Chapter 3

Creating Walls

Learning Objectives

After completing this chapter, you will be able to:

- *Understand the concept of walls*
- *Understand the properties of walls*
- *Create stacked walls*
- *Create exterior and interior walls based on the given parameters*
- *Create wall sweeps and wall reveals*



INTRODUCTION

In the previous chapter, you learned about various tools and options to start, open and save an architectural project in Revit. In this chapter, you will learn about various tools and options to create different types of walls. You will also learn about the functions and parameters of different types of walls. Moreover, you will learn various options to modify the properties of an architectural wall and its type properties will be discussed in detail. Also, you will learn about various tools that are used to add modifiers in a wall, such as sweep and reveal.

CREATING A BUILDING PROJECT

In Revit, the term 'project' comprises not only the physical building model but also its associated documentation such as drawings, views, schedules, areas, and so on. The first step in creating a project is to create the building model. In Autodesk Revit, you can create it using the following two methods:

Method 1: Create a building model using individual building elements such as walls, windows, doors, floors, roofs, and so on.

Method 2: Create a conceptual mass of a building model using the massing tools and conceptualize the overall building shape and volume before working with individual elements.



Tip

You can also use a combination of above two methods. You can generate a building mass using the massing tools and then convert it into a building model with individual building elements using the building maker tools.

The selection of method depends on different project parameters such as project magnitude, building shape, building technology, current documentation stage of a project, industry parameters, and so on. The use of the massing tools to create a building geometry and the usage of individual building components to develop a building model will be described later.

Autodesk Revit provides you with several tools to add individual building elements such as wall, floor, roof, and so on for creating a building model. Several predesigned element types have been provided for each building element in Autodesk Revit libraries. You have the flexibility to either use the predesigned element types or create your own element type to create a building model.

Sequence of Creating a Building Model

The sequence of using building elements for creating a building model depends on various parameters such as building type, building volume, building shape, and so on. For most of the building projects, the sequence given below may be adopted.

Step 1: Start the model by creating the exterior walls of the building at Level 1 (lowest level).

Step 2: Create interior walls at the desired locations.

Step 3: Add doors and windows to the exterior and interior walls at the desired location.

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Step 4: Add the floor to the building model.

Step 5: Add the roof to the building model.

Step 6: Add the structural or architectural grid and structural elements.

Step 7: Add stand-alone components such as furniture items and plumbing fixtures.

Step 8: Add text and annotations to different spaces.

Step 9: Create dimensions for different parameters of the project.

Step 10: Create project details and documentation.

Step 11: Create the rendered 3D views and walkthrough.

In Revit, each building element is considered a three-dimensional parametric entity. This means, on adding elements to the model, you also add the related information and specification about the elements. One of the most important elements in a building model is the wall. It defines the basic spatial arrangement of the building that acts as the host for doors and windows.

Understanding Wall Types

Autodesk Revit provides you with several predefined wall types such as **Exterior**, **Interior**, **Retaining**, **Foundation**, **Curtain**, and **Stacked Wall**, based on their usage.

Exterior Wall Type

This category constitutes the wall types that are primarily used for generating the exterior skin of the building model. It has predefined wall types such as **Brick on CMU**, **Brick on Mtl. Stud**, **CMU Insulated**, and so on.

Interior Wall Type

The interior walls are used as the interior partitions in a building project. These walls are non-bearing in character. The predefined interior walls provided in Autodesk Revit have a dry wall construction with a metal stud frame and varying thickness.

Retaining Wall Type

As the name suggests, the primary function of the retaining walls is to retain the earth. You can either use the retaining walls provided in the program or set the function of any wall type as retaining. For example, you can select a wall from the drawing and select **Retaining - 12" Concrete** for Imperial (**Retaining 300 mm Concrete** for Metric) from the **Properties** palette. On doing so, the current wall type will be changed for retaining wall.

Foundation Wall Type

The walls that form the foundation or substrate of the main building structure belong to this category. To create a foundation wall, the **Foundation - 12" Concrete** option for Imperial (**Foundation- 300mm Concrete** for Metric) is provided as the predefined foundation wall type in the **Properties** palette.

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Curtain Wall Type

These wall types have predefined curtain walls or screen walls that consist of panels and mullions.

Stacked Wall Type

A stacked wall is a wall that is made of different types of walls stacked vertically on top of each other.

This software provides you with the flexibility of creating your own wall type. The walls that you will create can have different parameters which can be modified, depending on their usage. In Revit, you can create both architectural and structural walls. An architectural wall does not contain analytical properties like the structural walls. In the next section, various techniques to create and modify architectural walls are discussed.

Creating Architectural Walls



Ribbon: Architecture > Build > Wall drop-down > Wall: Architectural
Shortcut Key: WA

In this section, you will learn the method of creating and editing architectural walls. In Autodesk Revit, each wall type has specific predefined properties such as its usage, composition, material, characteristics, finish, height, and so on. You can select the wall type based on its specific usage in the project. Walls, like most other model elements, can be created in a plan view or a 3D view.

To create an architectural wall, first you need to invoke the **Wall: Architectural** tool and then select the appropriate wall type and specify various properties. To do so, choose the **Wall: Architectural** tool from the **Build** panel of the **Architecture** tab, refer to Figure 3-1; the **Modify | Place Wall** tab with the **Options Bar** will be displayed. In the **Options Bar**, you can define the direction of the wall by choosing either the **Height** or **Depth** option from the **Height** drop-down list. You can select the desired level upto which the wall is to be created from the **Unconnected** drop-down list. If you select the **Unconnected** option from the drop-down list then the edit box next to it will be activated. Enter the desired height upto which you want the wall to be raised. Select the reference line for sketching the wall from the **Location Line** drop-down list.

Select an exterior or interior wall type from the **Type Selector** drop-down list in the **Properties** palette, as shown in Figure 3-2. Next, from the **Properties** palette, specify and edit various properties of the wall to be created. Various wall properties and the process to specify them are discussed next.



Tip

*Besides the **Properties** palette, wall types are also listed under the **Families** head in the **Project Browser**. Left-click on the arrow sign next to the **Families** head to view the families available in Autodesk Revit. Click the arrow symbol next to the **Walls** subhead and then the one next to the **Basic Wall** subhead to display various basic wall types. Select and right-click on any wall type to display a shortcut menu with the options that can be used for editing.*

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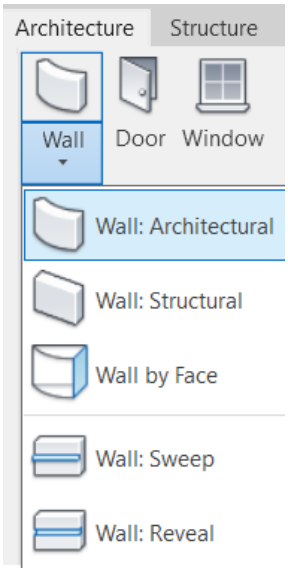

Figure 3-1 *Invoking the* ***Wall: Architectural*** *tool from the* ***Build*** *panel*

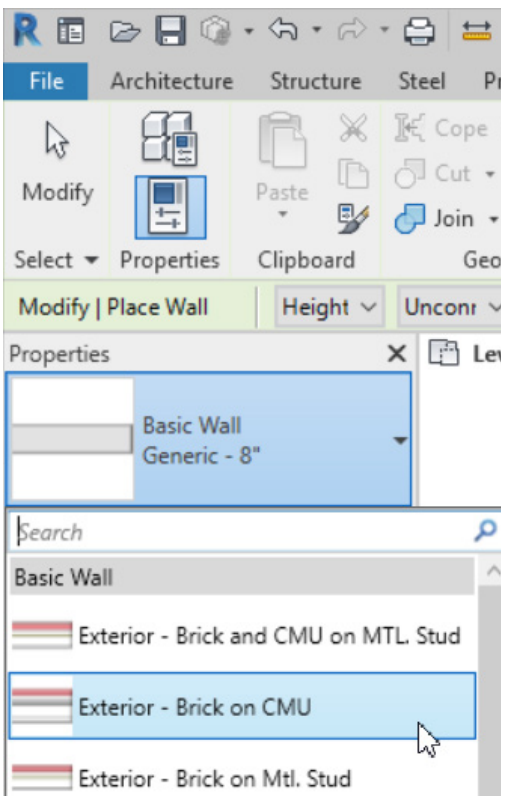

Figure 3-2 *Selecting the wall type from the* ***Type Selector*** *drop-down list*

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Specifying Architectural Wall Properties

In Autodesk Revit, wall has two sets of properties, type and instance. These set of properties control the appearance and the behavior of the element selected.

Specifying Instance Properties

After invoking the **Wall: Architectural** tool, the instance properties of the wall will be displayed in the **Properties** palette, as shown in Figure 3-3.

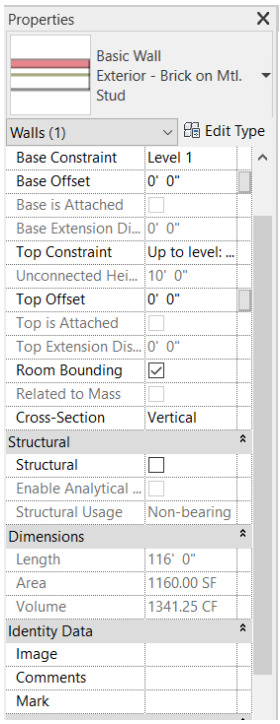

***Figure 3-3** The **Properties** palette for the **Exterior - Brick on Mtl. Stud** wall type*

The **Properties** palette contains the **Type Selector** drop-down list. You can select the family and the type of the proposed wall from this drop-down list. This palette shows various instance properties and their corresponding values for the specified instance of the element. The options in this palette depend on the type and instance of the selected element or the elements created based on the options selected in the **Type Selector** drop-down list. The properties of exterior walls are displayed in different categories such as **Constraints**, **Structural**, **Dimensions**, and **Identity Data,** each representing a set of properties corresponding to the title. You can use the twin arrows on the extreme right of the title to collapse the table of properties for each title. Some of the important parameters are discussed next.

In the **Properties** palette, the **Location Line** parameter indicates the reference line used for creating a wall. In 3D environment, the location line in a wall refers to a plane that does not get modified even if the wall parameters are changed. To assign a value to the **Location Line** parameter, click in the value field corresponding to this parameter; a drop-down list will be displayed. Click on the drop-down list to view the available options. The options in the drop-down list are given next.

Wall Centerline	-	Center line of the entire composite wall
Core Centerline	-	Center line of the structural core of the wall
Finish Face: Exterior	-	Exterior face of the wall as the location line
Finish Face: Interior	-	Interior face of the wall as the location line
Core Face: Exterior	-	Exterior face of the core
Core Face: Interior	-	Interior face of the core

The location line is indicated by a dashed line, which appears while sketching a wall segment. For example, on selecting the **Wall Centerline** option as the location line, you will notice a dashed line in the middle of the wall, as shown in Figure 3-4. When you select the **Finish Face: Interior** option, it appears on the interior face of the wall, refer to Figure 3-5.

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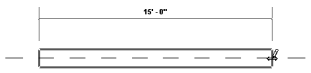

Figure 3-4 *Wall on selecting the* ***Wall Centerline*** *option*

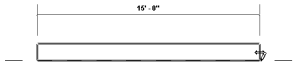

Figure 3-5 *Wall on selecting the* ***Finish Face: Interior*** *option*



Note

When a design is developed, you may need to modify certain parameters of the exterior wall such as its thickness and composition, based on the final selection of materials and their specifications. Considering this flexibility, the ***Location Line*** *parameter enables you to create walls.*

In Autodesk Revit, you can specify the height of walls by applying the base and top constraints with respect to the levels defined in the project. This means, if you set the base and height parameters of a top storey and apply these constraints, all walls will be sketched with the same base and the top. To create a wall segment that is not related to these components and levels, you can type the desired height in the column of the **Unconnected Height** instance parameter. The default value for the unconnected height is 20’ 0”.

The various instance parameters for walls and their usage are given next. The values of some of the instance parameters will be available only after an instance is created. The instance parameters of the wall are given in the table below.

Instance Parameter	**Description**
Location Line	Line or reference plane for sketching the wall
Base Constraint	Level or reference plane of the base of a wall
Base Offset	Height of a wall from its base constraint
Base is Attached	Check box showing whether or not the base of the wall is attached to any other element
Base Extension Distance	Distance of the base of the layers in a wall
Top Constraint	Specifies whether the wall height is defined by specified levels or is unconnected
Unconnected Height	Explicit height of a wall
Top Offset	Distance of the top of a wall from the top constraint
Top is Attached	Check box showing whether the top of the wall is attached to any upper element or not
Top Extension Distance	Distance of the top of a layer on a wall
Room Bounding	Specifies whether the wall constitutes the boundary of a room
Related to Mass	Specifies whether the wall relates to a massing geometry
Cross-Section	Determines whether the wall is vertical or slanted
Structural Usage	Defines the specific structural usage of a wall

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Area	Indicates the value of the surface area of a wall
Volume	Indicates the value of the volume of a wall
Image	Specifies the image file corresponding to a wall instance. This parameter can be used in the wall schedule to display the image of the wall instance
Comments	Specific comments that give description of a wall
Mark	To add a unique value or label to each wall



Tip

*The selection for the **Location Line** parameter should be based on your design intent. For example, to create walls defined by exact interior dimensions, you can select the **Finish Face: Interior** option as the location line value. Once this parameter is selected, any addition or reduction of wall thickness in the project will be made toward its outer face.*

Specifying Type Properties

The type properties of a wall specify the common parameters shared by certain elements in a family. Any changes made in the type properties of a wall element will affect all individual elements of that family in the project. To modify the type properties of an element, invoke the **Wall: Architectural** tool; the **Modify | Place Wall** tab will be displayed. In this tab, choose the **Edit Type** tool from the **Properties** panel; the **Type Properties** dialog box will be displayed, as shown in Figure 3-6.

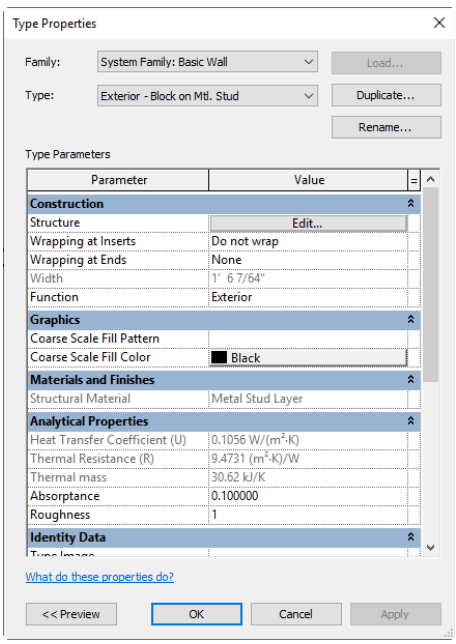

***Figure 3-6** The **Type Properties** dialog box with the **Exterior-Brick on Mtl. Stud** wall type*

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Using this dialog box, you can modify the type properties of the selected wall type such as **Structure**, **Function**, **Coarse Scale Fill Pattern**, and so on. In Autodesk Revit, in the **Type Properties** dialog box, you can view the Analytical Properties of the wall such as the **Thermal Mass**, **Thermal Resistance**, and **Heat Transfer Coefficient**. The Analytical Properties that you can edit are: **Absorptance** and **Roughness**. In the **Type Properties** dialog box, you can also define the composition of the wall type. To do so, choose the **Edit** button in the **Value** column of the **Structure** parameter; the **Edit Assembly** dialog box will be displayed. In the **Edit Assembly** dialog box, choose the **Preview** button; a preview box will be displayed. The preview box will display sectional detail of the selected wall type, as shown in Figure 3-7.

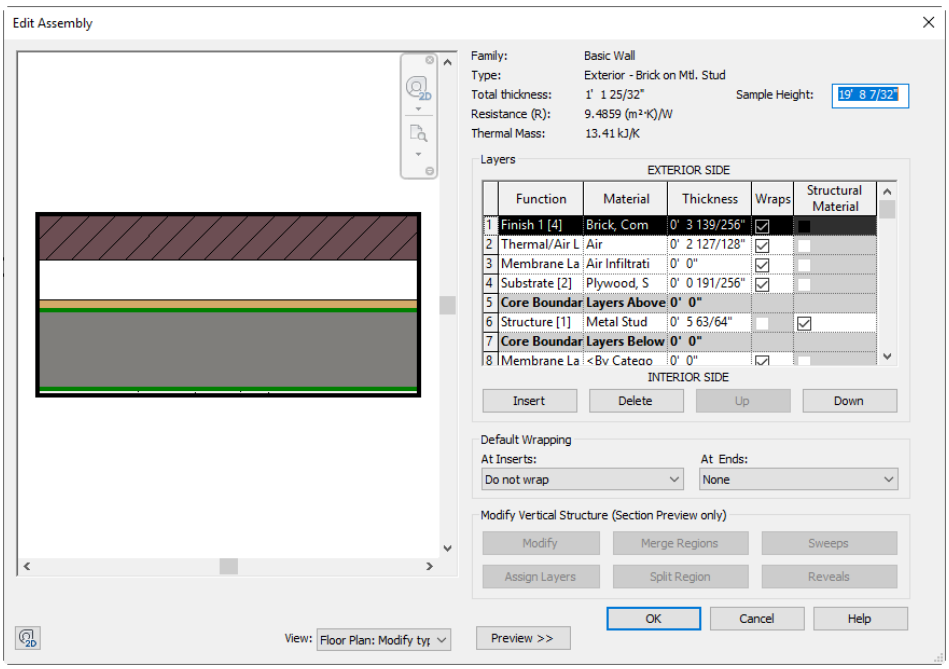

Figure 3-7 *The* ***Edit Assembly*** *dialog box with the* ***Preview*** *button chosen*

In Autodesk Revit, a wall is a composite building element and can consist of several layers. The **Layers** area in the **Edit Assembly** dialog box displays multiple layers of the selected wall, each with a specific function, material, and thickness. The layer on the top of the table represents the exterior side of a wall and the last layer represents the interior face. The **Layers** area, refer to Figure 3-7, displays the layers of the selected wall type. In this case, it is **Exterior- Brick on Mtl. Stud**. This wall type has nine layers. Each layer of the composite wall is assigned a specific function and priority based on its usage. The layers available in Autodesk Revit can be broadly classified into the categories given next.

Structure [1] - Consists of main supporting element of the structure such as concrete, brick, wood, metal stud, and so on.

Substrate [2] - Consists of material that functions as substructure, such as foundation and plywood.

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Thermal/Air Layer - Indicates the air cavity or the thermal insulation layer.

Membrane Layer - A zero thickness layer primarily for the prevention against water vapor penetration.

Finish 1 [4] - Exterior finish such as metal, brick, and stone.

Finish 2 [5] - Interior finish such as paint, gypsum wall board, and so on.



Note

The numbers placed next to certain layers show the priority set of the layer and enable Autodesk Revit to work out the joinery detail of wall segments at corners and intersections according to the priority. When joined, a higher priority layer takes precedence over a lower priority layer.

In the **Edit Assembly** dialog box, the **Material** column displays the material specification, whereas the **Thickness** column displays the thickness of each layer. The total thickness of this composite wall is the sum of thickness of all layers. In the present case, the total thickness of wall is **1'1 7/8" (350 mm)** which is given beside the **Total thickness** parameter on the top of the dialog box. You can click on the **View** drop-down list and select **Section: Modify type attributes** to view the section of the wall.



