

Design 0100, Weekly Design Guide Quarter 4, The Mercy Building

For the next 3 or 4 weeks we will construct the existing Mercy Building while we start each students design projects.

The construction of the Mercy Building starts with a Layout Sketch in the assembly before any parts are made.

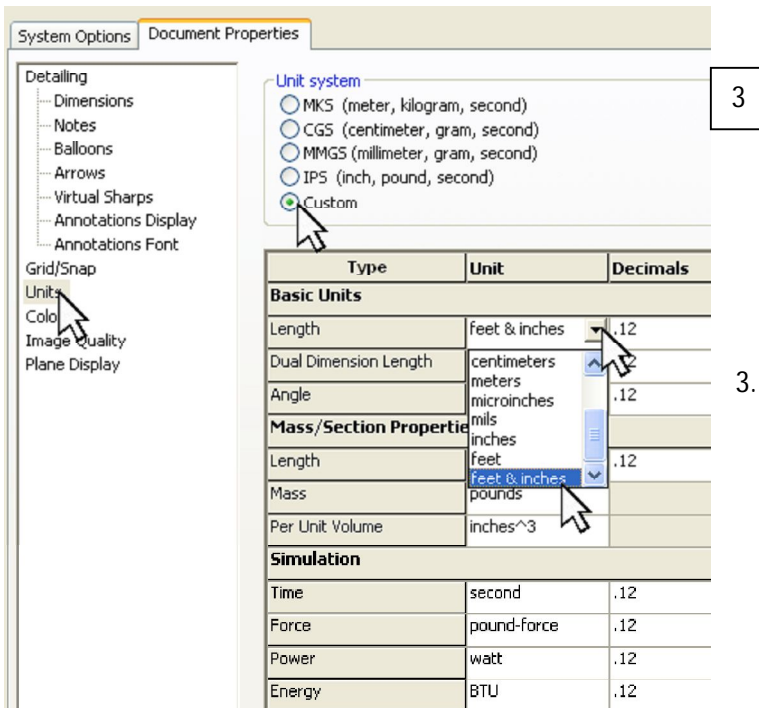
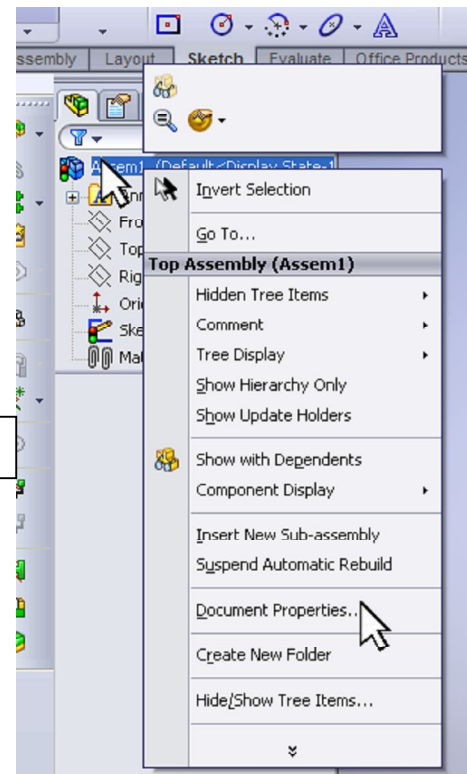
From this sketch most of the larger parts will be constructed such as the exterior and interior walls, siding and floor. These parts will be constructed in the assembly as we go.

Let's start by performing the following steps.

1. Start a new Assembly. In the Properties Manager close the dialog asking for the part to insert (the red X). Save your new assembly as "Mercy Building". Go to the "Sketch" tab on the Command Manager and choose the "Sketch Entity". When SolidWorks asks you for the plane to sketch on choose the top plane.



