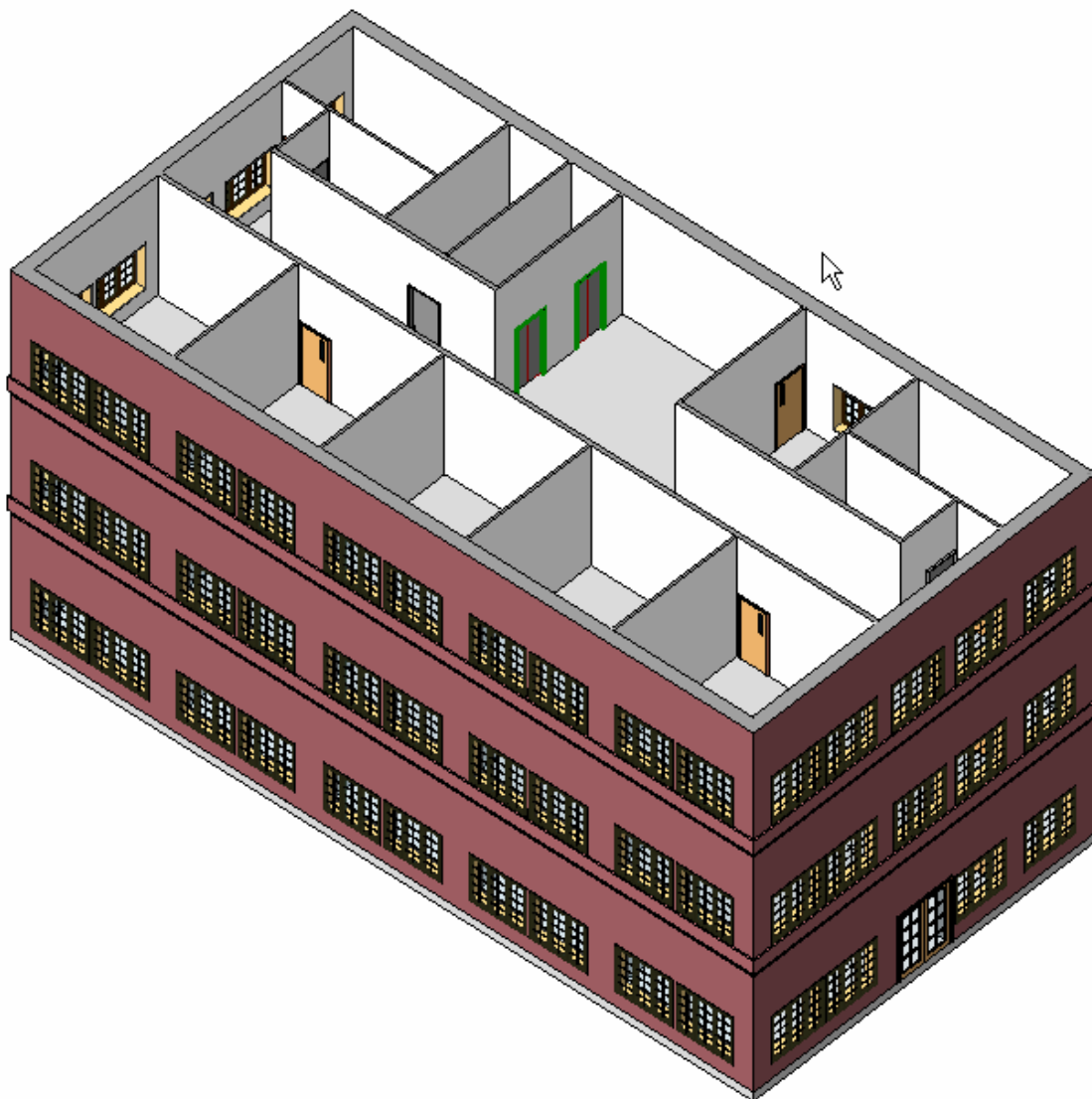


5 - Adding Floors and Floor Openings

In this exercise, you add sketched components to the building model. Floors, roofs, and ceilings are examples of sketched components, and all require their borders to be sketched. When sketching these components, you can select walls to define the border of the component. You can also select or draw lines. Like walls, each of these components can have a compound structure. When walls intersect a floor, roof, or ceiling, the respective layers interact according to the functional assignment within the Edit Assembly dialog box.

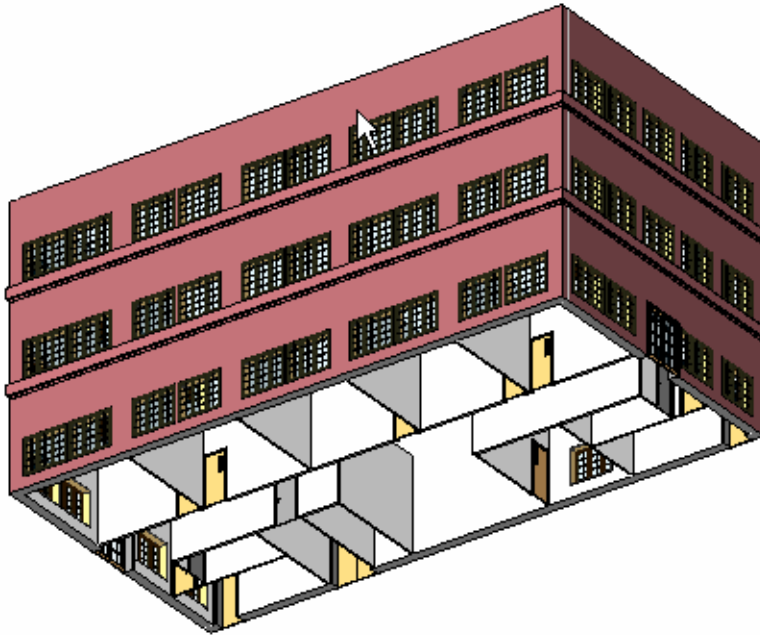
In this exercise, you first add a simple floor to Level 1. You add a more complex floor type to levels 2 and 3, where three openings are required for the stairs and elevators. You also add elevators and plumbing components to the building model.



This exercise requires the completion of the previous four exercises in this tutorial. You must use the project you saved at the end of the last exercise.

Add a floor to Level 1

1. On the View toolbar, click. 
2. On the View toolbar, click. 
3. Spin the model and observe that floors are needed throughout the building model.



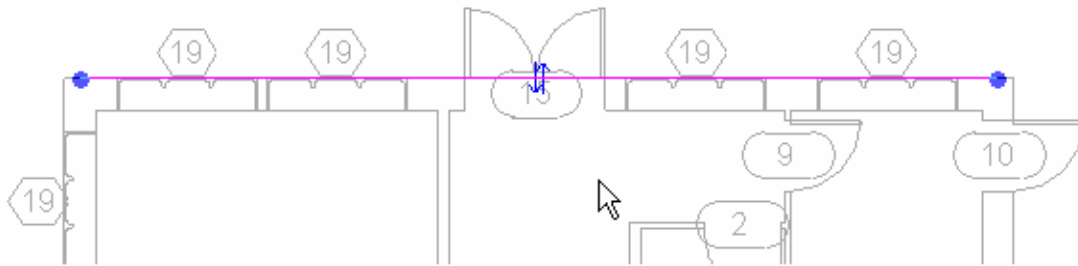
4. In the Project Browser, expand Views (all), expand Floor Plans, and double-click Level 1.
5. On the Basics tab of the Design Bar, click Floor.

You are in sketch mode. The Design Bar now has only one tab, Sketch. When in sketch mode, you must either finish or quit in order to access other design modes. In addition, the building model becomes an underlay until you finish the floor sketch.

6. Verify that Pick Walls is selected.
7. On the Options Bar, clear Extend into wall (to core).

8. Click the north exterior wall.

A magenta line displays with flip arrows.



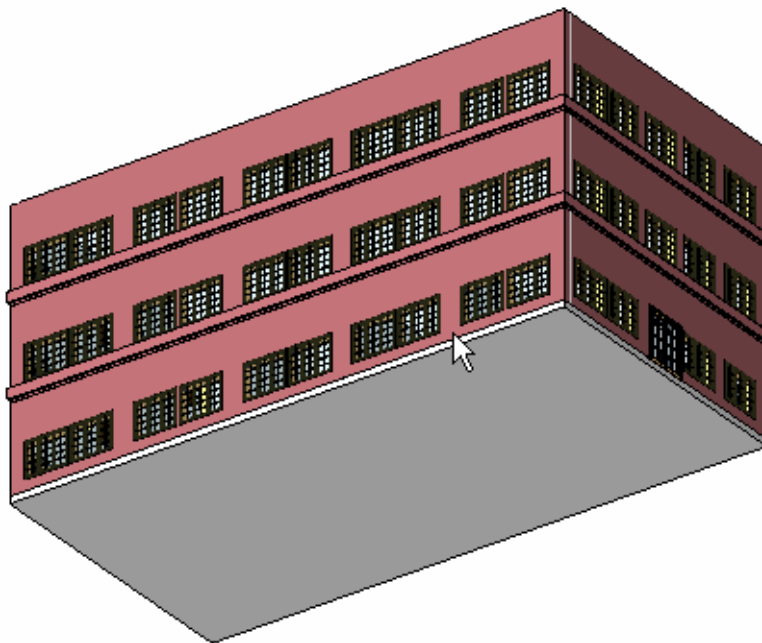
9. If the magenta line is not on the exterior face of the north exterior wall, click the flip arrows to flip the line.

You can click the flip arrows to move the floor boundary to either the interior or exterior face of a wall.

10. Select the three remaining exterior walls.
11. On the Sketch tab of the Design Bar, click Floor Properties.
12. Select Concrete 300 mm for Type, and click OK.
13. On the Sketch tab of the Design Bar, click Finish Sketch.

On the View toolbar, click. 

Notice that the floor on Level 1 extends to the exterior face of the walls.

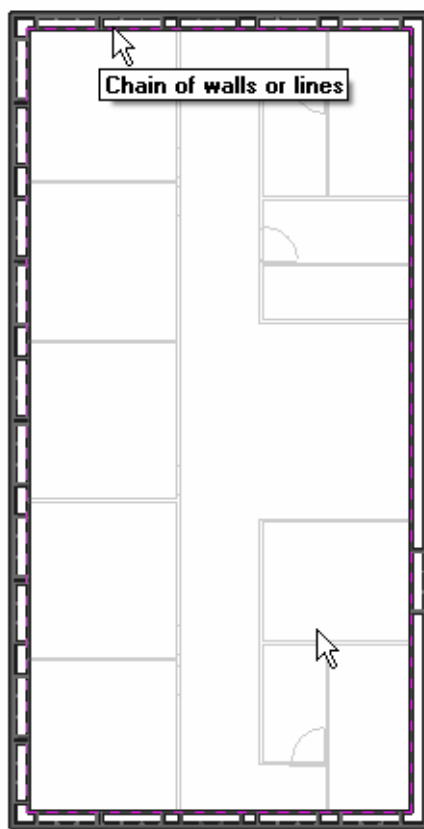


Add a floor to Level 2

15. In the Project Browser under Floor Plans, double-click Level 2.

In this view, the interior walls on Level 1 display as an underlay. The windows are not tagged because you did not add them within this view.