Note

*The **View** drop-down list will only be visible if you choose the **Preview** button in the **Edit Assembly** dialog box.*

Autodesk Revit enables you to add and remove layers by using the **Insert** and **Delete** buttons provided in the **Layers** area in the **Edit Assembly** dialog box. To shift the layers, choose the **Up** and **Down** buttons. You can also create your own layers. You will learn more about materials, layers, and composite walls in the later chapters. The **Default Wrapping** area in the **Edit Assembly** dialog box has two drop-down lists namely, **At Inserts** and **At Ends**. The options in these drop-down lists allow wrapping of a compound wall at the end and at the inserts (for doors and windows). From the **At Inserts** drop-down list, you can select any of the following options: **Exterior**, **Interior**, **Both**, or **Do not wrap**. Similarly, from the **At Ends** drop-down list, you can select any of the following options: **Exterior**, **Interior**, or **None**. The wrapping in the walls can be viewed in a plan view. Figures 3-8 through 3-11 illustrate the effects of different types of wrapping options on the wall.

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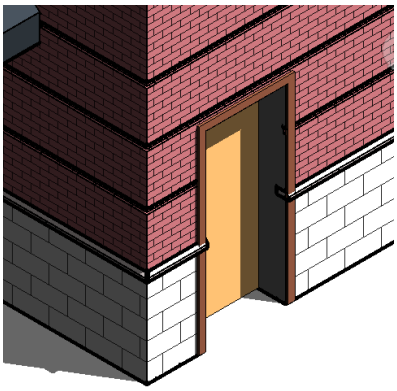

*Figure 3-8 The wall created with the **Do not wrap** option selected from the **At Inserts** drop-down list in the **Default Wrapping** area*

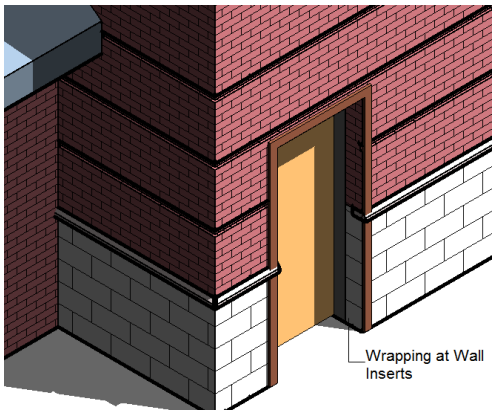

*Figure 3-9 The wall created with the **Exterior** option selected from the **At Inserts** drop-down list in the **Default Wrapping** area*

Tip

*While creating a new wall type, you can specify whether a wall is an exterior or interior wall. To do so, invoke the **Type Properties** dialog box of the wall to be created and click in the **Value** field of the **Function** parameter; a drop-down list will be displayed. From this drop-down list, you can select the **Exterior** option to assign exterior wall type function to the selected wall. Similarly, you can select the **Interior** option to assign the interior wall type function to the wall.*

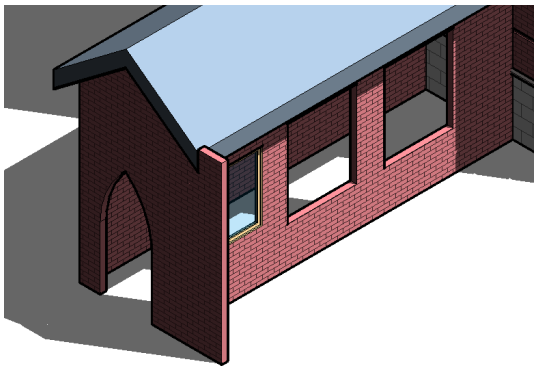

*Figure 3-10 The wall created with the **None** option selected from the **At Ends** drop-down list in the **Default Wrapping** area*

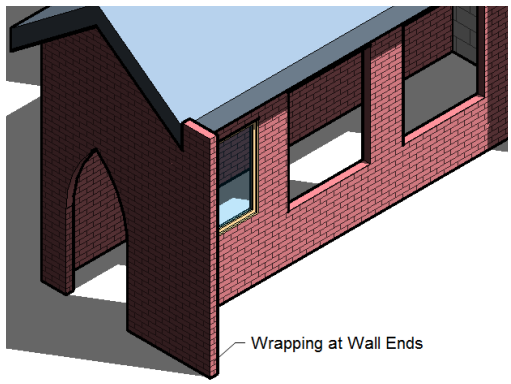

*Figure 3-11 The wall created with the **Exterior** option selected from the **At Ends** drop-down list in the **Default Wrapping** area*

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Sketching Walls

The next step after selecting the wall type from the **Properties** palette is to select the sketching tool. Autodesk Revit provides several sketching tools, such as **Line**, **Rectangle**, and others to sketch the walls of different shapes. These tools, along with the **Options Bar**, can be invoked from the **Draw** panel in the **Modify | Place Wall** tab, as shown in Figure 3-12.

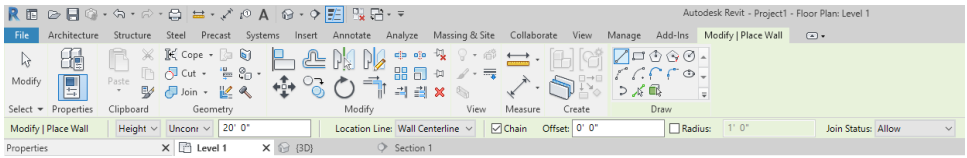

Figure 3-12 *Wall sketching tools available in the* ***Draw*** *panel*

Using Sketching Tools

In Autodesk Revit, you can access different sketching tools from the **Draw** panel and the **Options Bar** in the **Modify | Place Wall** tab. On invoking these tools, you can sketch different wall profiles. The procedure to do so is discussed next.

Sketching Straight Wall Profiles. You can sketch straight walls using the **Line** sketching tool by specifying the start point and the endpoint of the wall segment. To specify the location of the start point, click anywhere in the drawing area. Now, move the cursor in the drawing area, you will notice that a wall segment is starting from the specified point and the dimension that changes dynamically appears on it. This dimension is called the temporary dimension or listening dimension, and it shows the length and angle of the wall segment at any given location of the cursor, as shown in Figure 3-13. Also, notice that the cursor moves in increments by the value set in the **Dimension Snaps** area of the **Snaps** dialog box (See Snaps tool topic, Chapter 2). The angle subtended by the wall on the horizontal axis is also displayed and it keeps changing dynamically as you move the cursor to modify the inclination of the wall. Also notice that on bringing the cursor near the horizontal or the vertical axis, a dashed line will appear on the wall segment. This is called the alignment line and it helps you sketch the components with respect to the already created components. You will also notice that a tooltip is displayed indicating that the wall segment being sketched is horizontal, as shown in Figure 3-14.

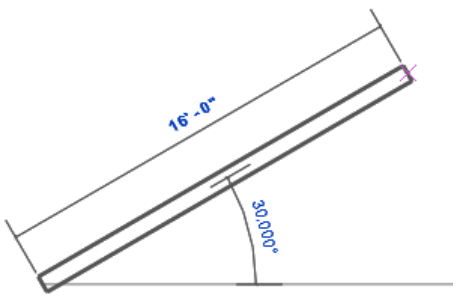

Figure 3-13 *Length and angle of the wall segment*

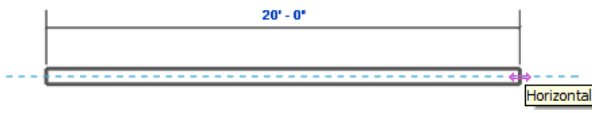

Figure 3-14 *Sketching a horizontal wall*

In Autodesk Revit, you can specify the length of the walls in two ways. First, specify the starting point of the wall, move the cursor in the desired direction, and click when the angle

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and the temporary dimension attain required values. Second, when Revit prompts you to enter start point of the wall, specify the start point by left-clicking at the desired point and enter required value in the edit box displayed. Next, press ENTER; a wall of the specified length will be drawn. Third, sketch the wall and then modify its length and angle to exact required value. For example, to sketch a 18'0"(5486 mm) long horizontal wall after specifying the starting point, you can move the cursor to the right until you see a dashed horizontal line parallel to the sketched wall. Click when the temporary dimension shows 20'0"(6096 mm) approximately. Note that the length of the wall may not be exactly 18'0"(5486 mm). You can now use the wall controls to modify the dimensions of the wall to its exact value.

To modify the wall, select the wall segment and view its control and properties. As you select the wall segment, it gets highlighted and blue symbols appear above the wall segment, as shown in Figure 3-15.

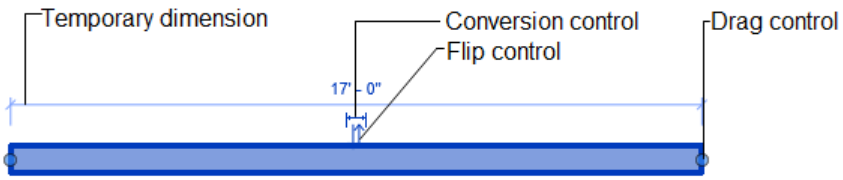

Figure 3-15 *Highlighted wall displaying its various controls*

The exact dimension of the sketched wall is visible in the dimension text of the temporary dimension. The conversion control symbol, which appears below the dimension value, is used to convert the temporary dimension into a permanent dimension. The two blue arrows which also appear on the upper face of the wall, indicate the flip control symbol for the sketched walls. They appear on the side interpreted as the exterior face of the wall. By default, the walls drawn from the left to right have the external face on the upper side and the walls drawn from the top to bottom have the external face on the right side. You can flip the orientation of the wall by clicking on the arrows symbol. Alternatively, you can place the cursor over the flip control symbol and notice the change in its color. After the color of the flip control changes, press SPACEBAR to flip the wall. The two blue dots that appear at the two ends of the wall segments are the drag control symbols. You can use them to stretch and resize the walls. To set the wall to the exact length, click on the temporary dimension; an edit box will appear showing the current dimension of the wall segment. Now, you can change the length of the wall by entering the desired value in the edit box. For example, you can enter **14' 8"(4470 mm)** in the edit box, as shown in Figure 3-16. Next, press ENTER; the length of the wall will be modified to **14' 8"(4470 mm).**

Alternatively, you can create a straight wall by typing the dimension of the length before choosing the endpoint. As soon as you start typing the length, an edit box appears above the dimension line. Enter the value of the length and press ENTER to create a wall segment of the specified length. To sketch a wall at a given angle, sketch it at any angle and then click on the angular dimension symbol; an edit box will appear. In the edit box, you can enter the exact angular dimension from the horizontal axis to which the wall will be inclined.

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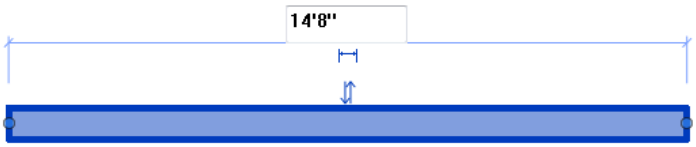

Figure 3-16 *Specifying the length of the wall*



Note

*The **Project Browser** shows **Level 1** in bold letters. This indicates that the wall has been sketched in that level.*

Sketching Rectangular Wall Profiles. You can invoke the **Rectangle** tool from the **Draw** panel in the **Modify | Place Wall** tab to sketch a rectangular wall profile. After you invoke the **Rectangle** tool, click on the screen to specify the location of one corner of the rectangular wall to be drawn. Next, move the cursor away from the point; a rectangular wall profile will be displayed along with the temporary dimension between the two parallel walls. Now, move the cursor to the desired location and when the temporary dimension attains the desired value, click to specify the diagonally opposite corner of the profile; the rectangular wall will be created along with the temporary dimensions displayed. Alternatively, you can also create a rectangular wall profile by sketching it using some rough dimension and then modifying its size. This can be done by clicking on the temporary dimension of the sketched profile and entering the exact distance in the edit box, as shown in Figure 3-17. The size of the rectangle will be modified to the exact values.

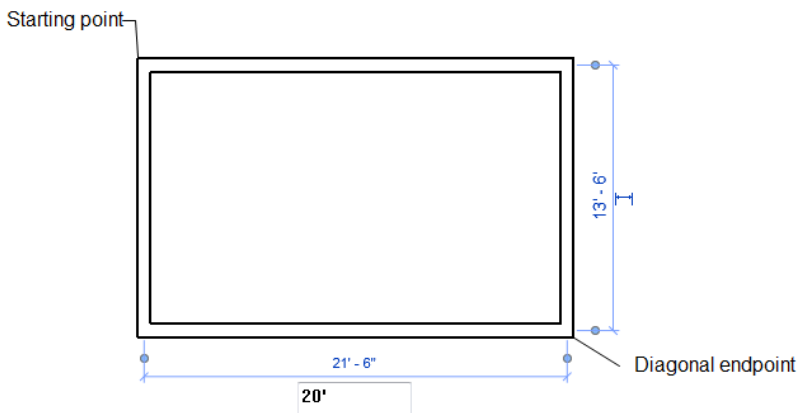

Figure 3-17 *Creating and modifying a rectangular wall profile*

Sketching Polygonal Wall Profiles. You can sketch a polygonal wall profile using either the **Inscribed Polygon** or **Circumscribed Polygon** tool from the **Draw** panel in the **Modify | Place Wall** tab. To draw an inscribed polygon, invoke the **Inscribed Polygon** tool or to draw a circumscribed polygon, invoke the **Circumscribed Polygon** tool. When you invoke any of these tools, various options for polygon creation are displayed in the **Options Bar**. In the **Options Bar**, you can specify the number of sides of the polygon in the **Sides** edit box. The polygonal profile can be created by specifying the radius of the

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inscribed or circumscribed circle. To draw an inscribed polygon, choose the **Inscribed Polygon** tool from the **Draw** panel in the **Modify | Place Wall** tab and then specify the desired number of sides, height (if unconnected), and offset value in the respective edit boxes in the **Options Bar**. Next, click in the drawing area to specify the center of the polygon. Then, drag the cursor and click again to get the desired radius; the inscribed polygon will be created. Similarly, a circumscribed polygon can also be created by choosing the **Circumscribed Polygon** tool from the **Draw** panel in the **Modify | Place Wall** tab.

Sketching Circular Wall Profiles. The **Circle** tool in the list box can be used to sketch circular wall profile. To sketch a circular wall profile, invoke the **Circle** tool from the **Draw** panel of the **Modify | Place Wall** tab and click in the drawing area to specify the center point of the circular wall. You will notice that a circular wall profile is extending dynamically with the specified point as the center and the other end attached to the cursor, as shown in Figure 3-18. The temporary radial dimension will also be displayed. Click when the desired value for the radius is displayed. Alternatively, before clicking on the second point, type the value for the radius of the circular profile. As you type, the value will be displayed in the edit box. Press ENTER to complete the profile. Notice that the dimension that you entered is the distance of the center point to the location line of the profile.

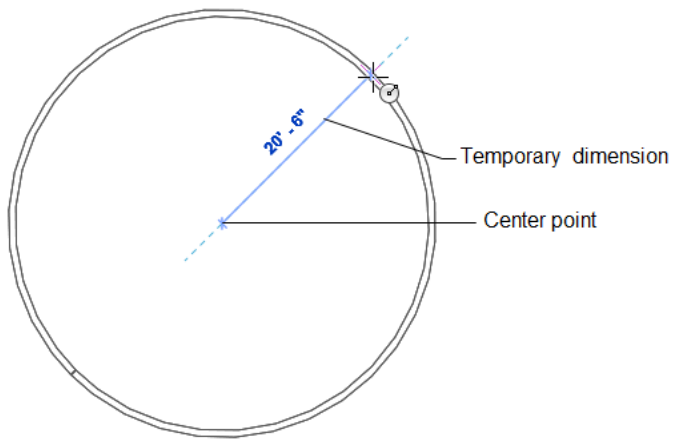

Figure 3-18 *Sketching the Circular wall profile*

Sketching Start-End-Radius Arc Profiles. The **Start-End-Radius Arc** tool in the **Draw** panel of the **Modify | Place Wall** tab enables you to sketch an arc wall by specifying the start point, end point, and the intermediate point that determines the radius of the arc. To create an arc wall, invoke the **Start-End-Radius Arc** tool from the **Draw** panel of the **Modify | Place Wall** tab; you will be prompted to specify the start point of the proposed arc wall. Specify the start point by clicking in the drawing area. Now, you will be prompted to specify the endpoint of the curved wall. Specify the endpoint of the curved wall; a curved wall with a variable radius stretches dynamically between the two specified points. Specify the location of the third point between the two specified points to specify the subtended angle or the radius of the arc. As you specify the third point, the angular and radial temporary dimensions are displayed along with the curve on the screen. Next, click

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in the drawing area to specify the third point; the curved wall will be sketched. You can also modify the sketched wall to the desired curvature parameters such as radius, angle subtended, orientation, and so on. To modify the curvature, select the sketched wall, click on the parameter such as the angular dimension and enter the new value, as shown in Figure 3-19. You can also use the drag controls to increase or decrease the extent of the wall. The central blue dot can be used to stretch the wall, keeping the subtended angle constant.

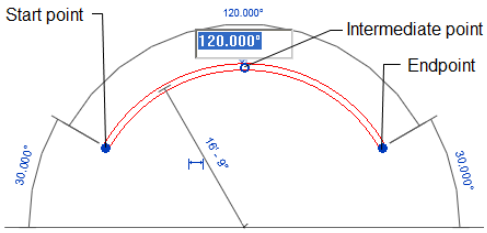

Figure 3-19 *Sketching and modifying a curved wall profile*

Sketching Center-ends Arc Wall Profiles. You can sketch a curved wall by specifying its center point and two endpoints. To do so, choose the **Center-ends Arc** tool from the **Draw** panel in the **Modify | Place Wall** tab. Next, click in the drawing area to specify the location of the center point and then move the cursor. Click when the desired value of the radius is displayed. You can also type the radius value and then press ENTER. The point that you specify will be taken as the start point of the wall. Next, click in the drawing area again to specify the endpoint of the arc wall. Note that the curved wall segment can be extended up to 180-degree. When the angle exceeds 180-degree, the wall will flip the side. Once the wall is sketched, you can select it and modify its parameters such as its subtended angle and radius. You can also modify the curvature keeping the radius fixed by using the drag controls, refer to Figure 3-20.

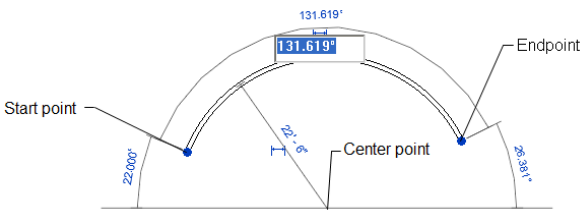

Figure 3-20 *Sketching a curved wall profile using the* ***Center-ends Arc*** *sketching tool*

Sketching an Elliptical Wall. To sketch an elliptical wall, choose the **Ellipse** tool from the **Modify | Place Wall** tab. Now click in the drawing area to specify the center of the ellipse and move the cursor away from the center in any direction. After specifying the direction, you can drag and click the cursor when the required value of the radius is displayed or you can enter the required value in the temporary dimensions box. Next, move the cursor in the direction perpendicular to the direction specified previously and click; the elliptical wall will be displayed, as shown in Figure 3-21.