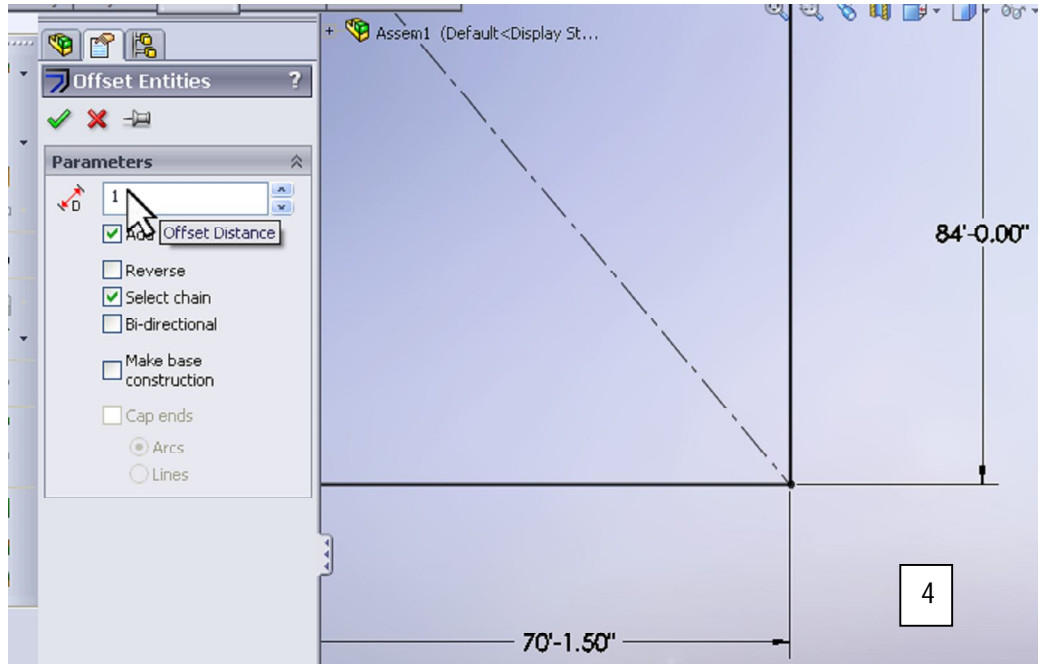
2. Draw a Center Rectangle as large as you can. Using the measurements that we obtained when measuring the building, add the following dimensions: 70'-1.5" on the front of the rectangle and 84'-0" for the east side of the rectangle. This rectangle defines the sides of the building minus the trim on the corners. Since we measured the building using the trim in the corners we will take off 1" for each of the corners measured. We also have to change the "Units" in SolidWorks so that our rectangle and other parts added to this assembly will be shown in Feet and Inches. Some of you may have the dimensions shown in millimeters and others as just inches. To change these dimensions to feet and inches use the following procedure: Go to the top of the Feature Manager Tree, right click and choose Document Properties from the selection menu.



3. Next choose "Units", then to the right of the menu choose "Custom" just below that click on the down arrow for the length then select "feet & inches". Click on the "OK" button on the bottom of the dialog box. When you go back to your model area the sketch should have the appropriate dimensions displayed as entered in the previous sketch.

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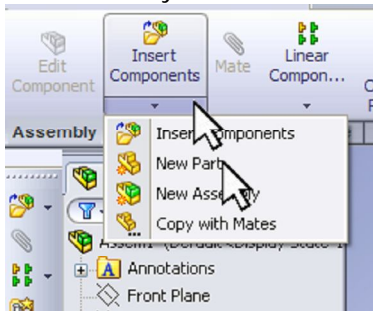
4. Now we need to do some offsets to the lines of the rectangle sketched. The first offset defines the thickness of the sheathing and siding on the exterior of the frame of the building. The second will define the interior structure and interior walls of the building (inside of the 2 x 6 studs and drywall). Choose the offset command on the "Sketch" tab in the Command Manager and choose the "Offset" command button. Fill in the value of 1 for 1 inch in the Properties Manager.



5. Offset to the inside of the rectangle, which is the thickness of the siding. Make certain that you rest your cursor to the inside of the rectangle, watch for the yellow arrow, then click the left mouse button. Create another offset, from the rectangle that was just offset in the previous step, to 6" also on the inside of the rectangle. This defines the thickness of the structure and drywall.