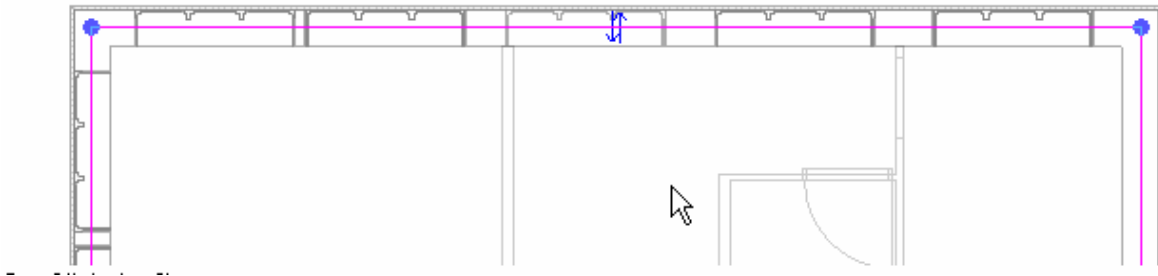
16. On the Basics tab of the Design Bar, click Floor.
17. On the Options Bar, verify that Extend into wall (to core) is selected.
18. Place the cursor over the north exterior wall and, when it highlights under the cursor, press TAB, and, when the chain of walls highlights, click to select it.



You can use TAB to select a chain of walls or lines at any time.

19. Zoom in on the north exterior wall.

Notice the location of the magenta line.



20. Click the flip arrows.

The line flips to each face of the core rather than the interior and exterior wall face.

21. Use the flip arrows to place the magenta line on the exterior face of the core.
22. On the Sketch tab of the Design Bar, click Floor Properties.
23. Select Beam and Block 200 mm for Type, and click OK.
24. Click Finish Sketch.

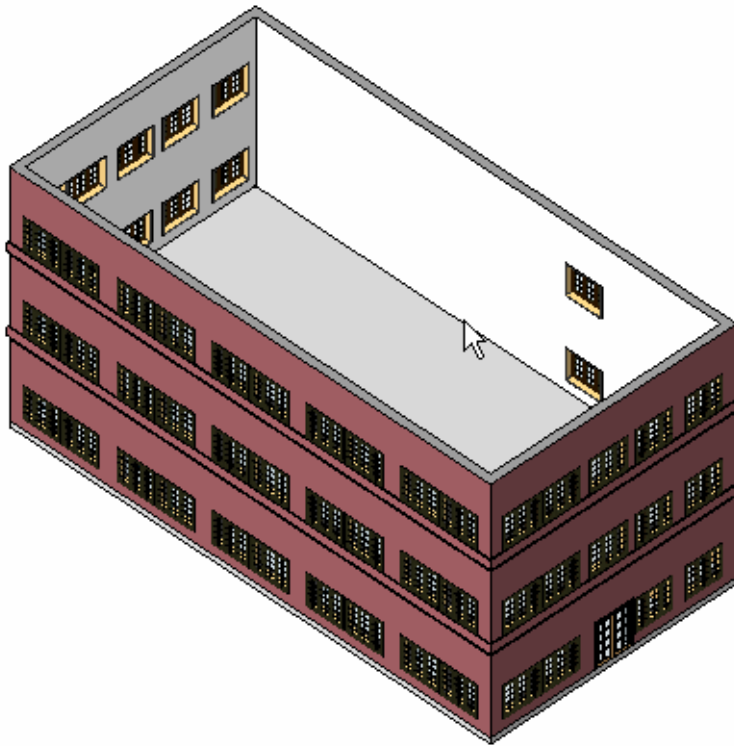
A message is displayed, asking if you want the walls that go up to this floor to attach to it. The interior walls of the building model are displayed in red, indicating that they are not attached to the floor. Attaching the walls ensures that if you change the floor elevation, the walls remain attached.

25. Click Yes.
26. A message displays asking if you want to join geometry and cut the overlapping volume out of the walls. This occurs because the structural layers of the floor must cut through the interior finish layer of the wall in order to extend to the wall core
27. Click Yes to join geometry and cut out the overlapping volume.

The structural layers of the floor must cut through the interior finish layer of the wall in order to extend to the wall core.

28. On the View toolbar, click. 
29. On the View toolbar, click. 

30. Spin the model and observe the new floor on Level 2.



Next, you add elevators and plumbing components on Level 1.

Add elevators and bathroom components

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

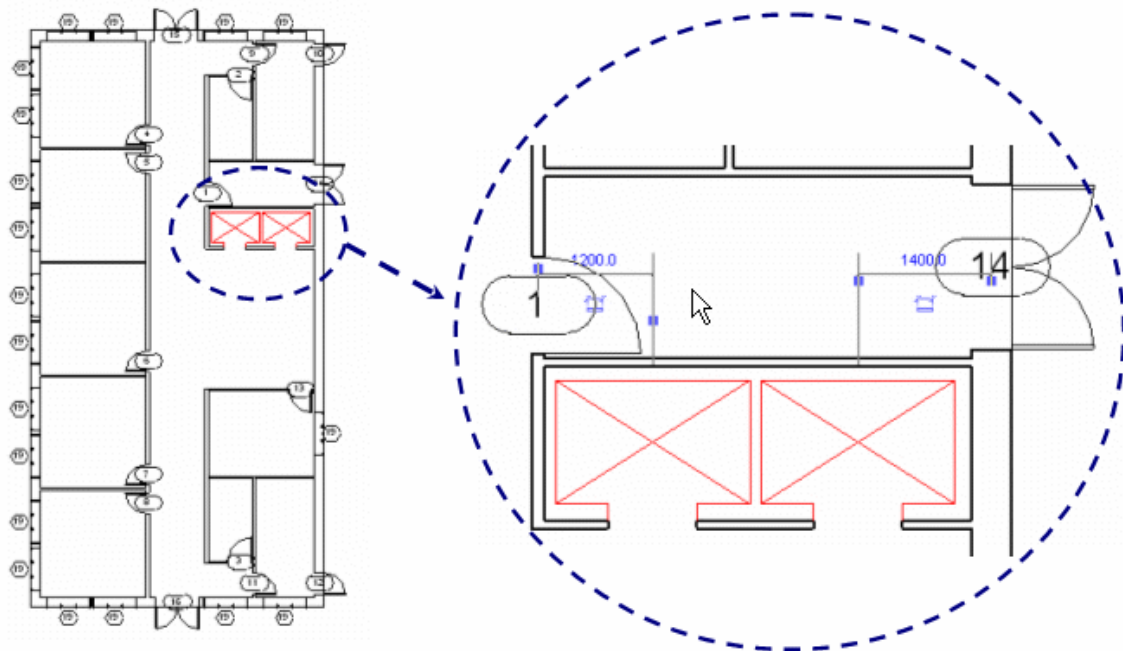
You can save time by adding the bathroom components and elevators now, and then including the components when you use the paste aligned command.

32. On the Basics tab of the Design Bar, click Component.

33. In the Type Selector, select m_Elevator Center: 2032mm x 1295mm.

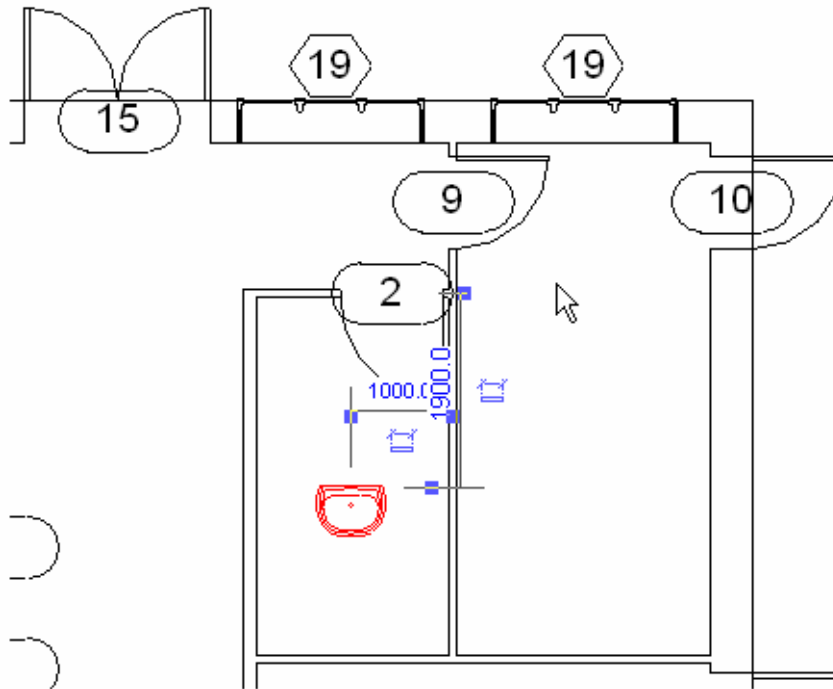
These elevators are wall-hosted components.

34. Add two elevators in the centre room on the right side of the building model, as shown. To do this, position the cursor on the wall, move the elevator into position, and click to place it.



35. On the Basics tab of the Design Bar, click Modify.
36. Zoom in to the upper right corner.
37. On the Basics tab of the Design Bar, click Component.
38. In the Type Selector, select m_Pedestal Sink-3D: Pedestal Sink.

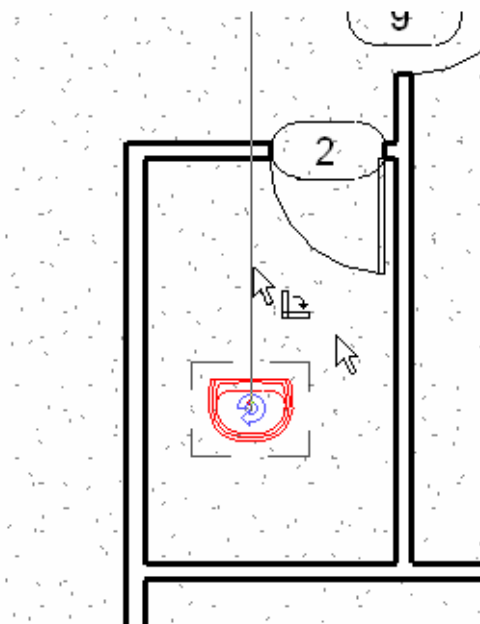
39. Add the sink to the centre of the room, as shown.