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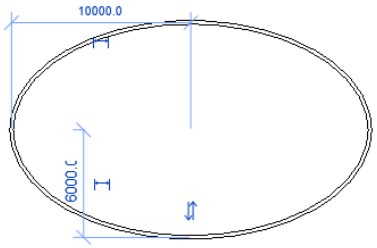

Figure 3-21 Sketching and modifying an elliptical wall profile

Sketching Tangent End Arcs Wall Profiles. To sketch a curved wall profile that starts tangentially from an existing wall, invoke the **Tangent End Arc** tool from the **Draw** panel in the **Modify | Place Wall** tab and click at the endpoint of an existing wall to specify the start point. After specifying the start point, move the cursor to the desired distance and click to define the curved wall profile.

Sketching Fillet Arc Wall Profiles. To create a curved fillet wall between the two existing walls, choose the **Fillet Arc** tool in the **Draw** panel of the **Modify | Place Wall** tab. Now, one by one, click on the two walls to create a fillet close to the desired fillet end. On doing so, a fillet wall will appear, showing its possible locations, as shown in Figure 3-21. Click to specify the location of the fillet. Once the fillet wall is sketched, you can modify its radius by clicking on it and typing its value. Notice that the walls are automatically trimmed after placing the fillet arc.

Using the Chain Option. Select the **Chain** check box in the **Options Bar** to create a continuous wall profile with a number of wall segments. It enables you to create a continuous wall with wall segments connected end to end. The end point of the previous wall becomes the start point of the next wall. To enable the **Chain** option, select the check box before or while sketching the wall profile. You can also use this option while using different sketching tools.

Using the Offset Option. The **Offset** edit box can be used to create a wall that starts at a specified offset distance from a point defined in an existing element. You can enter the offset distance value in the **Offset** edit box provided in the **Options Bar**. However, the shape of the resulting wall depends on the sketching tool selected. After entering the offset value and selecting the sketching option, click near the element to define the offset distance. When you move the cursor, the wall will start at the specified distance from the selected point. For example, this option can be used for creating boundary walls that are placed at a specific distance from the building profile.

Using the Radius Option. The **Radius** edit box in the **Options Bar** is used to specify the radius while sketching a circular, curved, or a fillet wall. You can type the value of the radius in the **Radius** edit box before or after invoking the desired sketching tool.

Tip

An appropriate sketching option should be selected based on the desired wall profile. You can also sketch walls using a combination of available sketching tools.

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CREATING SLANTED WALLS



In Revit 2021, you can create slanted walls. To create a slanted wall, sketch the desired wall profile and choose the **Slanted** option from the drop-down list corresponding to the **Cross-Setion** option in the **Properties** palette. Now, specify a value for the angle of inclination of the wall from the vertical in the **Angle From Vertical** option.

WORKING WITH STACKED WALLS

In Autodesk Revit, besides basic wall and curtain wall there is a special kind of wall called a stacked wall. A stacked wall is a wall created using two or more basic walls that are stacked on top of another to form a complex design. These walls are assembled in such a way that the entire facade acts as a single wall. In the next section, you will learn about various options that are used to create a stacked wall and then add it to the project.

Creating a Stacked Wall

To create a stacked wall, choose the **Wall: Architectural** tool from **Architecture > Build > Wall** drop-down; the **Modify| Place Wall** tab with the instance parameters in the **Properties** palette will be displayed. In the **Properties** palette, select the stacked wall type from the **Type-Selector** drop-down list. After selecting the stacked wall type, choose the **Edit Type** button from the **Properties** palette; the **Type Properties** dialog box will be displayed.

In the **Type Properties** dialog box, choose the **Duplicate** button to create a new type of stacked wall; the **Name** dialog box will be displayed. In this dialog box, enter a desired name and choose the **OK** button; the **Type Properties** dialog box will be displayed and the created type will be updated in the **Type** drop-down list. Now, you are required to edit the structural properties to form a new type. Choose the **Edit** button corresponding to the **Structure** parameter; the **Edit Assembly** dialog box will be displayed. In this dialog box, select the type of wall from the **Name** column. In the **Height** column, you need to specify the height of the walls. By default, the height of first wall is **Variable**. If you want to make other wall types as variable, select the desired wall type; the **Variable** button will be activated. Choose the **Variable** button to change the wall to variable. If you want to insert a row then choose the **Insert** button and to delete a row, choose the **Delete** button. You can use the **Preview** button to preview the stacked wall. Next, choose the **OK** button twice; the **Edit Assembly** and the **Type Properties** dialog boxes will be closed and will be selected in the **Type Selector** drop-down list. Now, you can use the stacked wall to create the building.

ADDING INTERIOR WALLS

In Autodesk Revit, interior walls are of a different wall types. They differ from the exterior wall types based on their usage, material specifications, and non load-bearing character. Several predefined interior wall types are provided in the Autodesk Revit libraries.

To view the interior wall types, choose the **Wall: Architectural** tool from **Architecture > Build > Wall** drop-down; the instance parameters of the wall will be displayed in the **Properties** palette. From this palette, you can select different types of walls available in Revit. The wall types that may be used as interior walls have been assigned the prefix **Interior**. Based on the project requirement, you can select the appropriate interior wall type from the drop-down list. For example, **Interior - 5" Partition (2-hr)** is a type of interior wall for Imperial (**Interior - 135**

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mm Partition (2-hr) for Metric) with a 2-hour fire rating and can be selected from the **Properties** palette, as shown in Figure 3-22.

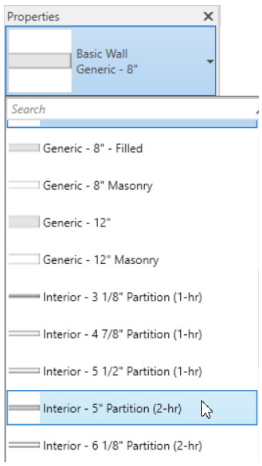

Figure 3-22 *Selecting the interior wall type from the* ***Properties*** *palette*

To view and specify the properties of an interior wall type, you can use the **Properties** palette, as shown in Figure 3-23. This palette shows various parameters of the selected wall such as **Unconnected Height**, **Location Line**, **Structural Usage**, **Top Constraint**, and so on. You can modify these parameters by entering a new value or selecting the required value from the corresponding value field in the **Properties** palette.

Tip
After creating a wall, right-click on any end of the wall; a shortcut menu will be displayed. Choose the ***Disallow Join*** *option from the shortcut menu to prevent the wall end from joining with other walls.*

The sketching tools explained earlier (for exterior walls) can also be used for sketching interior walls. When you sketch the interior walls, the top constraint of the interior walls is automatically set to a level above the current level.

Tip
The ***Location Line*** *parameter in the* ***Properties*** *palette of the selected walls is useful for creating interior walls. You can create interior walls at some specified distance from another existing wall using the* ***Finish Face: Interior*** *option.*

Note
The interior walls do not create a neat junction with the exterior walls as they have different composition and characteristics.

Walls are the host elements for other building elements such as doors and windows. Therefore, deleting walls will delete all their dependent elements as well.

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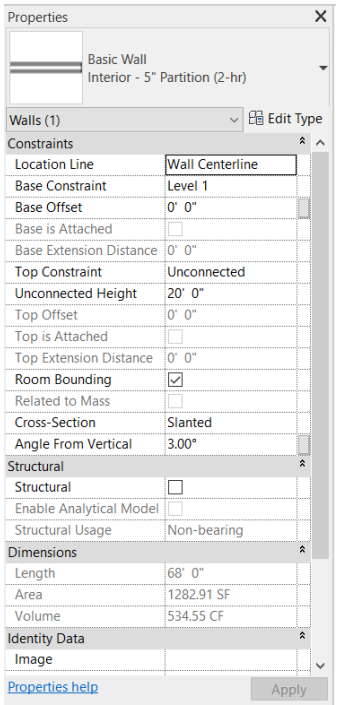

Figure 3-23 *The* ***Properties*** *palette for the* ***Interior - 5" Partition (2-hr)*** *wall type*

The basic composition of an interior wall type can be viewed by choosing the **Type Properties** tool from the **Properties** panel in the **Modify | Place Wall** tab. On doing so, the **Type Properties** dialog box will be displayed, showing different type parameters of the selected wall type.

To view the structural composition of a wall type, choose the **Edit** button in the **Structure** type parameter; the **Edit Assembly** dialog box will be displayed, showing layers for the corresponding wall type. For example, the **Interior - 5" Partition (2-hr)** for Imperial or (**Interior-135 mm Partition (2-hr)** for Metric) wall type comprises of seven layers with different materials and thickness. You can use the **Insert** and **Delete** buttons to modify the wall type. You can choose the **Preview** button to display the graphic view of the **Interior - 5" Partition (2-hr**) for Imperial (**Interior - 135mm Partition (2-hr**) for Metric) wall type in the preview area, as shown in Figure 3-24.

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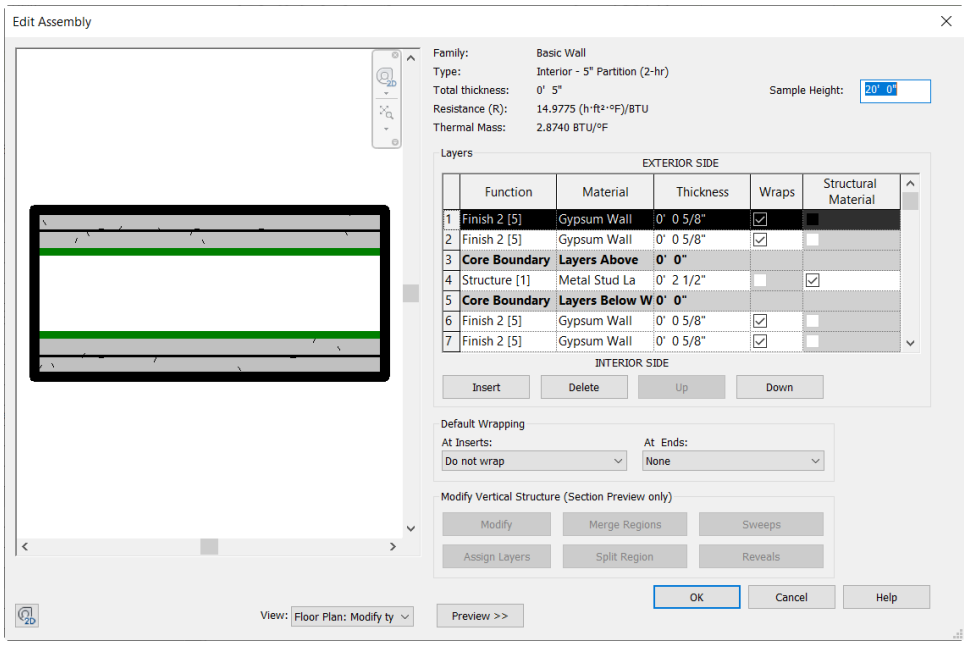

Figure 3-24 *The* ***Edit Assembly*** *dialog box for the* ***Interior - 5" Partition (2-hr)*** *wall type*

Tip

In Autodesk Revit, you can add a structural wall to a project by choosing the ***Wall: Structural*** *tool from* ***Architecture > Build > Wall*** *drop-down. The structural wall has analytical properties that can be used for structural analysis.*

ADDING WALL SWEEPS AND REVEALS

In an architectural project, wall sweep and wall reveal act as modifiers in a wall. Each type of wall sweep and wall reveal has predefined properties. You can select and use any type of wall sweep and wall reveal based on its usage in project. Wall sweep is used to add a baseboard, crown molding or other type of decorative horizontal or vertical projections to a wall. Wall reveal is used to add a decorative horizontal or vertical cutout to a wall. Wall sweep and wall reveal provide advancement to the building model by adding skirtings, projections and cutout to a building.

Note

Wall sweep and wall reveal can be added to a wall only in 3D view or in elevation view.

Wall Sweeps

Ribbon: Architecture > Build > Wall drop-down > Wall: Sweep

To add details to a wall, you can add a wall sweep by using the **Wall Sweep** tool. Wall Sweep can be selected either in an elevation view or in 3D view. Choose the **Default 3D View** tool from the **Quick Access Toolbar**; the user interface will be displayed. Next, invoke the **Wall: Sweep** tool from the **Build** panel of the **Architecture** tab, as shown in Figure 3-25. On doing so, the

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Modify | Place Wall Sweep tab will be displayed. In the **Placement** panel of this contextual tab, the **Horizontal** tool is selected by default. As a result, the wall sweep will be added horizontally to the face of the wall. Select the required type of the wall sweep from the **Type Selector** drop-down list. Now, move the cursor over the face of the wall; a preview of the wall sweep along with the temporary dimensions will be displayed on the wall face. Click at the desired level of elevation; a wall sweep will be created, as shown in Figure 3-26. After adding the wall sweeps at desired faces of the wall, press ESC, or choose the **Modify** button from the **Select** panel to exit from the contextual tab. Similarly, you can add a vertical wall sweep at the face of the wall. To create a vertical wall sweep, choose the **Vertical** tool from the **Placement** panel.

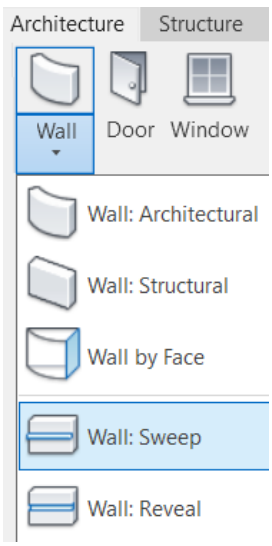

Figure 3-25 *Invoking the* ***Wall: Sweep*** *tool from the* ***Build*** *panel*

After adding the wall sweep to the wall, you can change the properties of the sweep such as its profile. To change the profile of the sweep, invoke the **Edit Type** button from the **Properties** palette; the **Type Properties** dialog box will be displayed. Now, choose the **Duplicate** button from the upper right corner of this dialog box; the **Name** dialog box will be displayed. In this dialog box, enter the desired name in the **Name** edit box and choose the **OK** button to return to the **Type Properties** dialog box. In this dialog box, you can select the desired wall sweep type from the **Profile** drop-down list by clicking on the value field of the corresponding parameter. You can edit the **Subcategory of Walls** by clicking on the corresponding value field of the **Type Properties** dialog box.



Tip

You can add more options to the ***Type-Selector*** *drop-down list by loading more families of profile into the drawings. To load more options, choose the* ***Load Family*** *tool from the* ***Load From Library*** *panel of the* ***Insert*** *tab; the* ***Load Family*** *dialog box will be displayed. In this dialog box, the predefined family profiles are available in* ***Profiles > Wall folder****.*

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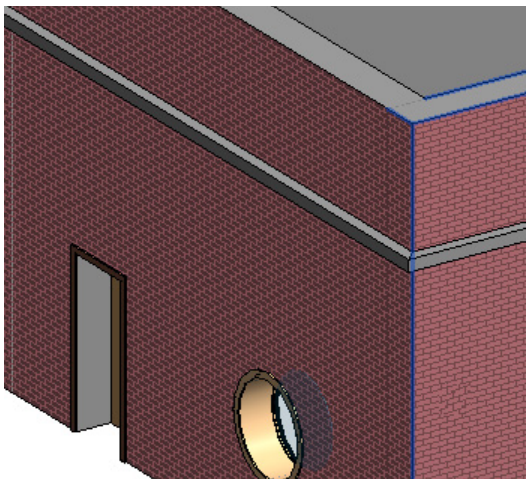

Figure 3-26 *Wall sweep added to the wall*

The methods to modify other **Type Properties** are discussed next.

Modifying Type Properties

The **Type Properties** dialog box displays various type parameters of wall sweep such as **Constraints**, **Construction**, **Material and Finishes**, and **Identity Data**. To edit the parameters, click in the **Value** field corresponding to any of the parameters under these heads and then specify a desired value to it. To edit the material properties of the wall sweep, click in the **Value** field corresponding to the **Material** parameter; a Browse button will be displayed. Choose the Browse button; the **Material Browser** dialog box will be displayed. You can use various options in this dialog box to specify the desired material for the wall sweep. Choose the **OK** button: the **Material Browser** dialog box will be closed and the specified material will be assigned to the wall sweep type.

Now, to create a copy of the original sweep type, you can choose the **Duplicate** button from the top right corner in the **Type Properties** dialog box. On doing so, the **Name** dialog box will be displayed, and you will be prompted to assign a new name to the duplicate copy. Enter a name in this edit box and choose the **OK** button; a new sweep type is created which inherits the properties of the parent sweep type. Now, you can modify its parameters, as desired. The **Rename** button is also available on the top right corner. This button is used to give a new name to the selected sweep type without changing its properties.

Now, you will learn to modify the instance properties of the sweep type.

Modifying Instance Properties

You can modify various instance properties of the wall sweep by using the parameters in the **Properties** palette. The modification in these properties results in the change of the properties of only that particular instance in the project. The description of various instance parameters is provided in the table given next:

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Instance Parameter	Description
Offset From Wall	Copies or moves a selected element to a specified distance from Wall face
Level	Level or reference plane of the base of a wall sweep and the properties shown only for Horizontal Sweep
Offset From Level	Specifies distance of sweep from level
Length	Indicates the length of a wall sweep
Image	Specifies the image file corresponding to a wall instance. This parameter can be used in the wall schedule to display the image of the wall instance.
Comments	Describes about the Wall Sweep
Mark	Add a mark or label to each sweep
Phase Created	Phase in which a wall sweep is created
Phase Demolished	Phase in which a wall sweep was demolished
Orientation	Sets the orientation of the sweep

Wall Reveals

Ribbon: Architecture > Build > Wall drop-down > Wall: Reveal

To complete the design of our wall, you need to add decorative cutout in the wall. To do so, you can use the wall reveal. To add a wall reveal, you need to be in an elevation view or in 3D view and then invoke the **Wall: Reveal** tool from the **Build** panel of the **Architecture** tab, refer to Figure 3-27; the **Modify | Place Reveal** tab will be displayed. In this contextual tab, select the desired orientation of the wall reveal by choosing either the **Horizontal** or **Vertical** tool from the **Placement** panel. Next, select the type of the wall reveal from the **Type Selector** drop-down list and then move the cursor over the face of the wall; a preview of the wall reveal with the temporary dimension will be displayed along the wall face. Click at desired level of elevation; a wall reveal will be added, as shown in Figure 3-28. You can add the wall reveal to other walls by clicking on their faces. After adding the wall reveal at desired faces of the wall, press ESC or choose the **Modify** button from the **Select** panel to exit the contextual tab. After adding the wall reveal to the wall, you can change the properties of the reveal such as its profile. To change the profile of the reveal, invoke the **Edit Type** button from the **Properties** palette; the **Type Properties** dialog box will be displayed. Choose the **Duplicate** button from the upper left corner of this dialog box; the **Name** dialog box will be displayed. In this dialog box, enter the desired name in the **Name** edit box and choose the **OK** button to return to the **Type properties** dialog box. In this dialog box, you can select the desired **Wall Reveal** type from the **Profile** drop-down list by clicking on the value field of this dialog box.