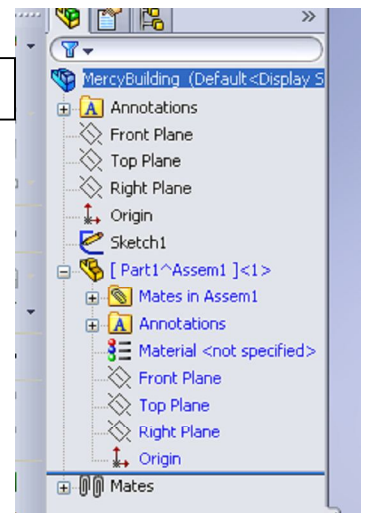
6. The sketch that will drive the design in the assembly is complete for now. The next step is to insert a new part. This part, the Floor, will be constructed the assembly. Perform the following steps: Go to the Command Manager and select "Assembly" tab. Select the pull down arrow on the "Insert Component" button. Then select the "New Part" option. SolidWorks will now be asking you for the plane that you want to reference the Front Plane of the New Part to (the cursor will have a green check mark next to it). Choose the Front Plane of the assembly in the Feature Manager.



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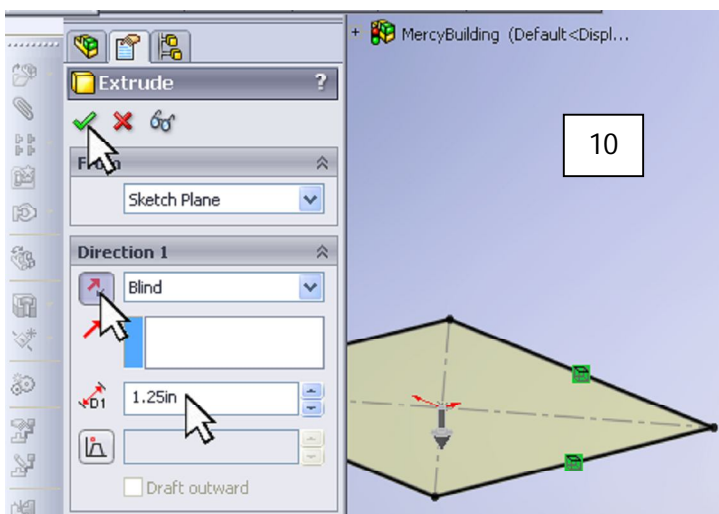
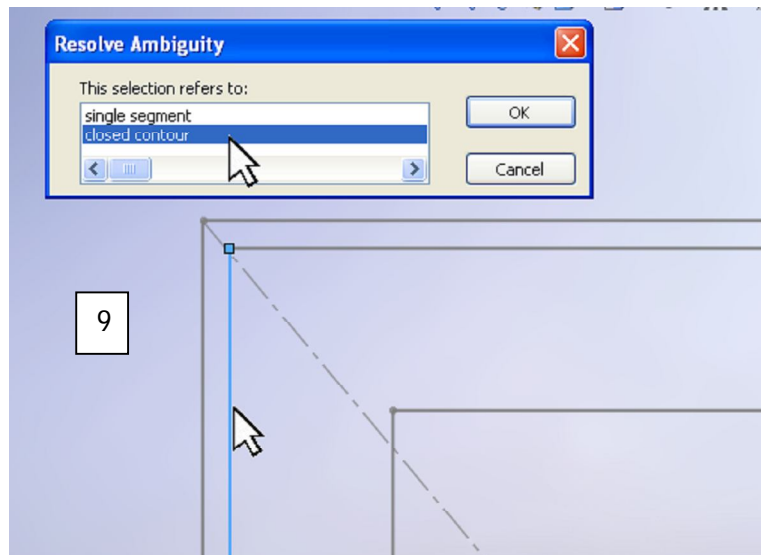
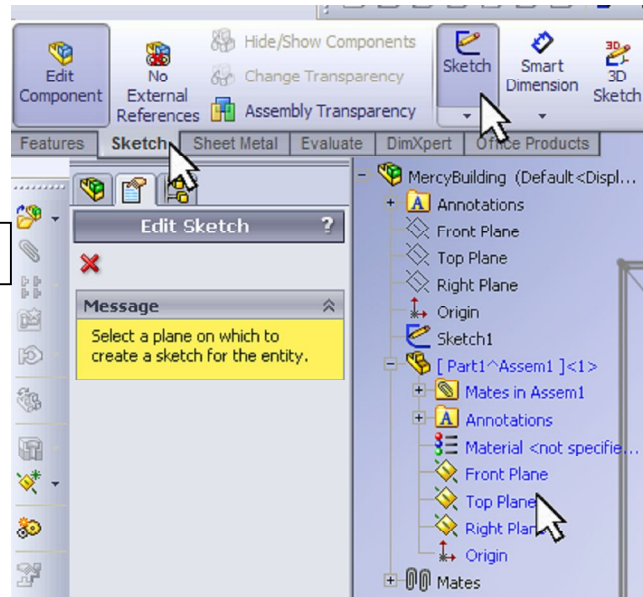
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7. Click on the Rebuild command (traffic light). Notice that the new part is defined by blue text. This means that this part is being edited within the assembly.

