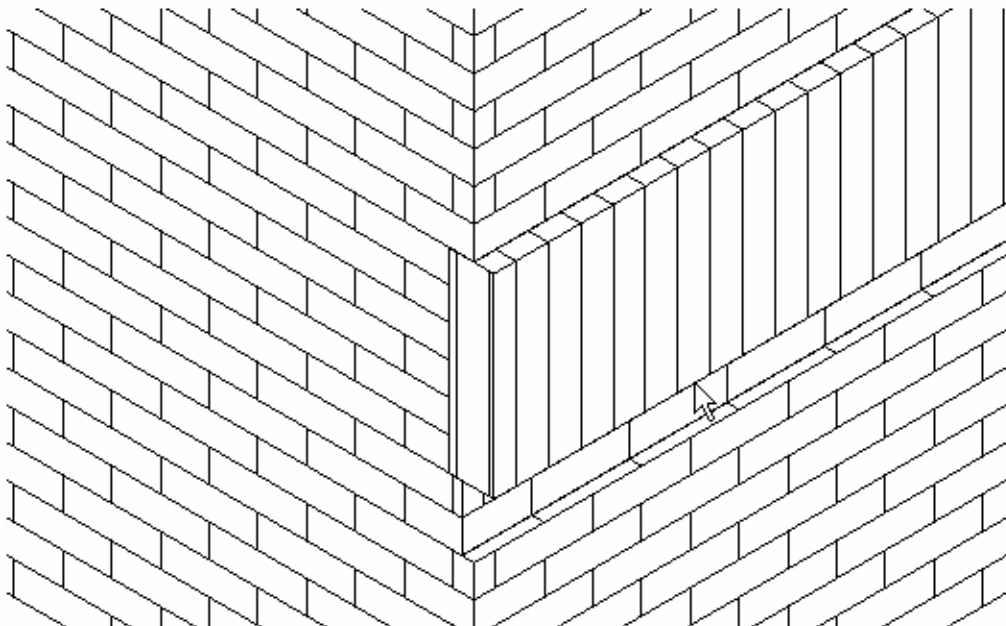
Ensure that the offset is negative.

51. Click OK.
52. Under Vertically Modify Structure, click Reveals.
53. Click Add.
54. Specify the reveal parameters:
 - Select M_Reveal-Brick Course: 2 Bricks for Profile.
 - Enter 4000 mm for Distance.
 - Verify that Bottom is selected for From.
 - Verify that Exterior is selected for Side.
 - Enter 0 mm for Offset.
 - Select Flip.
55. Click Apply.
56. Click Add.
57. Specify the parameters for the second reveal:
 - Select M_Reveal-Brick Course: 2 Bricks for Profile.
 - Enter 8000 mm for Distance.
 - Verify that Bottom is selected for From.
 - Verify that Exterior is selected for Side.
 - Enter 0 mm for Offset.
 - Select Flip.
58. In the Reveal dialog box, click OK.
59. In the Edit Assembly dialog box, click OK.
60. In the Type Properties dialog box, click OK.

61. In the Element Properties dialog box, click OK.



62. On the View menu, click Zoom - Zoom in Region and draw a region around the corner that includes the sweeps and reveals.



63. Enter **SD**, which is the shortcut key for Shading with Edges.

64. Enter **ZF**.

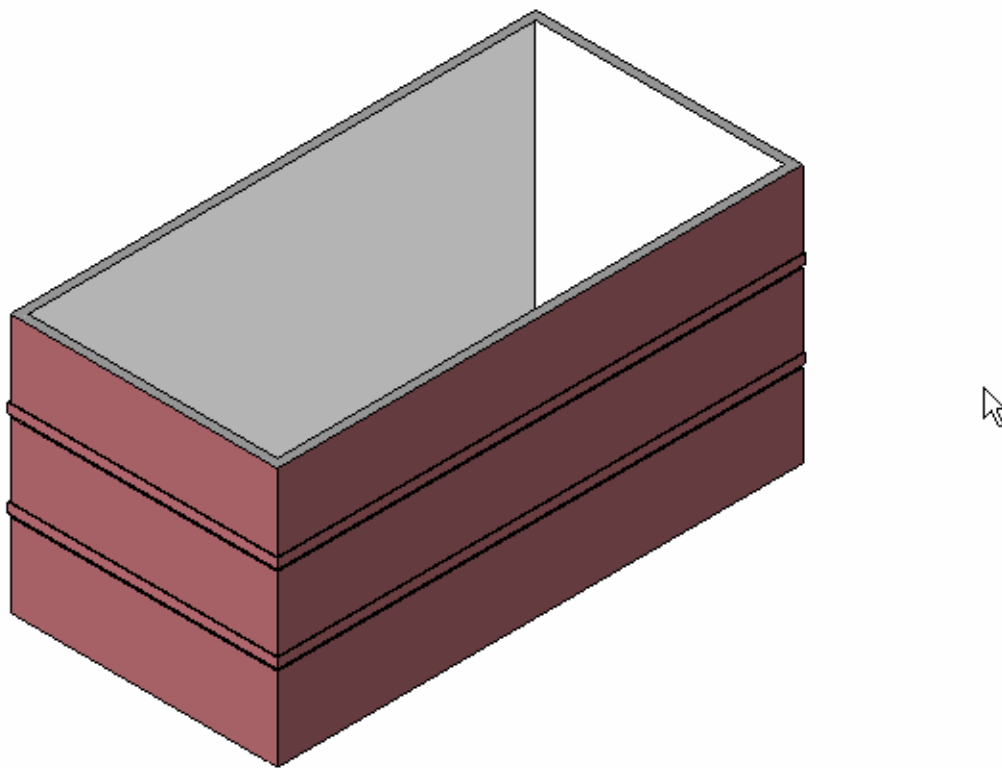
65. Select the three walls that are still the original wall type. They do not have sweeps or reveals.

Tip: To select multiple components, press and hold the CTRL key while you select.

66. In the Type Selector, choose Basic Wall: CW 102-85-215p with Soldier Course.

67. On the Design Bar, click Modify.

Notice that, after the new wall type is applied, the corners of the sweeps and reveals wrap automatically.



68. On the File menu, click Save.

You have completed the exterior walls of the west wing. In the following exercise, you add the interior walls for this wing.