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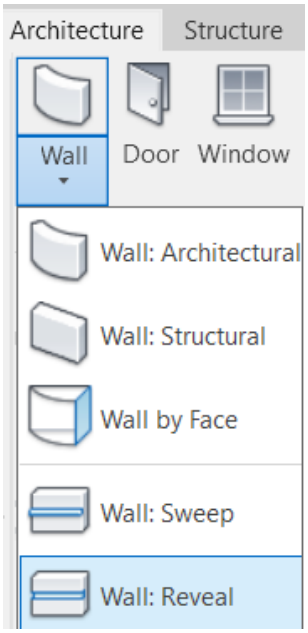

Figure 3-27 *Invoking the* ***Wall: Reveal*** *tool from the* ***Build*** *panel*

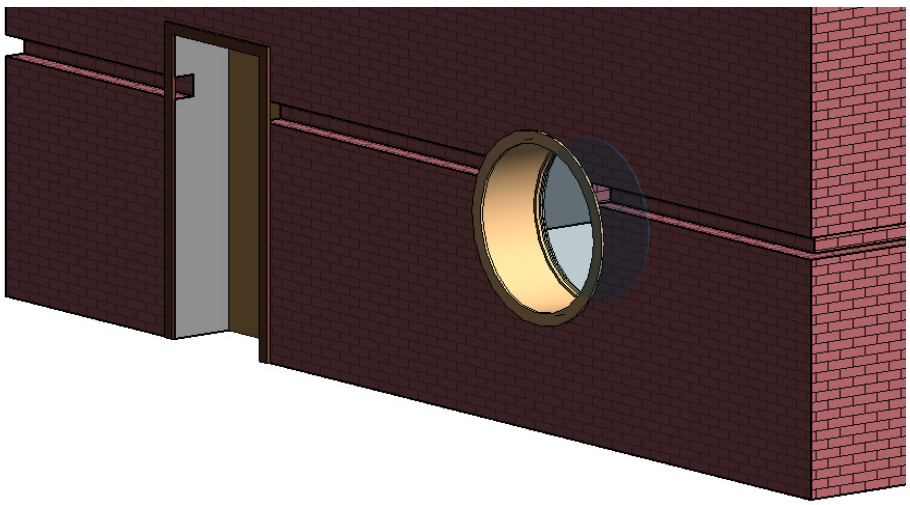

Figure 3-28 *Wall reveal added to the wall*

Now, you will learn to modify **Type Properties** and **Instance Properties** of the wall reveal.

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Modifying Type Properties

To modify the type properties of the selected **Wall Reveal** type, choose the **Edit Type** button from the **Properties** palette; the **Type Properties** dialog box for the selected reveal type will be displayed. The **Type Properties** dialog box displays the value of various parameters of **Wall Reveal**. The various type parameters are described in the following table:

Parameter	Description
Default Setback	By default, the default setback value in the edit box is 0'0". Wall reveal changes with the change in the value from positive to negative. The setback helps in making reveal type near windows and door trims.
Profile	Wall reveal is created by the profile family.

Modifying Instance Properties

To modify the instance properties of the selected **Wall Reveal** type, choose the reveal from the drawing window the **Properties** palette displays the **Instance Properties** of that reveal type. The various instance parameters are described next:

Instance Parameter	Description
Offset From Wall	Copies or moves a selected element to a specified distance from Wall face
Level	Level or reference plane of the base of a wall reveal and the properties shown only for Horizontal Sweep
Offset From Level	Specified distance of reveal from level
Length	Indicates the length of a wall reveal
Orientation	Sets the orientation of the reveal



Tip

*Wall sweep and wall reveal type can also be used directly by invoking the **Edit Type** button in the **Properties** palette of the wall. This dialog box is used only when sweep type or reveal is required throughout the building model along with the wall.*

TUTORIALS

The following tutorials are designed to familiarize you with the concepts of invoking the **Wall: Architectural** tool, selecting the wall type, modifying the wall properties, using the sketching tools, and sketching a wall with the given parameters.

All the files used in the tutorials can be downloaded from the CADCIM website. These files are compressed in zip file format and are required to be extracted before using them in the tutorials. The path of the files is as follows: *Textbooks > Civil/GIS > Revit Architecture > Exploring Autodesk Revit 2021 for Architecture*. For example, the tutorial file, *c02_Apartment_tut1.rvt* that is used in Tutorial 1 of Chapter 3 is compressed in the *c02_rvt_2021_tut.zip file*.

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Tutorial 1 Apartment 1

In this tutorial, you will create the exterior walls of a two-room apartment based on the sketch plan shown in Figure 3-29. The dimensions have been given only for reference and are not to be used in this tutorial. The project file and the parameters to be used for creating the exterior walls are given next. **(Expected time: 30 min)**

1. Project file-
   For Imperial *c02_Apartment_tut1.rvt*
   For Metric *M_c02_Apartment_tut1.rvt*
2. Exterior wall type- **Basic Wall: Exterior - Brick on Mtl. Stud**.
3. Location line parameter- **Wall Centerline**; Top Constraint- **Up to Level 2.**

The following steps are required to complete this tutorial:

a. Open the *Apartment 1* project file created in Tutorial 1 of Chapter 2.
b. Invoke the **Wall**: **Architectural** tool from the ribbon.
c. Select the exterior wall type **Exterior - Brick on Mtl. Stud** from the **Properties** dialog box.
d. Modify **Top Constraint**- **Up to level: Level 2** and **Location Line** - **Wall Centerline** as wall properties using the **Properties** palette.
e. Invoke the **Line** sketching tool and then sketch the exterior walls based on the given parameters.
f. Save the project using the **Save As** tool.
   For Imperial *c03_Apartment1_tut1.rvt*
   For Metric *M_c03_Apartment1_tut1.rvt*
g. Close the project.

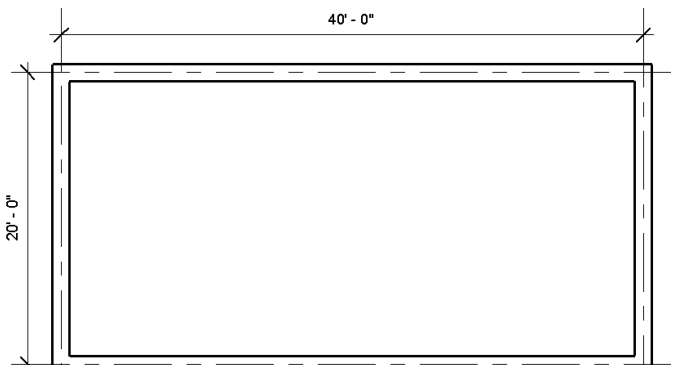

Figure 3-29 *Sketch plan for creating exterior walls for the Apartment 1 project*

Opening the Project File

Choose **Open > Project** from the **File** menu and open the *c02_Apartment1_tut1.rvt (M_c02_Apartment1_tut1.rvt for Metric)* project file. You can also download this file from *https://www.cadcim.com*. The path of the file is as follows: *Textbooks > Civil/GIS > Revit Architecture > Exploring Autodesk Revit 2021 for Architecture*.

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Invoking the Wall: Architectural Tool and Selecting the Wall Type

To start sketching the wall, you must invoke the **Wall: Architectural** tool from the ribbon and select the wall type to be used **(Exterior - Brick on Mtl. Stud** in this case).

1. Invoke the **Wall: Architectural** tool from **Architecture > Build > Wall** drop-down; the **Modify | Place Wall** tab is displayed.

2. In the **Type Selector** drop-down list of the **Properties** palette, select the **Exterior - Brick on Mtl. Stud** wall type.

Modifying Properties of the Exterior Wall

After selecting the wall type, you need to modify the instance properties of the wall type using the **Properties** palette.



Note

The default.rte or (DefaultMetric.rte for Metric) template file used for this project has two predefined levels: ***Level 1*** *and* ***Level 2****.*

1. In the **Properties** palette, ensure that the **Location Line** parameter has **Wall Centerline** as the default value. Click on the column adjacent to the **Top Constraint** instance parameter; a drop-down list is displayed. Select **Up to level: Level 2** from this drop-down list, and choose the **Apply** button, as shown in Figure 3-30.



Tip

If the ***Properties*** *palette is not displayed in the User interface screen by default, select the* ***Properties*** *check box from* ***View > Windows> User-Interface*** *drop-down.*

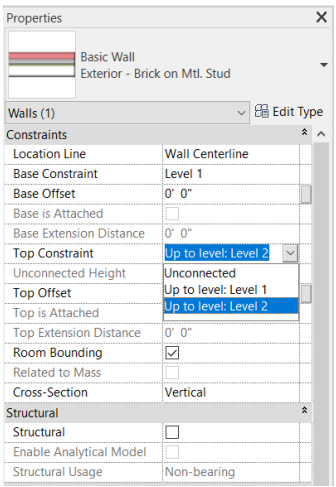

Figure 3-30 *Setting the* ***Top Constraint*** *parameter using the* ***Properties*** *palette*

Sketching the First Exterior Wall Segment

To sketch a wall, you need to choose an appropriate sketching tool from the **Draw** panel in the **Modify | Place Wall** tab. The exterior walls of the given sketch of the *Apartment 1* project can be created using the **Rectangle** tool. You will however use the **Line** tool to learn and understand the usage of this tool for sketching the straight walls.

1. Ensure that the **Line** tool is chosen in the **Draw** panel in the **Modify | Place Wall** tab and the **Chain** check box is cleared in the **Options Bar**.

2. Ensure that the **Allow** option is selected in the **Join Status** drop-down list.

3. Click between the four inward arrow keys to specify the start point of the first wall segment. Next, move the cursor toward the right hand side. On doing so, a wall segment starts from the specified point with temporary dimension appearing on it. The dimension changes

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dynamically as you move the cursor. This shows the length of the wall segment at any given location of the cursor.

4. Right-click in the drawing area; a shortcut menu is displayed. Choose the **Zoom In Region** option from the shortcut menu and zoom into the area to get a closer view of the sketched wall segment, as shown in Figure 3-31 (for zooming techniques, refer to Chapter 2- Starting an Architectural Project).

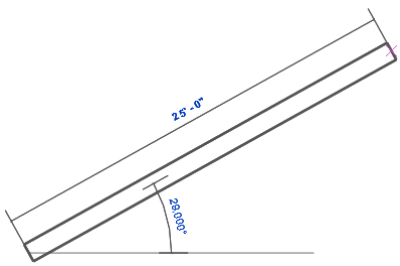

Figure 3-31 *The temporary dimensions displayed on the wall*

5. Move the cursor on the horizontal axis such that a dashed line appears at the central axis of the wall segment, as shown in Figure 3-32. Notice the two-sided arrow attached to the endpoint of the wall. This indicates that the wall segment being sketched is horizontal. A tooltip indicating the horizontal alignment is also displayed with two-sided arrow.

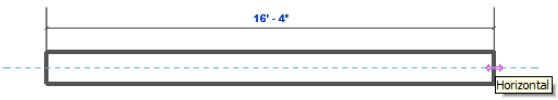

Figure 3-32 *Sketching a horizontal wall segment*

6. Move the cursor to the right until the temporary dimension shows a value more than 40'- 0"(12192 mm), as shown in Figure 3-33. Click at this location as the endpoint of the wall segment and press ESC twice; the wall is created. Note that, if the dimension is not displayed, you need to click on the created wall to display the dimension. Press ESC.

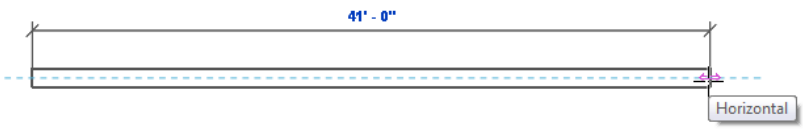

Figure 3-33 *The sketched horizontal wall with its controls*



Note

You can create a wall of exactly 40'0"(12192 mm) length using the dimension snaps set in the ***Snaps*** *dialog box. The only purpose of creating a wall of length more than the desired length is to explain how to modify the length of the sketched wall to the exact value.*

Modifying the Length of the Sketched Exterior Wall

You will now modify the length of the sketched wall to the actual dimension, as given in the *Apartment 1* sketch.

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1. Select the created wall and click on its temporary dimension; an edit box appears showing the current dimension of the wall segment.

2. Enter **40' (12192 mm)** in the edit box, as shown in Figure 3-34 and then press ENTER; the length of the wall is modified to 40'0"(12192 mm). Press ESC to exit the **Modify | Walls** tab.

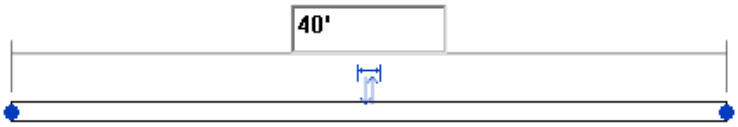

Figure 3-34 *Modifying the length of a wall segment using temporary dimensions*



Tip

To exit the current tool, you can also right-click and choose ***Cancel*** *from the shortcut menu displayed.*



Note

By default, the exterior faces of the walls drawn from the left to right are on the upper face, and those drawn from top to bottom are on the right face. Similarly, the exterior faces of the walls drawn from right to left are on the lower face, and those drawn from the bottom to top are on the left side. Hence, you can minimize the use of the ***flip*** *tool by sketching the walls in appropriate direction.*

Sketching Other Exterior Wall Segments

In this section, you need to create other exterior wall segments using the **Endpoint** object snap tool.

1. Choose the **Wall: Architectural** tool from **Architecture > Build > Wall** drop-down. Now, bring the cursor close to the right endpoint of the first wall segment. When the cursor shows a square box at the endpoint (indicating the **Endpoint** object snap), as shown in Figure 3-35, click to specify the start point of the second wall segment.



Figure 3-35 *Starting a second exterior wall segment using the* ***Endpoint*** *object snap option*

2. Move the cursor; a wall is dynamically created with one end attached to the specified point and the other end attached to the cursor. Move the cursor vertically downward. A dashed vertical line is visible inside the wall segment. Now, enter **20'0"(6096 mm)** as the value of the length; an edit box is displayed with the dimension that you have entered, as shown in Figure 3-36. Press ENTER; the second wall segment is sketched exactly to **20'0"(6096 mm)** length.

   Notice that the intersection of the first and second wall segments has been intuitively filled or completed.

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Figure 3-36 *Creating the second exterior wall segment*

3. To create the third wall segment, select the **Chain** check box from the **Options Bar**.

4. Move the cursor close to the endpoint of the second wall segment and click when the endpoint object snap is displayed. On doing so, the third wall segment starts from this specified point. Move the cursor horizontally toward the left. Now, hold the SHIFT key while moving the cursor.

   Notice that the cursor can now move only in orthogonal directions (in horizontal and vertical direction). When the length of the wall segment is around **40'0"(12192 mm)**, a vertical dashed line originates from the start point of the first wall segment. The alignment line shows the point on the third wall segment that is in plumb with the first point. An intersection snap symbol indicated by an X appears at this point, as shown in Figure 3-37.

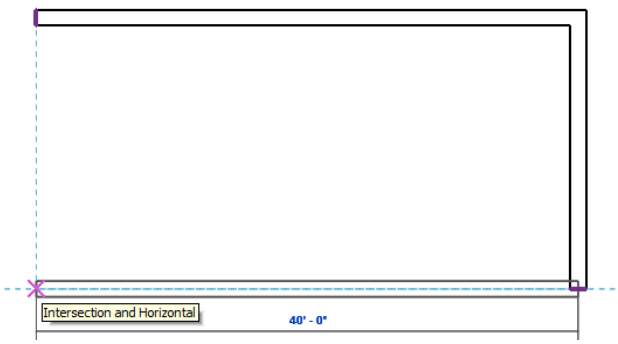

Figure 3-37 *Creating the third wall segment*

5. Click to specify the location of the endpoint of the third wall segment when the intersection snap symbol is displayed.

6. As you have enabled the **Chain** option, the next wall segment automatically starts from the last specified point. Move the cursor vertically upward and enter **25'(7620 mm)**, as shown in Figure 3-38, and then press ENTER. The fourth wall segment is created.

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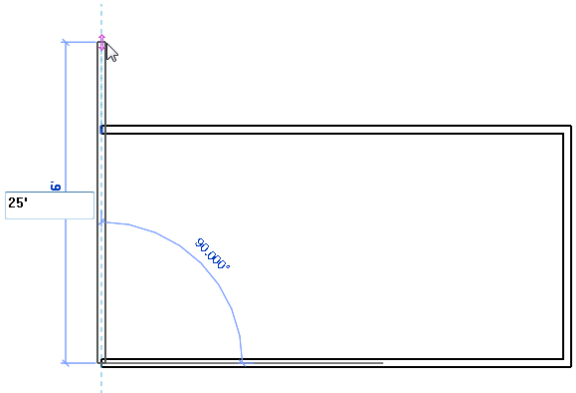

Figure 3-38 *Sketching the fourth exterior wall segment*

7. Press ESC twice to exit the **Wall: Architectural** tool.



Note

The purpose of creating a wall more than the desired length is only to explain how to stretch the wall to the exact length.

Stretching the Wall Segment

You will now stretch the wall segment to change its length to the desired dimension by using the drag controls.

1. Select the fourth wall segment to display its controls. The two blue dots at its two endpoints are the drag controls. Move the cursor near the upper dot; the color of the drag control symbol changes, as shown in Figure 3-39. Press and hold the left mouse button at this point and drag the cursor vertically downward and bring it close to the start point of the first wall segment. On doing so, the endpoint object snap is displayed at the intersection of two walls and the tooltip shows **Endpoint and Vertical**.

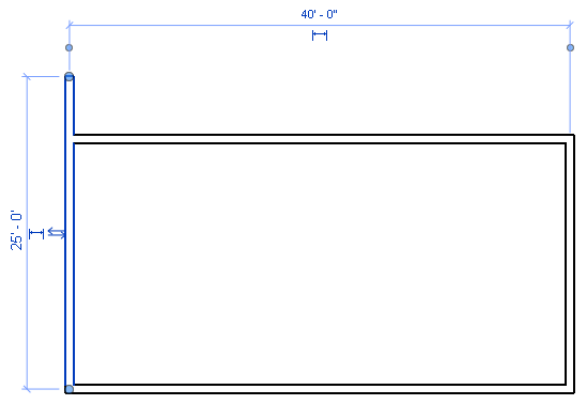

Figure 3-39 *Using the drag control to modify the length of wall*

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2. Release the left mouse button at the intersection point and click; the first and fourth wall segments are joined at the corner with their ends completed.

   Note that if these wall segments do not join at the corner on releasing the left mouse button, you need to click at their intersection.

3. Press ESC to remove the wall segment from the selection set. The external wall profile is completed for this tutorial, as shown in Figure 3-40.

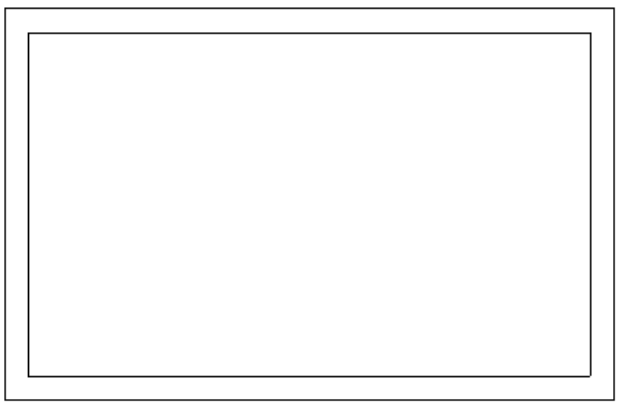

Figure 3-40 *The completed exterior wall profile*

Saving the Project

In this section, you will save the project file using the **Save As** tool.

1. Choose **Save As > Project** from the **File** menu; the **Save As** dialog box is displayed. Create a folder with the name **c03_revit_2021_tut** and then save the file with the name **c03_Apartment1_tut1** (**M_c03_Apartment1_tut1**).

