GRAPHISOFT®

ARCHICAD 8

Step by Step Tutorial

by Thomas M. Simmons

Graphisoft

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Graphisoft ArchiCAD Step by Step Tutorial

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The *Graphisoft ArchiCAD Step by Step Tutorial* was developed by *ARCHVISTA* and used with the ArchiCAD training course at the San Francisco Institute of Architects. This is the first edition of *Step by Step* produced for *ArchiCAD 8*.

The author, ***Thomas M. Simmons*****,** spent seven years as an architect and served as the Director of Design Technology for Esherick, Homsey, Dodge and Davis Architects, an award-winning and internationally acclaimed architecture firm, before starting his company, *ARCHVISTA*. While at EHDD Architects, he was instrumental in integrating and managing ArchiCAD on a variety of projects including single-family houses, commercial buildings, libraries and aquariums.

Simmons received a Master of Architecture degree from the University of California, Berkeley, and a Bachelor of Environmental Design degree from Texas A & M University. He has been a speaker on a variety of subjects including Beginning to Advanced ArchiCAD, Architectural Multimedia, QuickTime VR and Architectural Visualization.

ARCHVISTA has produced several notable projects for the architectural and ArchiCAD markets including the acclaimed NASA Virtual Tours - 2002, the Lawrence Berkeley National Laboratory Building Technology Facility - 2001, the award-winning Architectural Record, Record Houses CD-ROM - 1997 and 1998 and the award winning visualization of the American Hebrew Academy with Aaron Green Architects - 1998.

ARCHVISTA is a leading consultant and reseller of ArchiCAD for the Northern California, Nevada and Oregon regions and can be reached at **www.archvista.com**. ARCHVISTA is a member of the Virtual Building Group representing the largest base of ArchiCAD users in the United States.

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Introduction

Welcome to Step by Step

The *Step by Step Tutorial* for ArchiCAD 8 is designed as a 16- to 20-hour course that will guide you through a project. By the end of this course, you should have a basic understanding of ArchiCAD concepts, tools, drawing techniques and modeling. The steps highlight the implementation of a project, methods of design and the application of tools for construction documents.

The intention of this course is to offer a consistent and organized process for learning ArchiCAD based on an architectural project.

Each step guides you through the concept or technique to be learned, the information necessary to build the exercise, and what to do for that step. The steps also contain diagrams of the Toolbox and dialogs that provide quick references to Tools used in that exercise.

The Concept of a Virtual Building

Architectural software is evolving rapidly from an "automator" of two-dimensional drafting to a three-dimensional building simulator. As a result of this evolution, the architect's ability to construct a "virtual building" on a desktop computer, to simulate the building's behavior both before it is built and throughout its life cycle, will change the architect's design process, fee structure, and relationship with the client, contractor and the community. In addition to transforming the architect's own practice, ownership of the 3D computer model will carry important competitive advantages in procuring all future work associated with the same building.

Traditional CAD vs. Virtual Building Technology

So what is the difference between traditional CAD drafting and Virtual Building Technology? Traditional CAD is the world of lines, arcs, circles and blocks. With traditional CAD, your drawing is a 2D representation of how the building will be built. It is very similar to hand drafting but automated with computer technology.

With Virtual Building Technology, you construct a building using building elements: floor slabs, walls, roofs, windows, doors, stairs and other objects. A Virtual Building uses intelligent objects to create building elements. With object oriented CAD, each object in the system represents a building element with a behavior and intelligence relevant to that element. For example, the behavior of a door is different than the behavior of the wood used to construct it. Because you have the real model of a building, not just a 2D representation of one, you can ask it building specific questions. For instance, you can get detailed reports on egress analysis, heat loss analysis, code compliance or cost takeoffs.

From the virtual model, buildings can be analyzed with respect to building mass, overshadowing and visual appearance. ArchiCAD can automatically generate plans, elevations and sections, perspective views, animations and virtual reality views.

Integrated Building Information

Architects and building professionals using integrated 3D CAD software generate a wealth of valuable building information that can be used for both the traditional architectural practice as well as for many new fields and services. Some of the opportunities that can utilize this information are:

- Building master planning, design and development
- Creation of renderings, animations and virtual reality scenes
- Production drawings, details and schedules
- Building marketing
- Management of building spaces and assets

- Post-occupancy studies and simulation of design changes
- Analysis and visualization of product performance over the building life cycle
- Content development for electronic building component objects including product data and links to manufacturer Websites

With ArchiCAD and its Virtual Building Technology, architects, in partnership with owners, are in a prime position to assert their central role not only in the initial design of buildings, but also in their long-term programming, maintenance and operation.

How Firms use ArchiCAD

As the new age of Virtual Building Technology unfolds, architecture firms and the building industry must consider how to effectively apply Virtual Building Technology to design, production, collaboration and information analysis. ArchiCAD offers a complete solution and, unlike other CAD systems, has been built on the foundation of architecture.

With this in mind, there are a variety of architecture firms using ArchiCAD and its Virtual Building Technology system. The firms range in size from one-man firms to large companies and specialize in a variety of projects including housing, retail, commercial, schools and others. Here is what several architects have to say about ArchiCAD and their use of Virtual Building Technology:

House+House Architects (San Francisco, California)

"*Part of ArchiCAD's value lies in modeling and easy perspectives; you do not need to put a lot of effort into it,*" *Steven House* said. "*But it is worth it to take the extra step to create views with a different flavor. The results can be very powerful.*"

House+House are very hands on with their projects, working closely with builders, artisans and craftsmen to ensure that no detail goes unconsidered. "*We are very excited about our explorations in ArchiCAD,*" *Steven* said. "*And the potential it offers for us to communicate design ideas to our clients, our builders and ourselves.*"

STUDIOS Architecture (Washington, D.C.)

With a tight project timeline, the design team at STUDIOS appreciated ArchiCAD's ability to generate three-dimensional models automatically from the floor plan and section views allowing them to advance the construction documents, make design studies and prepare client presentations at the same time with relatively little additional work.

"*Modeling in 3D gives you and your client a chance to look at a design critically and react to it,*" project architect *Bill Deegan* said. *Deegan* also cites that STUDIOS could shave off critical time by sending QuickTime VR scenes to the client by e-mail and through an Intranet which links STUDIOS U.S. offices in Washington, D.C., San Francisco and New York.

The *Orcutt/Winslow* Partnership (Phoenix, Arizona)

When *Orcutt/Winslow* began to fully embrace the Virtual Building method of working, they had to rethink their billing process. "*The time spent on the project is greater up-front, but the documents phase time and effort has been significantly reduced*", Winslow said. ArchiCAD's single, integrated database allows them to start the input of specific materials and systems at a much earlier point in the design phase. With this method, they can show these details at any point, and comfortably make modifications because any changes made will be updated in all views. "*Our schematic designs show a much more complete three-dimensional presentation to the client and allow us to evaluate the design in 3D more thoroughly at early stages.*"

"*Office morale and profitability are both on the rise and we are currently in the process of shifting our project phasing percentages to take into account the Virtual Building methodology,*" added project manager *Russ Sanders*. "*More time is expended up front establishing the links from the*

primitive model to the layout sheets. Once this is done, the rest of the project can be developed within the model. By the time we have completed the design development phase, we are actually about 60 percent complete with construction documents."

***Rockefeller/Hricak* Architects (Venice, California)**

"*We would like to think that the appearance of our work is a direct result of how it gets built. Using ArchiCAD to build a 'living' model of the building helps us to focus on issues and assist us in making design decisions as the project takes shape.*" The firm is concerned not just how buildings look, but also how they function over time.

"*We need to be able to predict how the building will look 10 to 20 years down the road, because that affects the way we design it,*" *Hricak* said. "*If something is going to wear out in 20 years, we need to understand how that element interacts with what is around it. Obviously the structure is not going to wear out, but windows will be repaired, and equipment will become obsolete. ArchiCAD helps us be clear about the separation of systems and get a sense of how the building will perform.*"

How This Book and Step by Step Interactive Work Together

This book (also available in Adobe Acrobat .pdf format on the ArchiCAD 8 CD-ROM/ArchiCAD Documentation folder) is divided into seven sections beginning with the introduction of concepts, then moving through the construction of a Virtual Building. The Step by Step Interactive acts as a virtual assistant that answers questions with real-time movies of each step. All you need to use the interactive is a standard web browser.

Whenever you see this icon...

...it means there is a QuickTime movie demonstrating the step.

To View the Movies on Windows

Choose the *Step by Step Interactive* option of the Startup dialog box of the ArchiCAD 8 CD-ROM or *Browse this CD*, open the *Step by Step Interactive* folder on the ArchiCAD 8 CD-ROM and double-click the file called *Step Interactive.htm*. This will open into your default web browser.

To View the Movies on MacOS

Open the *Step by Step Interactive* folder on the ArchiCAD 8 CD-ROM and double-click the file called *Step Interactive.htm*. This will open into your default web browser.

To locate the corresponding movie for a step, use the information under the CD-ROM icon.

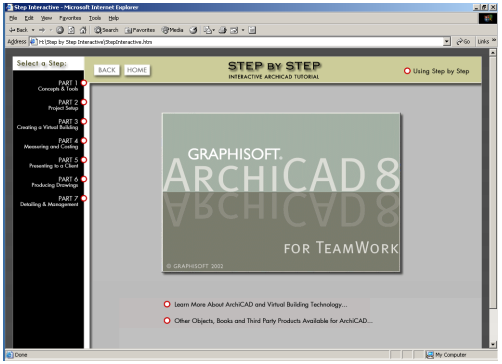
P-1: Indicates the main section, Part 1: Concepts and Tools

S-4: Indicates the step, Step 4: Editing and Notation

M-C: Indicates the movie designation for Step 4, Movie C - Multiply Exercise

1-4: Indicates the exercise numbers if the movie refers to more than one exercise

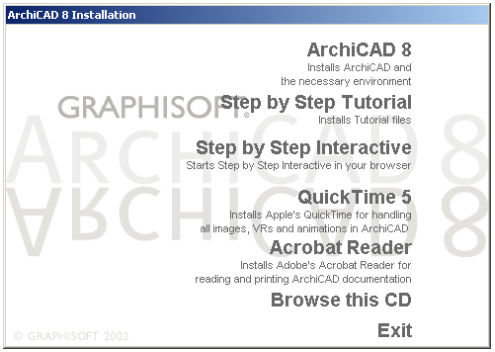
To play the QuickTime movie, simply click the name of the movie (the name in color with an underline), such as Movie C - Multiply Exercise. The screen will jump to the movie and begin playing it.



It is that simple!

How to Install and Use the Step Files on Windows

Insert the ArchiCAD 8 CD-ROM into your computer's CD-ROM drive. The main dialog box of the installation appears on your screen, where you can choose from the options by single-clicking on the appropriate caption:



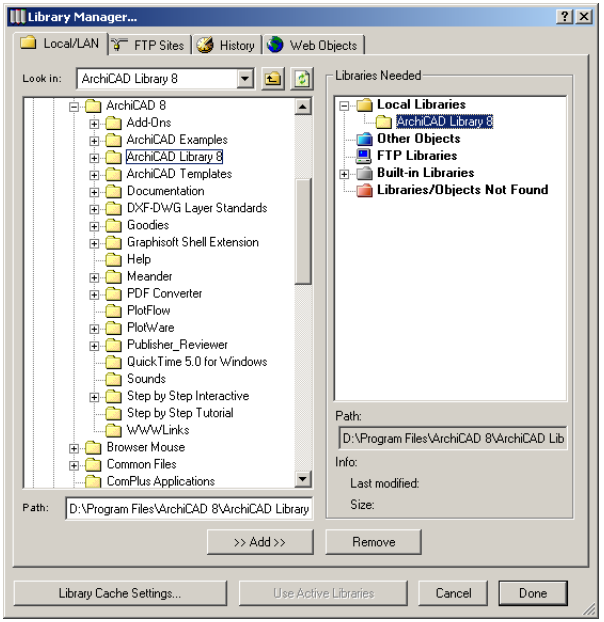
• Install Step by Step Tutorial

If you have an installed ArchiCAD 8 on your hard drive and you need only the Step Files, click *Step by Step Tutorial* caption and follow the installation procedure. Once completed, the requested items appear in the existing ArchiCAD 8 folder. Double-click on them and discover your new ArchiCAD tutorial files.

Library Manager

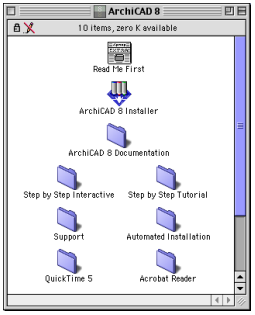
If you try to open a Step file and the **Library Manager** dialog box appears, asking where the ArchiCAD Object Library is located on your hard drive, you must:

1. locate the ArchiCAD folder,
2. open it and select the folder called *ArchiCAD Library 8*,
3. click the **Add** button in the center of the dialog box,
4. click the **Done** button.



How to Install and Use the Step Files on MacOS

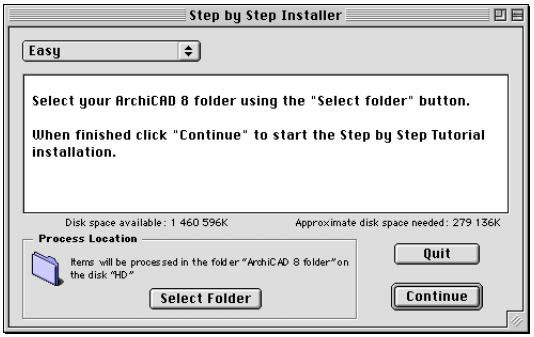
Insert the *ArchiCAD 8* CD-ROM into your computer's CD-ROM drive. The contents of the CD-ROM will appear on your screen.



• Install Step by Step Tutorial

If you have an installed ArchiCAD 8 on your hard drive and you need only the Step Files, click *Step by Step Tutorial* icon in the *Step by Step Tutorial* folder.

A dialog box will ask for the location of your ArchiCAD folder. Click the **Select Folder** button to browse your computer for the requested folder. Click **Continue** and follow the installation procedure.



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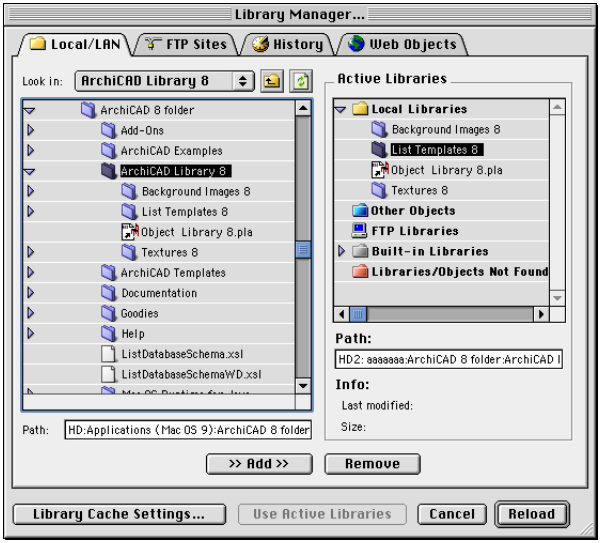


Starting a Tutorial Exercise

When the ArchiCAD 8 version is open on screen, go to the **File** Menu and **Open** the file *Step-xx.pln* located in the *Step Files* folder.

Part One: Concepts and Tools

Step 1: The ArchiCAD Workplace

Overview

Here you will learn the basic windows of the working environment and how to customize these windows to create your personal workspace. ArchiCAD has three primary working environments; Floor Plan Window, Section/Elevation Window and the 3D Window.

Additionally, this step will introduce you to the Tools and Palettes that are used to help you draw and construct building elements, notes, graphics and views.

Process to Learn

- ArchiCAD Workplace
  - Floor Plan Window
  - Section/Elevation Window
  - 3D Window
- Tools & Palettes
  - Toolbox
  - Info Box
  - Coordinate Box
  - Control Box

Starting the Step

To begin this step, double-click the file named *Step-01.pln* contained in the *Step Files* folder.

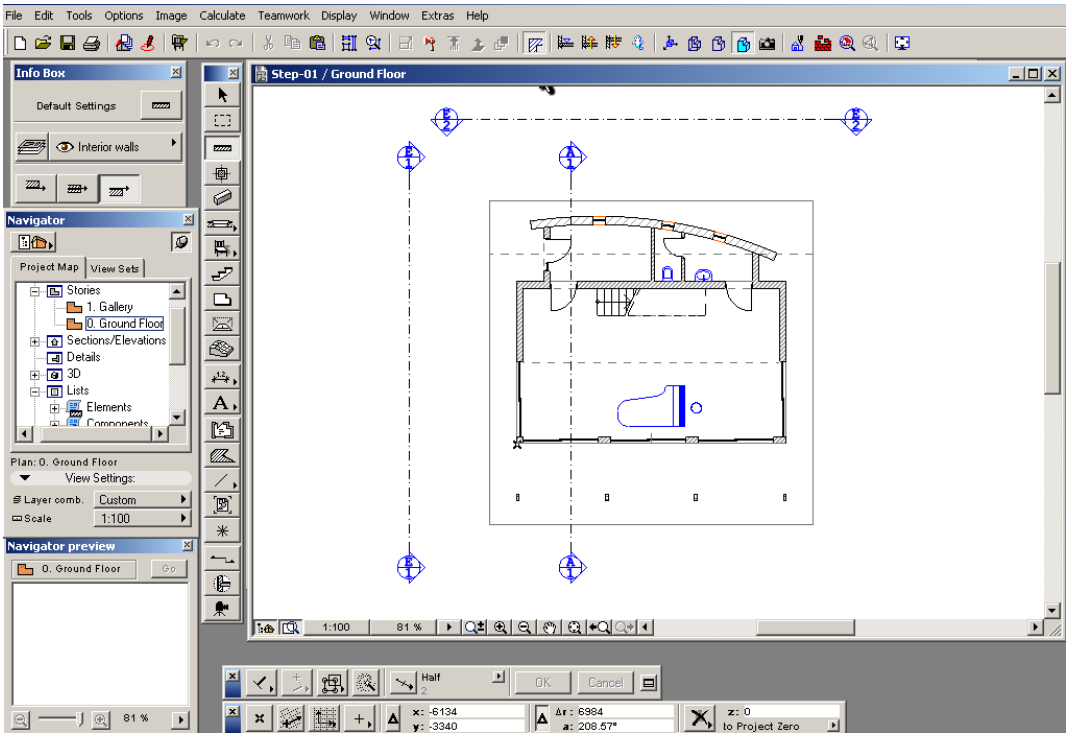
Introduction

This step introduces the visible elements of the ArchiCAD working environment. They will help you find your way around the ArchiCAD workplace and understand the role each component plays in using ArchiCAD.

In many respects, the ArchiCAD workplace is similar to conventional design and drafting environments. We like to think that ArchiCAD begins where your drafting table leaves off, providing you with **actual construction elements** designed to create a virtual building.

The ArchiCAD workplace is designed to provide you with tools that look and feel comfortable, but have all the power and precision available to a computerized system. Once you have started the program you will see the ArchiCAD Workplace on your screen, complete with a Floor Plan worksheet, Menubar, Floating Palettes, and other Windows displaying various aspects of the Virtual Building Project.

You can construct your model in ArchiCAD's main Windows displaying different project views:

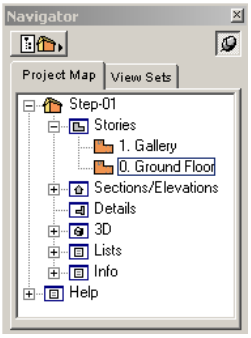


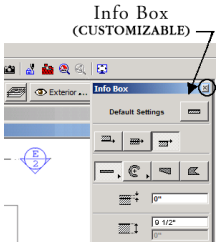
- The **Floor Plan Window** is the basic construction area where most editing operations take place.
- The **3D Window** gives you instant feedback on the construction operations performed in other views and at the same time allows you to directly edit your model in either perspective or axonometric view.
- Any number of **Section/ Elevation Windows** can be defined by a dedicated Tool at any moment, at any location.

What to Do

This step opens to the ground floor of a two-story building. Here we can view the three components of ArchiCAD's workplace. These three workspaces are linked working environments. The working environment allows an interactive drawing process between the **Floor Plan**, **Section/ Elevation** and **3D Window**. Elements are updated in all views to reflect current changes to the model.

These three workspaces can be accessed through the **Project Map** which is located in the **Navigator**. Since we do not need the Customizable Info Box, close it by clicking the **"X" button** in the top right corner as shown below.