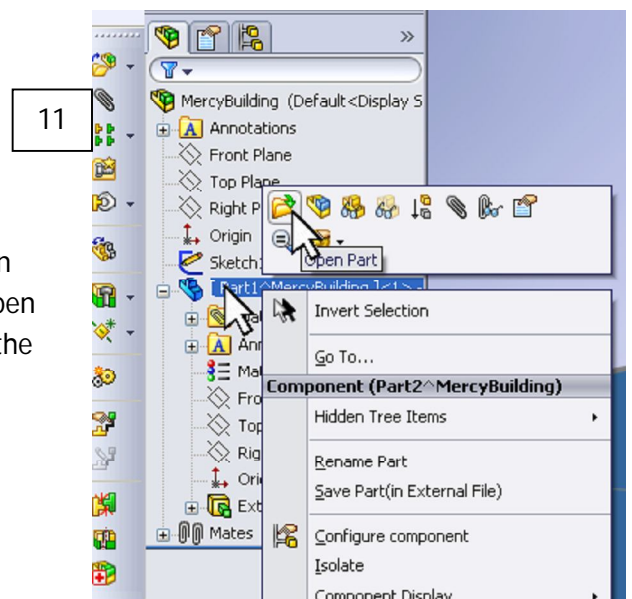


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- Just like you would with a part being designed outside of an assembly to start a sketch, click on the "Sketch" entity. SolidWorks will ask you for the plane that you want to sketch on. Choose the Top Plane in the new part. To choose this plane use the Command Manger to the right of the Properties Manager, in the Modeling Area.
- Now select a line of the middle rectangle of the assembly Layout Sketch which defines the exterior structure of the building which is also the extent of the floor. Choose the "Convert Entities" button on the Sketch tab on the Command Manager. Choose the closed contour option (this will complete the rectangular selection).
- Go to the "Features" tab on the Command Manager and choose the "Extruded Boss/Base" button. Extrude the converted sketch down by 1.25". Make sure the arrow is pointed down for this operation by clicking on the reverse direction button shown.



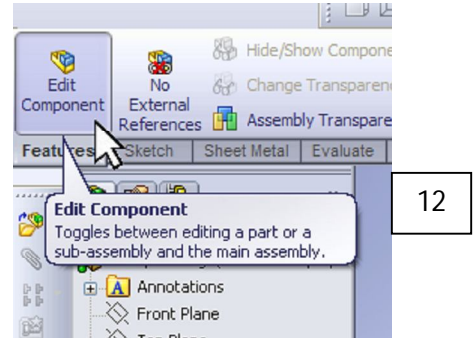
- To rename this part to "Floor" as it should be, right click on "Part1..." in the assembly Feature Manager and choose Open Part. In the open document save it as "Floor" then close the part. This will rename it and also change the name in the assembly.