2. Choose the **Close** option from the **File** menu; the file is closed.

Tutorial 2 Club

Create the exterior walls of the building. The sketch plan is shown in Figure 3-41. The dimensions have been given only for reference and are not to be used in this tutorial. The parameters to be used for creating the exterior walls of the club building are given next.

(Expected time: 30 min)

1. Project file-
   For Imperial *c02_Club_tut2.rvt*
   For Metric *M_c02_Club_tut2.rvt*
2. Exterior wall type- **Exterior - Split Face and CMU on Mtl. Stud**.
3. Unconnected height of walls- **15'0" (4572 mm)**.
4. All inclined walls are at 45-degree to the horizontal axis.

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The following steps are required to complete this tutorial:

a. Open the project file.
   For Imperial *c02_Club_tut2.rvt*
   For Metric *M_c02_Club_tut2.rvt*
b. Invoke the **Wall: Architectural** tool.
c. Select the exterior wall type:
   For Imperial **Exterior - Split Face and CMU on Mtl. Stud**
   For Metric **Exterior - Brick on Mtl. Stud**
d. Set the unconnected height to **15'0"** or **4572mm**.
e. Change the **Location Line** parameter to **Finish Face: Exterior**, refer to Figure 3-42.
f. Select the **Line** sketching option and sketch the inclined wall profile using the **Chain** option, refer to Figures 3-43 through 3-49.
g. Use the **Center-ends Arc** sketching option to create the curved wall, refer to Figures 3-50 and 3-52.
h. Save the project using the **Save As** tool.
   For Imperial *c03_Club_tut2.rvt*
   For Metric *M_c03_Club_tut2.rvt*
i. Close the project.

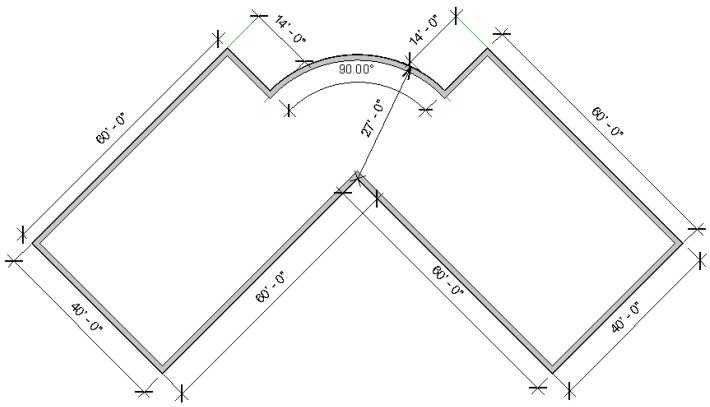

Figure 3-41 *Sketch plan for the Club project*

Opening an Existing Project

Choose **Open > Project** from the **File** menu and open the *c02_Club_tut2.rvt (M_c02_Club_tut2.rvt* for Metric*)* project file created in Tutorial 2 of Chapter 2. You can also download this file from *https://www.cadcim.com*. The path of the file is as follows: *Textbooks > Civil/GIS > Revit Architecture> Exploring Autodesk Revit 2021 for Architecture*.

Invoking the Wall: Architectural Tool and Selecting the Wall Type

First, you will invoke the **Wall: Architectural** tool from the ribbon and then select the specified exterior wall type, as given in the project parameters.

1. Choose the **Wall: Architectural** tool from the **Architecture > Build > Wall** drop-down; the **Modify | Place Wall** tab is displayed.

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2. In the **Properties** palette, select the required option from the **Type Selector** drop-down list.
   For Imperial **Exterior - Split Face and CMU on Mtl. Stud**
   For Metric **Exterior - Brick on Mtl. Stud**

Modifying Properties of the Exterior Wall

Next, you will use the **Properties** palette to modify the unconnected height to 15'0" or 4572mm. The dimensions given in the sketch are exterior wall face dimensions. Therefore, you need to set the **Location Line** parameter to **Finish Face: Exterior**.

1. In the **Properties** palette, click in the value field corresponding to the **Unconnected Height** parameter and replace the current value with **15'0"** (**4572mm**).

2. Click in the value field of the **Location Line** parameter and select the **Finish Face: Exterior** option from the drop-down list displayed, as shown in Figure 3-42. Choose the **Apply** button to accept the specified values.

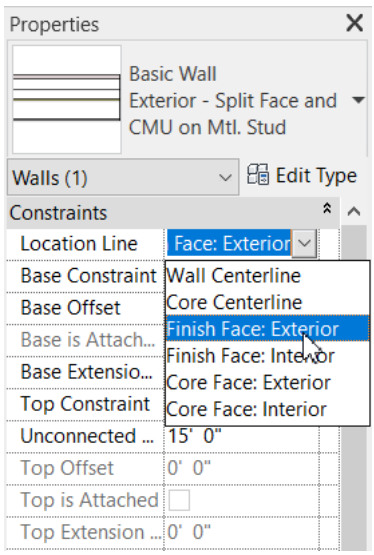

Figure 3-42 *Selecting the* ***Finish Face : Exterior*** *option for the* ***Location Line*** *parameter*

Sketching the Inclined Exterior Walls

Start creating the exterior wall profile by first sketching the inclined walls in a sequence such that the exterior face of the wall is on the external side. You need to select the **Chain** check box to sketch the continuous wall profile. Once you have created the first inclined wall, the other parallel and perpendicular walls can easily be created using the alignment lines and different object snaps options.

1. To create the straight wall, Choose the **Line** tool in the **Draw** panel of the **Modify | Place Wall** tab, if not chosen by default.

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2. In the **Options Bar**, select the **Chain** check box, if not selected. Also, select the **Allow** option from the **Join Status** drop-down list.

3. To start sketching the first inclined wall segment, click inside the four arrow keys in the drawing window and move the cursor upward toward the right and then move it to an inclination such that the angle subtended at the horizontal axis is 45 degrees.

4. Enter the value **14' (4267 mm)** to specify the length of the first wall segment; the value is displayed in the edit box, as shown in Figure 3-43. Press ENTER to create the first wall segment of the specified length.

5. As the **Chain** check box is selected in the **Options Bar**, the second wall segment will start from the last specified point. Now, move the cursor downward toward the right and right-click to invoke the shortcut menu. Next, choose **Snap Overrides > Perpendicular** from the shortcut menu displayed; the perpendicular snap symbol appears at the end of the wall. Enter **60'(18288 mm)**, see Figure 3-44; a wall is created perpendicular to the first inclined wall.

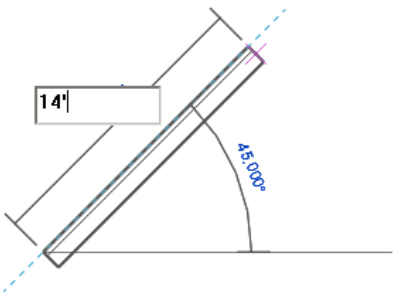

Figure 3-43 *Sketching the first inclined wall segment*

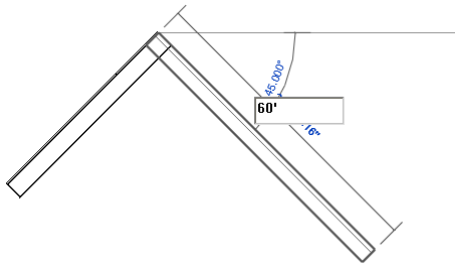

Figure 3-44 *Sketching the second inclined wall segment*

6. Similarly, for creating the next wall, move the cursor downward to the left and choose the perpendicular snap override as in step 5. Enter **40'(12192 mm)** as length, as shown in Figure 3-45. Now, press ENTER to create the third inclined wall.

7. To create the next wall, move the cursor upward toward the left and invoke the perpendicular snap override as in step 5. Enter **60' (18288 mm)** as the length of the wall segment and press ENTER to create the fourth inclined wall segment, as shown in Figure 3-46.

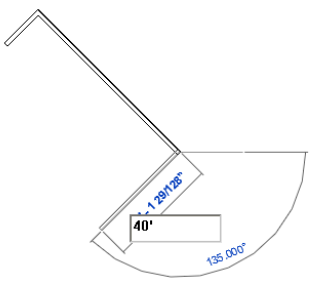

Figure 3-45 *Sketching the third inclined wall segment*

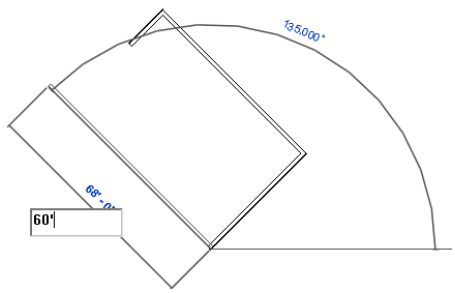

Figure 3-46 *Sketching the fourth inclined wall segment*

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8. Similarly, create the fifth inclined wall segment of **60'(18288 mm)** length, as shown in Figure 3-47.

9. Next, create the connected wall segment of **40'(12192 mm)** length, as shown in Figure 3-48.

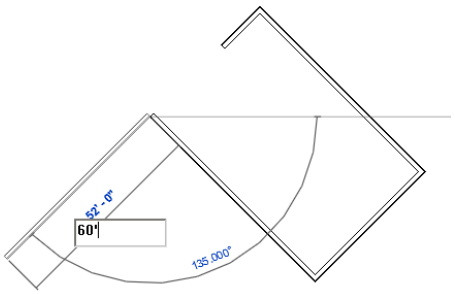

Figure 3-47 *Sketching the fifth inclined wall segment*

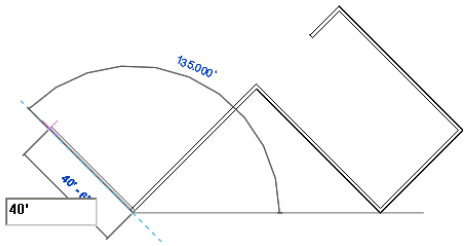

Figure 3-48 *Sketching the sixth inclined wall segment*

10. Now, create the next two wall segments of lengths **60'(18288 mm)** and **14'(4267 mm)** to complete the inclined wall exterior profile, as shown in Figure 3-49.

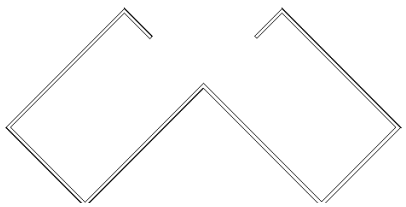

Figure 3-49 *The sketched inclined wall exterior profile*

11. Press the ESC key to discontinue the wall at this point and finish sketching the inclined walls.

Sketching the Curved Exterior Wall

Next, you will sketch the curved exterior wall profile based on the given parameters. You need to use the **Center-ends Arc** tool to create the curved wall segment.

1. Choose the **Center-ends Arc** tool in the **Draw** panel of the **Modify | Place Wall** tab. Move the cursor in the drawing window and click on the outer intersection of the inclined walls to specify the center of the curved wall, refer to Figure 3-50.

2. Move the cursor near the endpoint of the last sketched inclined wall segment. When 135-degree is displayed as the angular dimension, enter the value **27' (8100 mm)** as the radius of the curved wall and press ENTER, as shown in Figure 3-50. On doing so, the curved wall with the specified radius starts from the specified point.

Note

While tracking the wall, if the perpendicular or other snapping symbol does not appear, you can right-click and choose ***Snap Overrides****; a cascading menu will be displayed. Choose any snapping option from the cascading menu. On doing so, the desired snapping symbol will appear for the specified point or action.*

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3. Move the cursor toward the right and click when the cursor snaps to the endpoint of the inclined wall, as shown in Figure 3-51. Now, press ESC twice to complete the exterior wall profile, as shown in Figure 3-52.

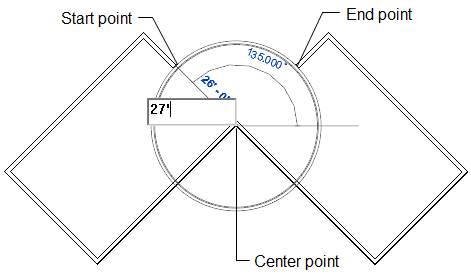

Figure 3-50 *Starting the curved wall segment*

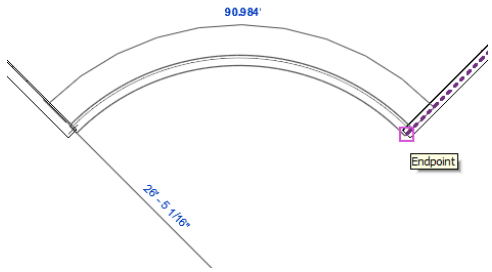

Figure 3-51 *Completing the curved wall segment*

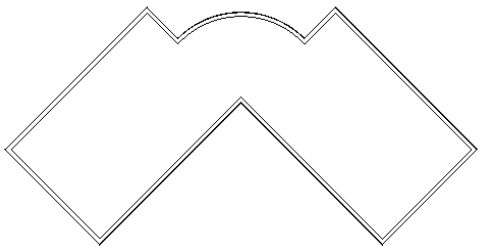

Figure 3-52 *Completed layout of the exterior walls for the Club project*

4. Choose the **Default 3D View** tool from **View > Create > 3D View** drop-down; a 3D view of the building model is displayed, as shown in Figure 3-53.

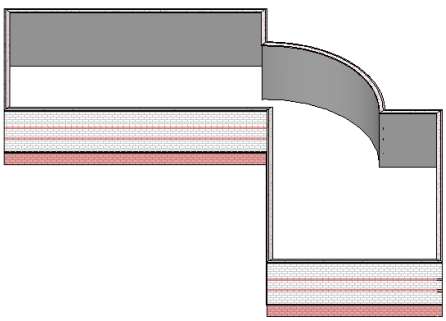

Figure 3-53 *3D view of the completed exterior wall profile*

5. From **View Control Bar**, choose the **Visual Style** button; a flyout is displayed. Choose the **Shaded** option from the flyout.

6. Under the **Floor Plans** head in the **Project Browser**, double-click on **Level 1** to return to the plan view.

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Saving the Project

In this section, you will save the project file using the **Save As** tool.

1. Choose **Save As > Project** from **File** menu; the **Save As** dialog box is displayed. Now, browse to the folder **c03_revit_2021_tut** and enter **c03_Club_tut2** (**M_c03_Club_tut2** for Metric) and choose **Save**.

2. Choose the **Close** option from the **File** menu; the file is closed.

Tutorial 3 Apartment 1 - Interior Walls

In this tutorial, you will add interior walls to the apartment plan created in Tutorial 1 of this chapter. The interior walls to be created are the intermediate walls among various rooms, as shown in the plan sketch in Figure 3-54. The dimensions and text have been given for reference and are not to be created. The project file name and the parameters to be used for different elements are given next.

(Expected time: 30 min)

1. Project file-
   For Imperial *c03_Apartment1_tut1.rvt*
   For Metric *M_c03_Apartment1_tut1.rvt*
2. Interior wall type- **Interior - 5" Partition (2-hr)**.
3. Location line parameter- **Wall Centerline**.

The following steps are required to complete this tutorial:

a. Open the *Apartment 1* project file created earlier in this chapter.
b. Invoke the **Wall: Architectural** tool and select the required interior wall.
   For Imperial **Interior - 5" Partition (2-hr)**
   For Metric **Interior - 135mm Partition (2-hr)**
c. Set the location line parameter as **Location Line- Wall Centerline**.
d. Select the **Line** sketching tool to sketch the straight walls.
e. Sketch the interior walls based on the given parameters.
f. Edit the interior walls location to achieve clear internal distances.
g. Save the project using the **Save As** tool.
   For Imperial *c03_Apartment1_tut3.rvt*
   For Metric *M_c03_Apartment1_tut3.rvt*
h. Close the project.

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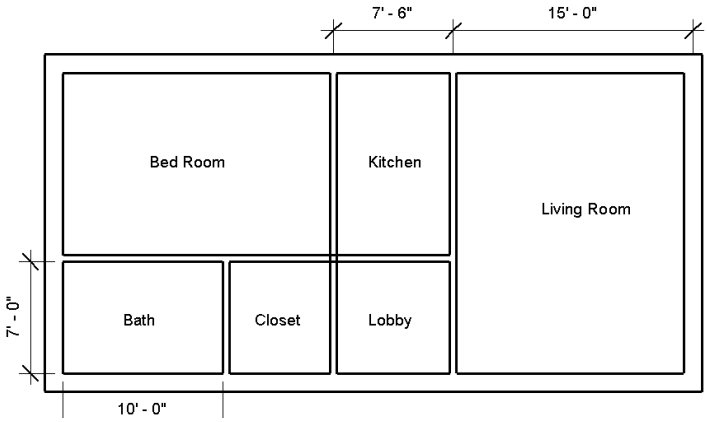

Figure 3-54 *Layout of internal walls for Apartment 1 project*

Opening the Project and Invoking the Wall: Architectural Tool

1. Choose **Open > Project** from the **File** menu and open the *c03_Apartment1_tut1.rvt (M_ c03_Apartment1_tut1.rvt)* project created earlier in this chapter. You can also download this file from *https://www.cadcim.com*. The path of the file is as follows: *Textbooks > Civil/GIS > Revit Architecture > Exploring Autodesk Revit 2021 for Architecture*.

2. Invoke the **Wall: Architectural** tool from **Architecture> Build > Wall** drop-down.

Selecting the Interior Wall Type

1. On invoking the **Wall: Architectural** tool, the wall instance parameters are displayed in the **Properties** palette. In this palette, select the required option from the **Type Selector** drop-down list, as shown in Figure 3-55.

   For Imperial **Interior-5" Partition (2-hr)**
   For Metric **Interior - 135 mm Partition (2-hr)**

2. In the **Options Bar**, select the **Wall Centerline** option from the **Location Line** drop-down list, if it is not selected by default. Also, clear the **Chain** check box and select the **Allow** option from the **Join Status** drop-down list in the **Options Bar**.

Sketching the First Interior Wall

After selecting the interior wall type, start sketching the interior walls. Notice that the **Line** tool is chosen as the default tool for sketching the walls.

1. Move the cursor near the top right endpoint of the wall structure and start moving the cursor toward left along the top horizontal wall. You will notice that a temporary

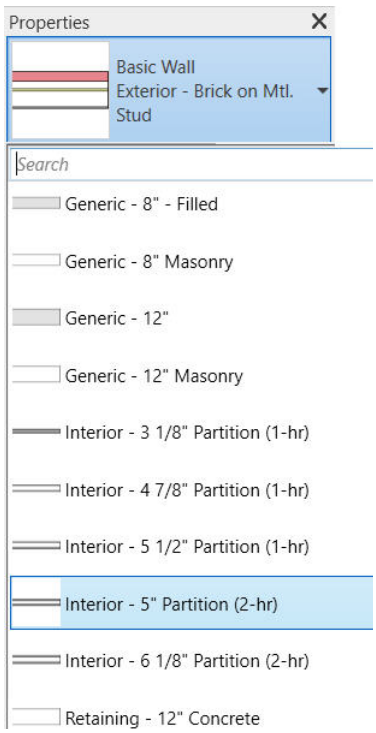

Figure 3-55 *Selecting the* ***Basic Wall: Interior - 5"Partition (2-hr)*** *wall type*

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dimension appears which changes dynamically as you move the cursor away from it. This dimension shows the distance of the cursor from the nearest wall segment.

