Chief Architect®
Architectural Home Design Software

# Creating an Elevated Structure on Pilings

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The information in this article applies to:


## QUESTION

I am an experienced Chief Architect software user and would like to design a structurally detailed seaside home on pilings. How can I do this?


# ANSWER

Chief Architect is designed to allow you to quickly model conventionally framed structures. A structure on pilings, however, does not fall into the category of conventional framing, so when drawing such a plan, we need to use Chief's framing tools creatively.

This article assumes that the reader is familiar with and comfortable using default settings, creating and using custom layers, and using the manual framing and CAD editing tools.

There are a number of distinct tasks involved in this project:

- To prepare to draw the structure
- To define the platform perimeter
- To create space for the supporting structure
- To generate the platform joists
- To position the walls and deck railings
- To create the pilings
- To create the stringers
- To create the pad
- To generate the deck planking

Before starting work on any drawing, it is important to set up the correct default settings – particularly for the structural aspects of the plan.

As you set up your defaults, you can also set up defaults for door styles and materials for roofing, casing, doors and other items. However, only structural defaults are discussed in this example.

## To prepare to draw the structure

1. Select **Edit> Default Settings** from the menu to open the **Default Settings** dialog.

    - To expand a category in the tree list and view its subcategories, click the arrow to the left of its name.

    - To open the defaults dialog for a line item, click on its name and then click the **Edit** button, or simply double-click on its name.

2. In the **Floor 1 Defaults** dialog, on the STRUCTURE panel, under the **Relative Heights** heading, specify the desired **Rough Ceiling** height. In this example, **109 1/8"** is used.

3. In the **Foundation Defaults** dialog, on the FOUNDATION panel:

    - Select **Walls with Footings** as the Foundation Type.

    - Under the **Stem Walls** section, specify the **Minimum Height** as equal to the required top height of the pilings at the building site, plus the thickness of the concrete pad at the base of the pilings. In this example, **148"** is used.

4. In the **Framing Defaults** dialog, on both the FOUNDATION and 1ST floor panels, under both the Subfloor **for Floor** and **Ceiling Above Floor** headings:

    - Select the radio button beside **Lap**.

    - Specify the **Spacing** as **16"** O.C..

- Specify the **Joist Width** as **1 1/2"**.
- Under the **Subfloor for Floor** heading on each panel, make sure **Rim Joist** is checked.

5. While still in the **Framing Defaults** dialog:
   - On the BEAMS panel, click on the **Edit Floor Beam Defaults** button. Specify the **Depth** as **11 1/4"**, **Width** as **3"**, the **Type** as **Lumber** and click **OK**.
   - Under the Beam **Options**, select the radio button beside **Under Joists** and the **Align Exterior with** radio button beside **Main Layer**.
   - On the POSTS panel, click on the **Edit Post Defaults** button. Specify the **Type** as **Lumber**, set the **Post Size Widths** both as **12"**.

     > **Note:** When a Round post is specified, **Width 1** refers to its diameter and **Width 2** is not available.

   - Under the **Post** Footings heading, specify the **Height Above Floor**, **Thickness** and **Width** values as **0"**. This will prevent footings from being created.

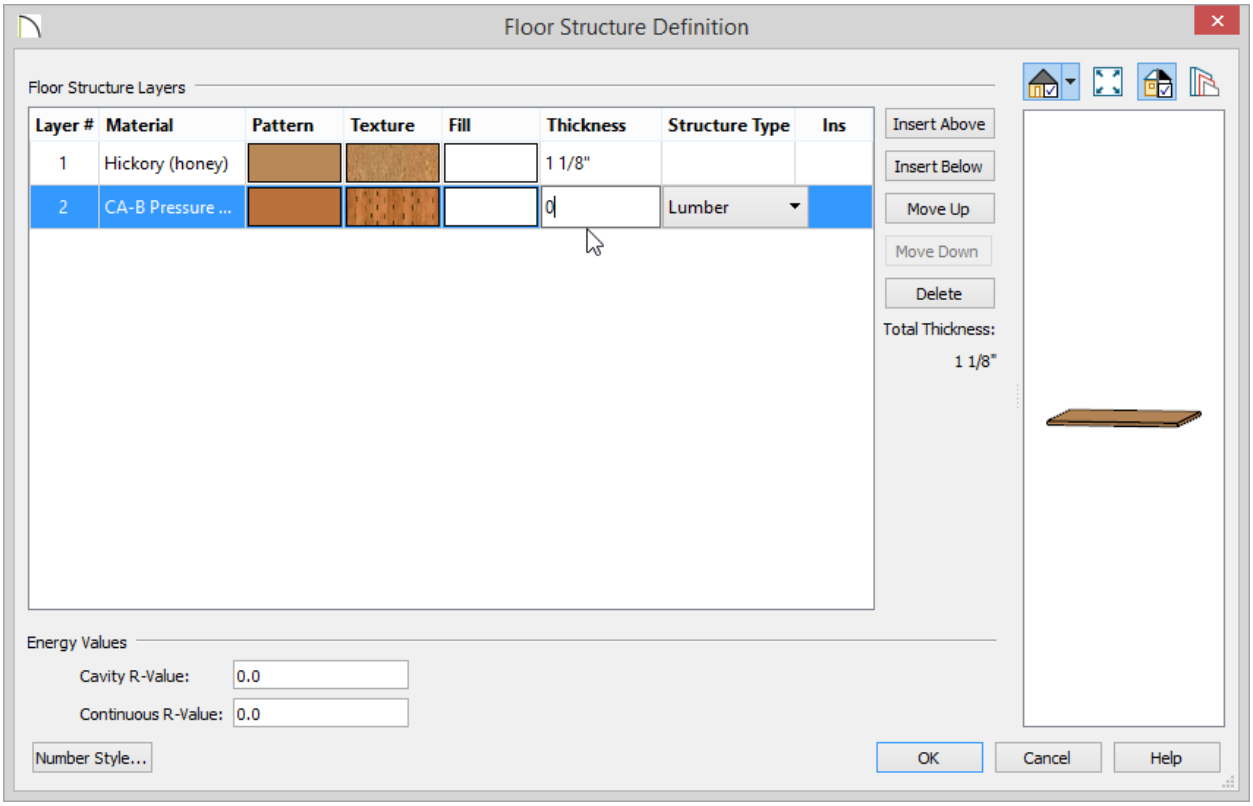
6. In **Default Settings**, expand **Floors and Rooms**, and select **Floor/Ceiling Platform**. In the **Floor/Ceiling Platform Defaults** dialog, click the **Floor Structure** edit button and specify:
   - **Layer 1** as **1 1/2"** of **OSB Hrz**.
   - **Layer 2** as **9 1/4"** of **CA-B Pressure** Treated Lumber.
   - Use the drop-down menu for **Structure Type** on **Layer 2** to use **Lumber**.