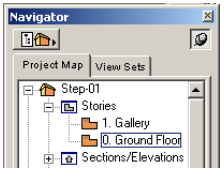
The Floor Plan Window

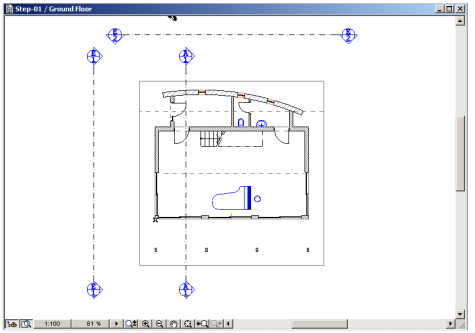
The center of the ArchiCAD workplace is the **Floor Plan** worksheet. This Window plays two roles at the same time:

- It displays a representation of the project as a traditional architectural drawing.
- It is a 2D/3D modeling environment that is interactive with the Sections/ Elevations and 3D workspace.

P-1, S-1, M-A

With the **Floor Plan** window open, we can view the plans for both floors of this building. The model currently shows the Ground Floor story. To move up a story, open the Stories section of the **Project Map** by clicking the "+" symbol and then **double click** the **Gallery** story.

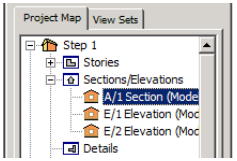


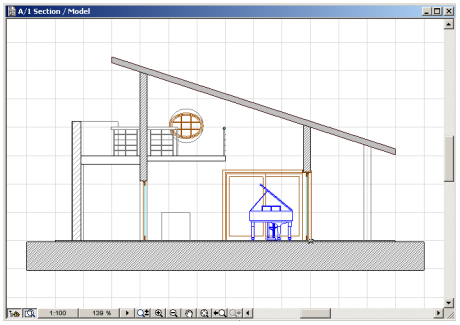


The **Floor Plan** worksheet is like a sheet of drafting paper. However, a traditional mechanical drafting board is limited by the size of the paper you can fit on it, while the ArchiCAD worksheet can be as big as you want it to be. You can pan and zoom the Window within the full drawing space to obtain the best view of the work you are doing.

The Section/Elevation Window

Using the **Section/Elevation Tool** in the **Toolbox**, you can generate any number of sections or elevations of your project, which will appear in separate Windows. To open a section or elevation, open the Section/Elevation workspace in the **Project Map** by clicking the "+" symbol and then double click the Section or Elevation you wish to view.





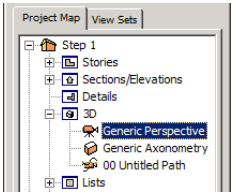
The **Section/Elevation Window** is interactively linked to both the **Floor Plan** and **3D Windows**. Elements selected in this Window are recognized as walls, beams, columns, slabs, roofs, windows, doors, lights and library parts. These elements are fully editable using the same editing tools as you use in the **Floor Plan** workspace.

You can also add drawing elements to this Window using the 2D drafting tools, place objects and text blocks on the section/elevation and even copy and paste parts of the Window to the floor plan for completing detailed working documents.

Section/Elevation views are saved with your project model file. It is also possible to save them as separate files in a variety of drawing formats using the **Save As...** command under the **File** menu.

The 3D Worksheet Window

The **3D Window** is used for three-dimensional visualization of the architectural project and as a project editing environment. To open the 3D Window, go to the preset views in the **Project Map** by clicking the "+" symbol next to 3D and then **double click** either the perspective or axonometric view**.**

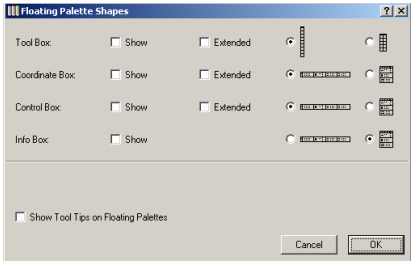


Either the complete project or just the parts you select in plan view will be displayed in the **3D Window**. Block, Wireframe, Hidden line and Shaded views are available in all types of parallel and perspective projections. The **3D Window** serves a variety of functions:

- In your design phase, the **3D Window** will serve as a source for visual feedback of your work.
- It is an interactive Window, so you can move freely about in the 3D environment both in Parallel and Perspective projections.
- The elements in this Window, as in the **Floor Plan** and **Section/Elevation Windows**, are completely editable.
- For PhotoRenderings, the **3D Window** sets the view that will be used to produce a final photorendering.
- For output to other applications, a 3D file can be exported from the **3D Window**.

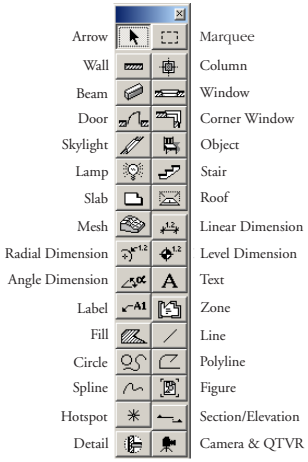
Tools & Palettes

Palettes can be customized to your preferences. Each Palette can be shown or hidden separately from the **Floating Palettes** hierarchical menu in the **Window** menu, and the four main palettes (Toolbox, Info Box, Coordinate Box, Control Box) can enabled or disabled together with the **Show Main Palettes Only** command. The shapes of the main palettes can be customized with **Options/Customize.**



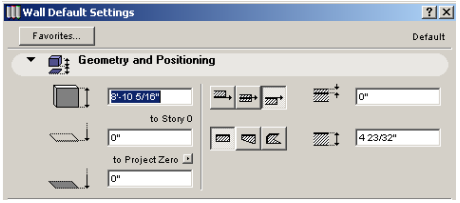
1. The Toolbox

The **Toolbox** is where you start in ArchiCAD. The **Toolbox** is divided into five basic parts: Selection Tools, 3D Tools, Notation Tools, 2D Tools and Visualization Tools.

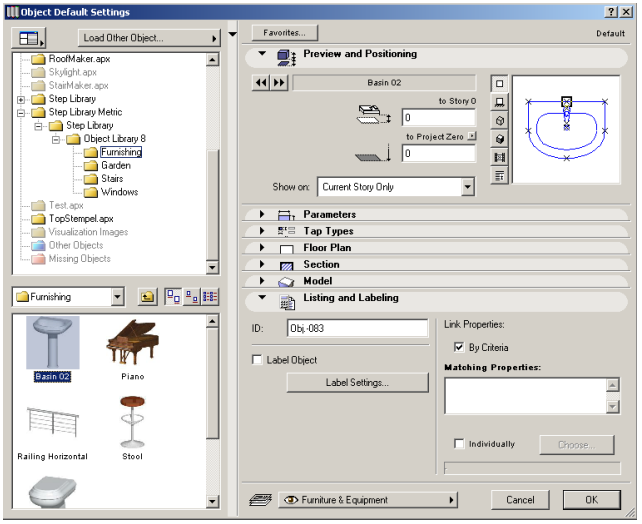


- **Review the Tool Settings Dialogs**: Each Tool has a settings dialog associated with it. To review the dialogs for each Tool, double-click the Tool.

  Note: that each tool has various settings for Floor Plan, Section, Model and Properties. The **Wall Settings** dialog is typical of the basic settings for each of the 3D Tool settings.



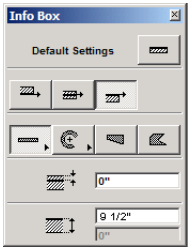
The **Object Settings** dialog (shown below) is similar for all library parts, which include windows, doors, lamps, objects and stairs. This dialog contains a library part browser and a system explorer tree to the left.



2. Info Box

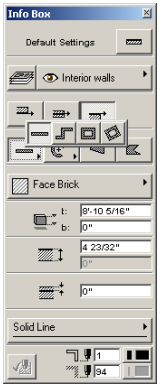
The Info Box displays the different control group parameters of the currently active Tools on various panels. The items displayed in the **Info Box** vary according to which ArchiCAD Tool is currently selected.

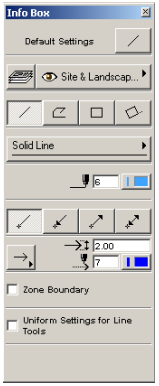
The Info Box is a customizable palette. With this palette the Infobox can be resized by the user manually by stretching the bottom right corner of the palette. The bigger it is stretched, the more information it shows.

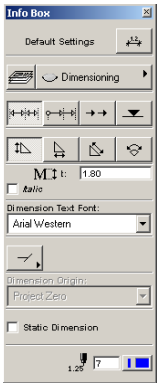


- **Review the Controls for Each Tool**: In this exercise, click each Tool in the **Toolbox** and observe how the **Info Box** settings differ for each Tool selected.

P-1, S-1, M-B



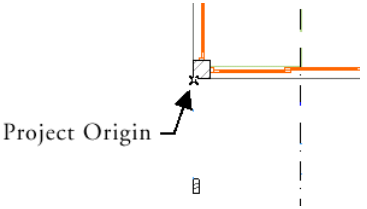




3. Coordinate Box

The **Coordinate Box** shows you the precise location of the ArchiCAD Cursor within both the Cartesian and the Polar coordinates for your drawing. This allows the entering and the viewing of very accurate numeric information through the keyboard, in addition to or instead of the mouse.

- **Cartesian and Polar Coordinates**: Move the cursor to the bottom right hand corner of the project so that the cursor changes to a check mark. Notice that the all the coordinates have a **"0" value** at this point. This point is identified by an **"X"** on the screen and is called the **Project Origin**.



You can toggle between Absolute and Relative coordinate values during drafting or editing by clicking its Delta icons:

Absolute values show the horizontal, vertical, radial and angular distance of the cursor from the Project Origin or a User Origin but never from an Edit Origin.

Relative values show the horizontal, vertical, radial and angular position of the cursor relative either to the Project Origin, to a User Origin before any element is begun, or to an Edit Origin once a drafting or editing process is under way.

- **User Origin**: Click the **"X" button** so that it is depressed and click the upper left corner of the building. Notice that the **"X"** has moved to this point and that the coordinates have a **"0"** value at this new point. This is known as the

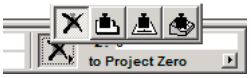
User Origin and this button allows you to relocate the origin anywhere in the Project.

- **Skewed Grid**: Turn on the Background grid by selecting Grid Display from the Options menu. To change the grid angle, click this button so that it is depressed and then click once on the screen to define the start point of the grid and a second point to define the angle of the skewed grid.

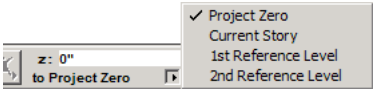
- The **Grid Switch** icon next to this Skewed Grid button allows you to toggle between the normal and skewed grids.

- **Grid Snap**: This icon allows you to activate either of the grids or turn off the snap feature altogether.

- **Gravity**: This icon allows the user to place elements relative to existing Slabs, Roofs or Meshes. The Gravity option can be turned off by selecting the "X" option.



- **Elevation**: The Elevation (z coordinate) field displays and allows you to edit the height or elevation of elements while the Elevation pop-up menu allows you to choose whether the Elevation coordinate field will display absolute or relative values.

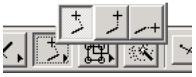


4. Control Box

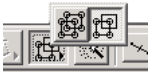
The **Control Box** gives you the ability to constrain the drawing angle and cancel or confirm the current drawing operation. It also allows you to group or ungroup elements, choose extension line settings, select offsetting commands, and provides active Tool specific help in the **Command Prompt** area during different drawing steps.

- **Relative Construction Methods**: These construction methods constrain the cursor to a defined angle or distance during drafting or editing.

- **Cursor Snap Variants**: This option controls the way the current position of the cursor is projected.



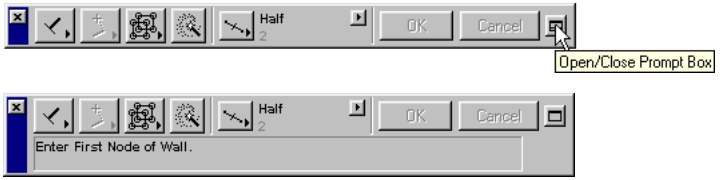
- **Suspend Groups**: This switch allows you to choose between editing grouped elements together or on their own.



- **Magic Wand Tool**: This tool traces the contours of existing elements in order to create new elements of other types.

- **Special Snap Point**: Using this control allows the user to use special definition controls to automatically generate temporary snap points on different parts of edges.

- **Extended Control Box**: The Prompt Box provides point-by-point instructions during drafting or editing. To expand the Control Box, click the button on the right side of the palette.



Extended Control Box with Command Prompt

Step 2: Understanding Objects and GDL

Overview

ArchiCAD is an object based program. This step introduces the concept of element types stored in outside files, including doors, windows, lamps, labels, and general objects. These objects can be stored in an ArchiCAD Library, a project library or over the Internet.

It also gives an overview of GDL (Graphic Description Language) and how it describes 3D solid objects like doors, windows, furniture, structural elements, stairs, etc., and the 2D symbols representing them on the Floor Plan.

Process to Learn

- What are Objects
  - Types of Objects
  - Purpose of Objects
  - Object Parameters
  - Object Settings
- What is GDL
- The ArchiCAD Library

Starting the Step

Use your file from the previous step or open the file named *Step-02.pln* contained in the *Step Files* folder.

Introduction

Library Parts are parametric prefabricated complex elements created either by ArchiCAD or a third party application and used as units in projects. When you start ArchiCAD for the very first time, it searches for a Library under the name ArchiCAD Library.

The icons in the **Toolbox** that reference ArchiCAD Libraries are as follows:

What to Do

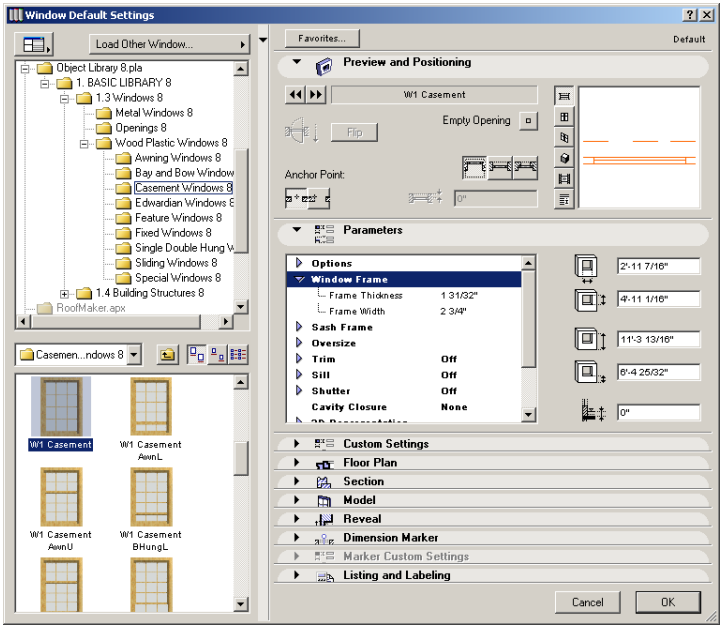
1. The Concept of Parametrics

An ArchiCAD innovation, parametric object definition allows a single stored object (i.e. window, door, light, stair or truss) to represent dozens of similar objects by simply changing their height, thickness, material and other custom parameters. Each object can also be re-saved under another name allowing you to quickly build up your own specific library.

P-1, S-2, M-A, 1-2

To view an example of how parameters are used, double-click on the **Window Tool** in the **Toolbox**. The dialog contains various parameters that can create a window with different forms, shapes, sizes and materials.

To make changes to the selected window, click in any of the Parameters fields with your cursor and change the settings (i.e., width, depth, length, height).



As you change the settings, view the preview window in top view, side view, hidden line 3D view, shaded 3D view and as a preview picture using the **Display Mode** buttons next to the preview window.

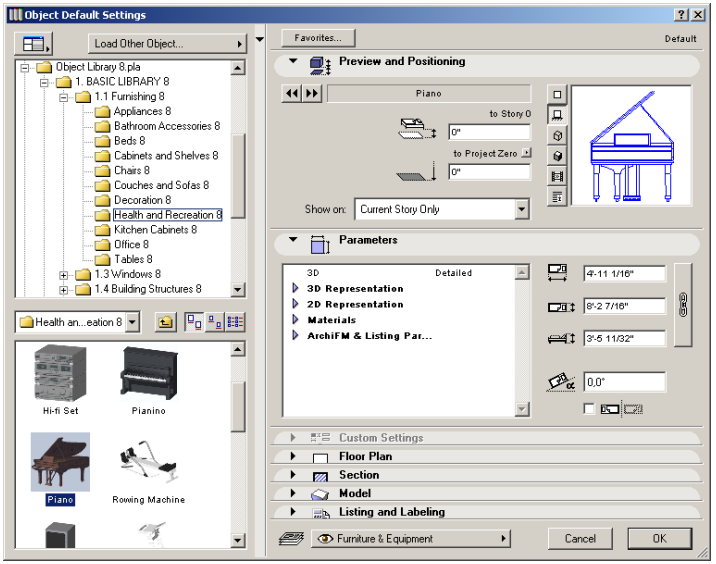
You can choose between window objects using the thumbnail previews in the browser at the left of the dialog or by selecting a different window library from the system explorer at the left of the dialog.

2. View an Object Library

To review the Object Library and how it is organized, double-click the **Object** Tool in the **Toolbox**. The **Object Settings** dialog will appear.

The **Object Settings** dialog (shown below) is similar for all library part, which include windows, doors, lamps, objects and stairs. The dialog contains a library part browser and a

system explorer tree to the left. You can choose different views of the object (top, side, 3D, etc.) by clicking the Display Mode icons to the right of the object preview.

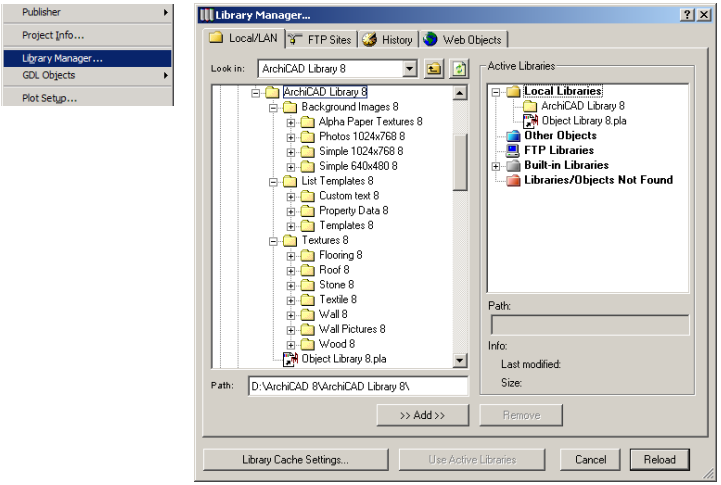


3. Review the Loaded Libraries

When ArchiCAD opens a project, it loads one or more libraries from the local hard drive, network or the Internet. To review which libraries are currently loaded, open **Library Manager** from the **File** Menu.

- **Local/LAN:** The **Local/LAN** tab page allows you to manage complete libraries and individual library parts stored on local disks or on remote volumes connected to your computer through a local area network.

To open the Library Manager, select the **Library Manager** option from the **File** menu. Click on the **Local/LAN** tab and the currently loaded ArchiCAD Libraries will appear in the dialog.



- FTP and Web Objects:
  - Using the **FTP Sites** tab page, you can add libraries and single library parts stored on FTP servers.
  - The **Web Objects** tab page allows you to download GDL Objects from websites and add them to your local libraries.

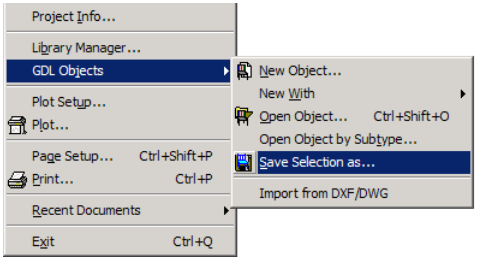
Since you are currently working from your local hard drive, the **FTP Site** and **Web Object Settings** will be empty since no links have been established to an online site.

4. What is GDL

GDL (Graphic Description Language) is a parametric programming language, similar to BASIC. It describes 3D solid objects like doors, windows, furniture, structural elements, stairs, etc., and the 2D symbols representing them on the floor plan. These are called **library parts**.

Creating custom ArchiCAD objects **does not require** an understanding of GDL. You can create custom library parts by using the standard tools (Wall Tool for vertical elements, Slab Tool for horizontal elements, Roof Tool for sloped elements, etc.) and saving the custom design as a GDL Object by

selecting "Save Selection As..." from the GDL Objects option in the File menu as shown below.



If you need to add parameters such as material selection or text input, you would then open the object and add GDL parameters. You can learn more about this in the book *Object Making with ArchiCAD* by David Nicholson-Cole. This book is published by Graphisoft.