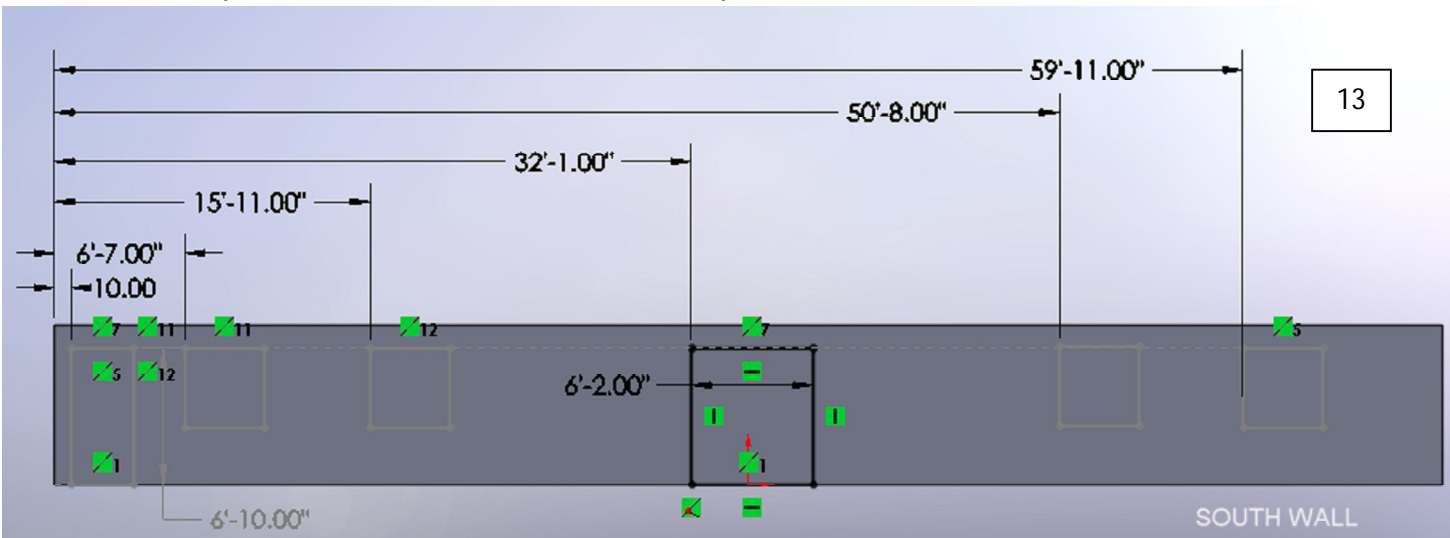
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12. We will build the walls in the same way as the Floor. To insert a new part (Exterior Walls) we must exit out of editing the floor. Click on the "Edit Component" button on the "Command Manger".

13. Insert a new part, choose the Front Plane of the Assembly, and rebuild just as we did above. We will sketch on the Top Plane of "Part 2..." and choose a line (as a portion of the middle rectangle) then "convert" with the closed contour option. To finish the edge of the wall we also want to choose a line (as a portion of the inner rectangle) using the same options as stated above. Extrude this up to 96 inches (8 feet). Open this part and resave it naming it as "Exterior Walls". We can keep the "Exterior Walls" open to add the windows and doors as they were measured. We will add those dimensions for the south exterior wall as shown below. Other sketch relations for the door and window sketch include: the single door opening is 38" wide, 82" tall, and coincident to the bottom of the wall. Make a block for this. The double door is similar to the single door with the width at 72". The window openings are 50" square and the top of the windows are collinear with the top of the doors. Make a block for this too.