2. Type **15'(4572 mm)** from the keyboard, as shown in Figure 3-56. Now, press ENTER; the starting point of the first interior wall is specified.

3. Next, move the cursor vertically downward near the lower exterior wall segment. When the **Vertical and Nearest** symbol appears, as shown in Figure 3-57, click to specify the location of the endpoint of the wall segment; the first interior wall segment is sketched.

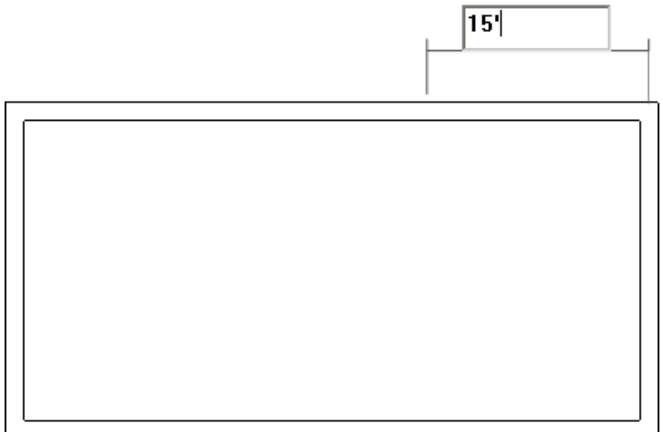

Figure 3-56 *Specifying the distance for starting the first interior wall segment*

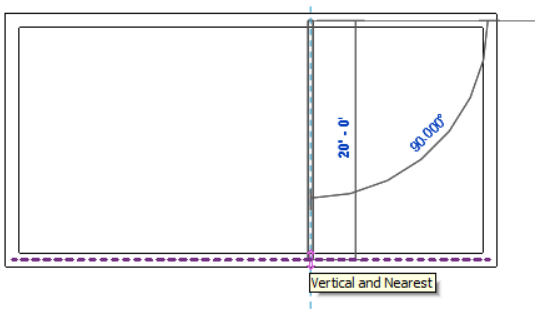

Figure 3-57 *Specifying the endpoint of the first interior wall segment*

Sketching Other Interior Walls

Next, you will sketch the other horizontal and vertical interior walls by specifying their start point and endpoint using different object snap options.

1. To sketch the second interior wall, move the cursor to the upper endpoint of the interior wall you just created and then move the cursor horizontally toward the left. When the temporary dimension and the intersection object snap appears, enter **7'6"(2286 mm)**, as shown in Figure 3-58. Now, press ENTER; the start point of the second interior wall segment is specified on the upper horizontal exterior wall.

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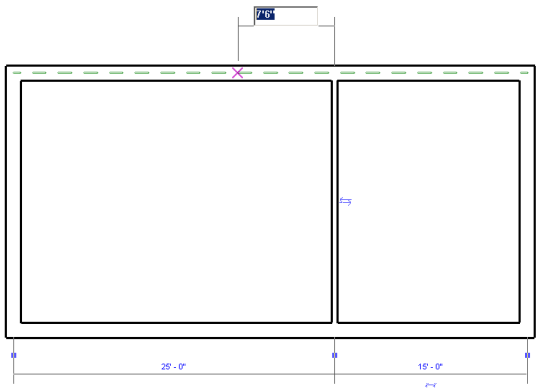

Figure 3-58 *Specifying the starting point of the second interior wall*

2. Press SHIFT and move the cursor downward. You will notice that the cursor moves parallel to the vertical axis while moving it downward. Click near the lower external wall when the **Vertical and Nearest** symbol appears, as shown in Figure 3-59.

   Next, you will sketch the interior walls of the bath. Since the internal dimensions have been provided for the interior walls, you will first sketch them using the wall center lines and later move them to get the exact clearance distance of the walls.

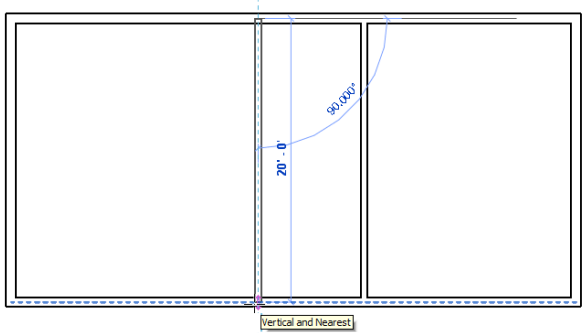

Figure 3-59 *Sketching the second interior wall*

3. Move the cursor to the lower left corner and then move it vertically upward. When the temporary dimension appears, enter **7'0"(2134 mm)** and then press ENTER to specify the starting point of the third interior wall, as shown in Figure 3-60.

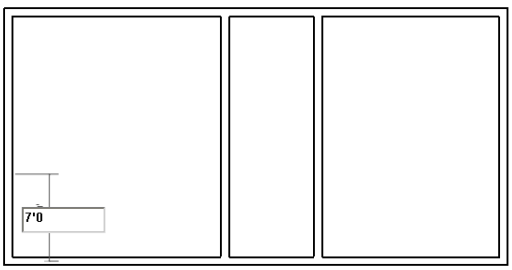

Figure 3-60 *Specifying the distance for sketching the third internal wall*

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4. Press SHIFT and move the cursor horizontally toward the right until it reaches the first vertical interior wall. When the **Horizontal and Nearest** object snap symbol appears, click to specify the location of the endpoint of the third interior wall, as shown in Figure 3-61, the wall segment is created.

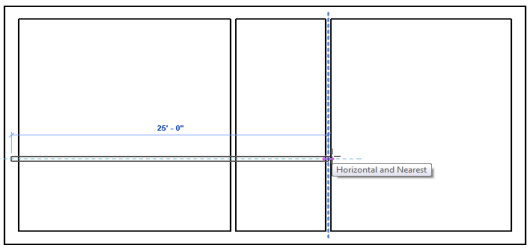

Figure 3-61 *Sketching the third interior wall segment*



Note

When temporary dimensions do not change, choose the ***temporary Dimensions*** *tool from the* ***additional settings*** *drop down; the* ***temporary Dimensions Properties*** *dialog box is displayed. Choose the* ***faces*** *radio button in the walls area and then choose the* ***OK*** *button.*

5. Similarly, move the cursor near the lower left corner and then move it horizontally toward the right. When the temporary dimension and the intersection object snap appears, enter the value **10'0"**, as shown in Figure 3-62, and then press ENTER.

6. Press and hold the SHIFT key and move the cursor vertically upward until it reaches the horizontal interior wall. When the **Vertical and Nearest** symbol appears, click to specify the endpoint of the wall. Now, press ESC twice to finish the sketch of the wall.

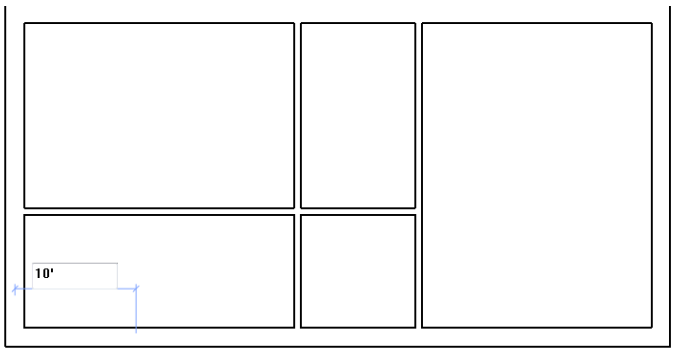

Figure 3-62 *Sketching the interior walls of the bath*

Moving Walls Using Witness Lines

As the dimension of the bath walls will be measured from the centerline of the external walls, you need to move the interior walls such that the internal dimensions are 7'0"X10'0" as specified in the sketch. Use the witness lines and specify these dimensions.

1. Select the last created interior wall from the drawing; the selected interior wall shows the centerline distances and its controls. Three blue dots define the extents of the dimensions.

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2. Click on the dot on the extreme left; the dot and the dimension witness line move to the interior face of the exterior wall, as shown in Figure 3-63.

3. Similarly, click twice on the next blue dot on the right to move it to the inner face of the third interior wall.

4. Now, click temporary dimension on the left, enter the value **10'(3048 mm)**, and then press ENTER; the interior wall is moved to the desired distance 10'-0" from the interior face of the exterior wall, as shown in Figure 3-64.

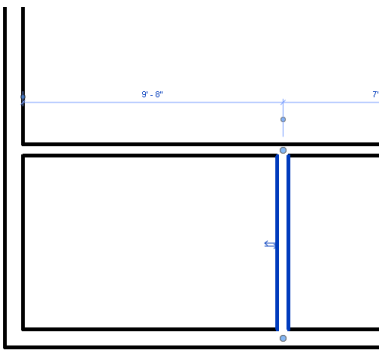

Figure 3-63 *The square dot moved*

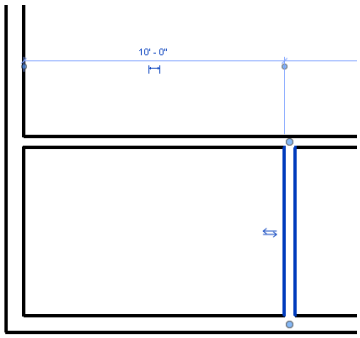

Figure 3-64 *The adjusted inner wall distance*

5. Similarly, to move the horizontal interior wall (common for the bath, kitchen and the closet), select it and move both the witness lines toward the inner face by clicking on the blue dots.

6. Now, click on the blue dots of temporary dimension from the lower external wall and the upper interior wall. Enter the value **7'(2134 mm)**, as shown in Figure 3-65, and press ENTER. On doing so, the interior wall is moved to the desired location. Now, press ESC to exit the **Modify | Walls** tab.

This completes the interior wall layout for the *Apartment 1* project, refer to Figure 3-65.

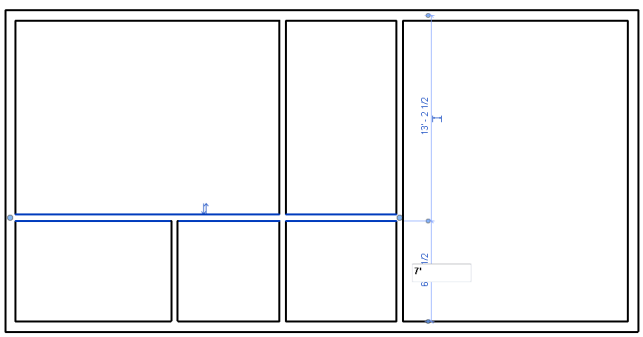

Figure 3-65 *Entering the value to adjust the dimension of the horizontal interior wall*

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7. Choose the **Default 3D View** tool from **View > Create > 3D View** drop-down. On doing so, the 3D view of the building model is displayed alongwith the **ViewCube** tool.

8. Now, choose the **Visual Style** button from the **View Control Bar**; a flyout is displayed. Choose the **Shaded** option from this flyout; the 3D view is displayed with the shading and edges visible, as shown in Figure 3-66.

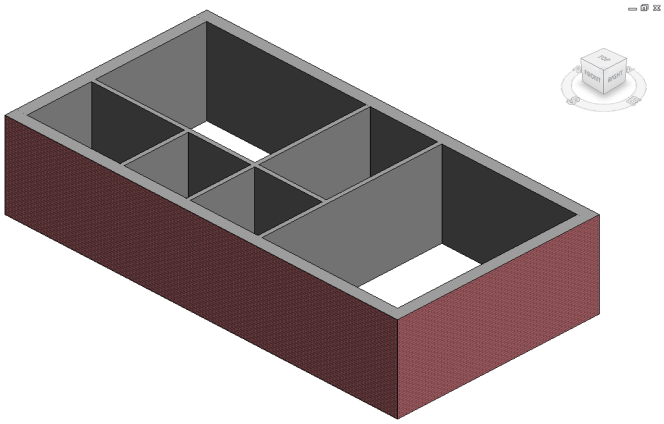

Figure 3-66 *3D view of the Apartment 1 building model*

Saving the Project

In this section, you will save the project file using the **Save As** tool.

1. Choose **Save As > Project** from **File** menu; the **Save As** dialog box is displayed. Now, browse to the folder **c03_revit_2021_tut** and enter **c03_Apartment1_tut3 (M_c03_Apartment1_tut3)** in the **File name** edit box and then choose **Save**.

2. Choose the **Close** option from the **File** menu; the file is closed.

Tutorial 4 Club - Interior Walls

Create the interior walls of the left portion of the club building whose exterior wall profile was created in Tutorial 2 earlier in this chapter. Create the walls based on the sketch plan shown in Figure 3-67. The dimensions are given for the centerlines of the walls and are displayed only for the purpose of drawing. You do not need to dimension or add text to the building. The project file name and the parameters to be used for different elements are given below.

(Expected time: 30 min)

1. Project file-
   For Imperial *c03_Club_tut2.rvt*
   For Metric *M_c03_Club_tut2.rvt*
2. Interior wall type -
   For Imperial **Interior - 6 1/8" Partition (2-hr)**.
   For Metric **Interior - 138mm Partition (1-hr)**.
3. Unconnected height of walls- **12'0"(3658 mm)**.
4. Location Line- **Wall Centerline**.

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5. Inclined walls are parallel to the external walls and perpendicular to each other.

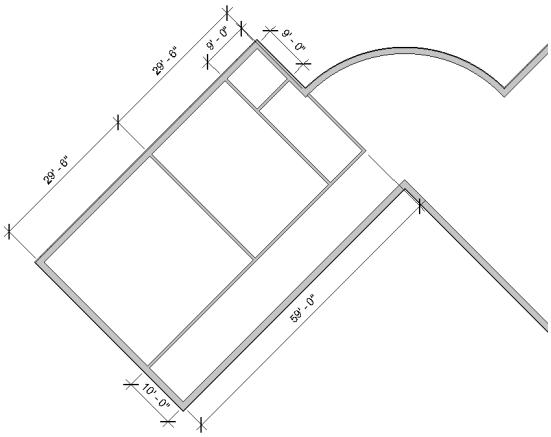

Figure 3-67 *Sketch plan for creating the interior wall of the left portion of the Club project*

The following steps are required to complete this tutorial:

a. Open the project file.
   For Imperial *c03_Club_tut2.rvt*
   For Metric *M_c03_Club_tut2.rvt*
b. Invoke the **Wall: Architectural** tool and select the required wall type.
   For Imperial **Interior - 6 1/8" Partition (2-hr)**.
   For Metric **Interior - 138mm Partition (1-hr)**.
c. Set the unconnected height to **12'0"(3658 mm)**.
d. Ensure that the location line parameter is set to **Wall Centerline**.
e. Select the **Line** sketching option to create the straight walls.
f. Sketch the interior walls based on the given parameters.
g. Save the project using the **Save As** tool.
   For Imperial *c03_Club_tut4.rvt*
   For Metric *M_c03_Club_tut4.rvt*
h. Close the project.

Opening the Existing Project and Invoking the Wall: Architectural tool

1. Open the *c03_Club_tut2.rvt (M_c03_Club_tut2.rvt)* project file by choosing **Open > Projects** from the **File** menu. You can also download this file from *https://www.cadcim.com*. The path of the file is as follows: *Textbooks > Civil/GIS > Revit Architecture > Exploring Autodesk Revit 2021 for Architecture*.

2. Click twice on **Level 1** under the **Floor Plans** head in the **Project Browser** and invoke the **Wall: Architectural** tool from **Architecture > Build > Wall** drop-down.

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Selecting the Interior Wall Type

Before creating the interior walls, you need to select the wall type using the **Properties** palette.

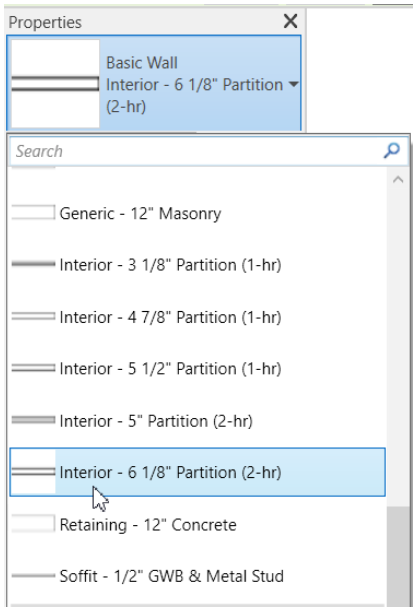

Figure 3-68 *Selecting the interior wall type from the* ***Properties*** *palette*

1. Select the required option from the **Type Selector** drop-down list in the **Properties** palette, as shown in Figure 3-68.
   For Imperial **Interior - 6 1/8" Partition (2-hr)**.
   For Metric **Interior - 138mm Partition (1-hr)**

2. Click in the value field corresponding to the **Top Constraint** parameter to display a drop-down list and ensure that the **Unconnected** option is selected in it.

3. Next, click on the value field corresponding to the **Unconnected Height** parameter, and replace the current value by entering the new value **12'0"** (**3658 mm**) in the cell.

4. Choose the **Apply** button to apply the changes made.

Sketching the Interior Walls

The interior walls to be created are straight in nature. Therefore you can use the **Line** tool from the **Draw** panel to create them.

1. Make sure that the **Wall Centerline** option is selected from the **Location Line** drop-down list in the **Options Bar**.

2. Clear the **Chain** check box in the **Options Bar**, if it is selected. Ensure that the **Allow** option is selected in the **Join Status** drop-down list.

3. Move the cursor close to the lower left corner, marked as 6, refer to Figure 3-69, and traverse upward along the centerline of extreme left wall of the building profile. When the temporary dimension appears, enter the value **10'(3048 mm)** and press ENTER to start the interior wall profile from the specified point, as shown in Figure 3-69.

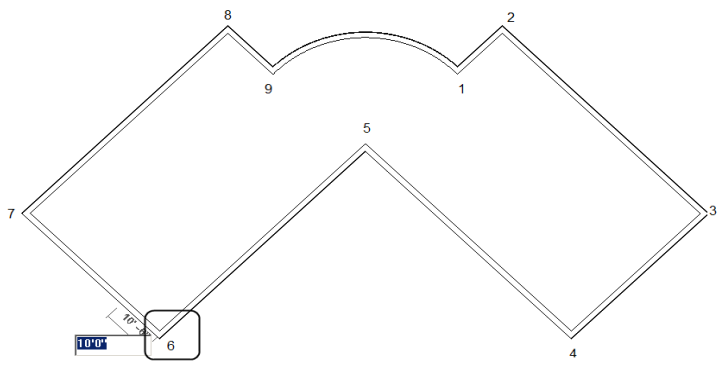

Figure 3-69 *Specifying the start point of the first interior wall*

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4. Move the cursor 45 degrees upward to the right. When a dashed line appears, enter the value **59'(17983 mm**), as shown in Figure 3-70 and then press ENTER.

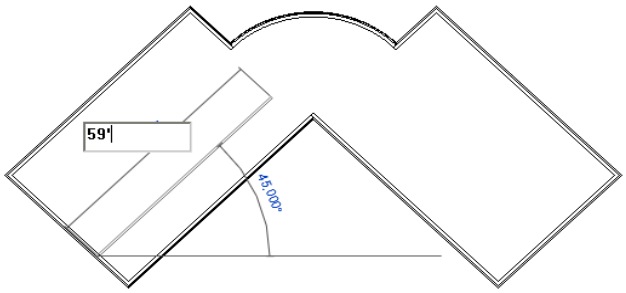

Figure 3-70 *Sketching the first interior wall of the Club project*

5. Start the next wall from the endpoint of the last created wall by clicking on its endpoint. Move the cursor upward toward the left such that it subtends an angle of 135 degrees with the horizontal and reaches the exterior wall displaying the **Nearest** object snap, as shown in Figure 3-71. Click to specify the endpoint of the wall.