7. In **Default Settings**, expand **Floors and Rooms**, and select **Room Types**. Select

**Deck** and click Edit. In the **Deck Room Type Defaults** dialog, on the STRUCTURE panel:

- Click the **Planks, Joists** Edit button, specify the desired deck planking thickness and material for **Layer 1**, and set the thickness for **Layer 2** to zero.

- Click **OK** to save these default settings.




8. While still in the **Deck Room Defaults** dialog, on the DECK panel:

   - Uncheck **Automatically regenerate deck framing**.

   - Check **Keep deck framing after the deck room is deleted**.

   - Under the **Deck Planking** heading, uncheck **Automatic** and set the **Plank Direction** to **90°**.

   - Under the **Deck Joists** heading, specify the **Joist Width** as **1 1/2"**, the **Joist Spacing** as **16"**, and the **Joist Direction** as 0°.

   - On the DECK SUPPORT panel, uncheck **Deck Beams**, **Deck Posts**, and **Deck Post Footings**.

9. In the **General Wall Defaults** dialog, uncheck **Show Wall Length When Editing**.

10. In both the **Exterior/Interior Wall Defaults** dialogs, specify the wall types that you require for your project.In this example, the wall types **Siding-6** and **Interior-4** are used.

11. In the **Deck Railing Defaults** dialog:

    - On the RAIL STYLE panel, check the box beside **No Half Post at Wall**.

    - On the NEWELS/BALUSTERS panel, set the **Newel/Posts Width** to **1 1/2"**.

In conventional framing, floor platforms and decks often use different floor platforms with different joist depths, directions, and even materials. When they do not, however, you can save time by automatically generating joists within a temporary shell.

## To define the platform perimeter

1. Select **Build> Wall> Straight Exterior Wall**  from the menu and draw walls to define the entire raised platform - including the enclosed building and all decks. In this example, the platform perimeter is **52' x 52'**.

2. Select **Tools> Layer Settings> Display Options**  and turn on the display of the **Walls, Main Layer Only** layer.

3. Select **Build> Framing> Framing Reference Marker**  , then click to place a marker at one of the corners of the structure. In this example, the marker is positioned at the wall intersection in the upper left corner of the structure, on the wall's framing layer.

4. Click the **Select Objects**  button, then click just outside of one of the walls to select the Exterior Room.

- If you select the wall instead, click the **Select Next Object**  edit button or press the **Tab** key on your keyboard.

- With the Exterior Room selected, click the **Make Room Polyline**  edit button to create a polyline around the outside of the walls.

5. With the newly created Room Polyline selected, concentrically resize it so it follows the outside of the wall's main layer.

   To do this:
   - Zoom in on one of the wall corners.

   - Hold down the **C** key on your keyboard. This is the keyboard hot-key for temporarily enabling the **Concentric Edit Behavior**.

   - Drag the corner handle of the Room Polyline inward until it snaps to the wall's main layer intersection.

6. With the Room Polyline still selected, select **Edit> Copy**  from the menu.

7. Return to the **Layer Display Options**  and turn off the **Walls, Main Layer Only** layer so that all of the wall layers display again in floor plan view.

In conventional framing, the main floor level is built directly on stem walls, a slab, or piers located close to the ground. This application calls for a main floor level to be located many feet above the terrain and supported by pilings,or posts, which must be placed manually. Before these objects can be created, space must be allotted for them in the model.

## To create space for the supporting structure

1. Select **Build> Floor> Build Foundation** from the menu.

2. Choose to Derive new foundation plan from the 1st floor plan.

> Do NOT create a blank new floor.

3. Delete the newly created foundation walls on **Floor 0**.

4. Select **Edit> Paste> Paste Hold Position** from the menu to paste a copy of the Room Polyline directly below its original location on **Floor 1**.