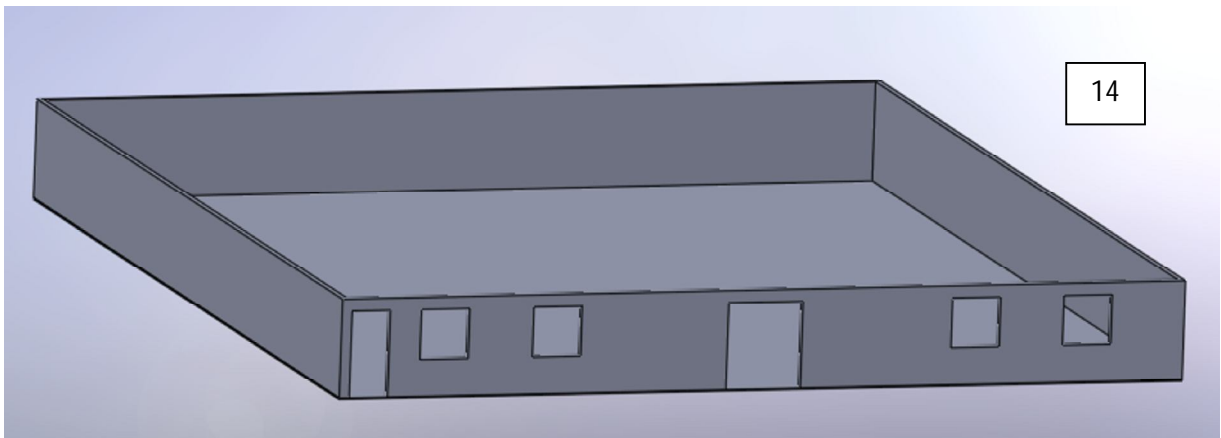


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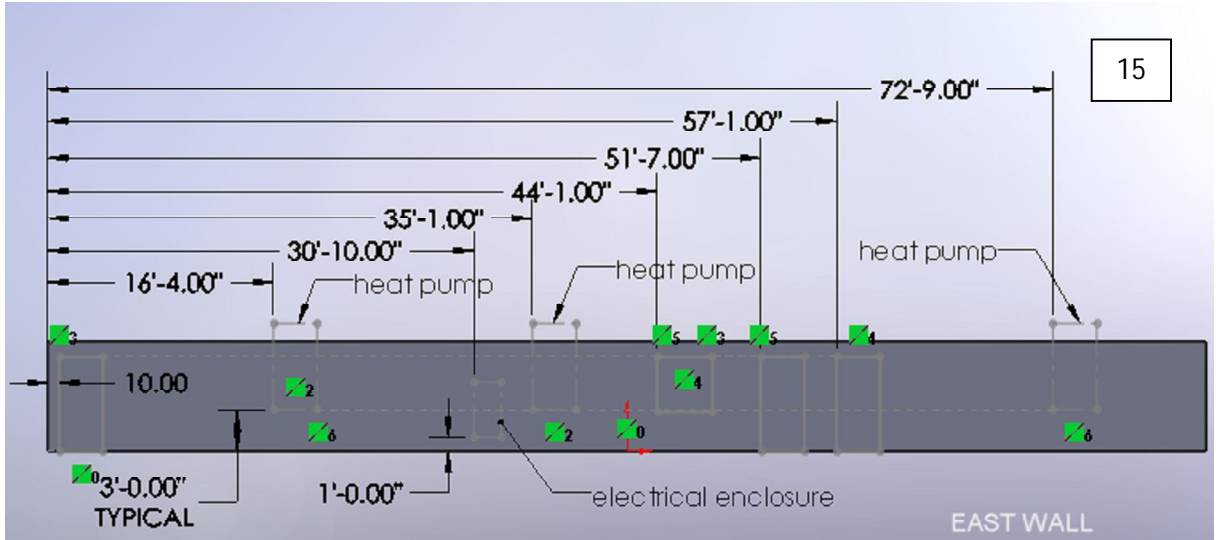
14. After you hide your assembly sketch, your Mercy Building Model should look similar to the one shown below. This view shows the South Wall of the building or the wall with the main entrance.