40. On the Basics tab of the Design Bar, click Modify.
41. Select the sink.
42. On the Edit menu, click Rotate.

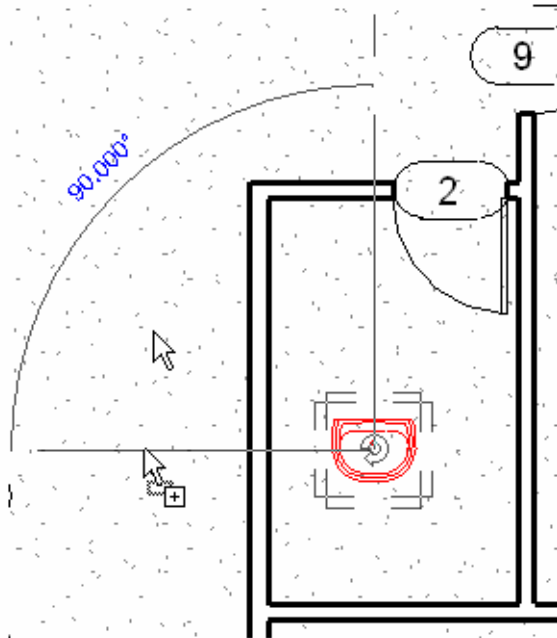
Rotating an object requires two clicks, with the first specifying the rotation start point and the second specifying the rotation endpoint.

43. Place the cursor north of the sink and click to set the rotation start point.

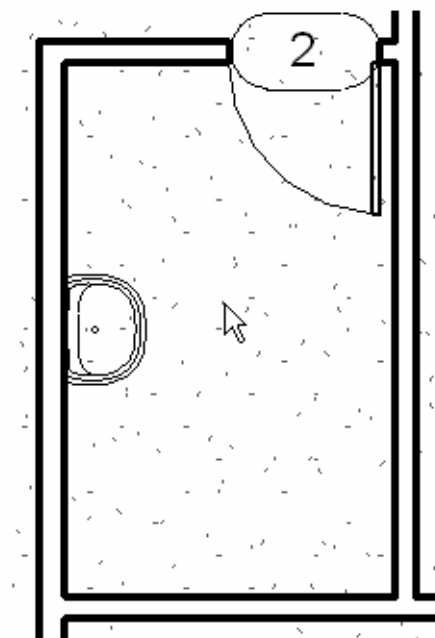


44. Move the cursor 90 degrees to the left and click to set the rotation end point.

Once you establish the rotation direction, you can enter the angle value and press ENTER to specify the final rotation point.

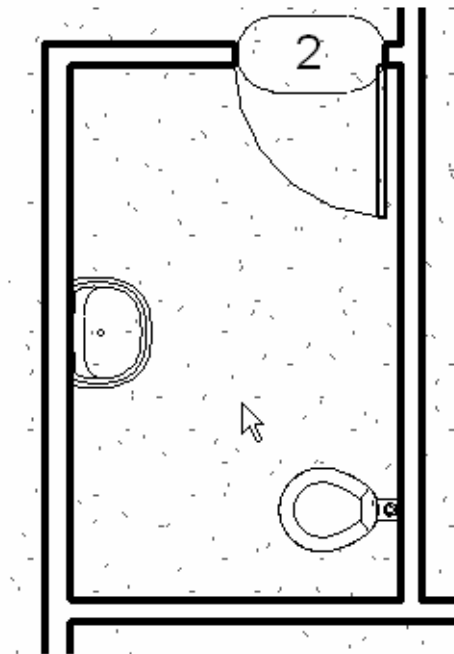


45. Drag the sink until it snaps to the left wall face.

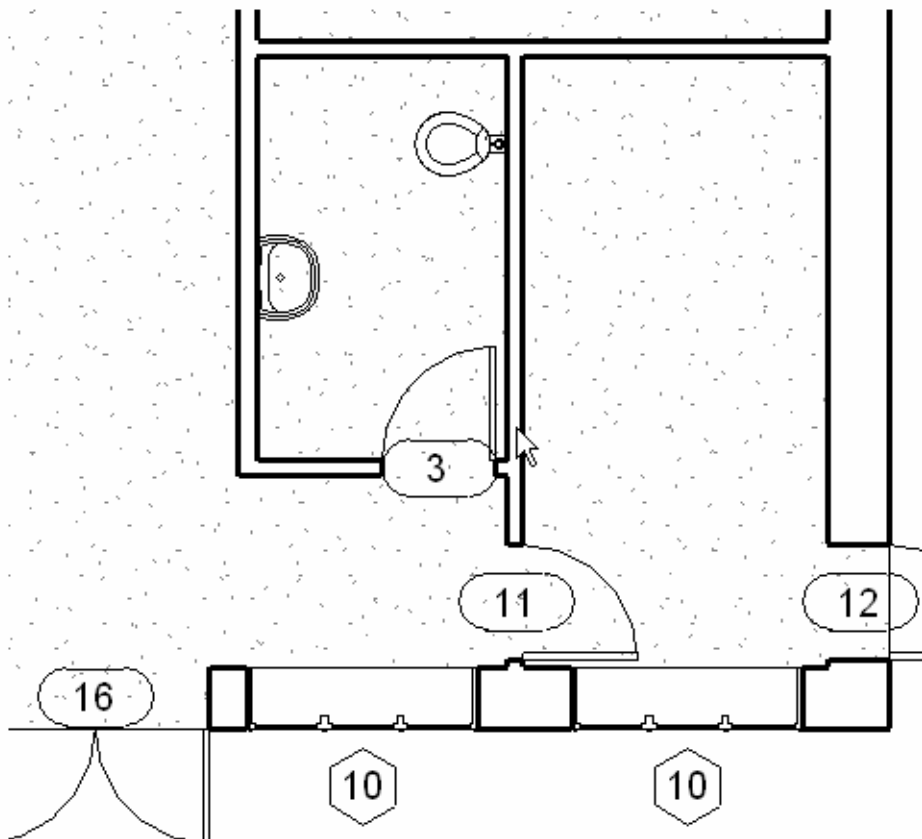


46. On the Basics tab of the Design Bar, click Component.
47. In the Type Selector, select M_Toilet-Commercial-Wall-3D: 480 mm Seat Height.

48. Add the toilet on the right wall, as shown.



49. Use the same procedure to add a toilet and sink in the similar room at the lower right of the building model.

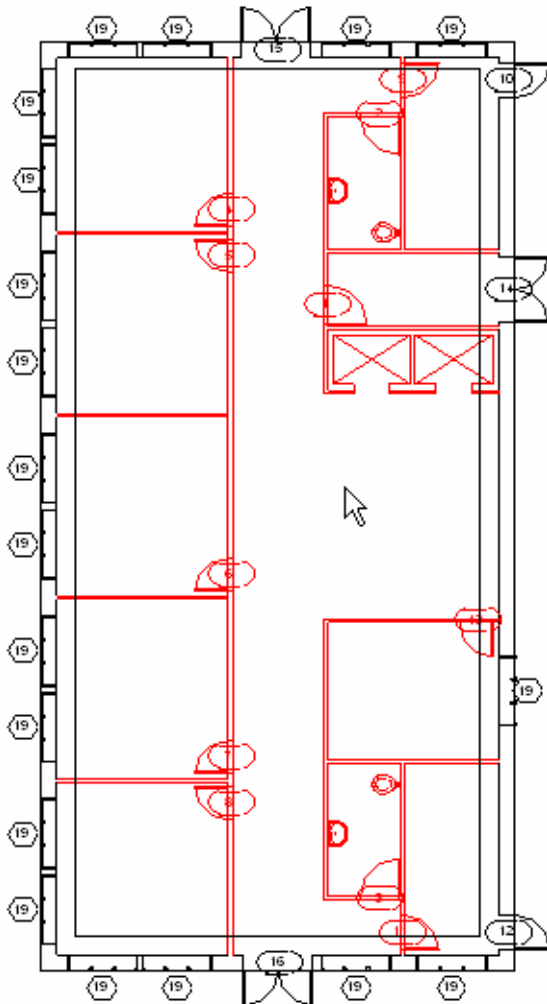


Before adding the final floor, the interior walls and doors can be paste aligned to Levels 2 and 3. In addition, you must add the openings for the stairwells and the elevators.

Paste align walls

50. In an empty space in the drawing area, right-click, and click Zoom To Fit.
51. On the Basics tab of the Design Bar, click Modify.
52. Draw a crossing pick box beginning inside the upper-right corner of the building model and extending to the inside of the lower-left corner. (Do not include the exterior walls in the selection.)

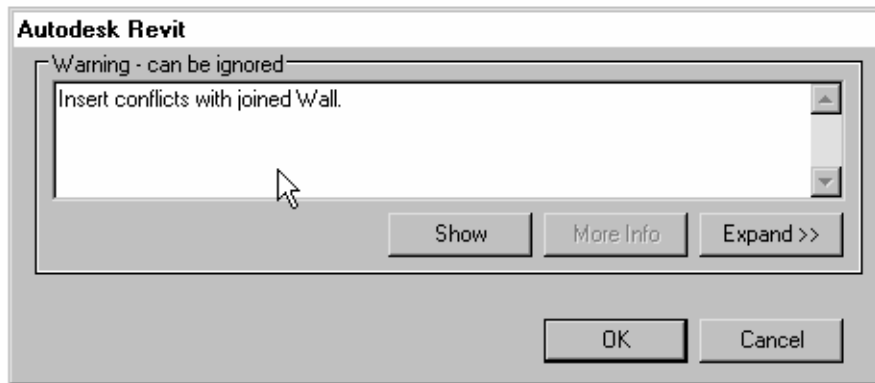
This captures all of the internal walls, doors, and components.