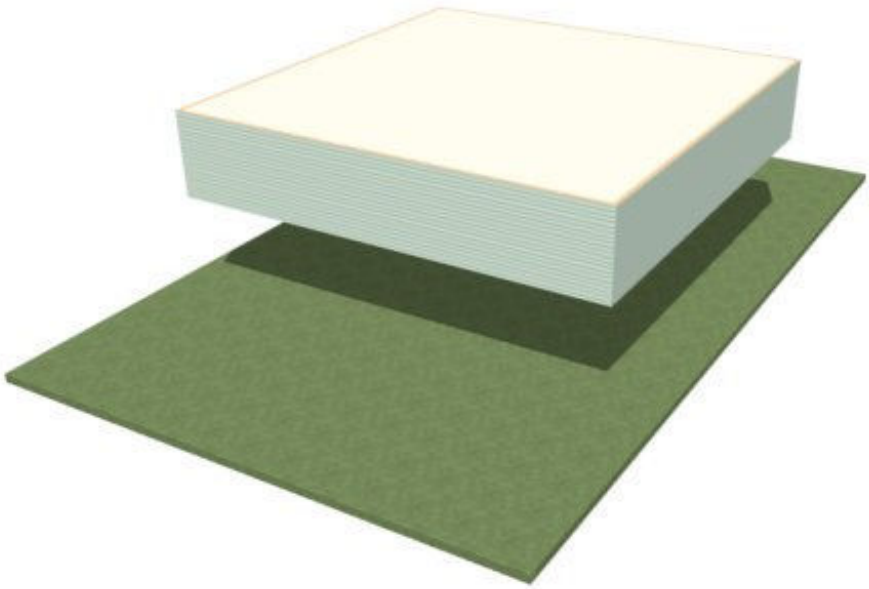
5. Select **Terrain> Create Terrain Perimeter** from the menu. The terrain perimeter will be **100'** deep and **62'** wide, or **10'** wider than the structure defined on **Floor 1**.

6. Select **Terrain> Terrain Specification**. On the GENERAL panel of the **Terrain Specification** dialog:

    - Under the **Building Pad** heading, uncheck **Automatic** and set the **Subfloor Height Above Terrain** to equal the top height of the pilings plus the thickness of the platform. In this example, **155 3/4"** (144" piling height+ 1" pad elevation + 10 3/4" platform thickness) is used.

    - Under the **Clipping** heading, uncheck **Hide Terrain Intersected by Building**, then click **OK**.

7. Select **3D> Create Perspective View> Perspective Full Overview** from the menu to see the results so far.

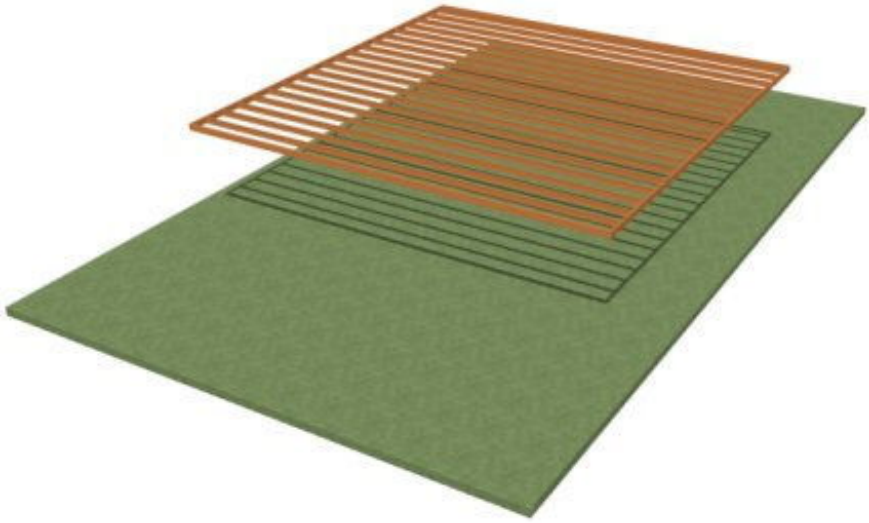


8. Select **File> Close View** when you are finished to return to floor plan view.

With the perimeter defined and vertical space for the structure created, the platform joists can now be generated

## To generate the platform joists

1. Select **Build> Framing> Joist Direction**  from the menu, then click and drag to draw a Joist Direction line in the direction that you want your joists to run.
    - In this example, the **Joist Direction** line is drawn horizontally, or parallel to the side of the building that faces the ocean.
    - When prompted to turn on the **Framing, Bearing Lines** layer, click **Yes**.
2. Select **Build> Framing> Build Framing**  .
    - On the FOUNDATION panel of the **Build Framing** dialog, check **Build Floor Framing** and click **OK**.
    - When prompted to turn on the display of the **Framing, Floor Joists** layer, click **Yes**.
3. Examine the floor joists to make sure they meet your needs. At this point, you can turn off the **Framing, Floor Joists** layer and **Delete**  the Joist Direction Line.
4. Go **Up One Floor**  to **Floor 1** and delete the Framing Reference Marker that you placed earlier, as well.
5. Create a **Perspective Framing Overview**  to view the results.



- To better see the joist's height, turn on the **Terrain Perimeter** layer while the framing overview is active if it's display is not already enabled.

- Close the view when you are finished.

The floor joists were generated using a temporary shell to define the platform. Once they are in place, the temporary shell can be replaced by the walls and railings of the actual structure.

## To position the walls and deck railings

1. Select each of the shell walls and use dimensions to move them so that they can serve as the exterior walls of the enclosed structure. In this example, the back or street side wall of the structure is moved **4'** inward, both side walls are moved **8'** inward, and the front or ocean side wall is moved **18'** inward.

2. Create an Exterior Room Polyline for the resized structure using the steps described earlier:

   - Turn on the **Walls, Main Layer Only** layer.

   - Select the Exterior Room and click the **Make Room Polyline** edit button.

   - Concentrically resize the polyline so it snaps to the outside of the wall's Main Layer.

- Turn the **Walls, Main Layer Only** layer off again.

3. Select **Build> Railing and Deck> Straight Deck Railing**  from the menu, then click and drag to draw Deck Railings that snap to the Exterior Room Polyline created previously. An Invisible Wall, or Room Divider, will automatically connect the outer deck railing from the walls of the enclosed structure to prevent an "island" room from being created. This is expected program behavior.