Part Two: Project Setup

Step 3: Customizing the Drawing Environment

Overview

We can customize options such as project grid, snap grid, line types, pens, colors, pen weight, fills, composites, materials and zones as well as Drawing Preferences to meet specific project needs and drawing requirements. This step teaches you how to customize these options to your drawing needs.

Process to Learn

- Grids & Background
- Pens & Colors
- Line Types
- Fill Types
- Composites
- Preferences

Starting the Step

Open the file named *Step-03.pln* contained in the *Step Files* folder.

Information

The document just opened will be used as the basis for much of the remaining tutorial. Each step will build upon the model to create a Virtual Building from which to derive plans, sections, elevations, renderings, sun studies, virtual reality scenes and more.

Using the controls in the **Options** Menu, you can customize ArchiCAD to reflect your drawing standards and preferences. We will use the following options in this exercise:

Grids & Background:

- The Grids & Background dialog allows you to define a working **grid configuration** and establish a background color for your workplace and grid lines.

Pens & Colors:

- ArchiCAD pen and color assignments are reviewed and modified using the Pens & Colors… command. In ArchiCAD, pens are simulated drawing instruments that have a specific **color** and **line weight**.

Line Types:

- When you choose the **Line Types** command, a dialog box appears allowing you to select, modify or delete the standard line types (**solid, dotted, dashed, etc.**). You can also define your own customized line or symbol line types.

Fill Types:

- Fills are **geometric patterns** that can display two faces: bitmapped and vectorial, but only one of the two at one time. You can set this option in the Display Options.

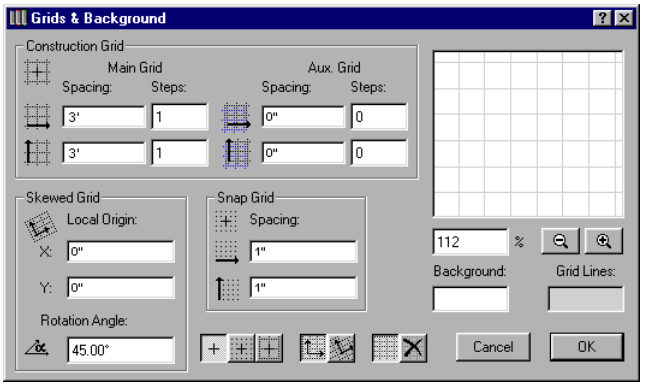
Composite Structures:

- Walls, Slabs and Roofs can have composite structures. In ArchiCAD composite structures are composed of patterns that represent the **components that compose the structure**. These components can be assigned a size, description and cost.

What to Do

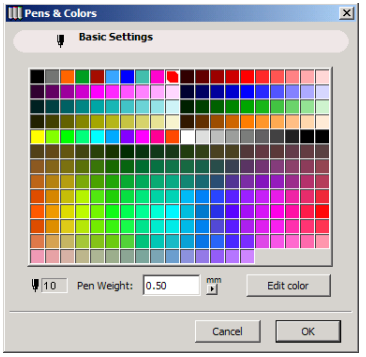
1. Create a Project Grid

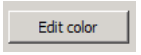
Open the **Grids & Background** dialog from the **Options** menu. Set the Main Grid to 3' (914mm) and the Snap Grid to a spacing of 1" (50mm).



2. Create a Custom Pen Color & Line Weight

Open the **Pens & Colors...** dialog from the **Options** menu. Place your cursor on **Pen #10** and double click the pen color box or click the Edit Color button. The Edit Color dialog will appear. Select the **Yellow** color and click **OK**.





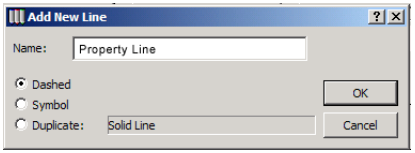
With Pen #10 still selected, place your cursor in the Pen Weight text box and change the Pen Weight to **0.50 mm**. When finished click **OK**. You have now set a custom color and line weight.

3. Create a Custom Line Type

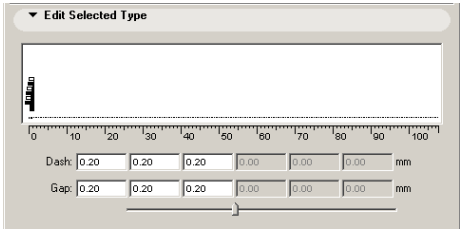
This new Line Type will be used as a property line in Step 15.

P-2, S-3, M-A

Open the **Line Types...** dialog from the **Options** Menu. Click the **New** button, select the **Dashed** radio button and enter the name ***Property Line*.** Click **OK**.



Select and drag the slider to the right to activate the three columns as shown.



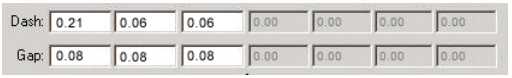
Now enter the numeric values as follows to create a property line:

Column 1: **Dash:** .21 and **Gap:** .08

Column 2: **Dash:** .06 and **Gap:** .08

Column 3: **Dash:** .06 and **Gap:** .08

You can also manually change the line spacing by selecting and dragging the flag.



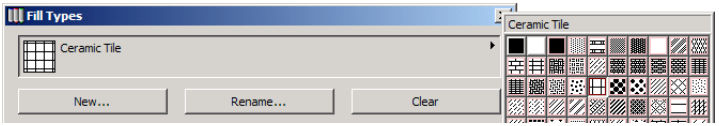
When finished, click **OK**.

4. Create a Custom Fill Type

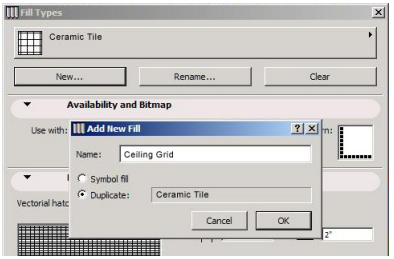
This new Fill Type will be used as a ceiling pattern in Step 14.

P-2, S-3, M-B

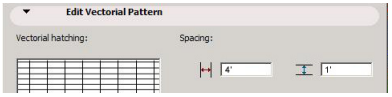
Open the **Fill Types...** dialog from the **Options** Menu. Select the "**Ceramic Tile**" pattern from the popup menu at the top of the dialog (the patterns are listed in alphabetical order).



Click the **New...** button, click Duplicate and type in the new name "**Ceiling Grid**". Click **OK**.



Now set the size to represent a Ceiling Grid pattern under **Edit Vectorial Pattern**. Type in **4' (1200mm)** for the length and **1' (300mm)** for the height.



Finally, change the **Bitmap pattern** (the pattern that appears as a preview of Fill patterns in the Tools dialogs) to represent the new pattern. To do this, click your cursor in the Bitmap

Pattern box to turn the black dots **ON.** This will allow you to create the pattern as shown below:

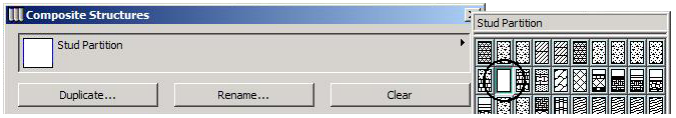
When finished click **OK**.

5. Create a Custom Composite Wall

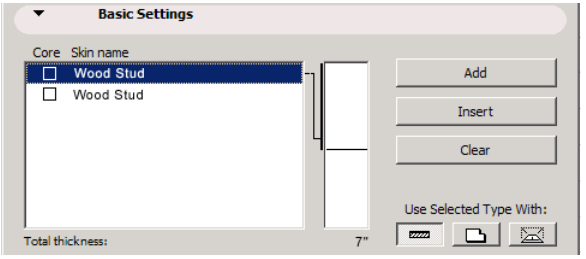
This new Composite Structure will be used as a interior wall type in Step 9.

P-2, S-3, M-C

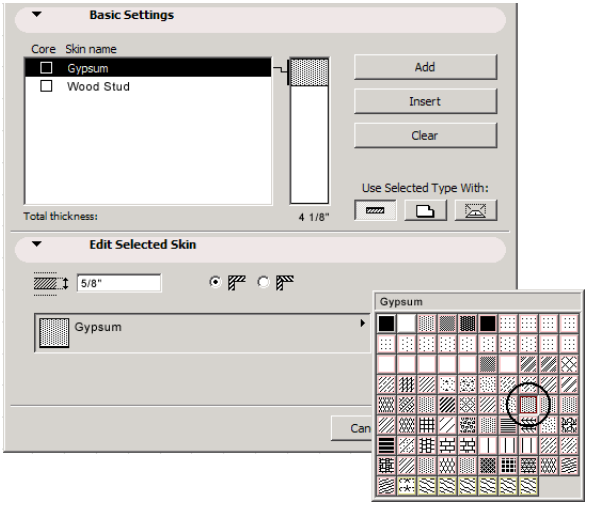
Open the **Composites...** dialog from the **Options** Menu. Select "Stud Partition" from the popup menu as shown below. Click **OK**.



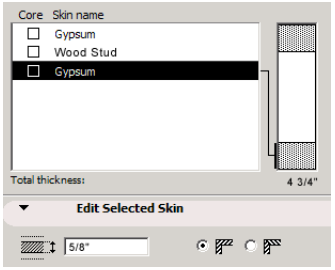
Click the **Insert** button to add a new skin to the wall.



With the outer skin selected as shown, click the popup fill pattern option in the Edit Selected Skin portion of the dialog and select the **Gypsum** fill pattern. To change the width of the Gypsum, click in the size box and enter **5/8" (25mm)**.



Now click and highlight the **Wood Stud** component of the wall and click the **ADD** button to add a skin to the opposite side of the wall. Click in the size box and enter **5/8" (25mm)** to set the size of the Gypsum. Click **OK**.



Note: Both Fill Types and Composite Structures can be shown with either Bitmap or Vectorial patterns in the **Display Options**. Bitmap Patterns are faster to display but cannot be scaled, zoomed or rotated, while Vectorial Patterns are slower to display but can be scaled, zoomed and rotated.

Step 4: Managing Project Information

Overview

This step is the foundation that will manage plans, sections, elevations, details, 3D information and final drawings for your Virtual Building. ArchiCAD manages this information by using Layers, Layer Combinations and the Navigator.

In this step we will discuss how to set up your ArchiCAD model so that you can both manage the information and produce the drawings.

Process to Learn

- Layers
- Layer Combinations
- Project Standards
- Navigator Palette
- Setting up Drawings
- Link to PlotMaker

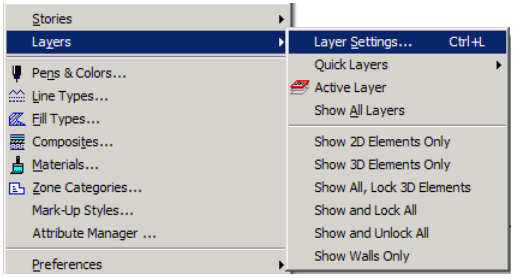
Starting the Step

Use your file from the previous step or open the file named *Step-04.pln* contained in the *Step Files* folder.

Introduction

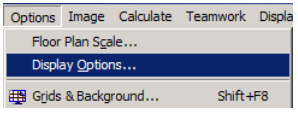
1. Layer Settings

ArchiCAD layers are used to **organize the elements** in your drawing for selective displays and quantity calculations. The **Layer Settings** command displays the Layer Settings dialog box, which allows you to define the layer settings for your project.



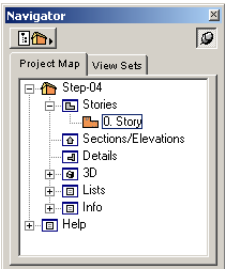
2. Display Options

The Display Options command opens a dialog box where you can customize the way the various construction elements are displayed on the **Floor Plan** worksheet. As an example, you can use this option to toggle between showing the door swing or displaying a header for the ceiling plan.



3. Navigator

The Navigator palette is used to give an **overview of the project structure**, providing instant access to stories, sections, elevations, detail drawings, and 3D views lists. Additionally, it is used to **manage view options** for typical drawing types such as an architectural floor plan, site plan, ceiling plan and other project drawings.



What to Do

1. Create Layers

Open the **Layer Settings** dialog under the **Options** Menu.

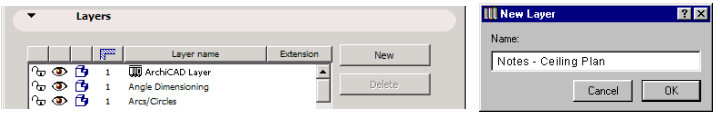
P-2, S-4, M-A

This dialog contains building and notation layers provided by ArchiCAD. To start this project we will add 3 new layers for notation purposes. Using the **Layer Settings** dialog as shown, create new layers by selecting **New** and typing the following layer names:

Notes - Ceiling Plan

Notes - Floor Plan

Notes - Site Plan

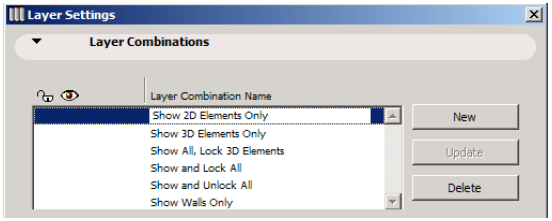


2. Create Layer Combinations

Each Layer Combination is a "snapshot" of the state of all Layers in the Project and can be called up at any time by selecting its name from the Layers list. Layer Combinations generally reflect the drawings that are to be produced (such as a floor plan, ceiling plan and site plan).

P-2, S-4, M-B

Before adding new Layer Combinations, delete the current Layer Combinations. To do this, select the each name and click the **Delete** button as shown below:

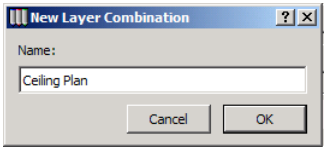


To add a layer combination, click the **New** button and type the Layer Combination names:

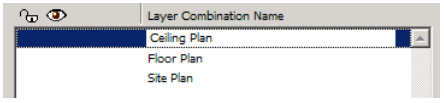
Ceiling Plan

Floor Plan

Site Plan

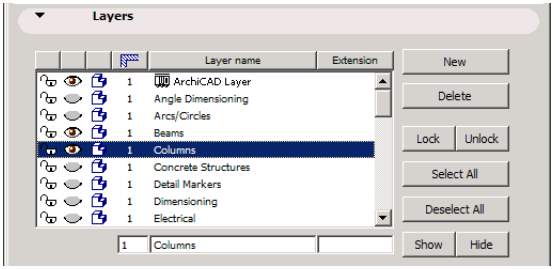


Once all the Layer Combination names are entered we must choose which layers are to be active and which are inactive using the **Show** or **Hide** buttons. Let's start by selecting the "Ceiling Plan" Layer Combination:



Then, click the **Select All** button and click the **Hide** button. Now deselect all the layers by clicking the **Deselect All** button. We are now ready to select which layers should be active for the Ceiling Plan. To do this, select each of the following active layers and click the **Show** button.

- Active Layers for the **Ceiling Plan** Layer Combination:
  - Beams
  - Columns
  - Exterior Walls
  - Fills
  - Floors
  - Interior Walls
  - Lamps
  - Notes - Ceiling Plan
  - Roofs



When finished, click the **Update** button next to the **Ceiling Plan** Layer Combination to make these changes permanent.

Now that the Ceiling Plan Layer Combination is finished, repeat the above steps for the Floor Plan and Site Plan Layer Combinations. The following layers are the active layers:

- Active Layers for the **Floor Plan** Layer Combination:
  - Beams
  - Columns
  - Detail Markers
  - Dimensioning
  - Elevations

- Exterior Walls
- Floors
- Furniture & Equipment
- Interior Walls
- Mark-Up
- Notes - Floor Plan
- Roofs
- Sections
- Stairs
- Zones

- Active Layers for the **Site Plan** Layer Combination:
  - Columns
  - Exterior Walls
  - Floors
  - Interior Walls
  - Level Dimensioning
  - Notes - Site Plan
  - Roof
  - Site & Landscaping
  - Stairs
  - Terrain

After having created the above layer combinations you can choose among them under **Option/Layers.**

3. Name the Current Story

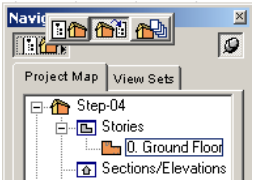
In this step we will create a name for the current story. Select the Story Settings dialog from the Stories option in the Options menu. Click in the Name text box and type **"Ground Floor"** and click **OK**.

4. Create View Sets using the Navigator

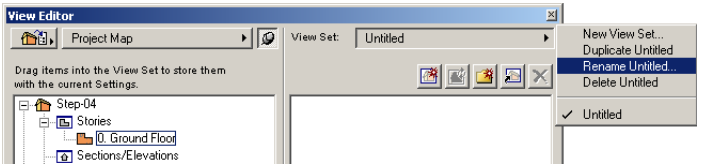
Now that the project layers and layer combinations are set, we must link these layer combinations to **View Sets**.

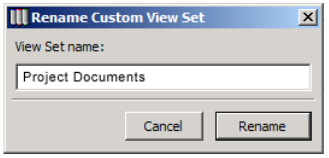
P-2, S-4, M-C

Using the **View Editor** we will assign the drawing scale, display options, layer combinations and drawing view. To edit the View Sets, click the popup button on the upper left side of the dialog and select the middle button to activate the View Editor.

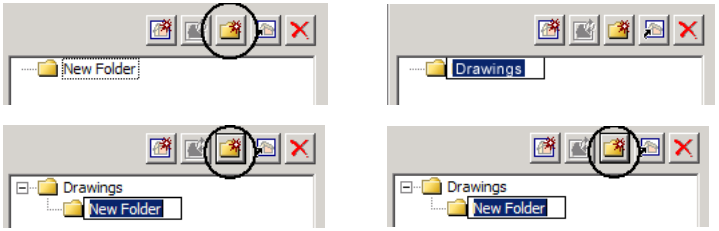


With the View Editor active, rename the "Untitled" View Set as **"Project Documents"** by selecting **Rename** from the popup commands at the right edge of the dialog.

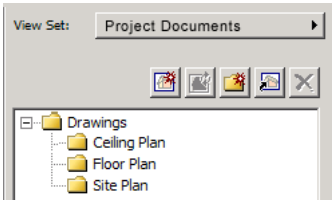




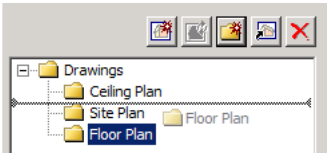
Next, create new folders that reflect the **Drawings** to be produced. To do this, click the **New Folder button** circled below and click the folder to rename it as **"Drawings"**. With the Drawings folder highlighted, click the **New Folder button** again and rename it as **"Ceiling Plan"**.



Highlight the Drawings folder and repeat this step to create two additional folders named **"Floor Plan"** and **"Site Plan"** as shown below.



To set the **order** of the folders simply click and drag the folder as shown below:



5. Assign View Settings and Storing Options

The final step is to assign the scale, display options and layer combination to each Drawing Type created.

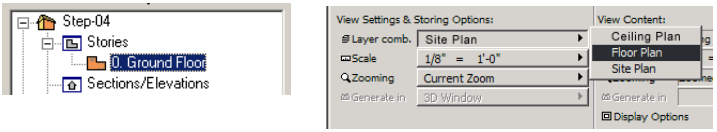
P-2, S-4, M-D

To configure these Drawing Types, set the View Settings and Storing Options as shown below:

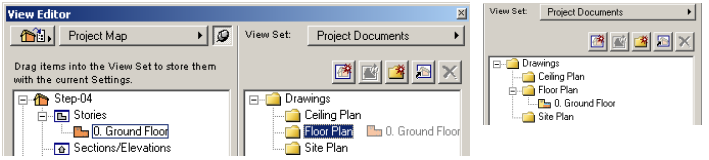
- **Assign the Floor Plan Settings/Options:**

- Click and **highlight** "1. Ground Floor" (0. Ground Floor - Metric) within the Stories section of the Project Map.

Assign the "Floor Plan" layer combination by clicking the Layer Combination popup button in the View Settings & Storing Options at the lower part of the Navigator palette.

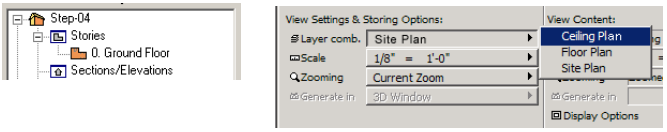


- Now that we have changed the View Settings and Storing Options for the Ground Floor, we must assign these settings to the Floor Plan folder. To do this, **drag and drop** the story "1. Ground Floor" (0. Ground Floor - Metric) into the **Floor Plan folder** as shown below.