53. On the Options Bar, click. 
54. Clear Door Tags, and click OK.
55. On the Edit menu, click Copy to Clipboard.

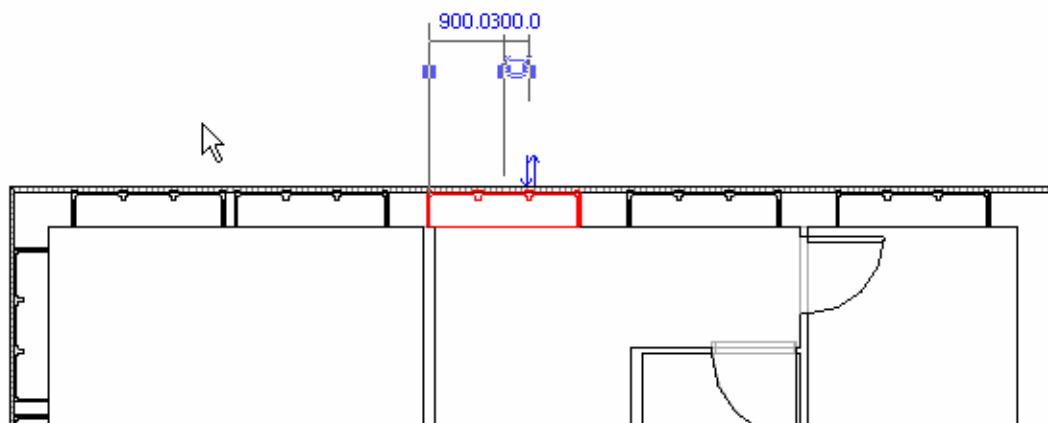
56. On the Edit menu, click Paste Aligned - Select Levels by Name.
57. Select Level 2, and click OK.

Depending on the exact placement of the windows you added in the north and south elevation views, a message might be displayed stating that the new walls conflict with an existing insert.

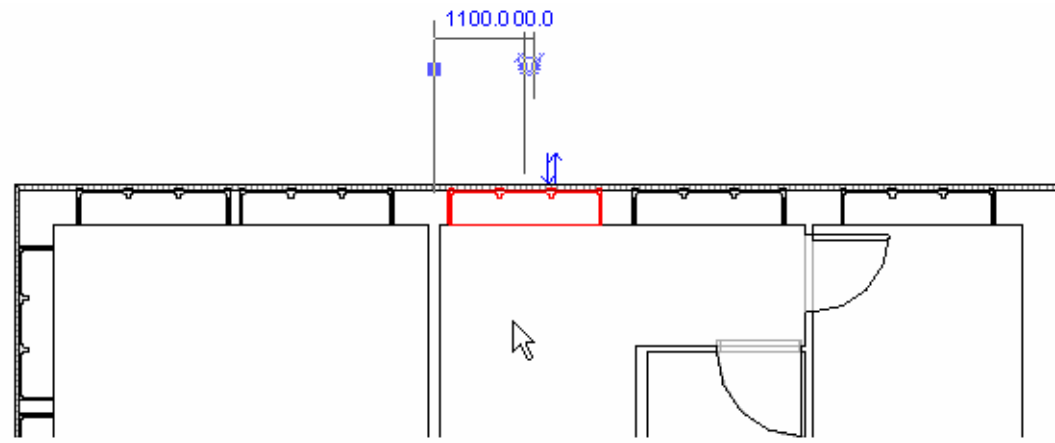


Conflict warnings alert you to problems in your layout. You can click OK to ignore the warning, and then resolve the layout problem.

58. Click OK.
59. In the Project Browser under Floor Plans, double-click Level 2.
60. If you received the conflict message, zoom in to the north exterior wall and notice that the centre window conflicts with the left wall of the corridor.



61. Correct the problem by moving the window away from the corridor wall.

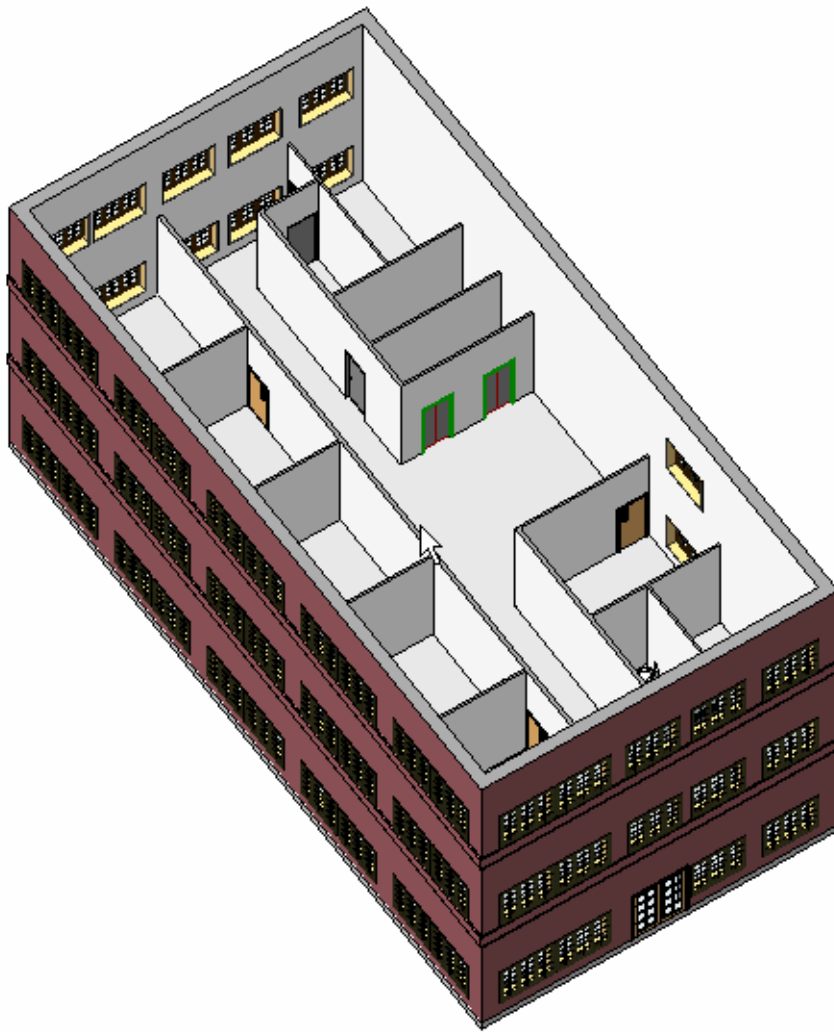


62. Check the south exterior wall for the same problem and correct it, if necessary.

63. On the View toolbar, click. 

64. On the View toolbar, click. 

65. Spin the model so you can see the interior walls and components on level 2.



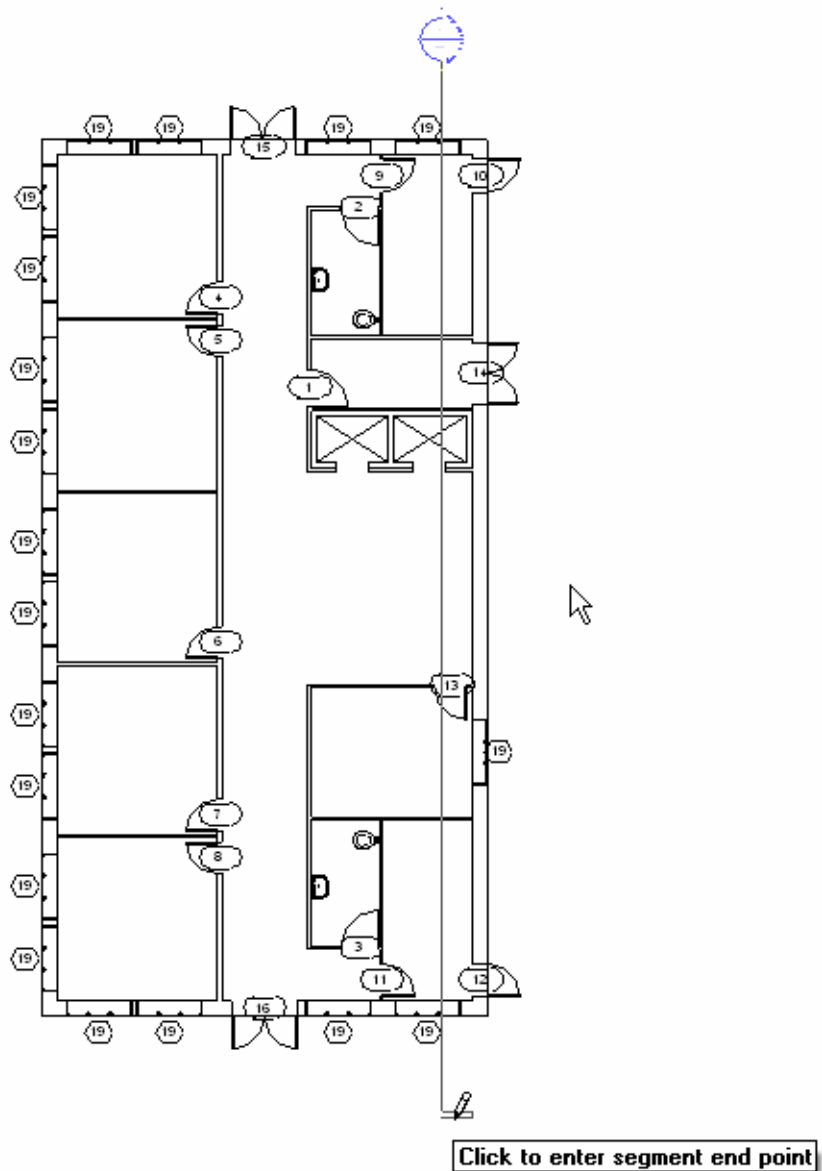
Add openings in the floor for vertical penetrations

When you add an opening, you are prompted to select the floor, roof, or ceiling in which you want the opening. Therefore, it is a good idea to create a view that makes the selection process more precise.

66. In the Project Browser under Floor Plans, double-click Level 1.
67. In an empty space in the drawing area, right-click, and click Zoom To Fit.
68. On the Basics tab of the Design Bar, click Section.

Adding a section is a two-click process. The first click specifies the section head, and the second click specifies the section tail. After you add the section, you can flip the view direction and modify the extents of the view.

69. Place the cursor over the upper right corner of the building model, click to set the start point, move the cursor down and click just below the south exterior wall.