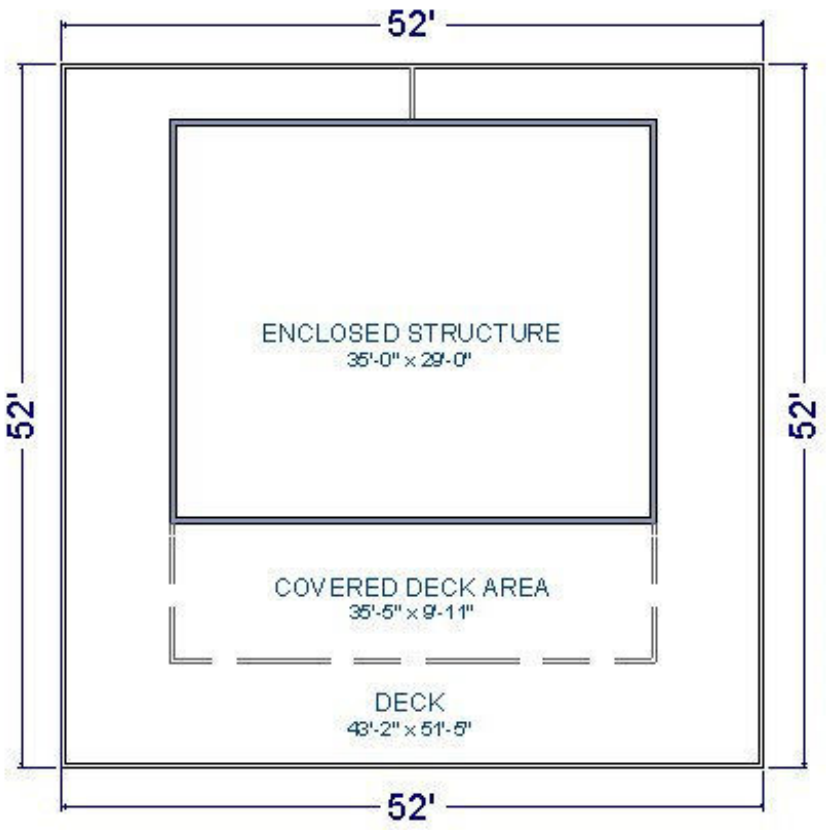
4. Create an Exterior Room Polyline for the Deck Railing, as described above.

5. Draw additional Deck Railing to define a covered deck area.

   - Make sure that the railing snaps to the Main Layer of the enclosed structure's exterior walls.

   - In this example, the covered deck area will extend out **10'** from the enclosed structure.

6. Specify the Deck Railings that define the covered deck area as **Invisible** on the GENERAL panel of the **Deck Railing Specification** dialog.




7. Select **CAD> Lines> Draw Line** from the menu, then click and drag to draw a line along the outside edge of the Invisible Deck Railing that faces the ocean side. Edit the CAD line's length as needed so it snaps to both ends of the Deck Railing without extending past it.

8. With the **Draw Line** tool still active, select all of the CAD objects on **Floor 1** and send a copy to the clipboard.
   - **Zoom** out so you can see the entire drawing.
   - Select **CAD> Lines> Draw Line** from the menu
   - Hold down the **Shift** key, then click and drag to draw a large rectangle around the entire drawing. The Status Bar should show 4 objects currently selected.
   - Select **Edit> Copy** from the menu.

9. Go **Down One Floor** and select **Edit> Paste> Paste Hold Position** to create a copy of the selected Room Polylines and CAD Line on **Floor 0**, directly below the

originals.

Once the walls and deck railings are in their final locations, pilings can be placed to support them. The CAD objects copy/pasted from Floor 1 will serve as helpful references.

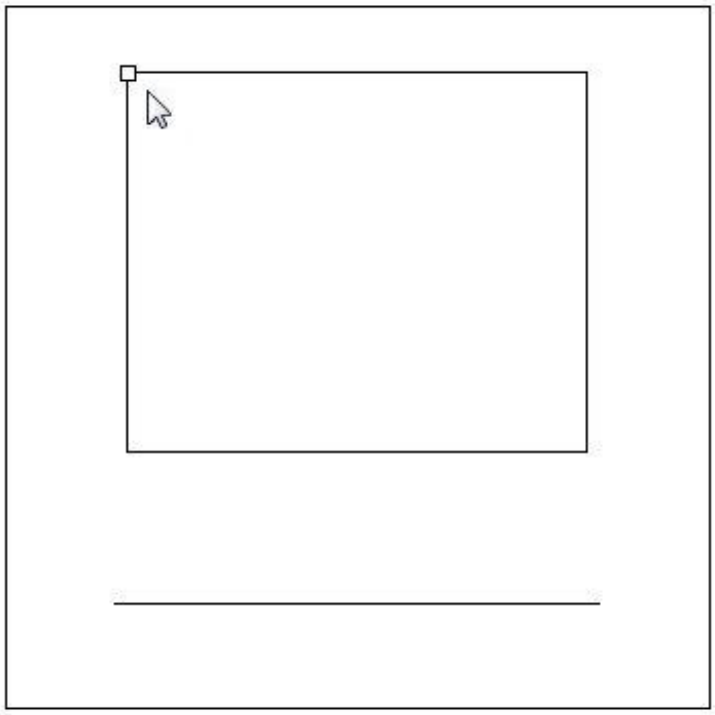
## To create the pilings

1. Select **Edit> Preferences** from the menu. On the BEHAVIORS panel of the **Preferences** dialog, specify the **Concentric Jump** distance as **3"**, then click **OK**. On a Mac computer, you will find Preferences in the **Chief Architect** menu.