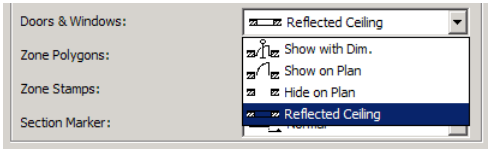


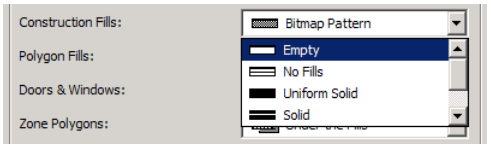
- **Assign the Ceiling Plan Settings/Options:**

- Click and **highlight** "1. Ground Floor" (0. Ground Floor - Metric) within the Stories section of the Project Map. Assign the "Ceiling Plan" layer combination by clicking the Layer Combination popup button in the View Settings & Storing Options at the lower part of the Navigator palette.

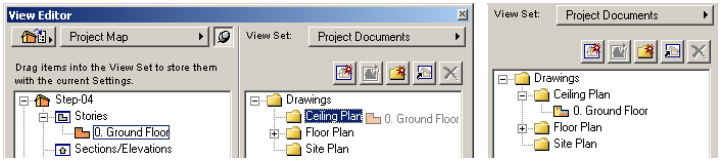


- Next, open the **Display Options** dialog from the **Options** menu. Within the dialog, set the "Doors & Windows" view option to "Reflected Ceiling", the "Construction Fills" view option to "Empty" and the "Polygon Fills" view option to "Vectorial Hatching". Click **OK** when finished.



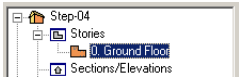


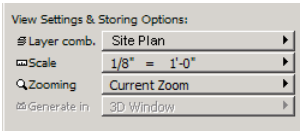
- Now that we have changed the View Settings and Storing Options for the Ground Floor we must assign these settings to the Ceiling Plan folder. To do this, **drag and drop** the story "1. Ground Floor" (0. Ground Floor - Metric) into the **Ceiling Plan folder** as shown below.



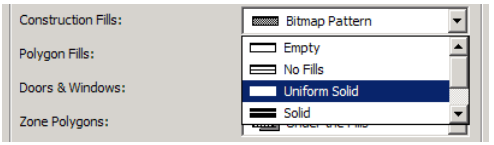
- **Assign the Site Plan Settings/Options:**

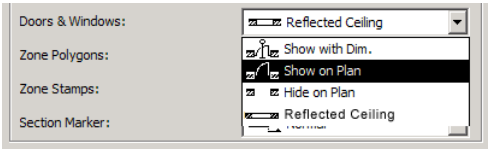
- Click and **highlight** "1. Ground Floor" (0. Ground Floor - Metric) within the Stories section of the Project Map. Assign the "Site Plan" layer combination by clicking the Layer Combination popup button in the View Settings & Storing Options at the lower part of the Navigator palette.



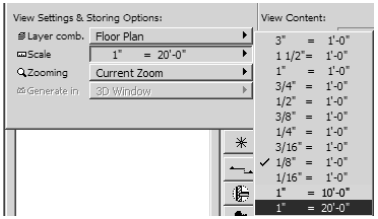


- Next, open the **Display Options** dialog from the Options menu. Set the "Doors & Windows" view option to "Show on Plan" and the "Construction Fills" view option to "Uniform Solid". Click OK when finished.

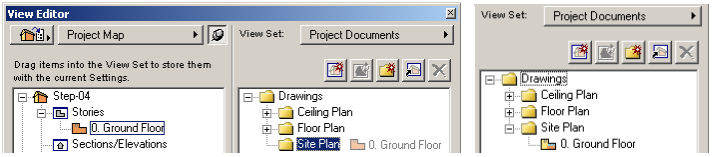




- Now change the scale for the Site Plan by clicking the Scale popup button in the View Settings & Storing Options at the lower part of the Navigator palette. Change the scale to 1"=20'-0" (1:200 mm).

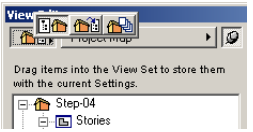


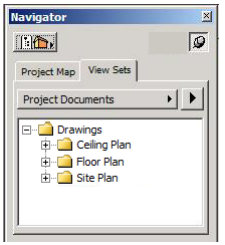
- Now that we have changed the View Settings and Stored Options for the Ground Floor, we must assign these settings to the Site Plan folder. To do this, **drag and drop** the story "1. Ground Floor" (0. Ground Floor - Metric) into the **Site Plan folder** as shown below.



6. Turn Off the View Editor

When you are finished with the above steps, restore the Navigator to its original setup by turning off the View Editor. To do this, click the popup button on the upper left side of the dialog and select the left button to activate the Navigator.





Part Three: Creating the Virtual Building

Step 5: Establishing the Base Building Layout

Overview

This step will teach you how to use the Slab Tool for creating a building slab and external paving. You will explore ways of manipulating slab shapes and slab openings. You will also learn how to construct linear and curved walls using the Wall Tool in both the Floor Plan Window and the 3D Window.

Process to Learn

- Creating a Slab
- Slab Materials
- Editing a Slab
- Creating Linear Walls
- Creating Curved Walls
- Wall Materials
- Working in the 3D Window

Starting the Step

Use your file from the previous step or open the file named *Step-05.pln* contained in the *Step Files* folder.

Introduction

When you create a **Wall** in ArchiCAD, you create the outline and hatching of a Wall in 2D, and a solid Wall body in 3D.

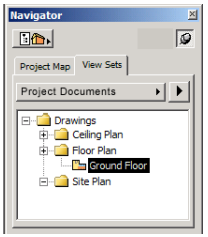
Because Walls are such important elements of your Project, they form special relationships with other ArchiCAD elements:

* **Other Walls**: Automatic L and T intersections are formed between Walls. Overlapping vertical edge segments for tangential Walls.
* **Columns**: Automatic Wall-Column connections, optional Wall wrapping around columns.
* **Beams**: When a Beam crosses a Wall, the element of lower priority is cut in 3D.
* **Doors and Windows**: A Wall is the only placeholder of these elements. They become part of the Wall.
* **Slabs**: Overlapping Wall and Slab edges are eliminated in 3D: facades will be clean on elevations and other 3D views.
* **Roofs**: Walls can be trimmed to Roofs.

Slabs are the basic horizontal building blocks in ArchiCAD. Slabs are drawn either on the Floor Plan or in the 3D Window, allowing them to accommodate any design. Existing Slabs are easily modified on the Floor Plan and in the 3D Window or through the Slab Settings dialog box.

What to Do

1. Set the View Set to "Floor Plan" using the Navigator



To set the View Set to the Floor Plan, click the View Set tab in the Navigator palette and double-click the Ground Floor in the Floor Plan view set:

2. Construct a Floor Slab

The first step is to draw the ground floor slab of the building, which will be 30 by 18 feet (10 by 6 meters) in plan. Use the pre-set 3 square foot (1 meter square) planning grid to help you construct the slab, by easily snapping to its intersection points.

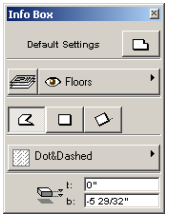
Hint: The different grid snap options can be switched on and off using the control button on the Coordinate Box or the menu items from the Options menu. When any of the snap options is switched on, the cursor moves from one grid intersection to another.

P-3, S-5, M-A

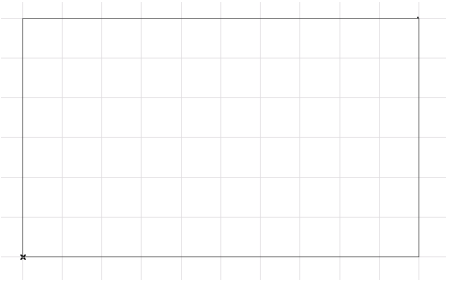
To draw the slab, do the following:

- Switch on the grid snap (select the third icon in the popup palette from the grid snap options in the Coordinate Box).

- Select the Slab tool in the Toolbox.
- Select the rectangular geometry method from the Info Box.



- Click on the origin indicated by the black X on the Floor Plan.
- Click a second time to finish the slab covering 10 grid squares horizontally and 6 vertically.



Hint: To change the view of the plan, choose the **Zoom in/Zoom out/Pan** or **Fit in Window** commands from the **Display** menu and either double-click on the plan or draw a marquee to define the extent of the magnification. Alternatively, use the magnifying glass/palm icons from the bottom of the window.

3. Create Linear Walls

At any time, you can see a three dimensional view of what is on the **Floor Plan** by opening the 3D Window by using the **Window** menu/**3D Window** command.

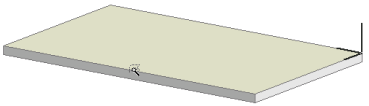
P-3, S-5, M-B

Now place walls around the sides of the slab here in the 3D Window. Use the magic wand feature to trace the perimeter of the slab and automatically place walls on it.

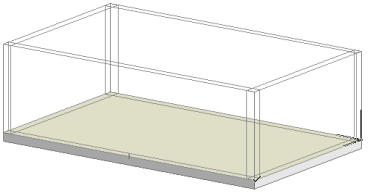
To place walls on the sides of the slab:

- Select the **Wall** tool in the **Toolbox**.
- Select the **Magic Wand** icon in the **Control Box**.

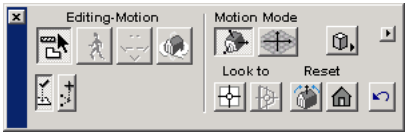
- Click on the front edge of the slab with the cursor (the Magic Wand icon will change to a wand with a loop indicating that you are snapping to a line).



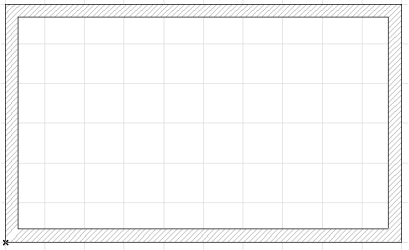
- Click on one of the top corner points of the slab to finish placing the walls.



Hint: The 3D Navigation Palette helps you navigate around in the 3D window. The Editing-Motion buttons are available depending on the type of the view (perspective/ axonometric); the Motion Mode buttons allow for changing between the view types. To navigate in an axonometric view select the fourth button under Editing-Motion (as shown) and click outside the rectangle in the 3D Window. We will discuss more about 3D Navigation and options in Step 06.



Go back to the **Floor Plan** (**Window** menu/**Floor Plan**). Notice that the walls have appeared on the plan.



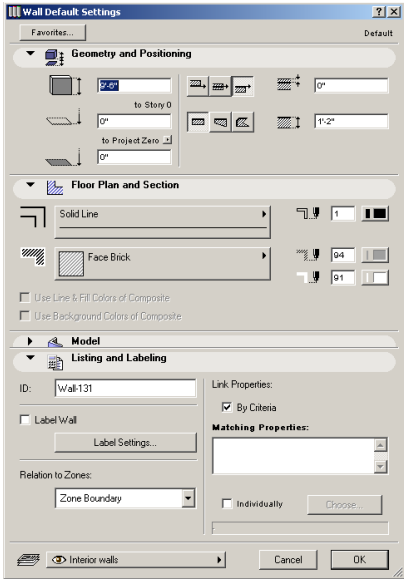
4. Construct Curved Walls

Now construct a curved block wall to the north of the building for the entrance enclosure.

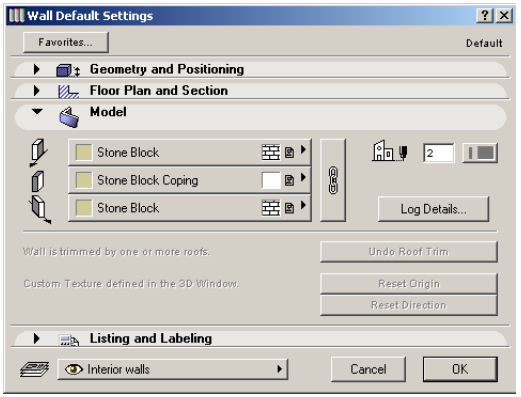
P-3, S-5, M-C

To do this, first change the wall type to a block wall:

- Double-click on the **Wall** tool in the **Toolbox** to bring up the Wall Settings dialog box.
- Change the thickness of the wall from 1' to 1'-2" (250 to 300 mm).
- Change the “Face Brick” hatching type to “Masonry Block” under “Floor Plan and Section Attributes” (the hatches are listed in alphabetical order).

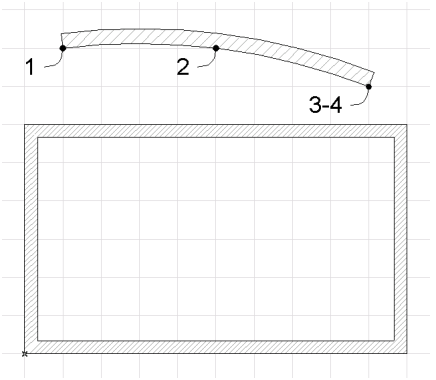


- Change the “White-Brick” material to “Stone Block” for the internal and external sides and to “Stone Block Coping” for the edges of the wall under “Model Attributes”.



- Click OK.

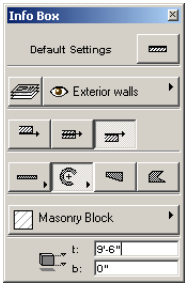
Place the curved wall shown in the picture below. The curvature will be defined by 3 points, all of which will be grid intersection points.



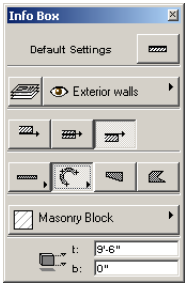
Hint: When drawing the line of the wall, after a first click a heavy black line follows the cursor like a rubberband. This "rubberband line" is the reference line for the wall. The reference line is used to connect walls smoothly and helps locate the walls with the cursor.

To draw the curved wall:

- Choose the relevant curved wall icon (2nd icon in the 2nd row) from the geometry methods in the Info Box.

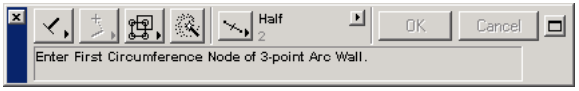


- Change the construction method as shown in the picture.

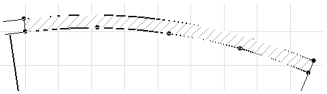


- Click on the grid intersection points in the order shown in the picture (the third and the fourth clicks are on the same point).

  Hint: You can get instant step-by-step instructions of the drafting and editing procedures in the maximized state of the Control Box. Following them eases the drawing procedure and reduces the number of errors.



It is easy to modify the length of this curved wall, for example by stretching both ends of the wall:



- Switch off grid snap. (Select the first icon from the grid snap options in the Coordinate Box as shown in the picture.)

- Select the wall (Select the Arrow tool and click on a side or a corner of the wall to highlight it. The appearing black dots around the wall confirm it has been selected.)
- Choose Edit menu and Stretch.
- Click on the hotspot (on the side of the wall's reference line) on the right end of the curved wall and make it approximately half a grid longer as shown in the picture (the cursor will change from an empty pencil symbol to a black one when snapping to a hotspot).
- Repeat for the other end of the wall.

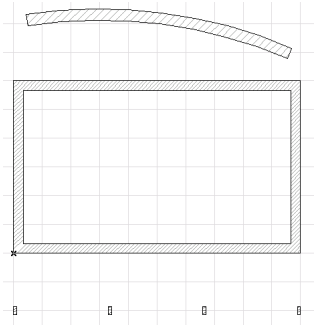
  Hint: To select something on the floor plan, use the mouse cursor. If the Arrow tool is active, simply click on one of the element's points. (To add/remove more elements to the selection hold down the Shift button while selecting them.) When another tool is active, press the Shift button to activate the selection method.

5. Place Structural Columns

Next, place four columns to create a veranda on the south side of the building.

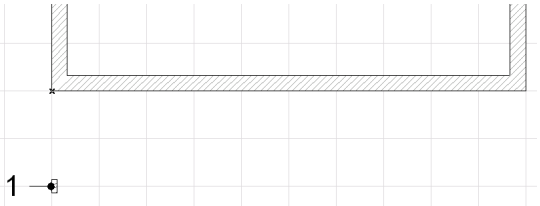
P-3, S-5, M-D

The first and the last column will align with the two side walls (place them on a grid intersection); they will be placed at equal intervals and run parallel to the front wall. Place the first column and then replicate it for the rest.



To place the first column:

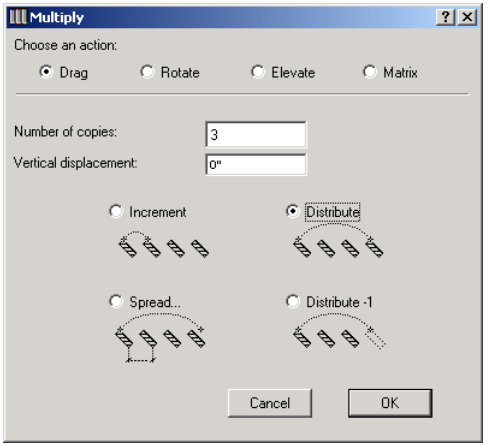
- Switch on the grid snap.
- Select the **Column** tool in the **Toolbox**.
- Click on the grid intersection point two grid spaces below the bottom left corner of the house (point no. 1).



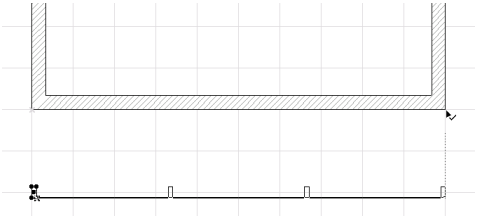
Notice that the column has been placed on the grid intersection point on the Floor Plan.

The next step is to replicate it parallel to the front wall:

- Switch off the grid snap.
- Select the column.
- Select the Multiply command from Edit/Multiply.
- Enter 3 as the number of copies, choose the Distribute method and hit **OK**.



- Click on one of the selection dots on the right side of the column and drag the rubber line horizontally, toward the right end of the building.
- Hold down the Shift key. You can see you are now constraining the horizontal direction, and the columns will be placed parallel to the side of the building.
- Position the cursor over the bottom right corner of the building (your cursor will change to a check mark indicating, that it will snap to a hotspot) so that the last copy will be aligned with the end of the building.



- Click to finish the Multiply command.

Hint: The mouse constraints help draw elements in specific relationship to existing elements and pre-set

directions. They are similar to traditional rulers and triangles.

Two Mouse Constraint mechanisms are available:

Coordinate Constraints are used to lock any of the Coordinate Box parameters and

Angle Pairs are used to lock the cursor at a particular drawing angle.

These techniques facilitate the use of all the 2D/3D drafting tools.

Hint: The Intelligent Cursor helps you identify special points (end, corner points, edges, etc.) and points of geometric relationships of elements (perpendicular, tangential, crossings) within the building and to show that special tools (magic wand, eyedropper, etc.) are effective at the moment.

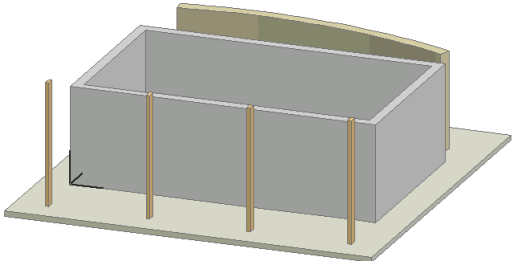
Click outside the building to deselect the column and go to the 3D Window to see the result in axonometry.

6. Create the External Paving

Now return to the Floor Plan to design the external paving around the house.

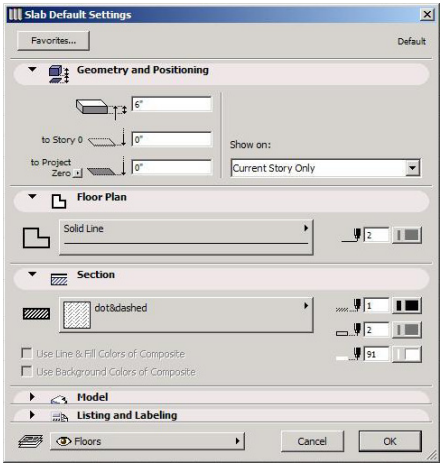
P-3, S-5, M-E

It will be of a timber decking construction, so the next step is to change the slab height, hatching type and materials. After that, place a rectangular slab around the building; lastly cut a hole into the slab for the footprint of the building.