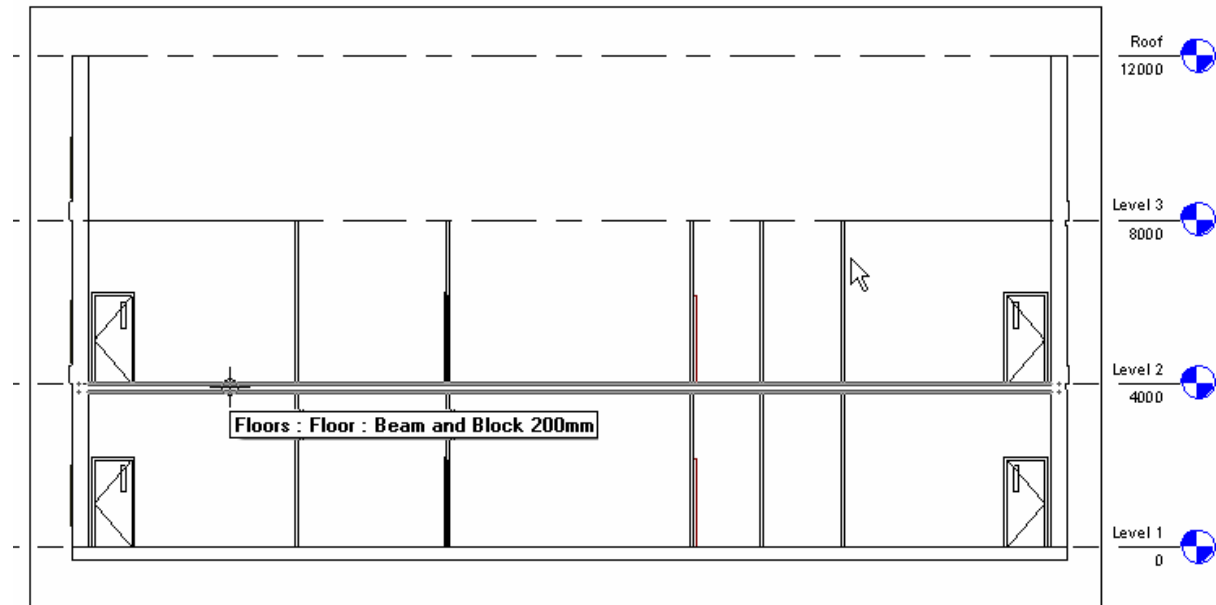
70. Click the flip arrows to change the direction of the view towards the interior.

[illegible]

The section head is displayed in blue, just as the level heads do in an elevation view. Similarly, the section heads are linked directly to the view so that if you double-click the section head, the referenced view opens.

This view offers easy accessibility to all floors as well as the stairwells on the left and right.

74. On the Modelling tab of the Design Bar, click Opening.
75. In the Opening Placement Options dialog box, select Pick a roof, floor, or ceiling and cut vertically, and click OK.
76. Place the cursor over the level 2 floor and, when it highlights, select it.

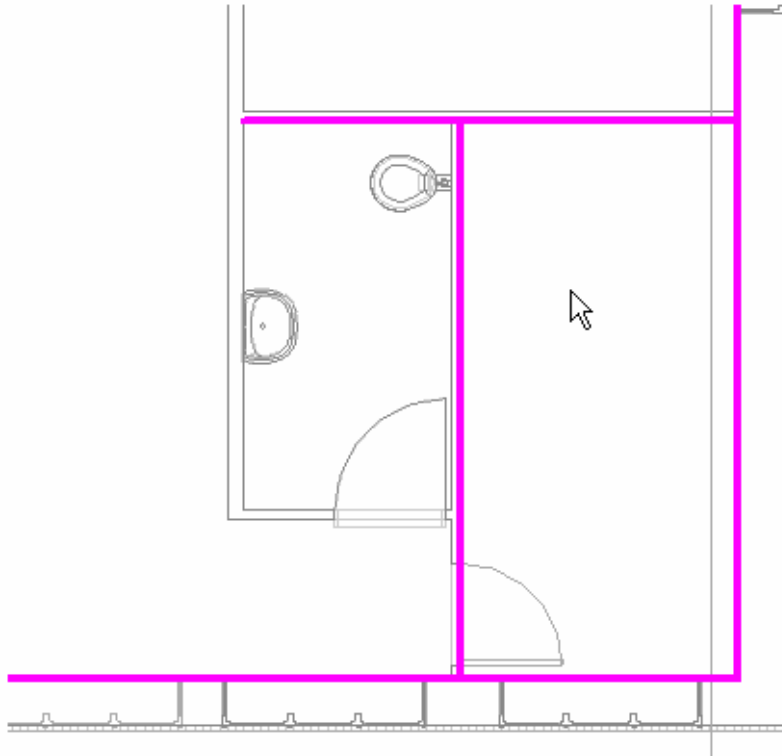


77. In the Go to View dialog box, select Floor Plan: Level 2, and click Open View.
78. Zoom in on the stairwell in the lower right corner.
79. On the Design Bar, click Lines.
80. On the Options Bar, click and the Lock option.

Using the pick and lock ensures that the opening moves with the selected walls.

81. Select the inside face of each wall within the stairwell.

In the following illustration, the sketch lines have been enhanced for training purposes.

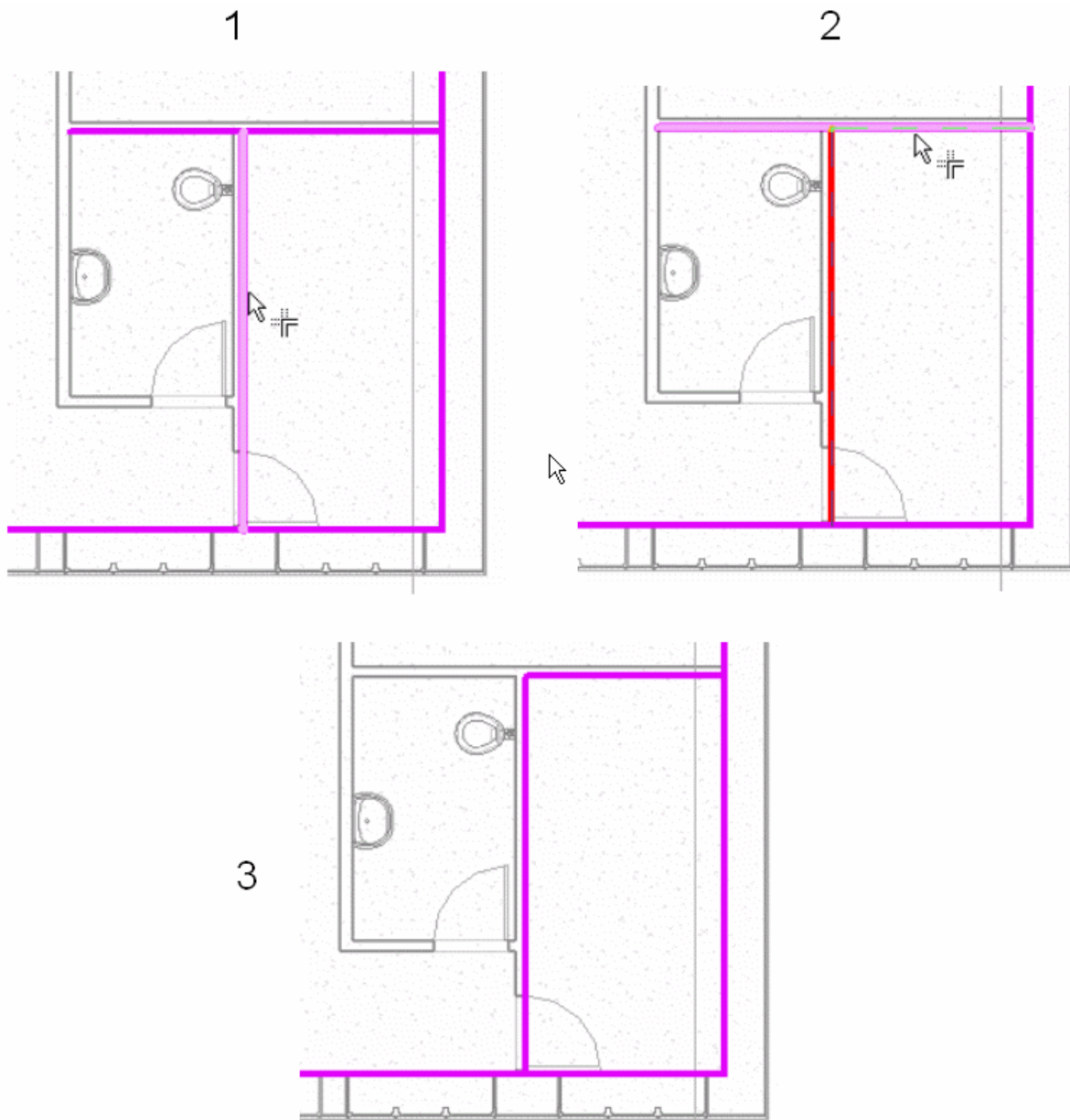


When sketching an opening, you must have a closed loop. Also, you cannot have intersections like the ones shown in the illustration above.

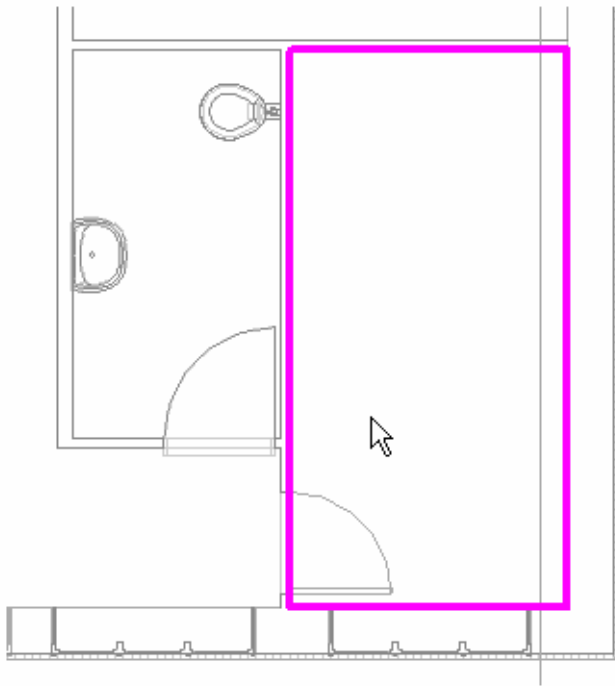
82. On the Tools menu, click Trim/Extend.

When using the Trim/Extend tool to clean up corners, select the portions of the lines that you want to keep, and the excess is automatically deleted.

83. Trim the upper left corner of the opening by first selecting the left vertical line and then selecting the top horizontal line.