2. Click the **Select Objects** button, then select the smaller Room Polyline associated with the enclosed structure and concentrically resize it **6"** smaller. To do this:

   - Zoom in on one of the polyline corners.
   - Hold down the **C** key on your keyboard.
   - Click and drag the corner edit handle slowly inward until you see it snap to the Concentric Jump increment two times, for a total of **6"**.

3. Select **Build> Framing> Post** from the menu, then click to place a single Post centered at the upper left corner of the smaller Room Polyline copy/pasted from Floor 1.

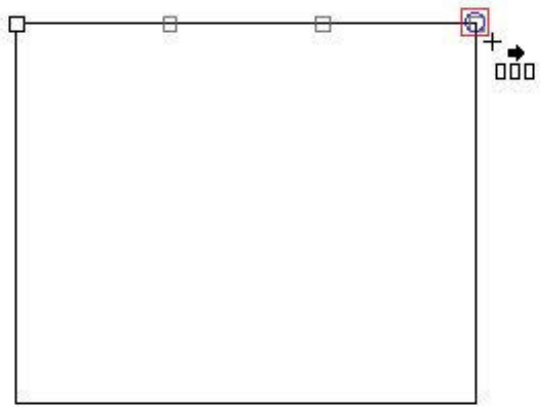


- When **Object Snaps** are enabled, the Post's center point will snap to the corner of the polyline.
- If prompted to turn on the **Framing, Posts** layer, click **Yes**.

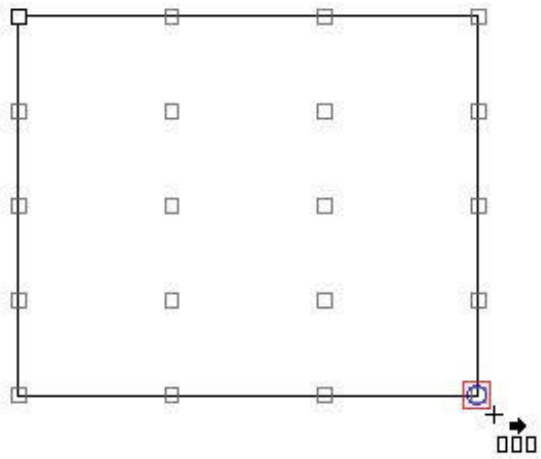
4. With the Post tool still active, click on the post and click the **Open Object** edit button to open the **Framing Specification (Post)** dialog:
   - On the GENERAL panel, select **Lock Top Height** and specify the **Total Height** as **145"**.
   - On the LINE STYLE panel, click the **Define** button under the **Layer** heading to open the **Layer Display Options**. Turn off the display of the **Framing, Floor Joists** layer if it is still turned on, and create a new layer called **Framing, Pilings**, select it, and click **OK**.
   - On the FILL STYLE panel, select **Solid** from the **Pattern - Type** drop-down list, click the **Appearance - Color** color bar and choose white.

5. With the post still selected, use the **Multiple Copy** edit tool to create an array of pilings under the enclosed structure. To do this:

- Click the **Multiple Copy** edit button.
- Click the **Multiple Copy Interval** edit button.
- In the **Multiple Copy** dialog, click the radio button beside **Evenly Distribute Copies When Dragging**, then specify the desired number of **Primary** and **Secondary** copies and then click **OK**. In this example, **3** and **4** are used, respectively.
- Right-click and drag from left to right, stopping when the editing preview snaps to the top right corner of the polyline. Release the mouse button to create a row of four pilings.



- Right-click again and drag down to the bottom right corner. Release the mouse button to create four more rows of pilings identical to the first.



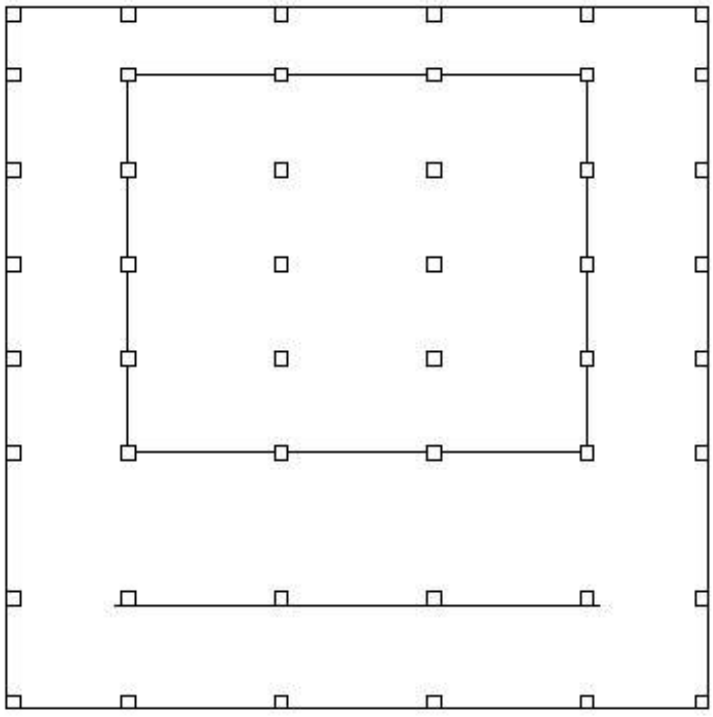
6. Group-select the top horizontal row of pilings use the **Copy/Paste** edit tool and **Move** edit handle to create another row of pilings aligned with the original and snapped inside the large outer Room Polyline.With **Object Snaps** on, the pilings

will snap to the polyline edge at their centers. If this occurs, leave them group-selected, **Zoom** in, and adjust their position.