6. Similarly, to start the next interior wall, bring the cursor close to the starting point of the last created wall (marked as 10), refer to Figure 3-71. Then, move the cursor away along the centerline of the wall until the temporary dimension appears. When the temporary dimension appears, enter the value **10'0"(3048 mm)** and press ENTER to specify the start point of the wall.

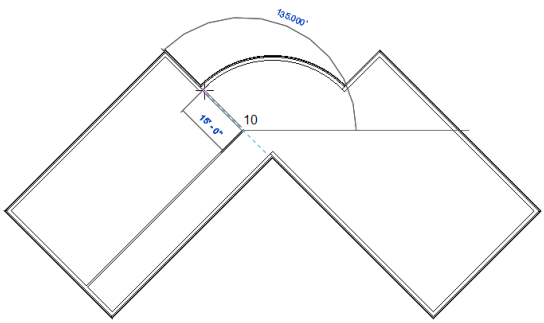

Figure 3-71 *Sketching the second interior wall*

7. Move the cursor upward toward the left such that it subtends an angle of 135 degrees with the horizontal until it reaches the exterior wall and the **Nearest** object snap is displayed, as shown in Figure 3-72. Click to specify the endpoint of the wall.

8. Create the next wall by moving the cursor away from the specified point. Next, move it downward toward the right. When the temporary dimension appears, enter the value **9'(2743 mm)** and press ENTER to start the wall, as shown in Figure 3-73.

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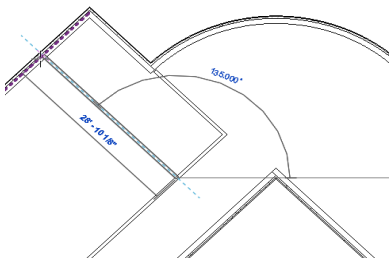

Figure 3-72 *Sketching the third interior wall*

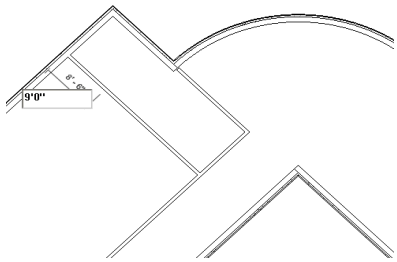

Figure 3-73 *Specifying the distance of the fourth interior wall*

9. Move the cursor upward toward the right. Click on the exterior wall to specify the endpoint of the interior wall the **Nearest** object snap is displayed.

10. To create the next wall, bring the cursor close to the midpoint of the first interior wall until the **Midpoint** object snap appears, as shown in Figure 3-74. Click on the drawing to start the wall.

11. Move the cursor up toward the left upto the exterior wall such that it subtend an angle of 135 degrees with the horizontal and click when the **Nearest** object snap appears on the exterior wall, as shown in Figure 3-75. Click to specify the endpoint; the wall is created.

This completes the interior wall layout for the left portion of the *Club* project.

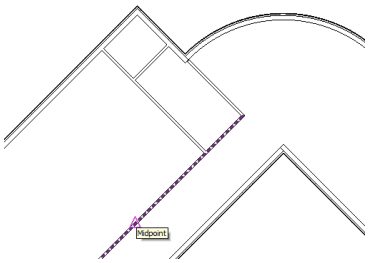

Figure 3-74 *Starting the fifth interior wall from the midpoint of the first interior wall*

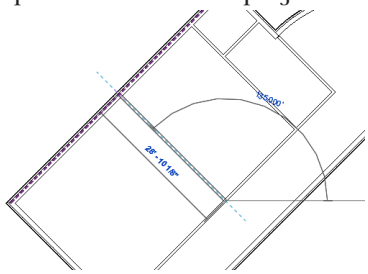

Figure 3-75 *Completing the interior walls*

12. Choose the **Modify** button to exit the tool selection.

Saving the Project

In this section, you will save the project file using the **Save As** tool.

1. Choose **Save As > Project** from **File** menu; the **Save As** dialog box is displayed. Now, browse to the folder **c03_revit_2021_tut** and enter **c03_Club_tut4** (for Metric **M_c03_Club_tut4**) in the **File name** edit box and then choose **Save**.

2. Now, choose **Close** from the **File** menu to close the file.

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Tutorial 5 House-Stacked Wall

In this tutorial, you will create stacked walls and also add interior walls to the house plan. The interior walls to be created are the intermediate walls of the rooms, as shown in the plan sketch in Figure 3-76. The dimensions and text have been given for reference and are not to be created. The project file name and the parameters to be used for different elements are given next.

(Expected time: 45 min)

1. Project file-
   For Imperial *default.rte*
   For Metric *DefaultMetric.rte*
2. Interior wall type-
   For Imperial **Interior - 5 1/2" Partition (1-hr)**
   For Metric **Interior - 138 mm Partition (1-hr)**
3. Location line parameter- **Wall Centerline**.

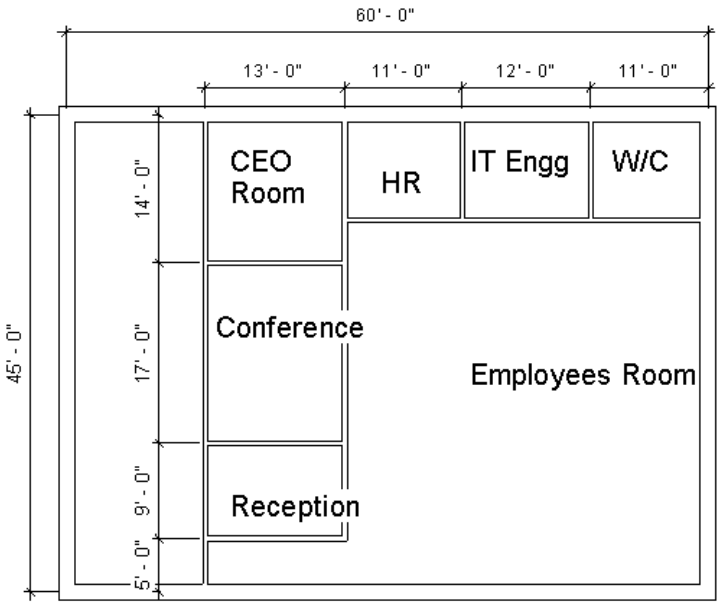

Figure 3-76 *Layout of internal walls for House project*

The following steps are required to complete this tutorial:

a. Open the project file.
   For Imperial *default.rte*
   For Metric *DefaultMetric.rte*
b. Invoke the **Wall: Architectural** tool and select the required wall type from the **Type Selector** drop-down list.
   For Imperial **Stacked Wall Exterior - Brick over CMU w Metal Stud**
   For Metric **Render on Brick on Block w Metal Stud**
c. Edit the wall type as **Stacked wall Exterior- EIFS over CMU w Metal Stud**.
d. Set the location line parameter as **Location Line- Wall Centerline**.
e. Select the **Rectangle** sketching tool to sketch the exterior walls.

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f. Sketch the interior walls based on the given parameters.
g. Edit the interior walls location to achieve clear internal distances.
h. Save the project using the **Save As** tool.
For Imperial *c03_Office_tut5.rvt*
For Metric *M_c03_Office_tut5.rvt*
i. Close the project using the **Close** tool.

Opening a New Project

1. Choose **New > Project** from **File** menu; the **New Project** dialog box is displayed.

2. In this dialog box, choose the **Browse** button; the **Choose Template** dialog box is displayed.

3. In the **Choose Template** dialog box, select the required template file.
For Imperial *default.rte*
For Metric *DefaultMetric.rte*
Then, choose the **Open** button; the selected template file is loaded in the **New Project** dialog box.

4. Now, choose the **OK** button; the selected template file is loaded.

Invoking the Wall: Architectural Tool and Selecting the Wall Type

In this section, you will create a stacked wall type.

1. Choose the **Wall: Architectural** tool from **Architecture > Build > Wall** drop-down; the **Modify | Place Wall** tab is displayed.

2. In the **Properties** palette, select the required option from the **Type Selector** drop-down list.
For Imperial **Stacked Wall Exterior - Brick Over CMU w Metal Stud**
For Metric **Stacked Wall Exterior - Brick Over Block w Metal Stud**

Modifying Exterior Wall Type

In this section, you will use the **Type Properties** dialog box to edit the wall type and the **Properties** palette to modify the unconnected height to 12'0"(3600 mm).

1. In the **Properties** palette, choose the **Edit Type** button; the **Type Properties** dialog box is displayed.

2. In this dialog box, choose the **Duplicate** button; the **Name** dialog box is displayed. Enter required name in the **Name** edit box.
For Imperial **Exterior - EIFS Over CMU w Metal Stud**
For Metric **Exterior - Render on Brick on Block w Metal Stud**
Then, choose the **OK** button.

3. Choose the **Edit** button corresponding to the **Structure** parameter; the **Edit Assembly** dialog box is displayed.

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4. In this dialog box, click on the first row under the value field of the **Name** column and select the required option from the drop-down list displayed.
   For Imperial **Exterior- EIFS on Mtl Stud**
   For Metric **Exterior- Render on Brick on Block**
   Ensure that **Variable** is selected under the **Height** column.

5. Similarly, click on the second row under the value field of the **Name** column and select the required option from the drop-down list displayed and enter the height as **5' (1524 mm)** under the **Height** column.
   For Imperial **Exterior- CMU on Mtl Stud**
   For Metric **Exterior- Block on Mtl Stud**

6. Choose the **Preview** button to view the wall type; a preview pane is displayed.

7. Now, choose the **OK** button from the **Edit Assembly** dialog box and the **Type Properties** dialog box to close them.

8. In the **Properties** palette, click in the value field corresponding to the **Unconnected Height** parameter and replace the current value with **12'0"(3600 mm)**.

9. Click in the value field of the **Location Line** parameter and select the **Finish Face: Exterior** option from the drop-down list displayed. Choose the **Apply** button to accept the specified values.

Sketching the Exterior Walls

In this section, you will learn to create the exterior walls.

1. To create the exterior wall, choose the **Rectangle** tool from the **Draw** panel of the **Modify | Place Wall** tab if not chosen by default.

2. To start sketching the first inclined wall segment, click inside the four arrow keys in the drawing window and move the cursor downward toward the right and click again; a rectangle is created with temporary dimensions displayed along with it, as shown in Figure 3-77.

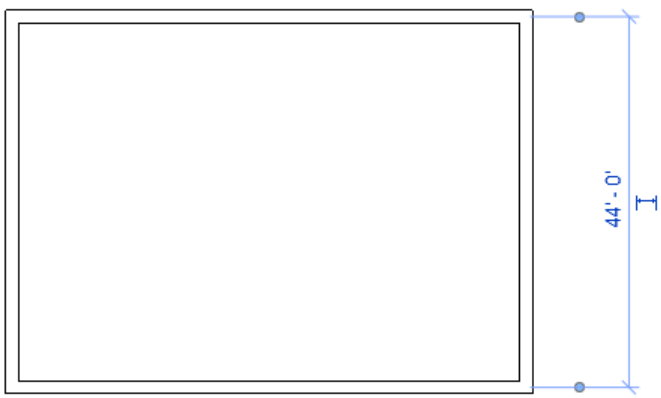

Figure 3-77 *Rectangle drawn with its temporary dimensions*

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3. Press ESC twice to exit the currently selected tool.

4. Now, select the upper horizontal wall; the **Modify| Stacked Wall** tab is displayed.

5. In the **Options Bar**, choose the **Activate Dimensions** button; the dimensions are activated for vertical side.

6. Click on the vertical temporary dimension and enter **45'** (**13716 mm**) in the edit box displayed, as shown in Figure 3-78 and press ENTER.

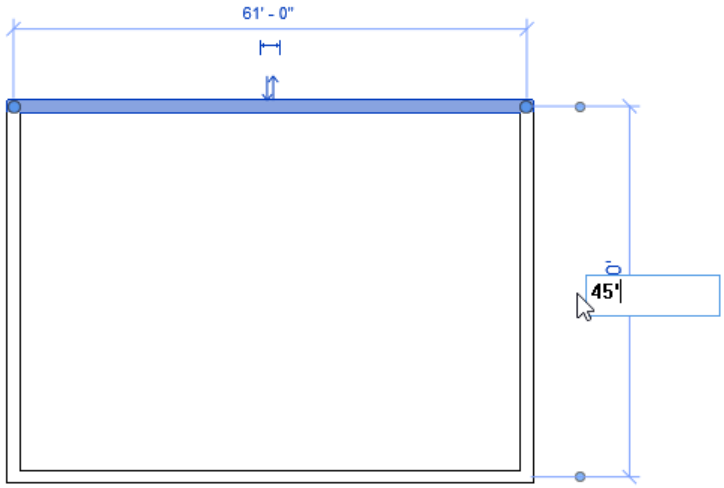

Figure 3-78 *Entering vertical dimension in the edit box*

7. Now, select the right wall and then activate the dimension using the **Activate Dimension** button from the **Options Bar**.

8. Click on the horizontal temporary dimension and enter **60'(18288 mm)** for the horizontal wall, as shown in Figure 3-79. Press ENTER.

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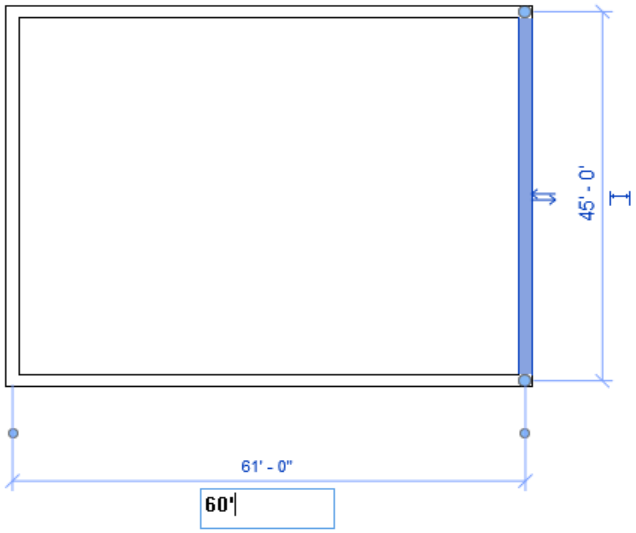

Figure 3-79 *Entering horizontal dimension in the edit box*

Selecting the Interior Wall Type

Before creating the interior walls, you need to select the wall type using the **Properties** palette.

1. Choose the **Wall: Architectural** tool from **Architecture > Build > Wall** drop-down.

2. Select the required option from the **Type Selector** drop-down list in the **Properties** palette, as shown in Figure 3-80.
   For Imperial **Interior - 5 1/2" Partition (1-hr)**
   For Metric **Interior- 138mm Partition (1-hr)**

3. Click in the value field corresponding to the **Top Constraint** parameter to display a drop-down list and ensure that the **Unconnected** option is selected in it.

4. Next, click on the value field corresponding to the **Unconnected Height** parameter, and replace the current value by entering the new value **12'(3658 mm)** in the cell.

5. Choose the **Apply** button to apply the changes made.

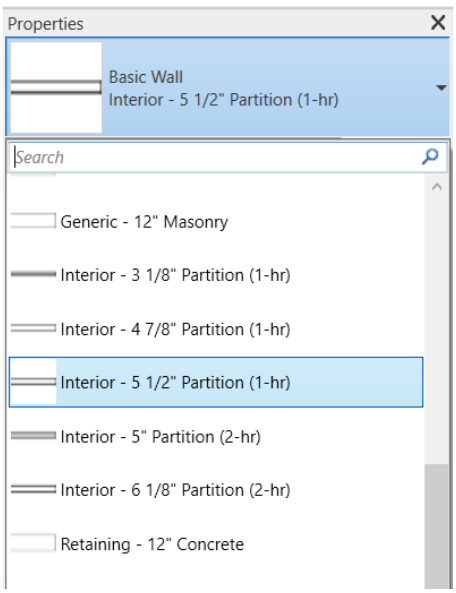

Figure 3-80 *Selecting the interior wall type from the* ***Properties*** *palette*

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Sketching Interior Walls

In this section, you will sketch the horizontal and vertical interior walls by specifying their start point and endpoint using different object snap options.

1. To sketch the interior wall, move the cursor to the upper left corner of the exterior wall and then move the cursor horizontally toward the right. Enter **13'(3962 mm)** in the edit box as shown in Figure 3-81, when the temporary dimension and the intersection object snap appears. Now, press ENTER; the start point of the interior wall segment is specified on the upper horizontal exterior wall.

2. Press SHIFT and move the cursor downward. You will notice that the cursor moves parallel to the vertical axis while moving it downward. Click near the lower exterior wall, as shown in Figure 3-82 when the **Vertical and Nearest** symbol appears.

   Next, you will sketch the other interior walls.

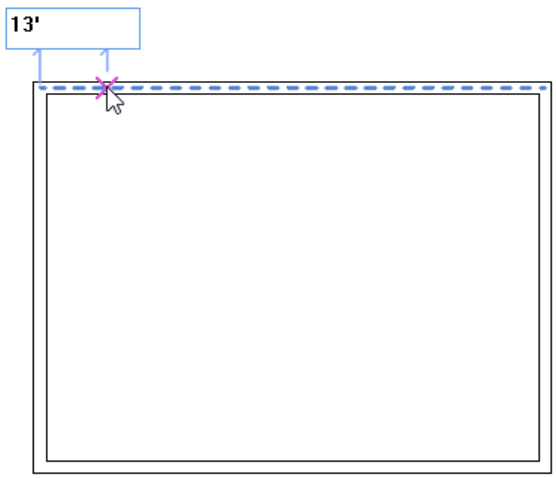

Figure 3-81 *Entering the value in the edit box*

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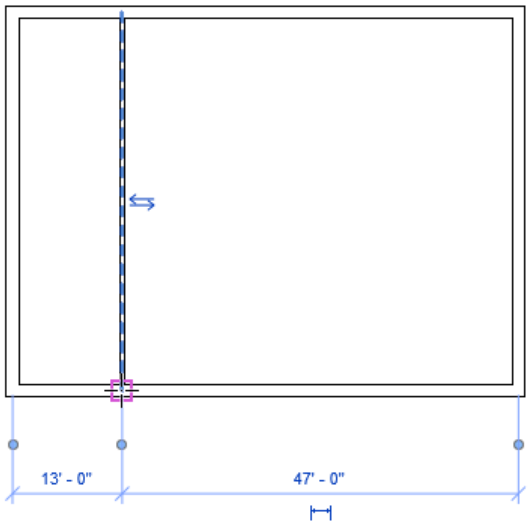

Figure 3-82 *Straight wall created till the lower exterior wall*

3. Move the cursor to the bottom of the wall just drawn and then move it vertically upward. When the temporary dimension appears, enter **5'0"(1524 mm)** and then press ENTER; the starting point of the third interior wall is specified, as shown in Figure 3-83.