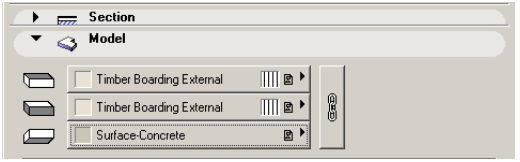


To change the slab settings:

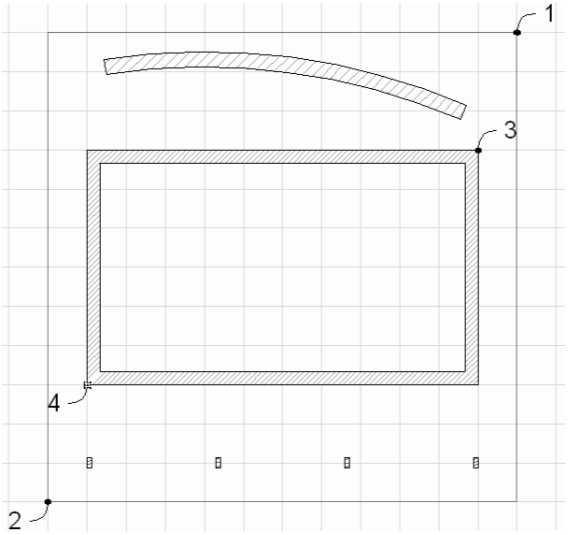
- Double click on the **Slab** tool in the **Toolbox**.
- Enter 6" (150 mm) as the thickness of the slab.
- Change the hatching type in the “Section Attributes” to “Dot and Dashed”.



- Change the top and the side materials in the “Model Attributes” to “Timber Boarding External” and the bottom to “Surface Concrete”.



- Click **OK**.



To place the slab:

- Switch on the grid snap.
- Click to the grid intersection at point no. 1 to start drawing the rectangular slab.
- Click to the grid intersection at point no. 2 to finish drawing the slab.

To cut a hole in the slab:

- Select the slab.
- Make sure the **Slab** tool is active in the **Toolbox**.
- Click to the grid intersection at point no. 3 to start drawing the rectangular hole of the slab.
- Click to the grid intersection at point no. 4 to finish drawing the hole of the slab.
- Click outside the slab to deselect it.

Check the result in the **3D Window**.

Step 6: Viewing the Building in 3D

Overview

The underlying principle of ArchiCAD is that a building is created on the computer not as a set of lines, but as a Virtual Building complete with 3D information. This step introduces how to view and edit the virtual model environment.

You begin the lesson using the two basic methods of the 3D Settings: parallel projections and perspective settings.

Process to Learn

- Navigator Palette
- Navigator 3D Preview
- 3D Projection Settings
- 3D Window
  - Navigating in 3D
- 3D View Types
  - Perspective View
  - Parallel Projections

Starting the Step

Use your file from the previous step or open the file named *Step-06.pln* contained in the *Step Files* folder.

Introduction

3D Window: The 3D Window is used both for three-dimensional visualization of an architectural project and for refining the design directly in 3D. It is directly linked to the Floor Plan Worksheet and to the Section/Elevation Windows. You can display either the complete project or just the selected parts.

- In the **design phase**, the 3D Window will serve as a source of visual feedback for your work in 2D and for constructing and modifying building components directly in 3D.
- In the **production phase** of your project, accurate 3D images optimized for plotter output are also generated in this Window.

3D Projections: The 3D Window can display two types of three-dimensional views: Parallel Projection and Perspective. To access these two view options, you can choose from several methods:

- **Navigator Palette & Preview**
- **3D Projections Dialog**
- **3D Navigation Palette**
- **Camera Tool**

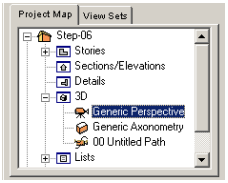
What to Do

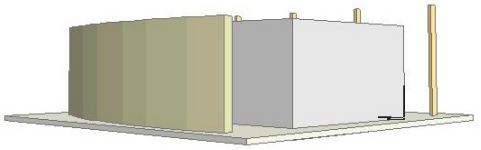
1. Navigator Palette & Preview

The Navigator Preview provides 3D Perspective and 3D Axonometric previews. In the 3D Perspective view you can manipulate the camera directly. In the 3D Axonometric views, a Small house popup button at the bottom of the palette lets you choose from predefined projections.

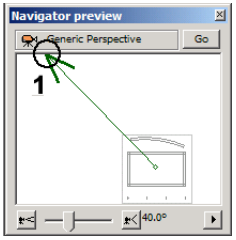
P-3, S-6, M-A

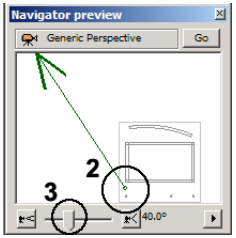
- **Select Generic Perspective**: To set the 3D Window to a perspective view, click the Project Map tab in the Navigator palette, click **3D** and double-click the **Generic Perspective**.



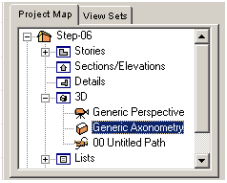


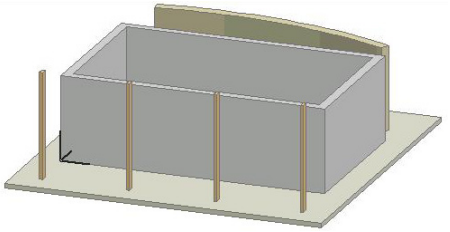
- **Navigate Using the Navigator Preview Camera**: In the bottom left corner of the screen is the Navigator Preview palette. Click the camera **location point** (#1) and drag your cursor; the 3D Window will change views based upon the position of the camera. Now select the camera **target point** and drag your cursor (# 2). You can also interactively change the zoom by selecting the slider (# 3).





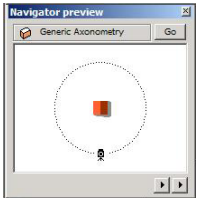
- **Select Generic Axonometry**: To set the 3D Window to an axonometric view, click the Project Map tab in the Navigator palette, click **3D** and double-click the **Generic Axonometry** option.





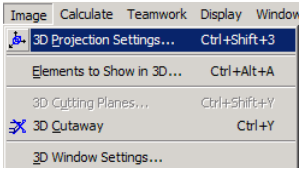
- **Navigate Using the Navigator Preview Camera**: Select the camera in the Navigator Preview. You can navigate the 3D window by moving the camera symbolizing the

projection direction. At the bottom of the palette, the popup button lets you choose from predefined projections.



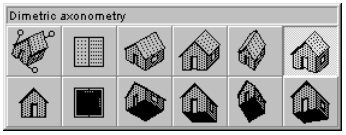
2. 3D Projection Settings

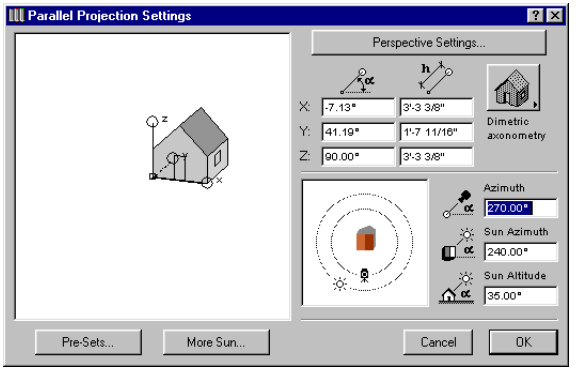
There are two main dialog boxes for 3D views: Parallel Projection Settings and Perspective Settings. These dialog boxes offer more options for defining custom views such as sun position, sun location camera angle and target distance.



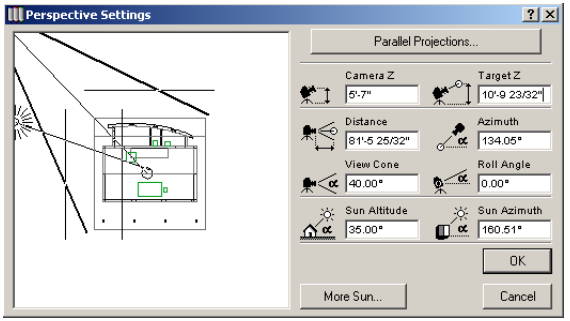
P-3, S-6, M-B

- **Parallel Settings:** Choose the **3D Projection Settings** dialog under the **Image** Menu. This dialog allows you to set views based upon numeric entries and sun position as well as from pre-set views. To change your viewpoint, drag the camera around the house and click **OK**. To change the sun position, drag the sun around the house and click **OK**. To set a specific location for the sun, click the More Sun button.





- **Perspective Settings:** Open the **3D Projection Settings** dialog, under the **Image** Menu. Click the **Perspective** button at the top of the dialog and use the **Perspective Settings** dialog. To try different perspective views, drag the end of the camera and/or the focal point to a different position and click **OK**.

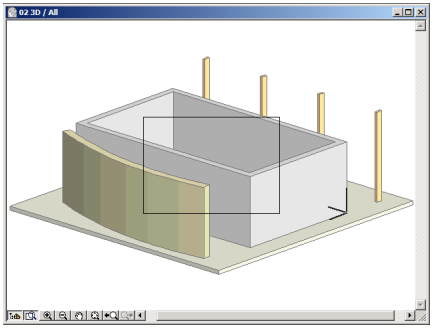


3. Interactive 3D Window

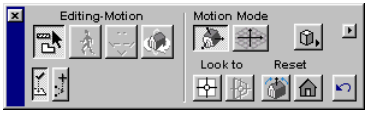
The **3D Window** allows for interactive 3D motion. Interactive navigation through your model is available in both Parallel and Perspective modes. The following steps will guide you through various options for determining position and movement in the 3D virtual environment.

P-3, S-6, M-C

- **Navigate the 3D Window - Parallel Projections**: Go to the **Image** Menu, select **3D Projection Settings** and create a Parallel Projection.



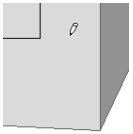
Click on the **Model Axis** button and then select the **Turn** button in the **3D Navigation Palette**.



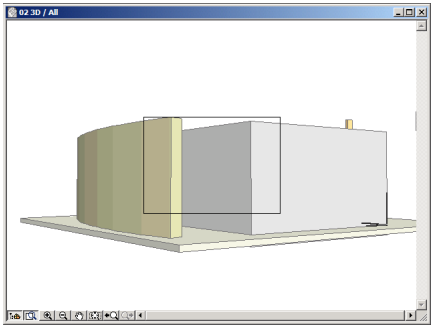
Place the Cursor on the **3D Window** and click and drag the mouse slowly to the right. Drag the mouse to the left. Now try upward and downward. You are rotating the model about its axes.

Click on the **Target Lock** button and then repeat the different rolling procedures. Notice the difference in the way the model rolls.

Click the **Frontal View** button and then click on a surface you want to view in elevation. The view resets to the elevation of that element.

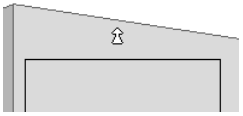


- **Navigate the 3D Window - Perspective Projections:** Go to the **Image** Menu, select **3D Projection Settings** and create a Perspective Projection.



Click on the **Camera** button and then on the **Walk** button in the **3D Navigation Palette**.

Place the Cursor on the **3D Window** with the Cursor **Arrow** facing up and drag the mouse slowly upward to walk forward; drag the mouse down to walk backward, and to the right or left to walk to the side.



Try using the **Turn** button and the **Lateral Move** Tool . Notice the difference in movement.

Click on the **Target Lock** button and repeat the previous Tool selections and maneuvers.

Select the **View Cone Angle** to slide the button right or left to change the view cone angle, which affects the current zoom.

Step 7: Working with Stories

Overview

Stories provide a "physical" separation of elements according to their vertical level. Each story has a unique Floor Plan window in which you place elements – just as architects use separate plans for stories of a building.

This exercise will demonstrate how stories are created in ArchiCAD and how elements are copied between stories.

Process to Learn

- Creating a New Story
- Copying Elements Between Stories
- Viewing 3D Vectorial Hatching
- Slab Settings
- Constructing the Slab
- Updating View Sets

Starting the Step

Use your file from the previous step or open the file named *Step-07.pln* contained in the *Step Files* folder.

Information

Choosing the **Stories menu** item opens a submenu with commands that allow you to:

- Define the vertical structure of your design, story by story
- Navigate between stories by determining which story is currently displayed
- Display a Ghost Story
- Move elements and items between them using a special Cut/Copy and Paste function

All Story functions are controlled through the **Stories** submenu or through the **Project Map** section of the Navigator palette. The Stories and their elevation value defined in the Story Settings dialog box are displayed at the bottom of the submenu. The current Story is shown three different ways within the project model:

- With a Checkmark in the submenu listing
- As the name appears in the title bar of the Floor Plan Window
- Highlighted in the Project Map section of the Navigator Palette

What to Do

The next step is to define the story structure for the Showroom building.

P-3, S-7, M-A

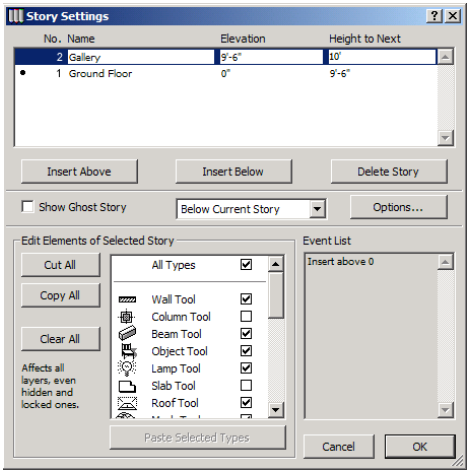
Two stories are required; the ground floor which we have worked on so far, and an upper Gallery. Open the Story Settings dialog box to create the stories, define their heights and copy and paste elements between them.

1. Create the Gallery Story

- Go back to the **Floor Plan**.
- Select **Options/Stories/Story Settings** to bring up the Story Settings dialog box.
- Click to highlight “Ground Floor”.
- Click Insert above to create a story above it.
- Enter “Gallery” as the name for story no. 2 (metric 1) and change its “Height to Next” value to 9'-6" (3000 mm).

The next step is to copy all the walls from the ground floor and paste them into the gallery:

- Highlight the Ground Floor story and Click on the Copy All button.
- Highlight the Gallery story.
- Unclick the column and the slab icon from the icons below (so that they will not be included among the items that will be pasted to the Gallery level).
- Click on Paste Selected Types and Click OK.



You are now on the Gallery story. As you can see, the walls have been copied from the ground floor. (The name of the story is written in the window’s title bar after the file name.)

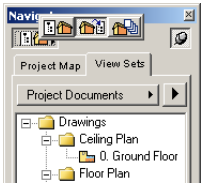
2. Add the Gallery to the Project Documents View Set

Using the View Editor, as we did in Step 4, we will assign the drawing scale, display options, layer combinations and

drawing view for the three drawing types: Ceiling Plan, Floor Plan and Site Plan.

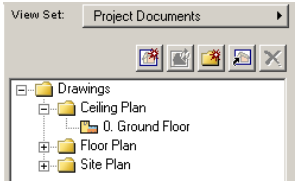
P-3, S-7, M-B

To edit the View Sets, click the popup button on the upper left side of the Navigator dialog and select the middle button to activate the **View Editor**.

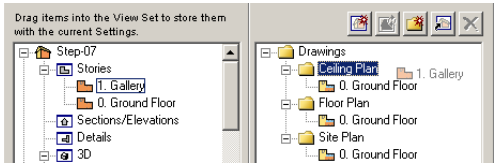


- **Assign the Ceiling Plan Settings/Options to the Gallery:**

- Select and double click the "1. Ground Floor" (0. Ground Floor - Metric) in the Ceiling Plan section of the View Sets. This will set the view to the Ceiling Plan layer combination, scale and display options that were set in Step 4.

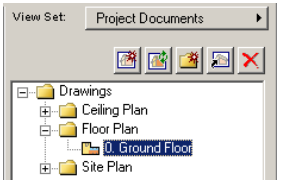


- Now that we have set the View Settings and Stored Options to the Ceiling Plan drawing type, **drag and drop** the story "2. Gallery" (1. Gallery - Metric) into the Ceiling Plan folder as shown below.

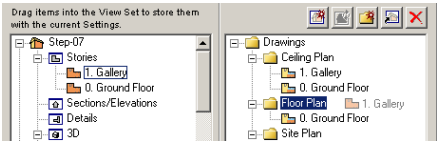


- **Assign the Floor Plan Settings/Options to the Gallery:**

- Select and **double click** the "1. Ground Floor" (0. Ground Floor - Metric) within the Floor Plan section of the View Sets. This will set the view to the Floor Plan layer combination, scale and display options that were set in Step 4.

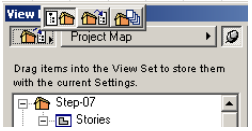


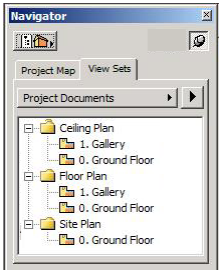
- Now that we have set the View Settings and Stored Options to the Floor Plan drawing type, drag and drop the story "2. Gallery" (1. Gallery - Metric) into the Floor Plan folder as shown below.



3. Turn Off the View Editor

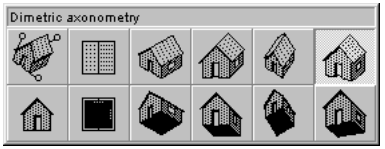
When you are finished with the above steps, restore the Navigator to its original setup by turning off the View Editor. To do this, click the popup button on the upper left side of the dialog and select the left button to activate the **Navigator**.





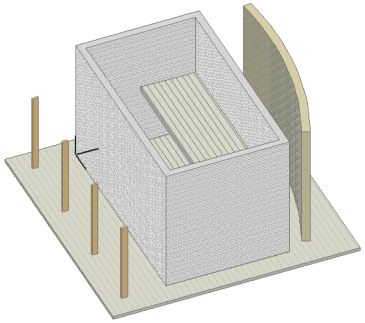
4. Open the 3D Window again to check progress

Hint: If the view is not as shown below, go to the Image menu and select the 3D Projections option. If Parallel Projections is not active, click the Parallel Projections button and select an Axonometric preset view.



The texture of the construction elements can be made visible in the 3D window. To see how the building looks with the mortar joints and the floor boarding:

- Select Image menu/ 3D Window Settings.
- Switch on the Vectorial 3D Hatching under the effects menu item.



5. Construct the Slab

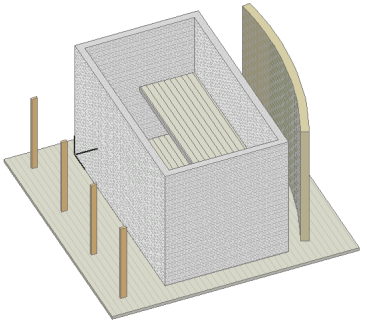
To construct the slab of the gallery, return to the Floor Plan. It will be of a light timber joist construction, different from that used for the ground floor slab, so first the settings for the Slab tool need to be changed.

P-3, S-7, M-C

To change the slab settings:

- Double-click on the Slab tool in the Toolbox.
- Change the thickness of the slab to 8" (200 mm).
- Change the hatching type to “Empty fill” under “Section Attributes”.
- Change the bottom and the side materials in the “Model Attributes” to “Surface White” and the top material to “Timber Boarding Internal”.
- Click OK.

Now everything is set for placing the gallery slab. The slab will only span to half the depth of the building, leaving a void so that one can look down from the gallery to the exhibition space on the ground floor.

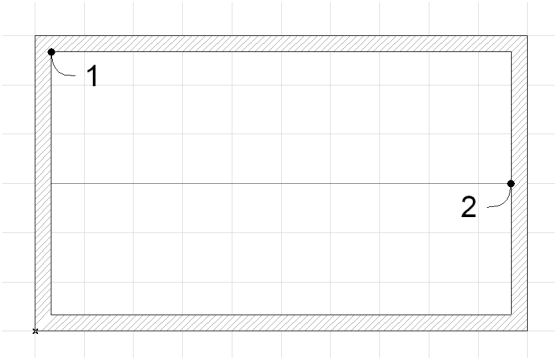


To place the slab:

- Switch off the grid snap.
- Select the Slab tool in the Toolbox.
- Click on the inside corner point of the top left wall corner to start drawing the slab (point no. 1 in the picture).
- Move the cursor over the inside line of the east side wall to bring up a snap point in the middle of the wall (above point no. 2 the cursor will change from an empty pencil to a pencil with a line inside it to indicate it is snapping to a line).

- Click on the snap point in the middle of the wall to finish the slab (at point no. 2 the cursor will change from a pencil with a line inside it to a black pencil to indicate it is snapping to a point).

  Hint: Special snap points help you to find special points on the drawings. These snap points can be predefined divisions/distances of lines/arcs, center point of arcs, and parallel and perpendicular locations from elements.



Step 8: Completing the Building Envelope

Overview

In this Step, you will use the Roof Tool to build a roof. This exercise will also demonstrate how to trim walls and columns to a roof, and how to use the Ghost Story.