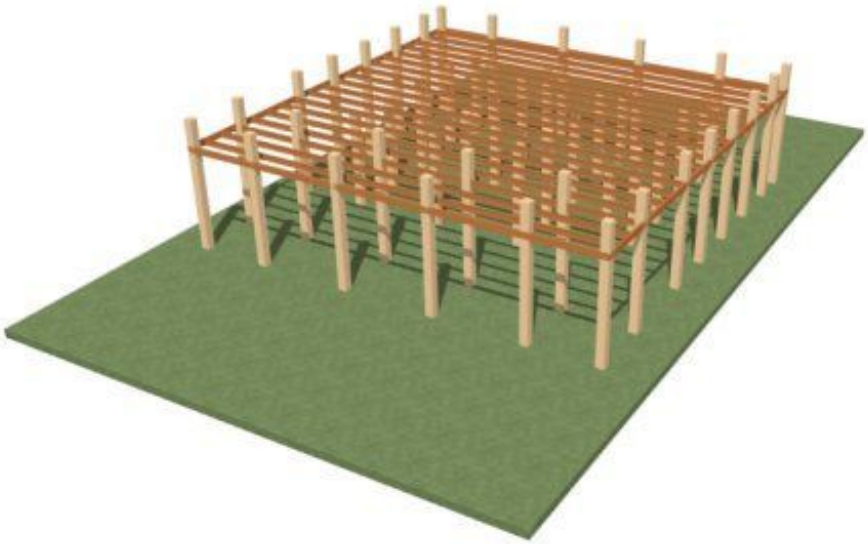
7. With the newly copied pilings selected, increase their top heights so they extend through the outer Deck Railings and act as newel posts. To do this:
   - Click the **Open Object** edit button.
   - On the GENERAL panel of the **Framing Specification (Post)** dialog, select **Lock Bottom Height** and specify the **Top Height** as **36"**.

8. Repeat steps **6** and **7** to create two copies of the bottom row of pilings: one aligned inside the bottom edge of the outer Room Polyline and one aligned with the CAD line representing the edge of the covered deck area. When you add a roof over the covered deck area later on, you can adjust the top heights of the pilings defining that area so they support the roof.

9. Use this same procedure to create two additional vertical rows or columns: one aligned inside the left edge of the outer Room Polyline, and one aligned with the right edge.



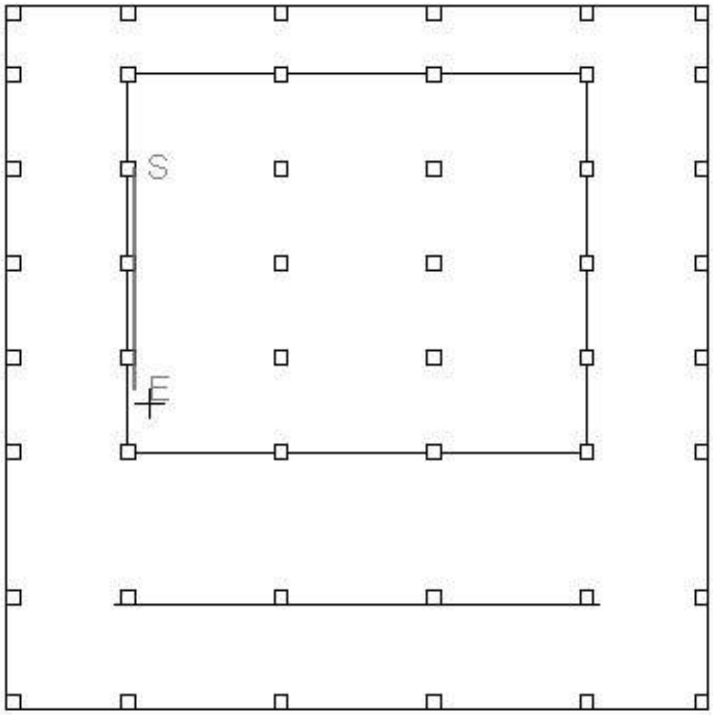
10. Create a **Perspective Framing Overview** and turn on the **Framing, Pilings** layer to view your progress. When you are finished, **Close** the view.



With the pilings in place, pairs of stringers can be added to their sides, directly under the platform joists. Stringers typically sit on a notch at the top of the pilings. In Chief Architect, we will simply position the stringers inside the perimeter of the pilings.

## To create the stringers

1. Select **Build> Framing> Floor/Ceiling Beam** from the menu, then click and drag vertically to draw a stringer along the right side of the pilings under the left side of the enclosed structure.

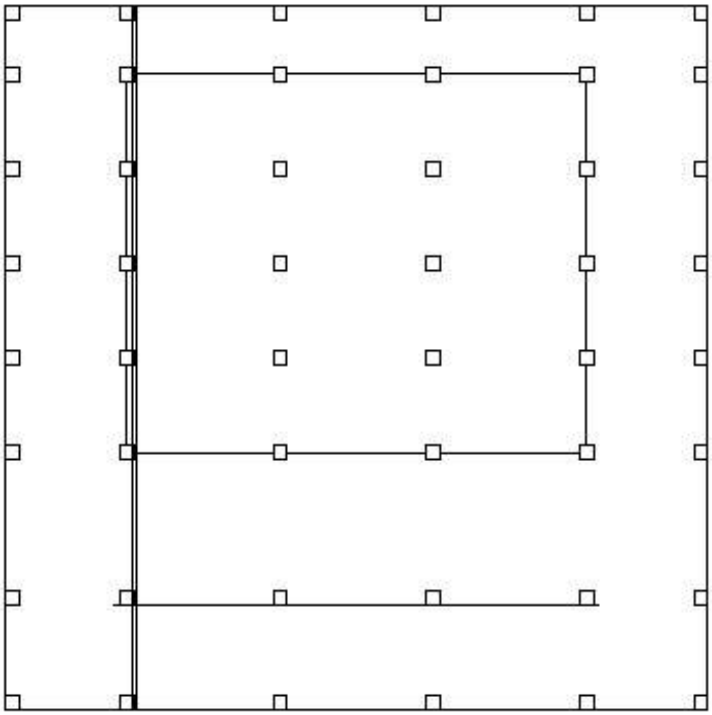



- Make sure that this stringer is drawn entirely within the Room Polyline representing the enclosed area. Do not extend it into the Deck area at this time.