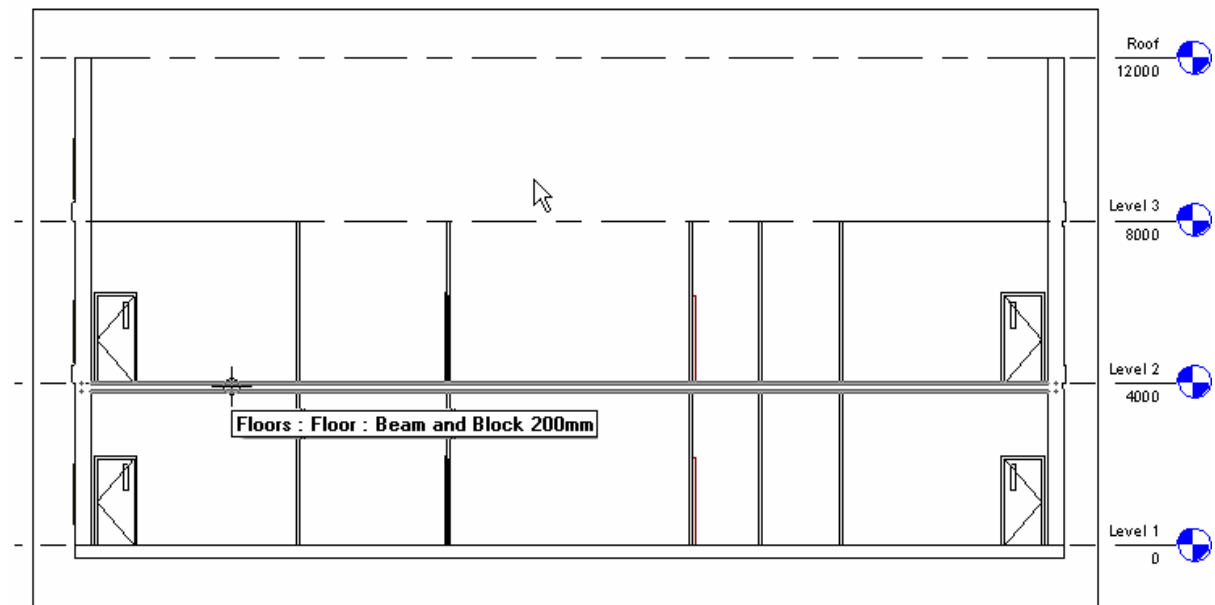
84. Trim the remaining corners using the same technique.



Note: Although the opening could account for the stair landings at this point, it is often easier to add the stairs first and then modify the opening precisely to the location of the stairs. The modification of the opening is done for you in a dataset used later in this tutorial.

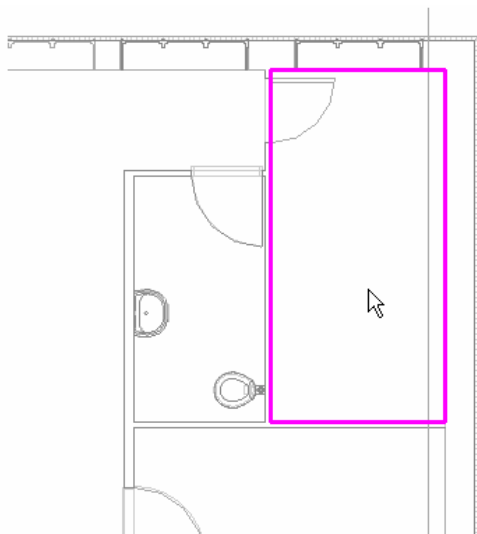
85. On the Design Bar, click Finish Sketch.
86. In the Project Browser, under Views (all), under Sections, double-click Section 1.
87. On the Modelling tab of the Design Bar, click Opening.
88. In the Opening Placement Options dialog box, select Pick a roof, floor, or ceiling and cut vertically, and click OK.

89. Place the cursor over the level 2 floor and when it highlights, select it.



90. In the Go to View dialog box, select Floor Plan: Level 2, and click Open View.
91. Zoom to the stairwell in the upper right corner.
92. On the Design Bar, click Lines.
93. On the Options Bar, click  and the Lock option.
94. Select the four walls bordering the north stairwell and trim the corners using the techniques learned in the previous steps.

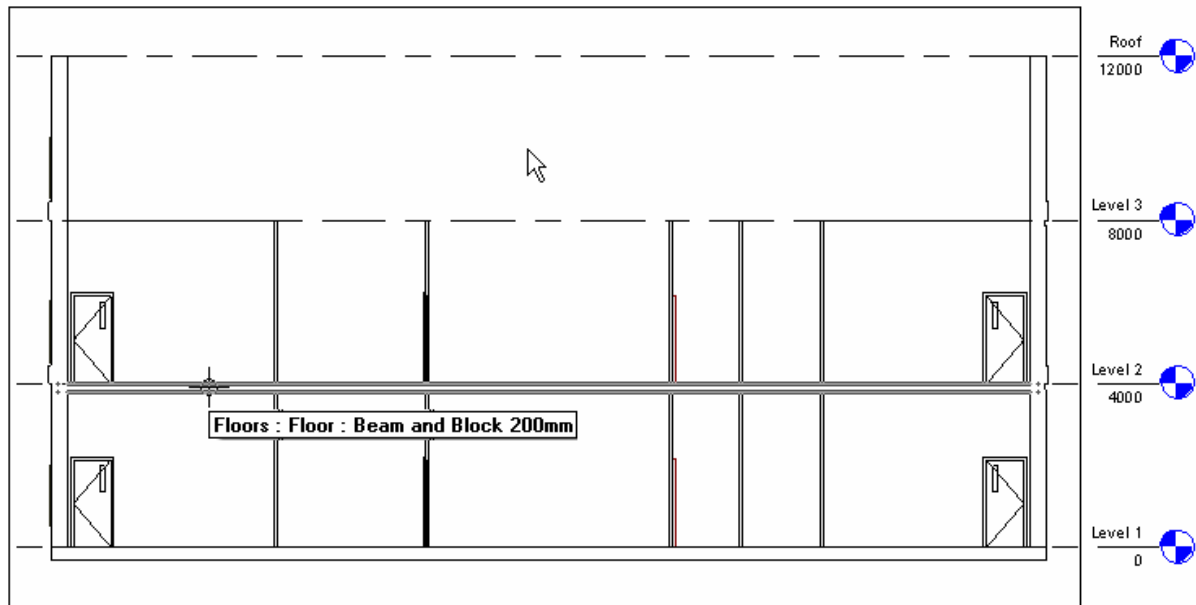
In the following illustration, the sketch lines are enhanced for training purposes.



95. Click Finish Sketch.

Add an opening for the elevators

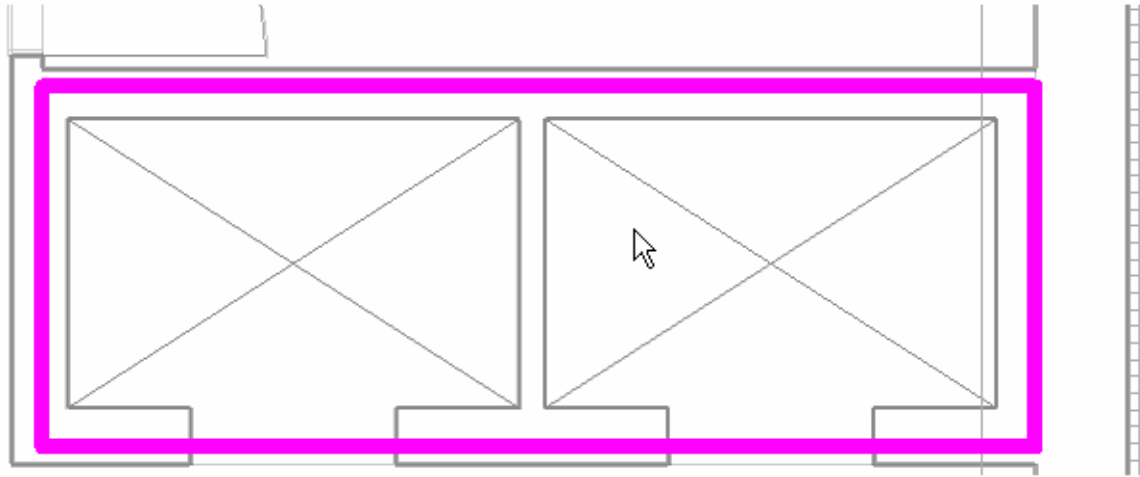
96. In the Project Browser under Sections, double-click Section 1.
97. On the Modelling tab of the Design Bar, click Opening.
98. In the Opening Placement Options dialog box, select Pick a roof, floor, or ceiling and cut vertically, and click OK.
99. Place the cursor over the level 2 floor and, when it highlights, select it.



100. In the Go to View dialog box, select Floor Plan: Level 2, and click Open View.
101. Zoom in to the elevators.
102. On the Options Bar, click  and the Lock option.

103. Select the four walls bordering the elevators and trim the corners using the techniques learned in the previous steps.

In the following illustration, the sketch lines are enhanced for training purposes.