Process to Learn

- Roof Tool
- Using the Ghost Story Feature
- Constructing a Roof
  - Viewing a Roof in the 3D Window
- Trim Walls and Columns to Roof

Starting the Step

Use your file from the previous step or open the file named *Step-08.pln* contained in the *Step Files* folder.

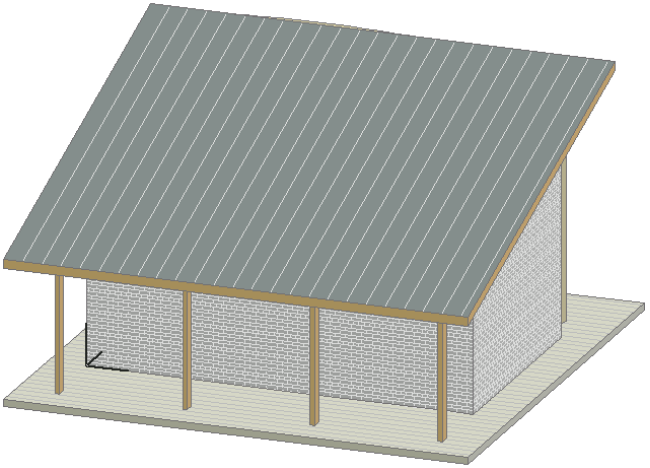
Information

ArchiCAD's sophisticated **Roof** Tool has extremely flexible characteristics. In addition to its normal use in creating roofs, it can be used to create abstract 3D shapes. You can create three basic roof types by using the **Roof** tool:

- Sloped Roofs
- Dome-Shaped Roofs
- Barrel-Vaulted Roofs

What to Do

This section explains how to put a roof over the building. It will be a semi-pitched roof with sufficient headroom over the floor of the gallery, and will have a wide overhang supported by columns to create a south-facing veranda at the front.



1. Roof and Ghost Story Setup

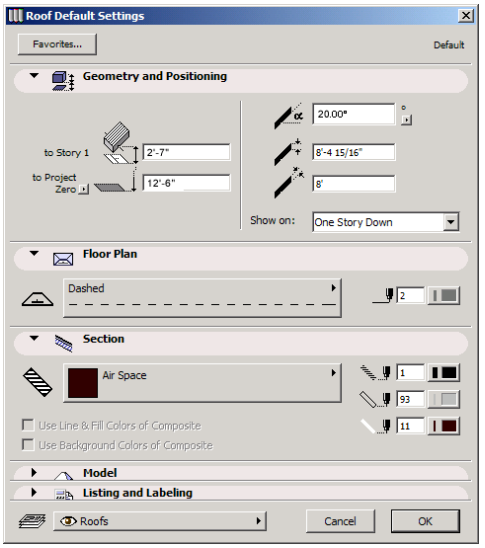
To construct the roof on the gallery level it is necessary to see the columns below on the ground floor.

P-3, S-8, M-A, 1-3

Contents of remote stories can be made visible on the active story by using the “Ghost Story” feature. To switch on the Ghost Story, select Options/Stories/Show Ghost Story. Now the content of the Ground Floor is visible a light yellow color on the plan of the Gallery. The elements of the Ghost story cannot be edited, but they can be used as snap points in constructing new elements.

Before starting, open the **Roof Settings** dialog box by double-clicking on the Roof tool in the **Toolbox**.

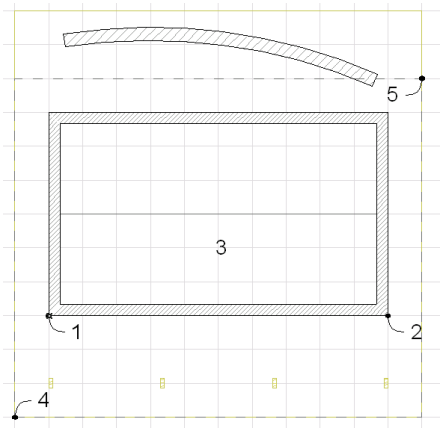
The angle of the roof will be 20 degrees, its thickness 8” (200 mm) and its pivot line will be at 12'-6’ (3800 mm) above the project 0 level (2'-7” (800 mm) from the Gallery level), as shown in the picture. Click OK.



2. Roof Construction

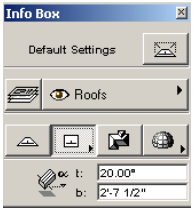
To construct a roof, first define its pivot line (which is the intersection line of the roof plane and the horizontal plane at the height defined in the dialog). Then define from which side of the pivot line the roof will slope upward (at the angle

defined in the dialog box) and lastly draw the outline of the roof (which is its projection to the horizontal plane).



To start constructing the roof:

- Switch on the grid snap.
- Select the rectangular geometry method in the **Info Box**.



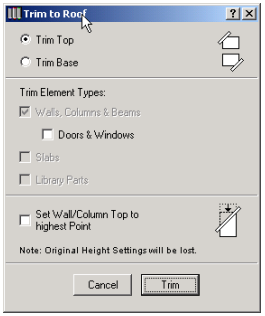
- Click on the external corner point of the bottom left wall corner (point no. 1) to start the pivot line.
- Click on the external corner point of the bottom right wall corner (point no. 2) to finish drawing the pivot line.
- Click above the pivot line with the eye icon (point no. 3 to define the uphill slope direction of the roof.
- Click on the grid intersection point at point no. 4 to start drawing the outline of the roof.
- Click on the grid intersection point at point no. 5 to finish drawing the outline of the roof.

Look at the roof in the **3D Window**.

3. Trim the Walls and Columns to the Roof

Now you can trim the walls and the columns to the roof:

- Select the roof in the **3D Window** (click on it with the Arrow tool).
- Select the **Edit/Trim to Roof** menu point.



- Click **Trim** in the dialog box.

The columns and walls have now been trimmed to the underside of the roof. Finally, return to the **Floor Plan**.

Step 9: Developing the Design

Overview

Now that the building envelope is under way, we need to create sections and elevations of the building, and add interior walls, create additional roofs and update the project View Sets.

Process to Learn

- Section/Elevation Tool
- Level Dimension Tool
- Update View Set
- Adding Interior Walls
- Creating a Flat Roof

Starting the Step

Use your file from the previous step or open the file named *Step-09.pln* contained in the *Step Files* folder.

Information

The **Section/Elevation** Tool is used to generate elevations and sections from the model by placing standard section/elevation symbols on the Floor Plan with optional breakpoints, including markers with identifiers and a section line.

Every section/elevation symbol is an **active link to the model**, meaning that when you change an element in section or elevation it will automatically update all other views.

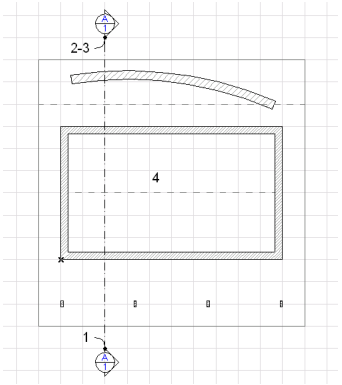
What to Do

1. Cut a Cross Section Through the Building

Simply place the section/elevation line on the Floor Plan and ArchiCAD will generate the sectional/elevational view of the building.

P-3, S-9, M-A

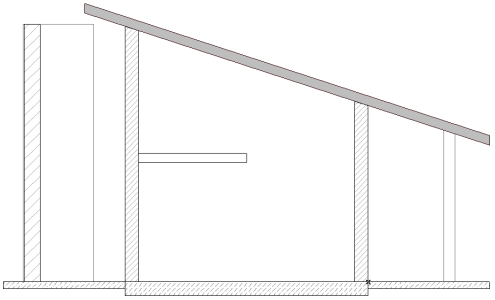
Any modifications to the model in the Section/Elevation Window will be updated automatically in all other views of the building.



To place a section through the building:

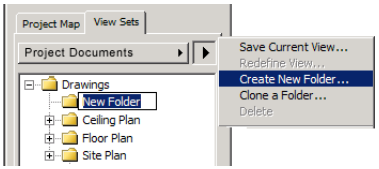
- Switch on the grid snap (to help you quickly define the section line location).
- Go down to the ground Floor Plan (**Options/Stories/ Ground Floor**).
- Select the **Section** tool in the **Toolbox**.
- Click to point 1 as shown to start drawing the section line on the Floor Plan.
- Double-click on points 2-3 as shown to finish drawing the section line.
- Click to the right of the section line (point 4 as shown) with the eye icon to determine which direction the section will face.

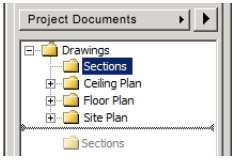
After placing the section, open the section window (Window/ Sections/Elevations/'A/1 Section'/Model), and ArchiCAD will generate the section of the model automatically.



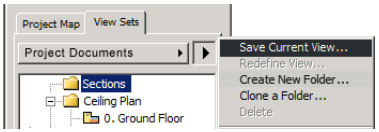
Finally, add the **A/1 Section as a new drawing** to the Project Documents View Set. This will allow us to access the section as a drawing in PlotMaker.

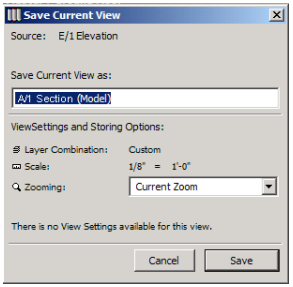
To do this, click the View Sets tab in the Navigator palette, select the Drawings folder so that it is highlighted and choose **Create New Folder** from the popup menu. Name the new folder **"Sections"**. This is where our project sections will be stored. If you want to move the Sections folder so that it is organized alphabetically, click to highlight the folder, then drag it to the desired location.

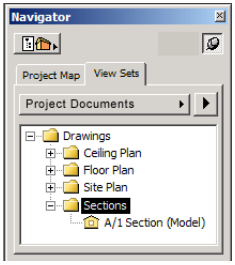




With the section folder selected, choose "Save Current View" from the popup menu. Use the defaults and click "Save".





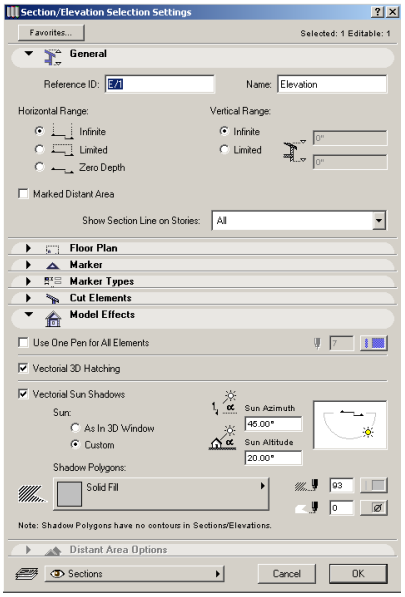


2. Create the North and West Elevation

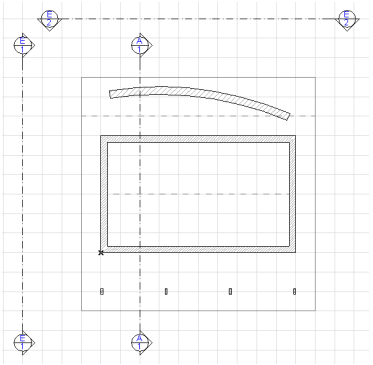
The elements can be shown with or without textures. Sun shadows can be cast on them in the elevation windows.

To place the elevations:

- Double-click on the **Section/Elevation** tool in the **Toolbox** to bring up the Section/Elevation Settings dialog box.
- Enter “Elevation” to the Name field.
- Enter E/1 as the Reference ID.
- Check the Vectorial 3D Hatching and the Vectorial Sun Shadows options under the Model Effects.

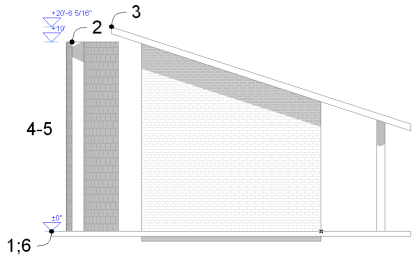


- Place the elevations as shown (ArchiCAD will number them automatically).

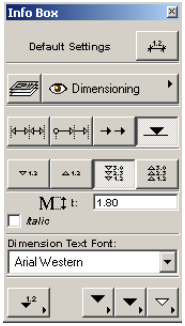


- Switch off the grid snap.

Next, open the west elevation and place some elevation dimensions on it.



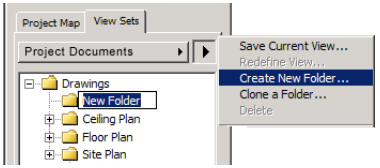
- Open up E1 Elevation (Window/Sections/Elevations/'E/1 Elevation'/Model).
- Select the **Dimension** tool in the **Toolbox**.
- Select the height dimensioning icon from the popup menu under the construction methods in the Info Box.
- Select the multiple height dimensioning icon from the popup menu under the geometry methods in the Info Box.



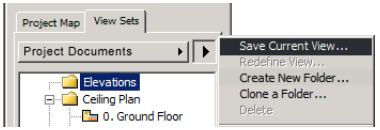
- Click to the points (1-2-3) as shown in the picture to dimension.
- Double-click anywhere (e.g. to points 4-5). The Hammer cursor will come up.
- Click with the Hammer cursor to place the chain of dimensions on the section (point 6).

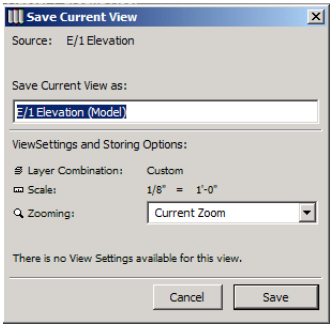
Finally, add the **E1 Elevation** as a **new drawing** to the Project Documents View Set. This will allow us to access the section as a drawing in PlotMaker.

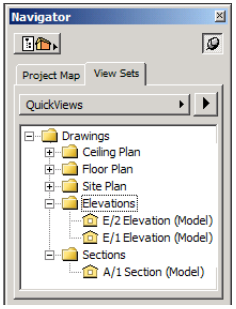
To do this, click the View Sets tab in the Navigator palette, select the Drawings folder and choose **Create New Folder** from the popup menu. Name the new folder "**Elevations**". If you want to organize the Elevations alphabetically, click to **highlight** the folder then **drag** it to the desired location.



With the Elevation folder selected, choose "Save Current View". Use the defaults and click "**Save**".



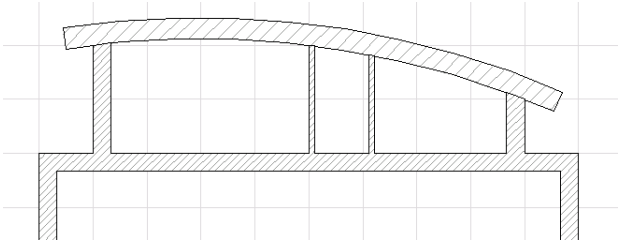




Open the **E2 Elevation** for another view of the building and repeat the same steps to save it to the View Set as shown above.

3. Add Exterior and Interior Walls

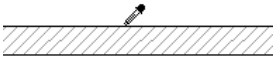
For the entrance, draw the same type of wall as the external walls.



P-3, S-9, M-B

In ArchiCAD you can easily pick up an element's characteristics and transfer them into the Toolbox (to start drawing a new element with the same settings) or to other elements in the project. Let's pick up the settings of the external walls:

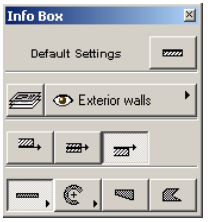
- Select the **Wall** tool in the **Toolbox**.
- Hold down the Alt key (the cursor will change to an Eyedropper tool) while clicking on a side of one of the straight walls (a beep notifies the action).



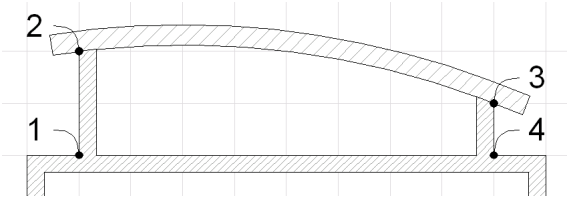
Now the settings are correct for the brick wall, and only the height value needs to be changed. Double-click on the Wall tool in the Toolbox and change the height value to 8'-6"(2700 mm).

Draw the front and the back wall of the entrance enclosure with the help of the grid snap.

- Switch on the grid snap.
- Select the single wall geometry method and the construction method as below.



- Click to the grid intersection point 1 to start drawing the wall.
- Click to the grid intersection point 2 to finish the wall.

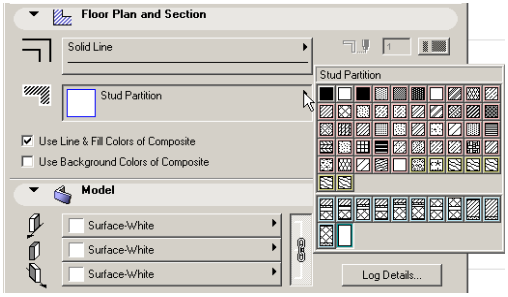


In the same way draw the back wall starting from point 3 and finishing at point 4. Just make sure to choose the correct construction method to place the wall with its reference line on the outside.

Rebuild the floor plan view (Choose Window/ Rebuild) to get a neat wall cross-section (optional).

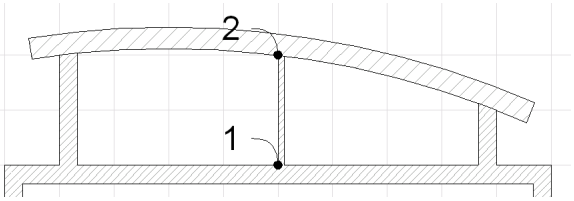
> **Hint**: The Redraw command (Display/Redraw) will remove all temporary screen display graphics remaining from transformations and deletions during construction. The Rebuild command (Display/Rebuild) starts a more thorough screen update - it will also refresh the wall intersections and draw them correctly.

The next step is to draw some interior partitions. Open the Wall Settings dialog box and select the composite wall, **Stud Partition,** you created in Step 3.



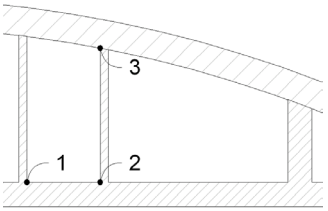
Change the layer from “Exterior walls” to “Interior walls” and set the material of the wall to "Surface-White".

Draw the partition in the middle of the space as shown.



Hint: ArchiCAD layers are used to organize the elements in your project for selective displays and quantity calculations. You can easily change the layer settings (show/hide, lock/unlock layers and create different layer combinations) from the Options/Layers/Layer Settings pull-down menu.

Now draw the partition of the future toilet at 3 feet (1000 mm) wide; enter the coordinate values manually:



- Switch off the grid snap.
- Position the cursor over the right corner point of the wall junction as shown (point 1).
- Type in x from the keyboard (Note the x coordinate is highlighted).

- Type in “3 +” (or “1000 +” in mm) from the keyboard and hit the Enter key. Note you are now drawing a wall from point 2 (3’ (1000 mm) to the right of point 1).
- Use the shift key to draw a vertical wall and click on the internal side of the curved wall to finish the wall (point 3).

4. Create a Flat Roof

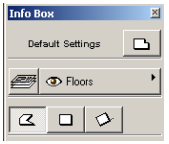
Go up to the floor plan of the Gallery and place a flat roof over the entrance to finish the building envelope.

P-3, S-9, M-C

Open up the Slab Settings dialog box and set the thickness of the slab to 1' (300 mm), the top material to “Timber boarding External”, the side material to “White Brick” and the bottom material to “Surface-White”.

To draw the slab over the entrance:

- Select the polygonal geometry method.

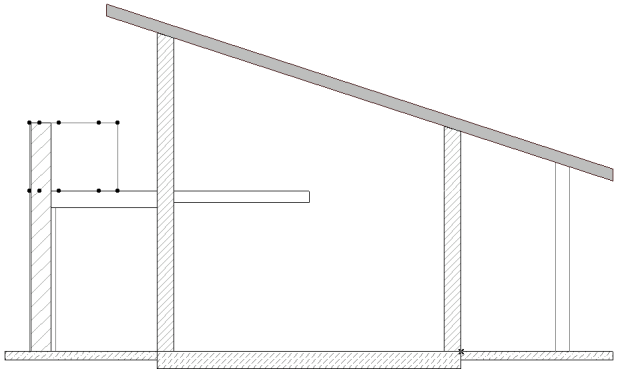


Click on the external corner points of the front and the back wall (points 1, 2, 3, 4, 5) to place a rectangular slab as shown in the picture.