- By default, beams will snap to objects like posts at the midpoint of the beam's end. For the purposes of this example, this is fine.

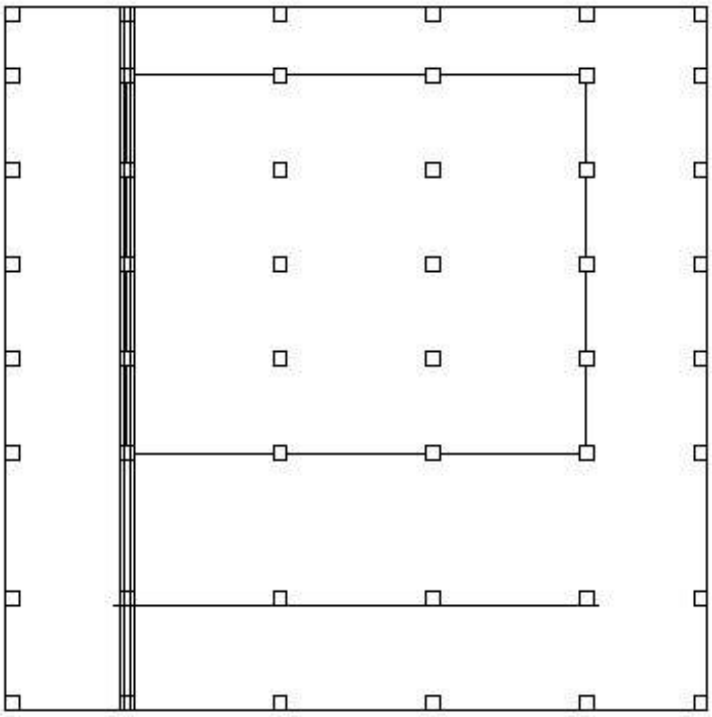
- If prompted to turn on the **Framing, Floor Beams** layer, click **Yes**.

2. Resize the stringer so that it extends along all of the pilings and reaches the top and bottom edges of the outermost deck pilings.



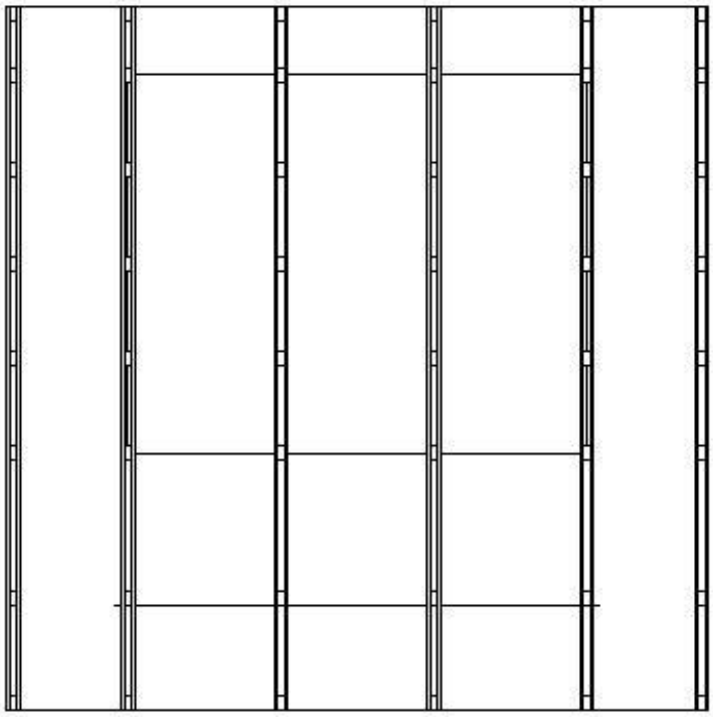
3. Click on the stringer to select it, then click the **Open Object** edit button to open the **Framing Specification (Floor Beam)** dialog:
    - On the LINE STYLE panel, click the **Define** button under the **Layer** heading, create a new layer named **Framing, Floor Stringers**, select it, and click **OK**.
    - On the FILL STYLE panel, specify a Solid grey fill.
4. With the stringer still selected, click the **Transform/Replicate Object** edit button. In the **Transform Replicate Object** dialog:
    - Check the box beside **Move**.
    - Specify the **X Delta** value as a negative number equal to half the Thickness of the beam - in this example, **-1 1/2"**, then click **OK**.
    - If your project will require presentation views that include the stringers, instead specify **1 7/16"** as the **X Delta** value so the stringers and piling materials do not Z-fight in camera views.
5. With the stringer still selected, use the **Copy/Paste** and **Reflect About Object**

edit tools to create a copy on the other side of the adjacent pilings. To do this:



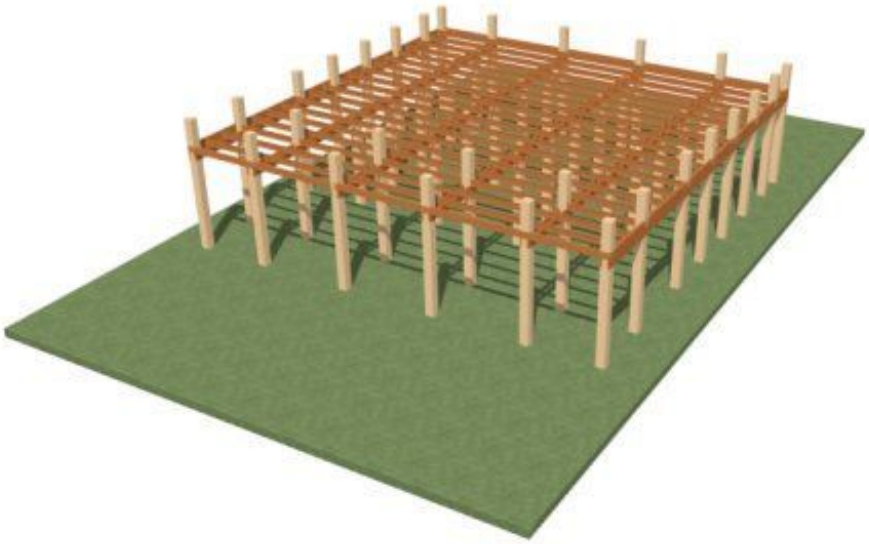
- Click the **Copy/Paste** edit button.
- Click the **Reflect About Object** edit button.
- Click once on one of the adjacent pilings.

6. Use the **Copy/Paste** and **Point to Point Move** edit tools to create a pair of stringers on either side of all the vertical rows of pilings. To do this:



- Select one of the stringers, hold down the **Shift** key, and then click on the other stringer to select them both.
- Click the **Copy/Paste** edit button.
- Click the **Point to Point Move** edit button.
- Click on the top left corner of the piling at the top of the row between the stringers.
- Click on the top left corner of the piling at the top of the next row.

7. Create a **Perspective Framing Overview** and turn on the **Framing, Floor Stringers** layer to view your progress. When you are finished, close the view.



The last structural item that needs to be added on Floor 0 is a concrete pad.

## To create the pad

1. Click the **Select Objects** button, then click on the smaller Room Polyline associated with the enclosed structure.

2. Click the **Convert Polyline** edit button, and in the **Convert Polyline** dialog, select **Sidewalk (Perimeter)** and click **OK**. Alternatively, you could select Slab; however, Sidewalks automatically follow the terrain without requiring you to calculate the needed height relative to the floor on **Floor 1**.

3. On the GENERAL panel of the **Terrain Path Specification** dialog, which opens next, confirm that the **Height** is **1"** and click **OK**.

4. **Zoom** in on the newly created Sidewalk and Concentrically Resize it larger as described above by at least **9"**, or three Concentric Jump increments.

5. When you are finished, the remaining Room Polyline and CAD Line can be deleted.

6. Since Preference settings are global, it is a good idea to return to **Preferences** and set the **Concentric Jump** value back to **0"**.

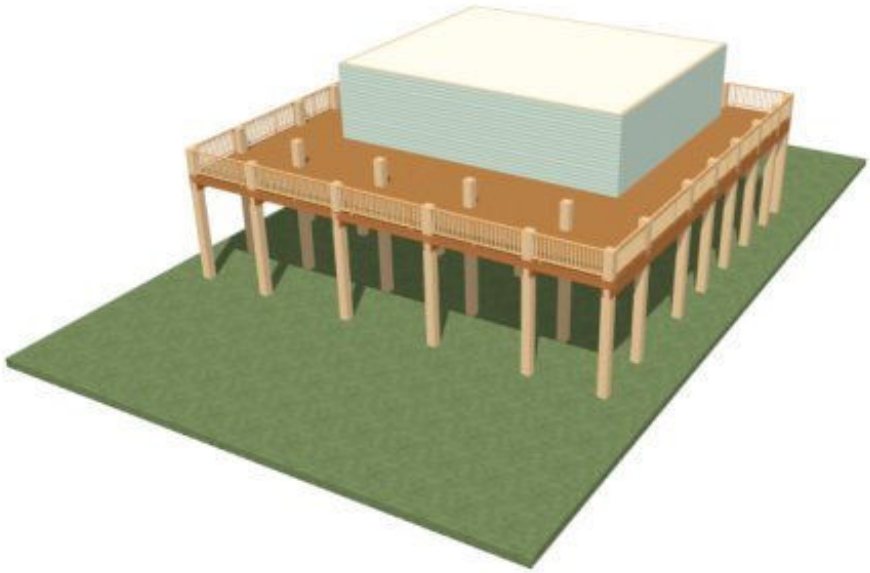
## To generate the deck planking

1. Go **Up One Floor** to **Floor 1** and click in an empty space in one of the Deck rooms to select it.

2. Hold down the **Shift** key and click in the other Deck room to select them as a group.

3. Click the **Open Object** edit button and on the DECK panel of the **Room Specification** dialog, check the box beside **Automatically regenerate deck framing** and click **OK**.

4. Create a **Perspective Full Overview** to see the results. Turn on the **Framing, Pilings** and **Framing, Floor Stringers** layers so that they can be seen, as well.



At this point, the foundation structure and main level floor platform are complete, and you can now add interior walls, doors and windows, stairs, a roof - and even a second floor. Using the information provided in this tutorial, you should now be prepared to apply this knowledge to your designs created on pilings.

Related Articles

- Modifying a Light for Placement on a Stair or Pier Piling (/support/article/KB-00478/modifying-a-light-for-placement-on-a-stair-or-pier-piling.html)