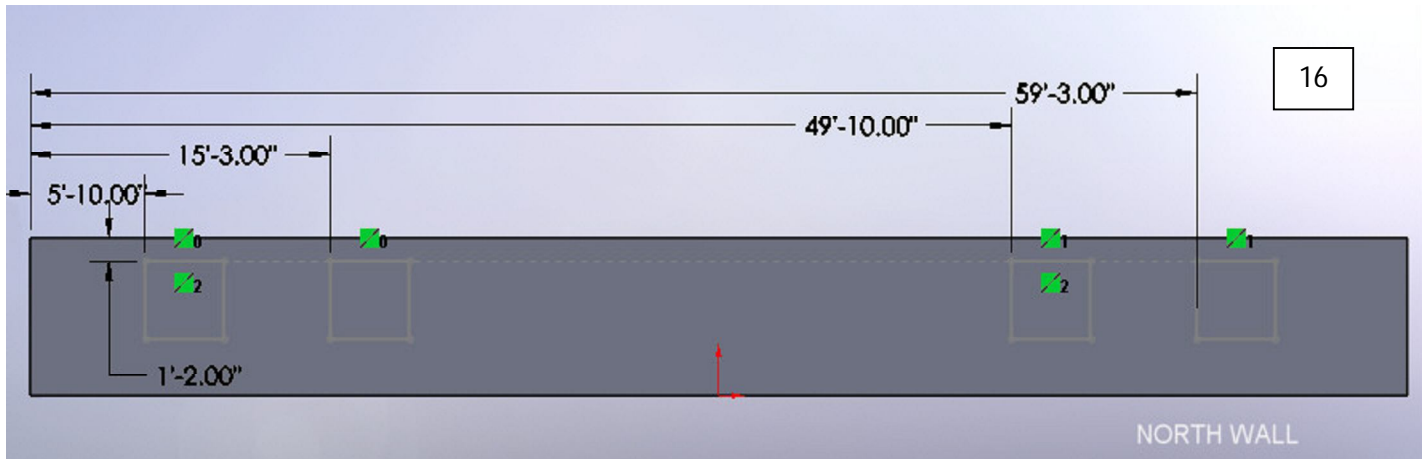
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15. For the East wall the dimensions are shown below. Notice that we have two additional features that are drawn using Construction Lines which include the heat pumps and electrical enclosure. We will be using Construction Lines for these features as reference only so that when we build these parts later we have a place to install them on our building. Remember, Construction Lines are there as a reference and will not affect any 3D feature.

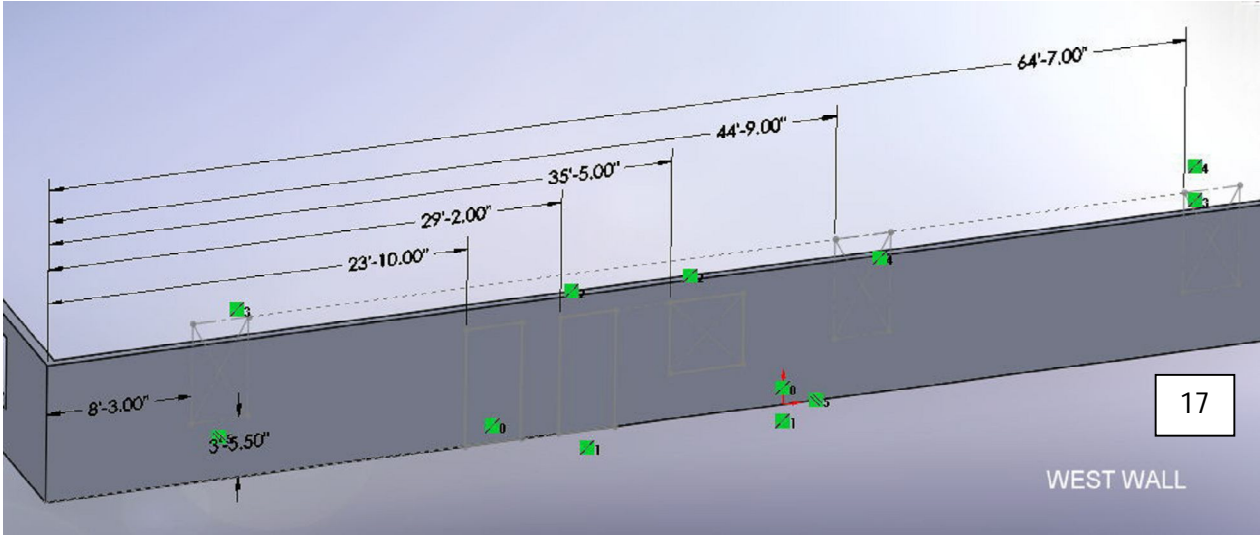


16. The North Wall dimensions are shown below.



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17. The West wall dimensions are shown below.



18. After we do our Extrude Cut features into the exterior walls and start adding some of our part models, the Mercy Building assembly should resemble the image below.