Now modify the northern edge of the slab to align it with the curved wall:

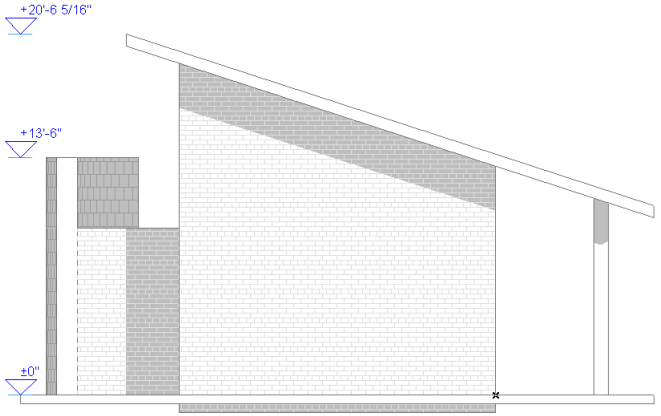
- Select the slab.
- Make sure the Slab tool is active in the Toolbox.
- Hold down the mouse button over the edge of the slab (between points 2 and 3) and select the second icon as shown from the pet palette (as shown).
- Pull the edge of the slab over the curve of the wall to align.

Now check the progress in the cross section. Open the Section A/1 window (Window/Sections/Elevations/'A/1 Section'/Model). The curved wall will serve as a parapet wall to the balcony so lower it to 4' (1200 mm) height:



- Switch off the grid snap.
- Select the top part of the curved wall.
- Double-click the **Wall** tool in the **Toolbox** to bring up the Wall Settings dialog box.
- Enter 4' (1200 mm) as the height value instead of 9'6" (3000 mm).
- Click **OK**.

Open the elevations to check how the modification affects the facades. Notice how the elevations have been updated with the dimensions.



Step 10: Working with Doors, Windows and Skylights

Overview

*In Step 10, you will learn about the **Door** and **Window** Tools, which create realistic architectural openings in wall elements by inserting special library parts with editable parameters.*

Additionally, we will place a Skylight into the roof. In ArchiCAD, Skylights are objects that recognize a roof element and automatically cut the opening within the roof structure.

Process to Learn

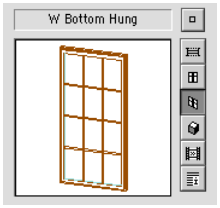
- Parameters for Doors/Windows
- Using the ArchiCAD Library
- Placing a Door/Window
- Viewing a Door/Window
- Editing Doors/Windows
- Creating Dimensions
- Placing a Skylight

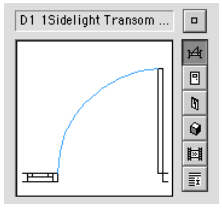
Starting the Step

Use your file from the previous step or open the file named *Step-10.pln* contained in the *Step Files* folder.

Introduction

Both **Windows** and **Doors** are objects, meaning that they are stored in libraries of objects that can be used on many Projects. Library Parts comprise a 2D Symbol and a 3D description in GDL (Geometric Description Language), as well as some optional information such as an additional 2D description, a user interface script or a component definition.





Windows and Doors can be added to an ArchiCAD Project only by placing them into an existing wall. They cannot be independently placed into a Project. Once a Window or Door has been placed in a Wall, it becomes an integral part of that wall and stays with the wall when it is moved or stretched.

Doors and Windows cut real, see-through openings into the wall, so that 3D visualizations are more accurate and lifelike.

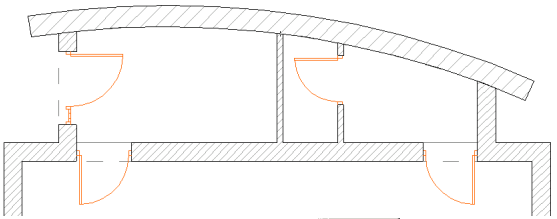
What to Do

It is time now to develop the design further by adding openings into the building. ArchiCAD's door and window objects are parametric library parts; by changing their parameters, their properties change. The parameters can be modified in the Object Settings dialog box.

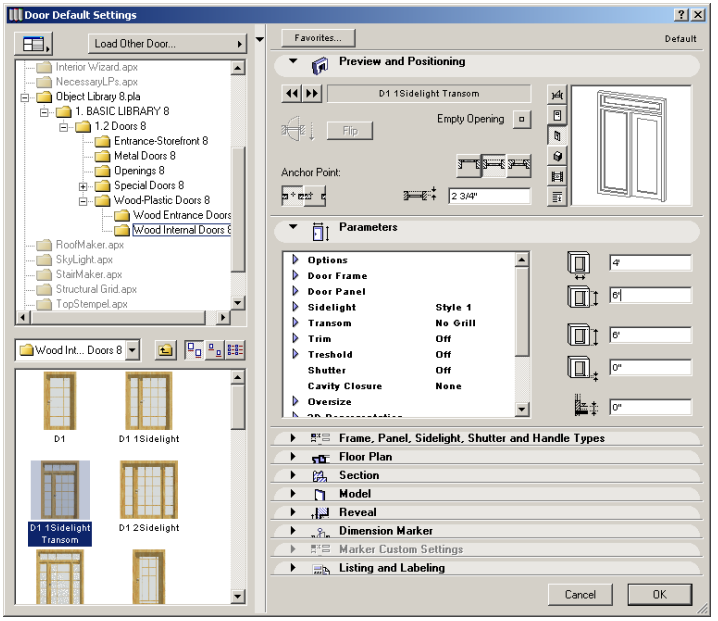
1. Add an Entrance Door

Now return to the Ground floor plan and start placing doors to achieve the layout as shown below.

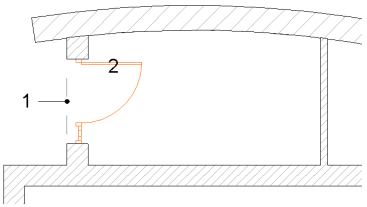
P-3, S-10, M-A, 1-2



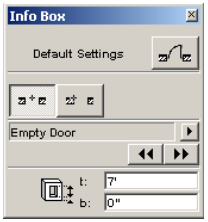
Double-click the Door tool in the Toolbox to bring up its settings dialog (select the Door/Window tool in the Toolbox and hold down the mouse button to shift between them). Choose D1 Sidelight Transom 8 from the library, browse through the parameters and see what effect they will have on the 2D and 3D representation. Click Cancel (to make sure the settings are just as they were when you opened the dialog box).



Place the entrance door in the middle of the front wall of the entrance enclosure:



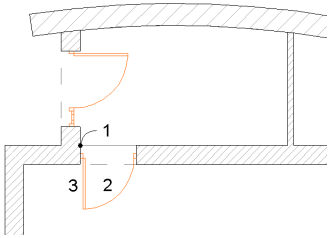
- Select the Center Point geometry method.



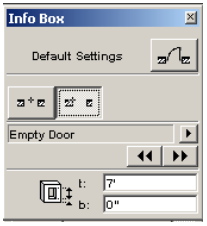
- Hold the cursor over the external side of the front wall to bring up a special snap point in the middle of it.
- Click on the snap point (point no. 1).
- Click above and to the right from the center point of the door to define the opening direction (point no. 2).

2. Add Internal Doors

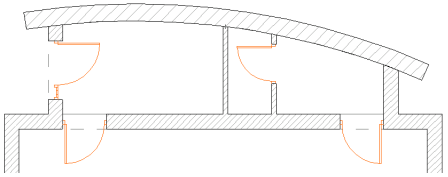
Select D1 from the door dialog box for the door opening into the Exhibition space:



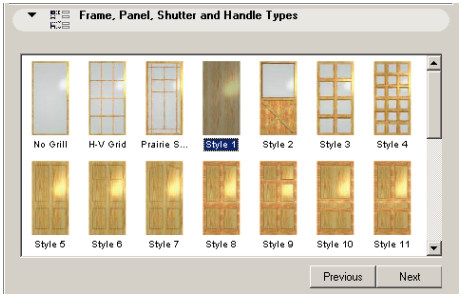
- Select the Corner Point geometry method.



- Click to place the door on the internal corner point of the wall junction as shown (point no. 1).
- Click to the right of it to define the door position (point no. 2).
- Click below and to the left of its center to define the opening direction (point no 3).



Use the same door type for the restroom symmetrically on the other side of the entrance enclosure. For the future toilet, change the width to 2'-8" (750 mm) and its Door Panel to Style 1 (shown under the Frame, Panel, Shutter and Handle Types in the dialog).

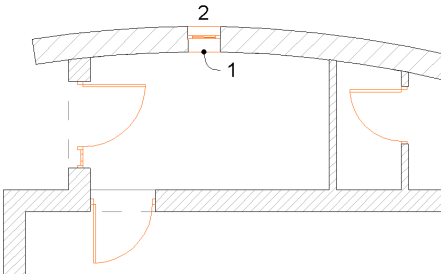


Place it by eye as shown in the picture above.

3. Place Windows in a Curved Wall

Likewise place the windows into the curved wall of the entrance enclosure.

P-3,S-10, M-B, 3-4



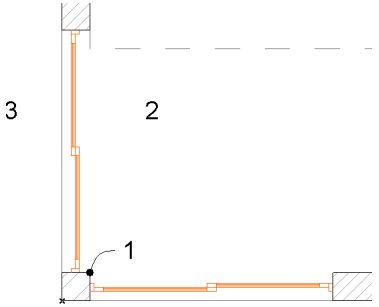
- Choose the **Window** tool in the **Toolbox**.
- Select "W1 Casement" in the dialog box.
- Select the Center Point geometry method.
- Click to point no. 1 by eye to start placing the window.
- Click above the wall (point no. 2) to define the window opening direction.

Similarly place a window to the other two rooms of the entrance enclosure by eye.

For the glazed walls of the exhibition space, we will use sliding doors.

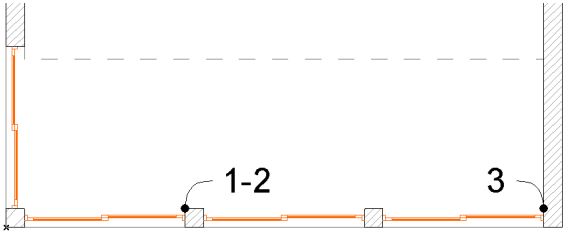
4. Insert a Sliding Door

Choose D2 Sliding Door in the door dialog, set the reveal value to 4" (70 mm) and select the corner point geometry method option to place a door on both sides of the bottom left corner of the exhibition space:



- Click to the inside corner point of the bottom left wall junction (point no. 1 in the picture).
- Click with the cursor (double eye shape) above the corner (point no. 2 in the picture) to define the wall into which the door will be placed.
- Click with the cursor (eye shape) outside the wall (point no. 2 in the picture) to define its opening direction.
- To place the second sliding door, repeat the steps above only this time click to the right at step no. 2 with the double eye cursor.

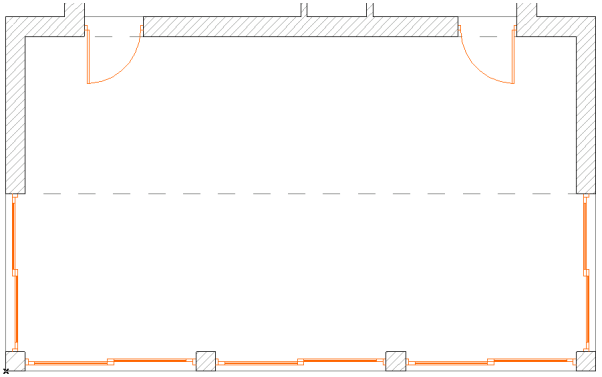
Next, replicate the sliding door in the southern wall:



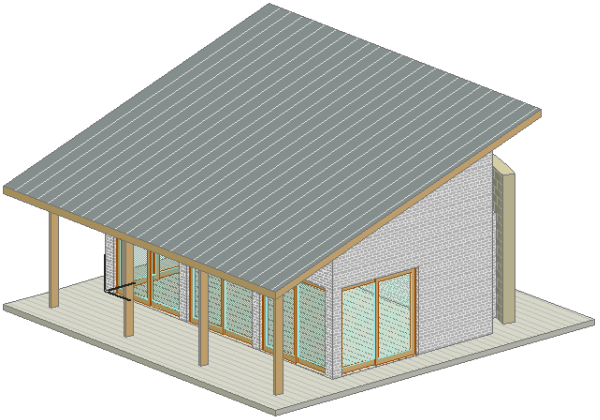
- Select the door (click one of the corner points of the door with the arrow tool or by the shift key; point no. 1).
- Select **Edit/Multiply** from the pull down menus.
- Type in 2 as the number of copies, select the Distribute method and Click **OK**.

- Click on one of the selection dots on its right side (point no. 2).
- Move the cursor on the inside corner point of the bottom right wall junction (the cursor is in the shape of a checkmark (point no. 3).
- Click to finish the Multiply command.

Place the last sliding door to the corner of the eastern wall.



Deselect the door and switch to the **3D Window** to check the progress of the building.



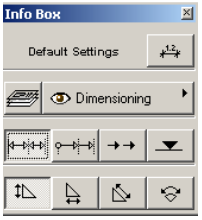
5. Create Dimensions

The next step is to check the dimensions of the walls and the openings.

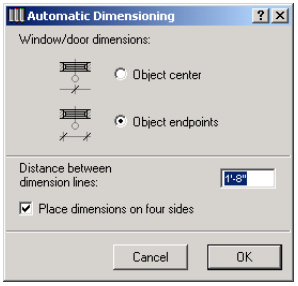
P-3, S-10, M-C

With the automatic dimensioning feature all the walls and the openings of your building can be dimensioned with just a few clicks. Simply select the items/points to be dimensioned and ArchiCAD will do the rest:

- Go back to the Floor Plan.
- Select the **Dimension** tool in the **Toolbox** and make sure the length dimensioning icon is selected in the Info Box.

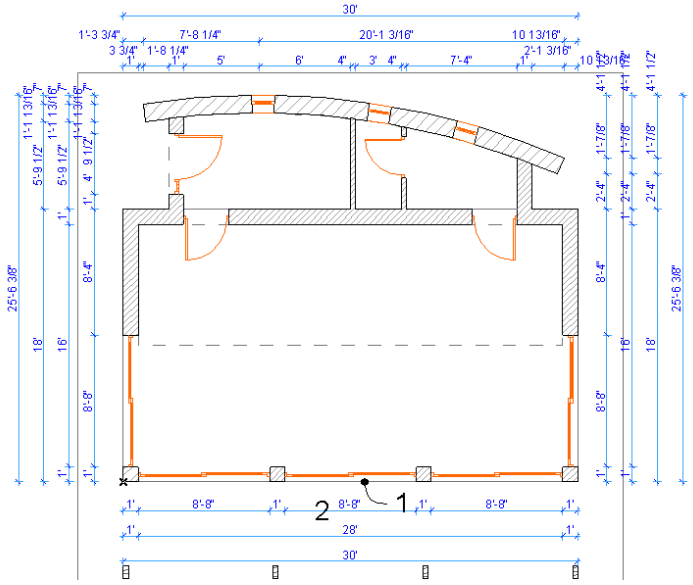


- Select all the walls (select the **Wall** tool in the **Toolbox** and choose **Edit/Select All Walls**).
- Select **Tools/Automatic Dimensioning/Exterior Dimensioning** and enter the following values:

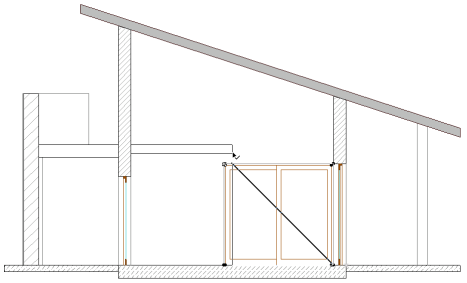


- Click **OK**.
- Click on the external side of the southern wall to define the direction of the dimensions (point 1).

- Click below the wall with the hammer icon to define the distance of the first row of dimensions (point no.2).



Note that the rows of dimensions have been placed around the four sides of the building. In ArchiCAD all dimensions are associative, meaning if you change an element that was dimensioned previously, after the modifications the dimensions will follow the changes. View the resulting layout in cross-section on Section A/1.



6. Edit Doors and Windows in Section and Elevation

Notice the door is a bit too wide; it's better to align it with the edge of the gallery slab.

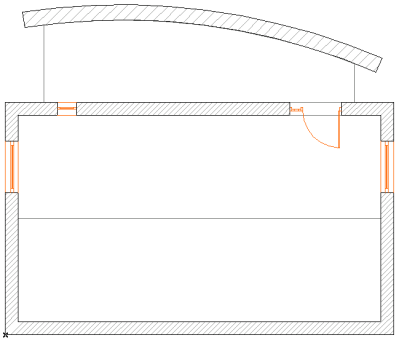
P-3, S-10, M-D

- Select the sliding door.
- Select **Edit** menu/**Stretch**.
- Click on the top left corner of the door to start stretching it.
- Move the cursor out in the horizontal direction and hold down the shift key to constrain the horizontal movement.
- Click on either corner points of the edge of the slab (cursor is a shape of a checkmark as shown above).

Go back to the Floor Plan: Note that the dimensions have been automatically updated on the plan following the modification in the section window.

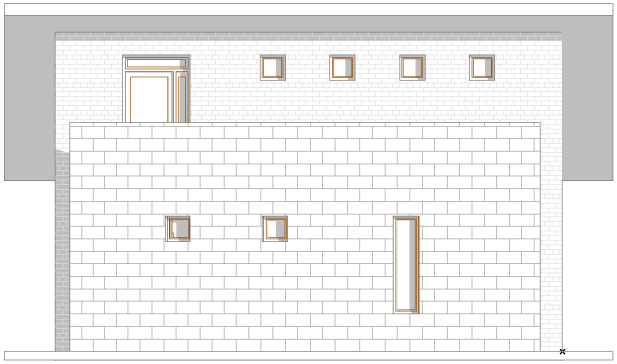
Select the sliding door on the other side and stretch it similarly; this time, do it on the plan to align it with the dashed line of the gallery slab.

The next steps is to design the openings of the gallery.



Switch off the Show Ghost Story option (deselect Options/Stories/Show Ghost Story) and the grid display (deselect Options/Grid Display), because from now on this won't be used.

Place the same door as the entrance door (D1 Sidelight Transom) for the door to the balcony, the “W1 Casement” as square windows in the northern wall, and the “W Round Piv” round windows to both sidewalls of the gallery (enter 2’ (600) as the parapet height for the round window). Do not worry about their exact location, just place them by eye.



Open the north elevation and modify some of the windows:

- Stretch the square window of the entrance room on the North Elevation.
- Replicate the window above the balcony.

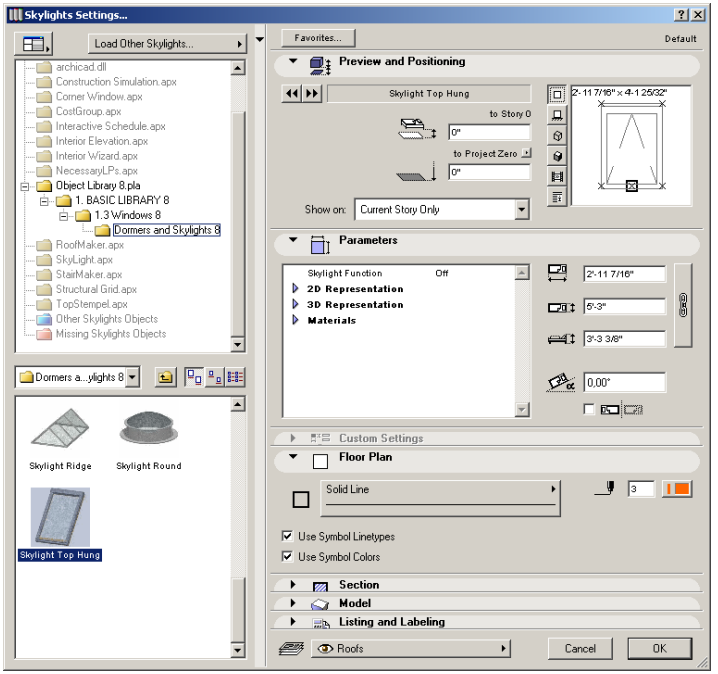
7. Inserting Skylights into the Roof

On the Gallery level we will insert a skylight into the roof.

P-3, S-10, M-E

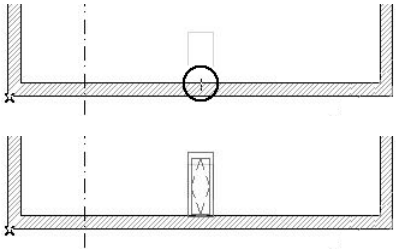
To do this, select the Skylight Tool from the Tools palette as shown.

Double click the Skylight Tool to open the settings dialog. Choose the "Skylight Top Hung" object from the Object Library.



At the bottom of the dialog set the layer to **Roofs**. Click **OK**.