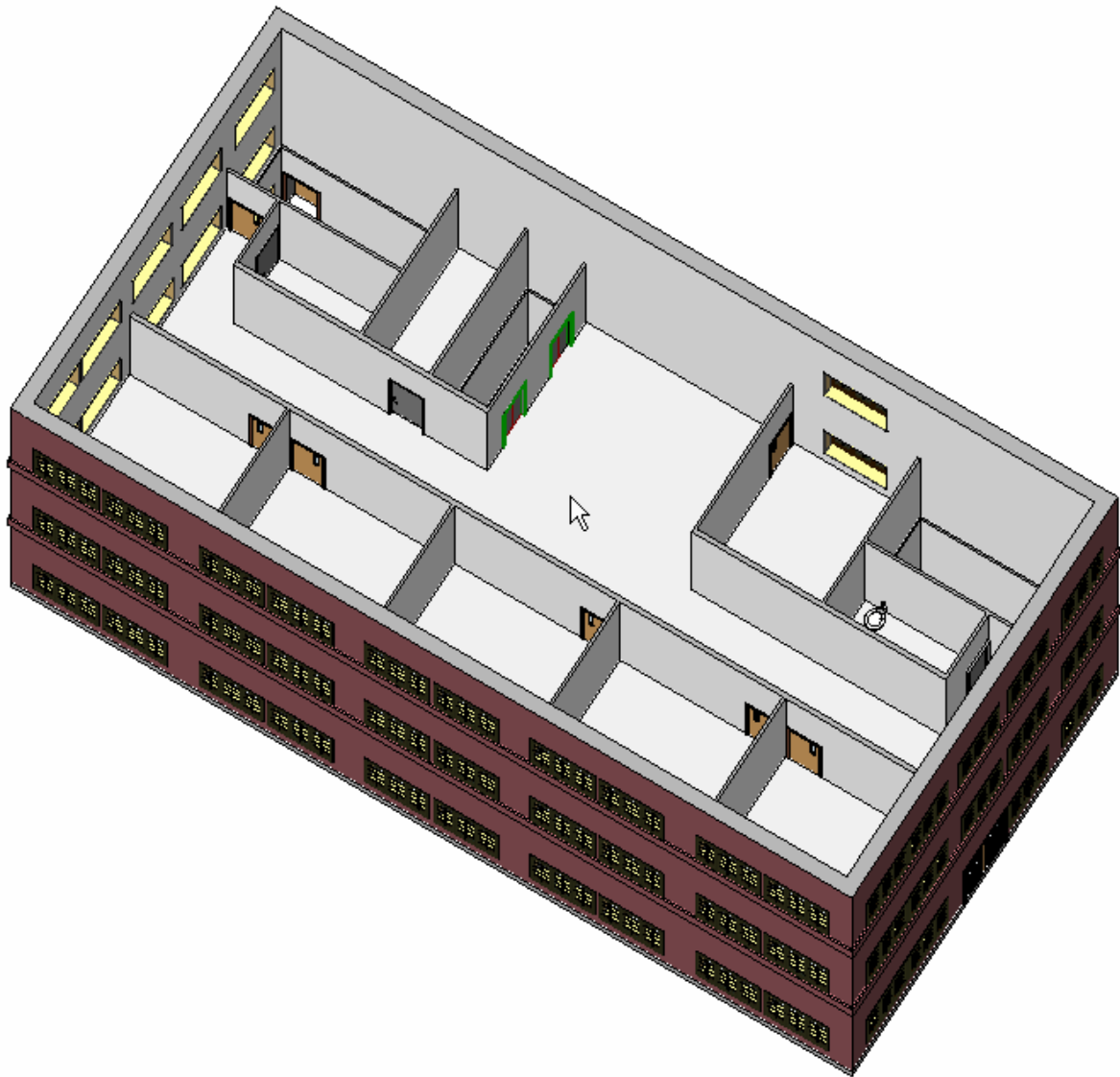
104. Click Finish Sketch.

You have completed the three openings required for this level. After adding a floor to Level 3, you paste align these openings rather than sketch them again.

105. On the View toolbar, click. 

106. On the View toolbar, click. 

107. Spin the model so that you can see the vertical penetrations on level 2.



Add a floor to Level 3

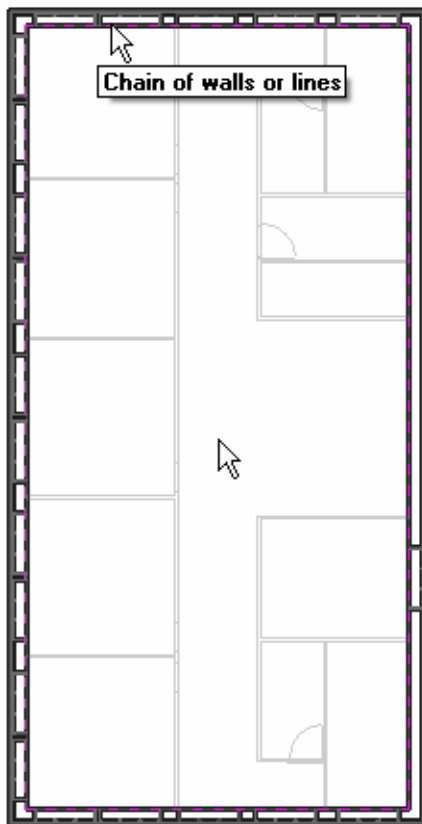
108. In the Project Browser, under Views (all), under Floor Plans, double-click Level 3.

109. Right-click, and click Zoom To Fit.

110. On the Basics tab of the Design Bar, click Floor.

111. On the Options Bar, verify that Extend into wall (to core) is selected.

112. Place the cursor over the north exterior wall and, when the wall highlights under the cursor, press TAB, and, when the chain of walls highlights, click to select it.



113. On the Design Bar, click Finish Sketch.

The floor type you assigned to Level 2 is used for Level 3.

114. Click Yes to attach the walls to the bottom of the floor.

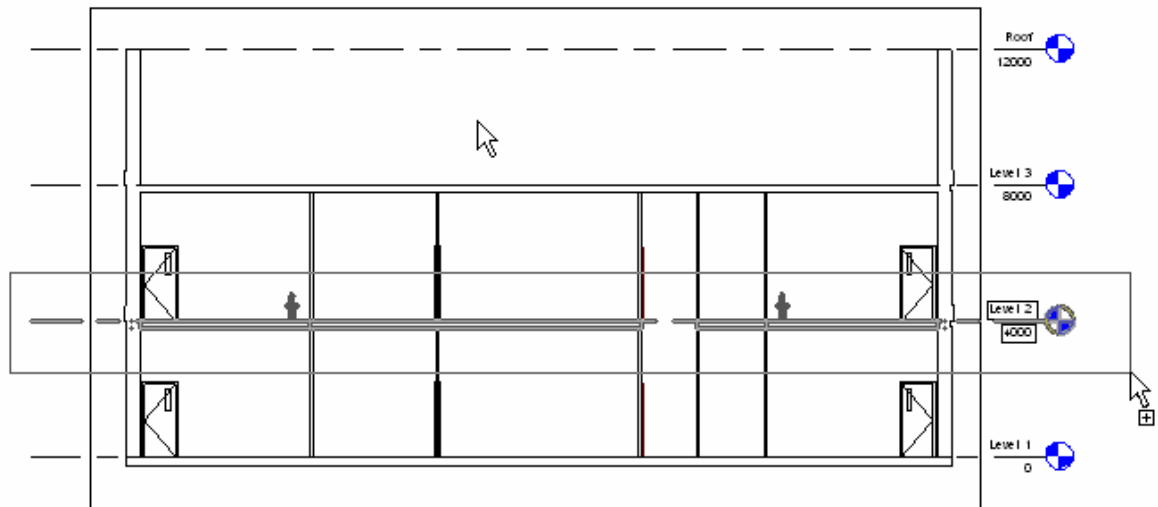
115. Click Yes to join geometry and cut volume.

Copy floor openings to Level 3

116. In the Project Browser, under Views (all), under Sections, double-click Section 1.

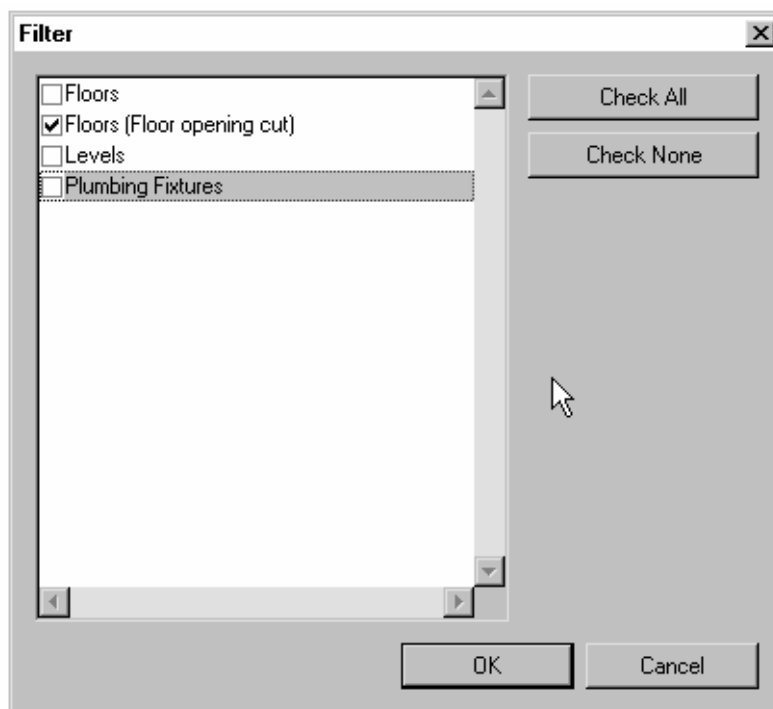
117. On the Basics tab of the Design Bar, click Modify.