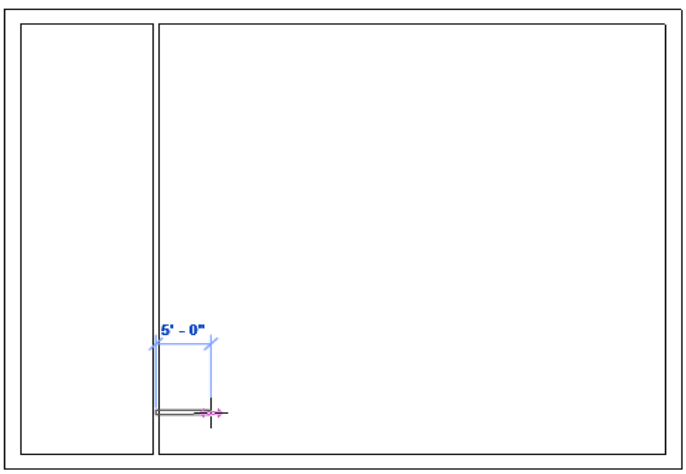

Figure 3-83 *Specifying the starting point of third interior wall*

4. Press SHIFT and move the cursor horizontally toward the right. When temporary dimension appears, enter **13'(3962 mm)** and then press ENTER; the wall segment is created.

5. Select the end point of the first wall created, move the cursor vertically upward and click on the upper exterior wall; the wall gets extended upto the upper exterior wall, as shown in Figure 3-84.

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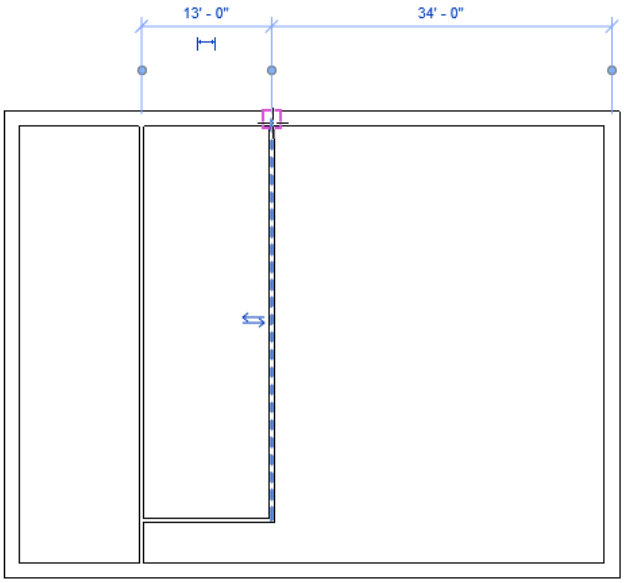

Figure 3-84 *The wall created extended upto the upper exterior wall*

6. Move the cursor near the upper right corner and then move it vertically downward. When the temporary dimension and the nearest object snap appear, enter the value **10'0"(3048 mm)** and then press ENTER.

7. Press and hold the SHIFT key and move the cursor horizontally toward left until it reaches the vertical interior wall. Next, click to specify the endpoint of the wall, as shown in Figure 3-85. Now, press ESC twice to finish the sketch of the wall.

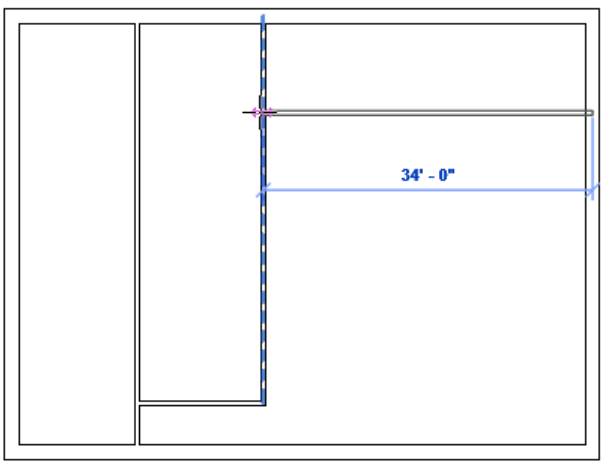

Figure 3-85 *Horizontal wall created at the distance of 10' from the outer exterior wall*

8. Similarly, sketch other walls, as shown in Figure 3-86.

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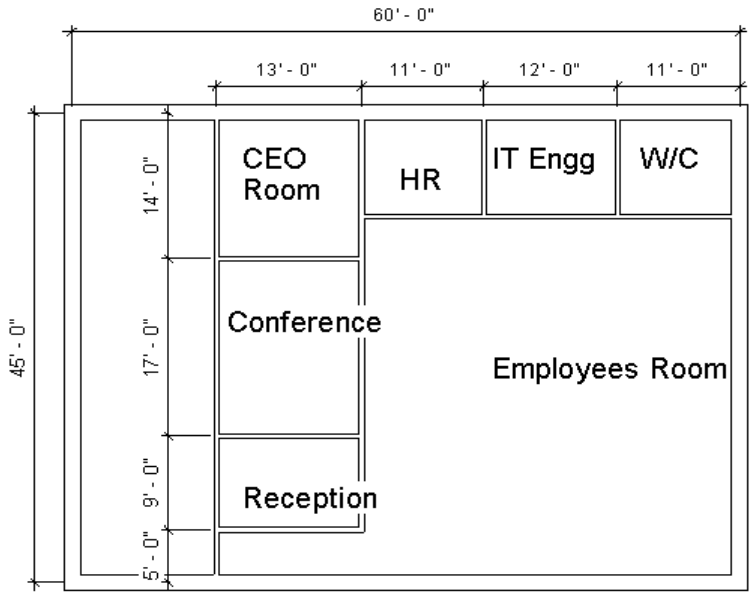

Figure 3-86 *Other interior walls for the project*

9. To view the building model in 3D, choose the **Default 3D View** tool from **View > Create > 3D View** drop-down. On doing so, the 3D view of the building model is displayed along with the **ViewCube** tool.

10. Now, choose the **Visual Style** button from the **View Control Bar**; a flyout is displayed. Choose the **Shaded** option from this flyout; the 3D view is displayed with shading and with edges visible, as shown in Figure 3-87.

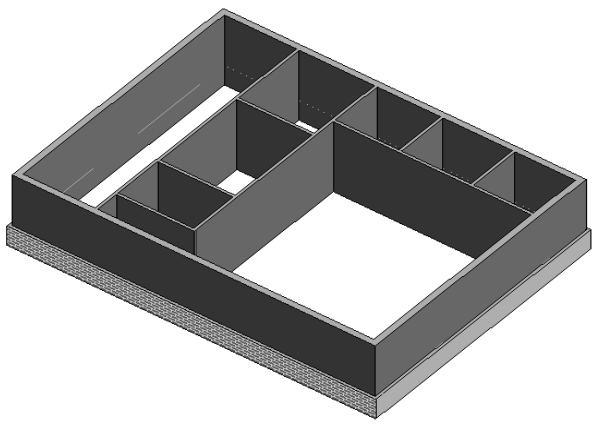

Figure 3-87 *3D view of a building with the shaded edges*

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Saving the Project

In this section, you will save the project file using the **Save As** tool.

1. Choose **Save As > Project** from the **File** menu; the **Save As** dialog box is displayed. Now, browse to the folder **c03_revit_2021_tut** and enter **c03_office_tut5** (for metric **M_c03_office_tut5**) in the **File name** edit box and then choose **Save**.

2. Now, choose **Close** from the **File** menu to close the file.

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. Which value of the Structural Usage parameter will turn a structural wall into an architectural wall?

   a) **Bearing** b) **Non-bearing**
   c) **Structural combined** d) **Shear**

2. A stacked wall is comprised of one or more _____ wall types.

   a) Generic b) Simple
   c) Basic d) Complex

3. You can use the _____ to view the instance parameters of an element.

   a) Properties palette b) Project Browser
   c) Filter d) Type Selector

4. The _____ option enables you to sketch continuous and end to end connected wall segments.

5. To create a wall starting at a specified distance from a point on an existing element, you can use the _____ option from the **Options Bar**.

6. You can select a wall type from the _____ drop-down list.

7. You can modify the instance properties of a wall type in the **Properties** palette. (T/F)

8. When you modify the instance properties of a wall, the instance properties of all the similar wall types used in the project are modified. (T/F)

9. You can create a wall type of your choice by combining various layers. (T/F)

10. By default, when you sketch a wall from left to right, the lower face becomes the external face. (T/F)

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Review Questions

Answer the following questions:

1. Which of the following sketching tools can be used to create a straight wall?

   a) **Lines** b) **Circles**
   c) **Fillet Arc** d) **Center-ends Arc**

2. Which of the following keys can be used to constrain the cursor such that it moves along the orthogonal direction only?

   a) TAB b) SHIFT
   c) ALT d) F3

3. Which of the following sketching tools can be used to create a curved wall?

   a) **Polygon** b) **Line**
   c) **Fillet Arc** d) **Rectangle**

4. The _____ dimension appears after you specify the start point of a wall and move the cursor.

5. You can use the _____ option to create a curved wall by specifying the center and the endpoints.

6. The **Location Line** parameter is an instance property of a wall. (T/F)

7. The value of the **Function** parameter in the **Type Properties** dialog box for an exterior wall is **Exterior**. (T/F)

8. You can add or delete layers of a composite wall type to create a new wall type. (T/F)

9. Once a wall is sketched, its dimension and angle cannot be modified. (T/F)

10. The **Chain** option can be enabled or disabled without exiting the **Wall: Architectural** tool. (T/F)

11. The usage of the wall can be changed by modifying the value of the **Function** parameter. (T/F)

12. While using the **Wall: Architectural** tool, if you invoke any other tool, the **Wall: Architectural** tool will be exited. (T/F)

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EXERCISES

Exercise 1 Apartment 2

Create the exterior and interior walls of the *Apartment 2*, refer to Figure 3-88. The thick walls are the exterior walls and the thin walls are the interior walls. The dimensions and texts are not to be added. The project parameters for this exercise are given next.

(Expected time: 30 min)

1. Project file -
   For Imperial *c02_Apartment2_ex1.rvt*.
   For Metric *M_c02_Apartment2_ex1.rvt*.
2. Exterior wall type- **Exterior - Brick on Mtl. Stud**.
3. Interior wall type-
   For Imperial **Basic Wall: Interior - 5" Partition (2-hr)**.
   For Metric **Basic Wall: Interior - 135mm Partition (2-hr)**.
4. Height of the wall- **Top Constraint - Up to Level 2**.
5. Location line parameter for the exterior walls- **Wall Centerline**.
6. Name of the file to be saved-
   For Imperial **c03_Apartment2_ex1**
   For Metric **M_c03_Apartment2_ex1**

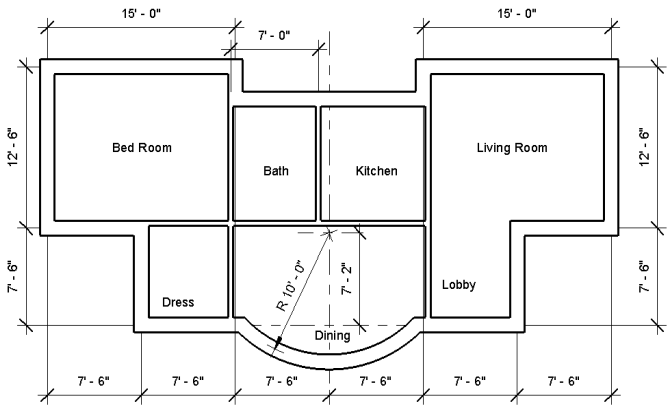

Figure 3-88 *The sketch plan for creating the exterior and interior walls for the Apartment 2 project*

Exercise 2 Elevator and Stair Lobby

Create the exterior walls of the *Elevator and Stair Lobby* project, refer to Figure 3-89. Do not add dimensions or texts as they are given only for reference. The project parameters for this exercise are given next. **(Expected time: 30 min)**

1. Project file -
   For Imperial *c02_ElevatorandStairLobby_ex2.rvt*
   For Metric *M_c02_ElevatorandStairLobby_ex2.rvt*
2. Exterior wall type - **Basic Wall Exterior Brick on Mtl. Stud**.

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3. Height of the wall - **Top Constraint- Up to Level 2**.
4. Location line parameter - **Wall Centerline**.
5. Name of the file to be saved -
   For Imperial **c03_ElevatorandStairLobby_ex2**.
   For Metric **M_c03_ElevatorandStairLobby_ex2**.

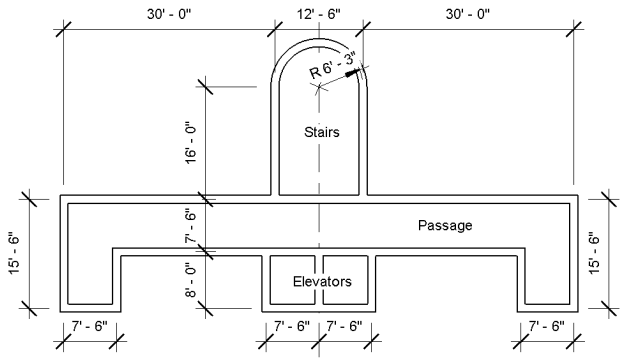

Figure 3-89 *Sketch plan for creating the exterior walls for the Elevator and Stair Lobby project*

Exercise 3 Club-Interior Walls

Create the interior walls of Hall 2 of the *Club* project, refer to Figure 3-90. Do not dimension the sketch as dimensions are given only for reference. The project parameters for this exercise are given next. **(Expected time: 30 min)**

1. Project file -
   For Imperial *c03_Club_tut4.rvt*
   For Metric *M_c03_Club_tut4.rvt*
2. Interior wall type-
   For Imperial **Basic Wall: Interior - 6 1/8" Partition (2-hr)**.
   For Metric **Basic Wall: Interior - 138mm Partition (1-hr)**.
3. Unconnected height of walls- **12'0"(3658 mm)**.
4. Location Line- **Wall Centerline**.
5. Inclined walls are parallel to the external walls and perpendicular to each other.
6. Name for saving the file-
   For Imperial **c03_Club_ex3**.
   For Metric **M_c03_Club_ex3**.

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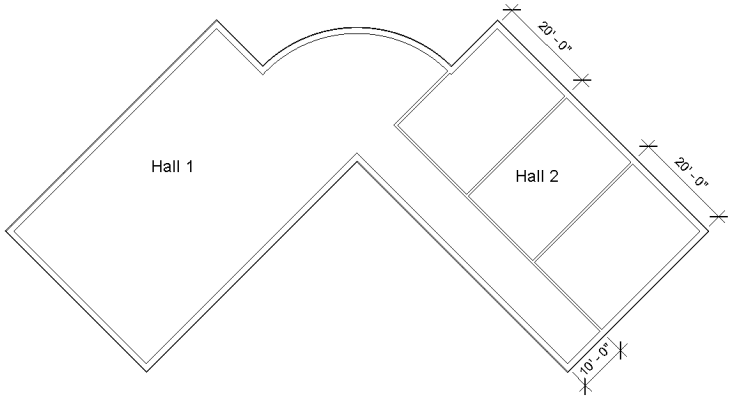

Figure 3-90 *Sketch plan for sketching the interior walls of right portion for the Club project*

Exercise 4 Residential Building- Walls

Create stacked wall type for exterior walls and also create the interior walls for *Residential Building-Walls* project, refer to Figure 3-91. Do not dimension the sketch as dimensions are given only for reference. The project parameters for this exercise are given next.

(Expected time: 30 min)

1. Project file -
   For Imperial *c02_residential_ex3.rvt*
   For Metric *M_c02_residential_ex3.rvt*
2. Exterior wall type-
   For Imperial **Stacked Wall: Exterior - Brick Over CMU w Metal Stud**
   For Metric **Stacked Wall: Exterior - Brick Over CMU w Metal Stud**
3. Exterior wall type-
   For Imperial **Generic- 5”**
   For Metric **Generic- 125mm**
4. Top Constraint- **Level 2**.
5. Location Line- **Wall Centerline**.
6. Inclined walls are parallel to the external walls and perpendicular to each other.
7. Name for saving the file-
   For Imperial **c03_residential_wall_ex4**.
   For Metric **M_c03_residential_wall_ex4**.

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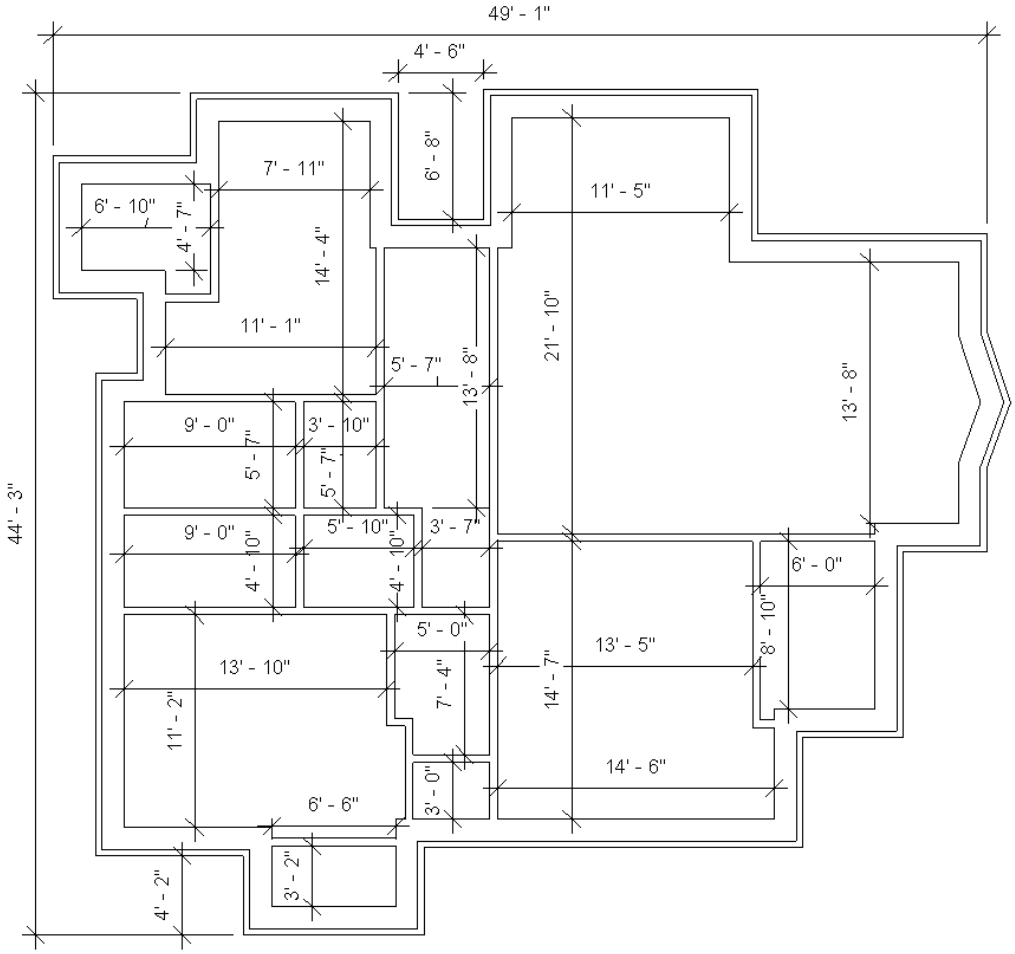

Figure 3-91 *Sketch plan for sketching the interior walls of right portion for the Residential building Walls- project*

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Answers to Self-Evaluation Test

1. c, **2**. c, **3**. a, **4**. **Chain**, **5**. **Offset**, **6**. **Type Selector**, **7.** T, **8.** F, **9.** T, **10.** F