118. Draw a pick box around Level 2 so that you capture the three openings you created on Level 2.



119. On the Options Bar, click. 

120. Clear everything except Floors (Floor opening cut), and click OK.

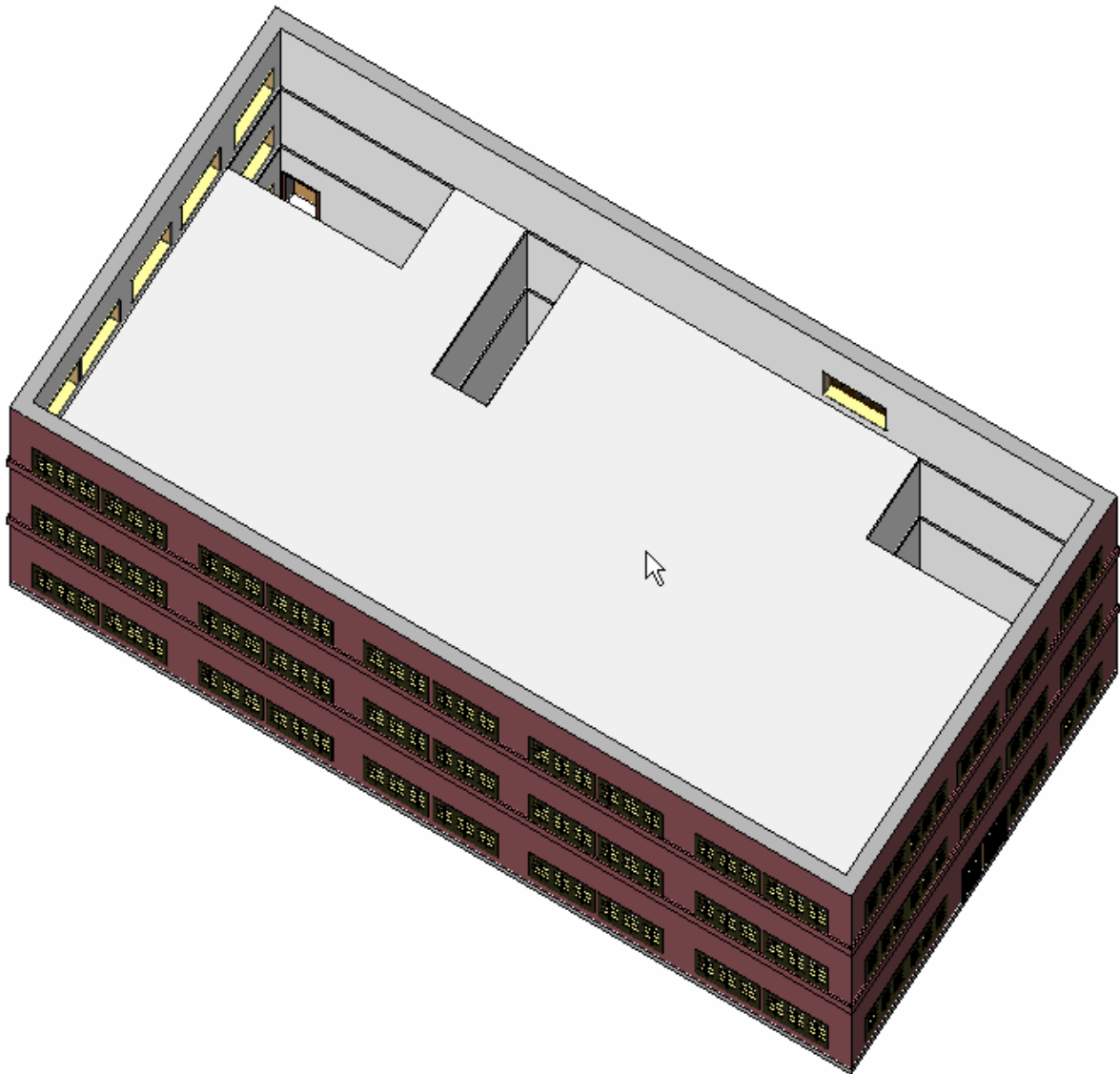


121. On the Edit menu, click Copy to Clipboard.

122. On the Edit menu, click Paste Aligned - Select Levels by Name.

123. Select Level 3 and click OK.

124. On the View toolbar, click. 



The vertical penetrations extend through Levels 2 and 3. The only remaining task is to paste align the Level 2 interior walls, doors, and components to Level 3.

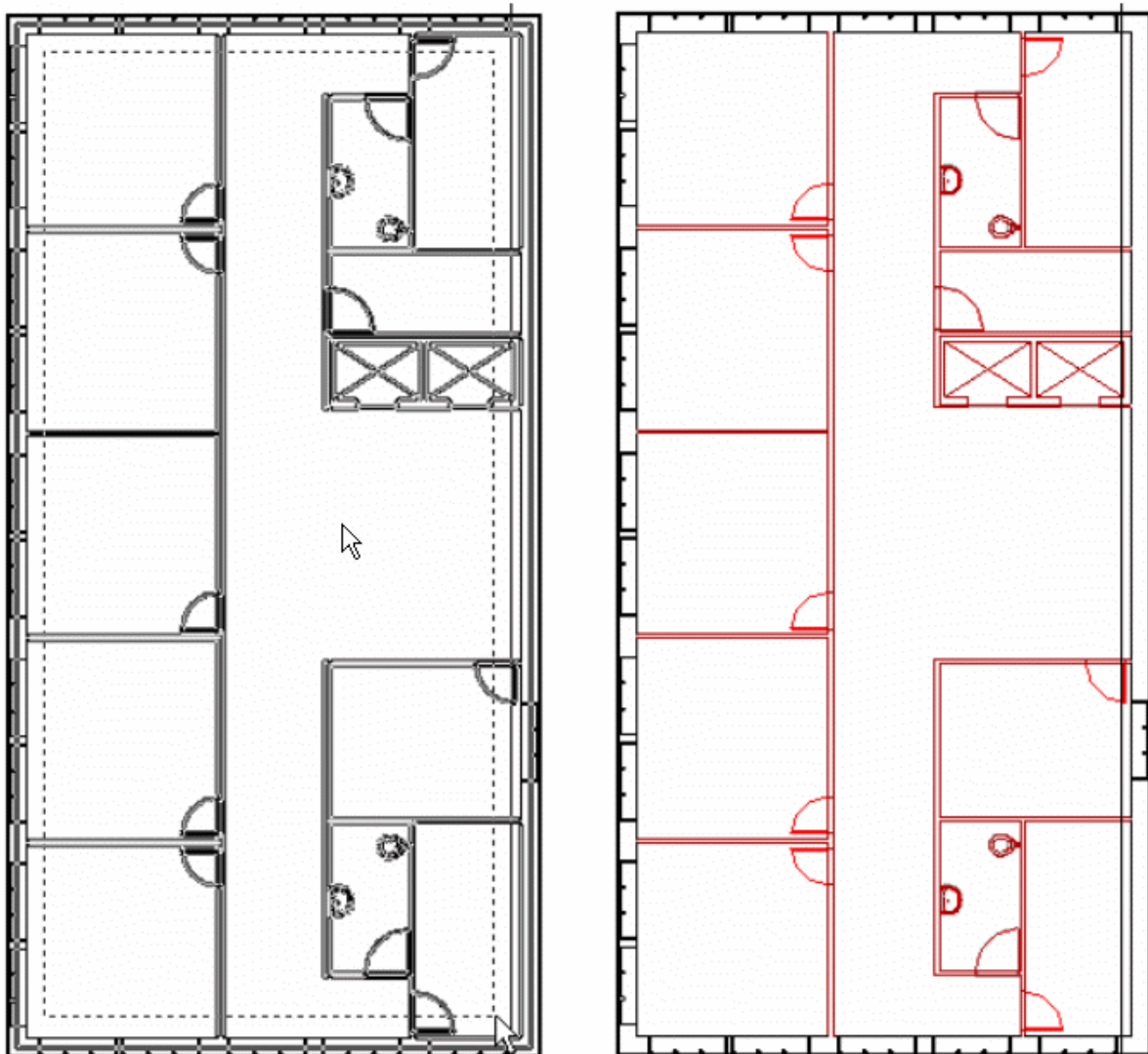
Paste align components to Level 3

125. In the Project Browser, under Views (all), under Floor Plans, double-click Level 2.

126. Right-click, and click Zoom To Fit.

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

128. Draw a crossing box beginning just inside the upper right corner and extending to the lower left corner of the floor plan. Do not include the exterior walls.



129. On the Options Bar, click. 

130. Clear Floors and Floors (Floor opening cut), and click OK.

131. On the Edit menu, click Copy to Clipboard.

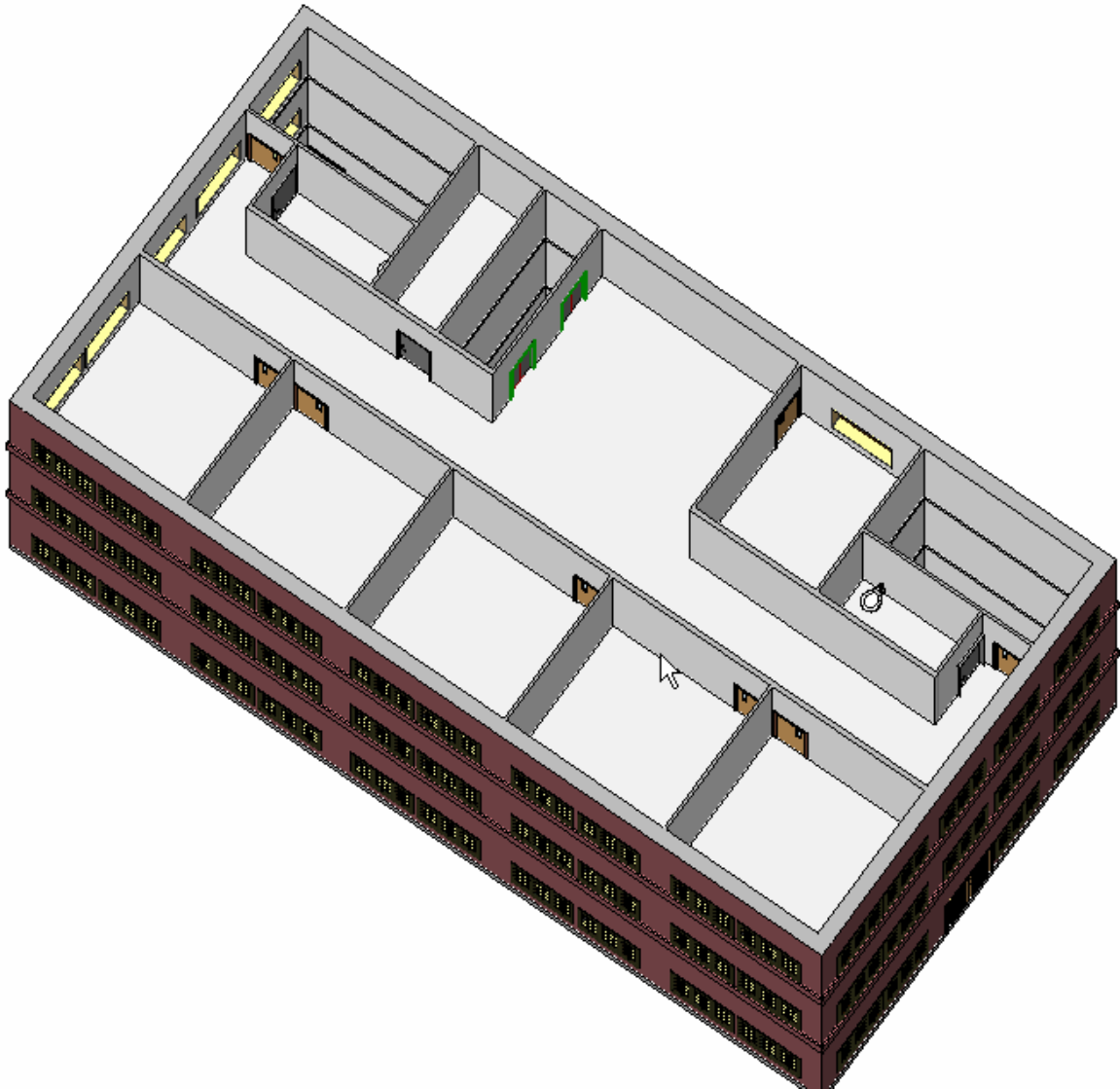
132. On the Edit menu, click Paste Aligned - Select Levels by Name.

133. Select Level 3 and click OK.

Note: If you receive a warning that a conflict exists with an insert, click OK and go to the Level 3 floor plan. Reposition one or both of the windows that may be intersecting the corridor wall.



134. On the View toolbar, click.



135. On the File menu, click Save.

The next exercise requires this building model in its current state.

In this exercise, you learned how to create floors and floor openings. You created a section view. In addition, you loaded plumbing components and elevators, and used the rotate tool to adjust the sink. You also learned how to use various pick methods in conjunction with the filter.

In the following exercise, you create a gable roof and add a ceiling to the building model.