Drag your cursor to the inside edge of the wall. Place the skylight at the center of the wall using the **Snap Point**.



The Skylight object will automatically cut a hole in the roof and set its slope to the angle of the roof as shown in the section cutaway below.

Step 11: Adding Internal Circulation

Overview

This step will teach you how to create a custom stair using the Stair Tool. The Stair Tool lets you easily design and construct all kinds of stairs required for ArchiCAD projects by selecting from a set of predefined geometry types, or by drawing the main geometry of the stair and editing parameters.

Process to Learn

- Stair Tool
  - Creating a Stair Object
  - Selecting the Stair Type
  - Setting Flight and Tread
  - Defining the Stair Structure
  - Selecting the Handrail
- Create a Slab Opening

Starting the Step

Use your file from the previous step or open the file named *Step-11.pln* contained in the *Step Files* folder.

Introduction

The Stair Tool automatically produces full-feature ArchiCAD objects that you can save directly into your library of building components. Using the Stair Tool, you can design stairs step by step by defining the following components:

- Shape (geometry)
- Flights
- Landings
- Treads
- Structure
- Railing
- Attributes

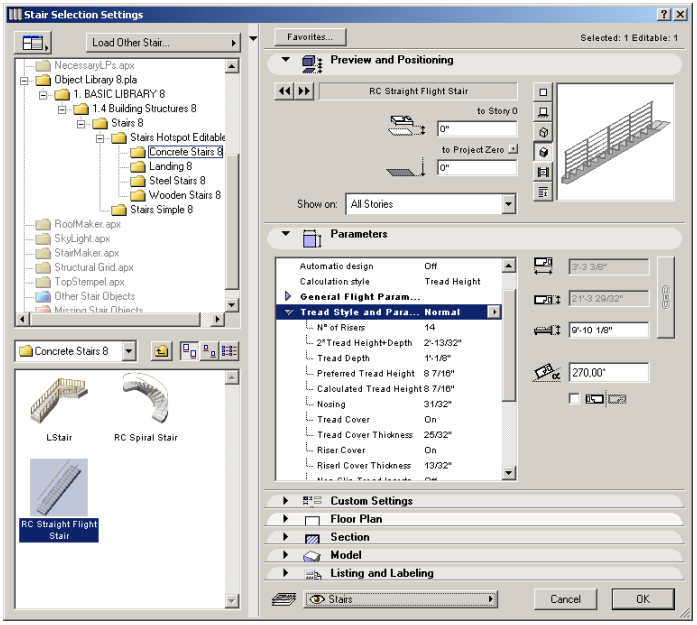
What to Do

1. Add a Staircase to Reach the Gallery

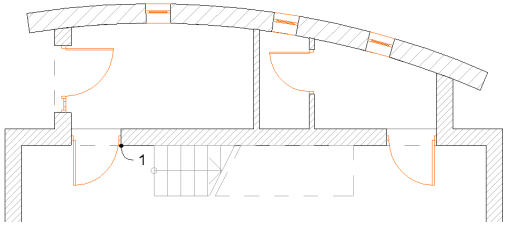
P-3, S-11, M-A

In this exercise we select a stair from ArchiCAD's library to provide internal circulation within the gallery:

- Return to the Ground Floor.
- Double-click on the **Stair** tool in the **Toolbox** to bring up the Stair Settings dialog box.
- From the parameter list on the right, switch off the Automatic design.
- Set the dimensions of the desired stair in "General Flight Parameters" and in "Tread Style and Parameters".
- Choose the Right Railing and Rail Wired options, check the rail geometry.
- Select "Stairs" from the Layers popup menu.
- Check how the staircase looks in 3D in the preview window.
- Enter 270 degrees as the rotation angle and click OK to confirm the settings.



After that, position the stair alongside the northern wall in the exhibition space:



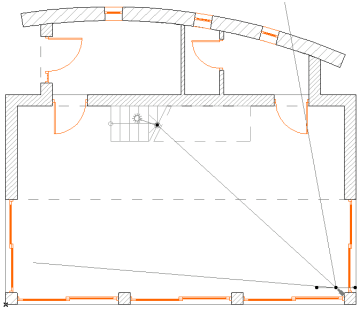
- Position the cursor over the bottom right corner point of the door opening into the exhibition space (point no. 1).
- Type in "x 2' +" (x 750 +) from the keyboard and see how the cursor moves 2 feet (750 mm) to the right.

- Hit the "Enter" key.

2. View the Stair in 3D

The stair has been placed on the plan by its insertion point 2 feet (750 mm) to the right of the corner of the door. Check to see how the room looks with the staircase. In ArchiCAD the Camera tool is used to define perspective views. Place a camera in the room to see how the room looks from that view:

- Select the **Camera** tool in the **Toolbox**.
- Click inside the room near the bottom right corner to place the camera location.
- Click near the middle of the stair to locate its projection target.
- Select the camera on the plan.



- Open the 3D Window.

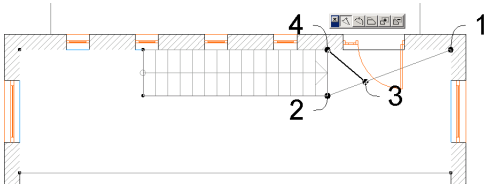
3. Edit the Slab on the Gallery Story

P-3, S-11, M-B

From the model it is clear that there is no opening in the slab for the stairway; the outline of the slab needs to be modified to circumvent the staircase:

- Go up one story to the Gallery level.
- Select the slab.
- Make sure the **Slab** tool is active in the **Toolbox**.
- Hold down the mouse button over the top edge of the slab to bring up the pet palette and choose the first icon to add a new node on it and pull it over the bottom right corner point of the staircase (point no. 2).

- Using the same method create a new node (point no. 3) on the slab edge between point no. 1 and 2, and pull it over the top right corner point of the staircase (point no. 4).



- Similarly, create two more nodes and place them on the left cornerpoints of the staircase.
- Deselect the slab (click outside it) and open the **3D Window** to check the result.

Step 12: Defining Room Usage and Spaces

Overview

This step will demonstrate how to set up and assign different Zones to spaces of different use in a building. This allows the project to be later evaluated on a Zone basis and to calculate the area of the building.

Process to Learn

- Defining a Zone
- Placing a Zone
- Placing a Zone Stamp
- Creating Room Information
    - Room Name
    - Room Number
    - Square Footage

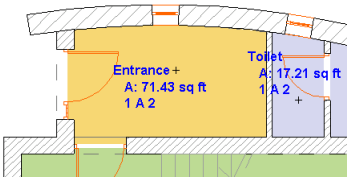
Starting the Step

Use your file from the previous step or open the file named *Step-12.pln* contained in the *Step Files* folder.

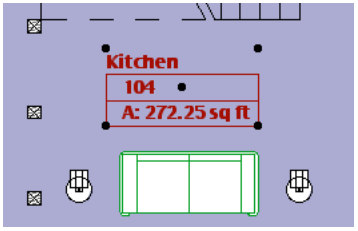
Introduction

With the **Zone** Tool, you can define spatial units called Zones in your Project. Zones can be made up of rooms, groups of rooms or even larger parts of a Project.

Zones appear on the Floor Plan as fills and zone stamps linked to the zone fills. The zone fill designates the zone space in the Project, while the zone stamp contains textual information about the zone, including its name, number, area, and other optional parameters such as the material of the subfloor, materials of the walls and surface of the walls (with or without their openings).



ArchiCAD zone stamps are Library Part elements. The predefined zone stamps reside in the ArchiCAD Library, but in many respects their behavior differs from that of other Library Part types like Objects, Doors or Windows, as they are 2D-only elements: they have a 2D symbol, a 2D GDL script and a Properties script.



Zone stamps are **intelligent parametric Library Parts** whose look, contents and behavior can be adapted to local architectural practice.

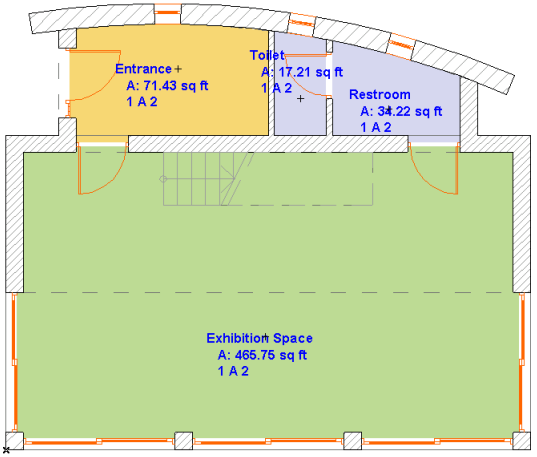
What to Do

Next, define names of the rooms of the building using the ArchiCAD's **Zone** tool.

1. Place a Zone in Each Room of the Ground Floor

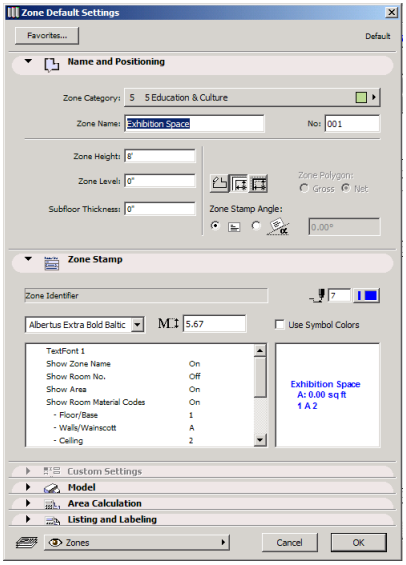
P-3, S-12, M-A

The ground floor of the project will be assigned zone names and numbers as shown :



Follow these steps to place the zones :

- Double click the **Zone** tool in the **Toolbox**.
- Select "5 Education and Culture" from the zone categories popup menu. Enter Exhibition Space as the zone name.
- (For the QEN metric files: Type "Timber Boarding" as the Floor Type).
- Select the icon in the middle above the Zone Height value to automatically place the zone object into rooms. Click **OK**.



- Click inside the room to place the zone. ArchiCAD automatically fills the space to the face of walls bounding the space.

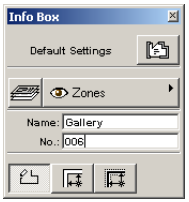
2. Use the same procedure for the remaining rooms

For the zone category choose “9 Communication and Access” for the Entrance and “7 Other Usage” for the Restroom and the Toilet.

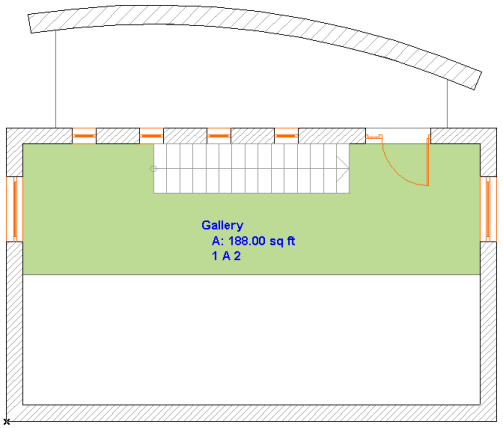
Now go up to the Gallery level by clicking the Gallery level in the Navigator palette.

You will manually draw the outline of this zone, as one side has no wall. For the Gallery use the same zone settings as for the Exhibition space. To draw the zone manually:

- Select the first icon in the **Info Box**.



- Click one by one on the corner points of the slab to place the zones (or use the Magic Wand on the perimeter of the slab to trace it).



Step 13: Adding Final Details

Overview

ArchiCAD libraries contain many types of prefabricated elements such as bathroom fixtures, cabinets, furniture, steel components, graphic symbols and more.

Specialized libraries can be used for different applications and national standards. The objects in the libraries are also parametric items, just like the door/window objects.

Process to Learn

- The ArchiCAD Library
- Object Tool
    - Viewing Objects
    - Editing Objects
    - Placing Objects

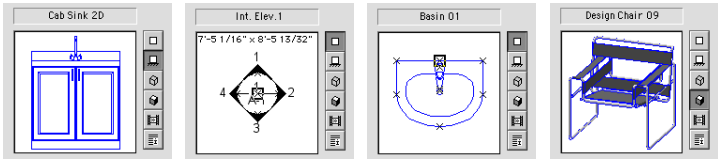
Starting the Step

Use your file from the previous step or open the file named *Step-13.pln* contained in the *Step Files* folder.

Introduction

Whenever you need either a complex element that exceeds the capabilities of the basic tools or a type of element with a specific role and behavior, you can rely on predefined, **fully parametric individual objects** (Library Parts) or objects stored in a folder or set of folders called the Library. These objects are accessed using the Object Tool in the Toolbox.

Library Parts comprise a **2D Symbol** and a **3D description in GDL** (Geometric Description Language), as well as some optional information such as an additional 2D description, a user interface script or a component definition.

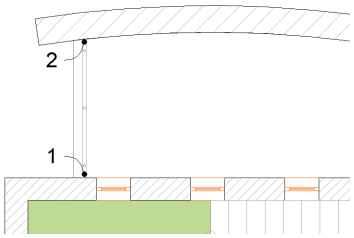


What to Do

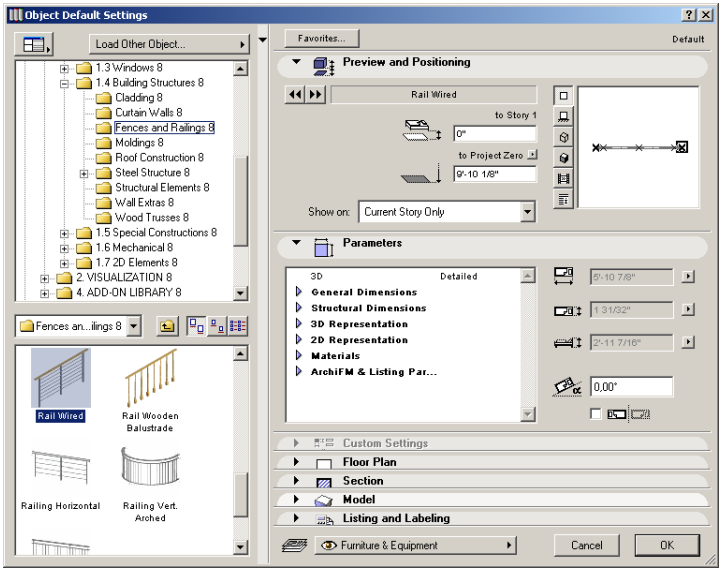
We now need some furniture and fittings in the rooms, such as handrails in the Gallery and fixtures in the Restroom. For this project we have provided only an extract of the standard ArchiCAD library. To see all the standard objects of ArchiCAD, browse the ArchiCAD Library folder on your computer.

1. Place a Handrail on the Left Side of the Balcony

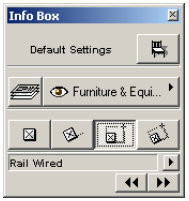
P-3, S-13, M-A



- Double-click on the **Object** tool in the **Toolbox** to bring up its settings dialog.
- Select the “Railing Horizontal” object from the library.



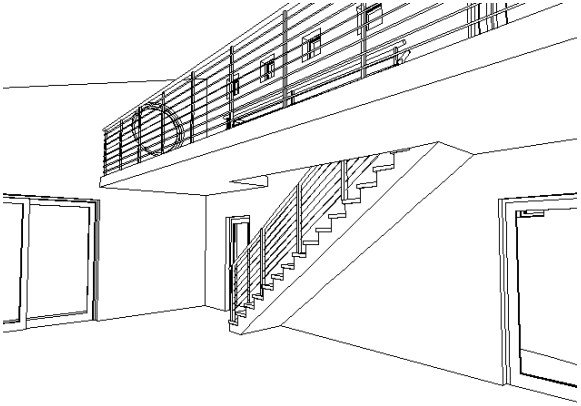
- Click **OK**.
- Select the diagonal geometry method in the Info Box.



- Click inside the bottom left corner of the balcony slab (point 1) to start placing the object.
- Click by eye to define its length inside the top left corner of the balcony slab (point 2).

Now place the railing object in all the necessary places inside the building. When the orientation of the railing changes to horizontal, open the settings dialog and modify the rotation angle.

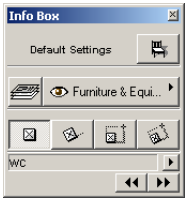
Check it in the **3D Window** and note that there are only three vertical columns in the long railing on the edge of the gallery slab; this is clearly not strong enough. Go back to the Floor Plan, select the railing and open its settings dialog. Modify the number of posts to 10 in Posts Parameters and confirm the settings.



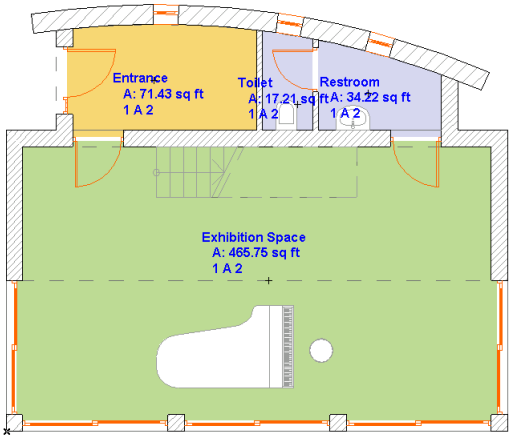
2. Add Bathroom Fixtures

P-3, S-13, M-B, 2-3

Before adding the restroom fixtures as shown in the picture, go down to the ground floor plan and select the 'Orthogonal' Geometry method for the **Object** tool.

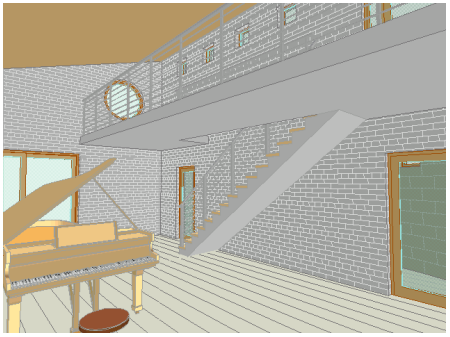


Zoom in to the Restroom and open the Object Settings dialog box. Select the 'WC' object, change its rotation angle to 180 degrees and place it in the Toilet. In the same way you can place the 'Basin 02' object next to the entrance door of the Restroom.



3. Add a Piano Object

To furnish the Exhibition Space place a Piano in the room. In the Object Settings dialog select the Piano object, modify its rotation angle to 90 degrees, and put it in the center of the room. To finish it off, place a Stool object in front of the Piano and check the result in 3D.



Step 14: Creating a Ceiling Plan

Overview

In this Lesson, we explore placing, editing and creating a 2D ceiling pattern and placing ceiling light objects using the ***Fill*** *Tool and* ***Lamp*** *Tool.*

Ceiling lights are 3D objects, so when placed on a ceiling, they become both a 2D graphical element as well as an element containing light.

Process to Learn

- Lamp Tool
- Fill Tool
- Creating Ceiling Patterns
- 2D and 3D Ceilings
- Changing View Sets
- Control Box

    Special Snap Point

Starting the Step

Use your file from the previous step or open the file named *Step-14.pln* contained in the *Step Files* folder.

Introduction

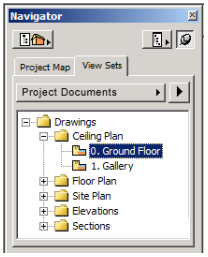
Ceilings are created in 3D using the **Slab** or **Roof** Tool and **Lamps** are applied to those surfaces. The 3D ceiling, however, does not create a 2D representation for the Ceiling Plan. Therefore, we must also place a **Fill pattern** to indicate the ceiling for the reflected ceiling plan. This exercise describes how to create and place the ceiling fill pattern and the associated light objects.

- **Fills** are geometric patterns that have three view options: **solid, bitmapped** and **vectorial**. In a project, all fills are displayed either as bitmapped or vectorial. You can change this option under **Display Options** command in the **Options** Menu.
- The **Lamp** Tool is used to place additional light sources as library parts into the project. Most of the **Lamp** Tool's settings, features and techniques are identical to those of the **Object** Tool. The additional Lamp controls affecting their behavior in PhotoRenderings are found in the Parameters or Custom Settings.

What to Do

1. Set the View Set to "Ceiling Plan" using the Navigator

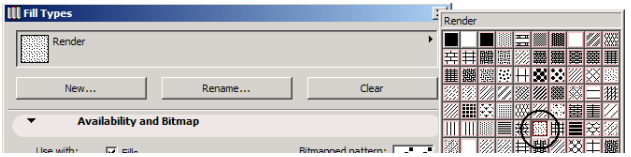
To set the View Set to the Ceiling Plan, click the View Sets tab in the Navigator palette and double-click the **"Ground Floor"** in the Ceiling Plan view set.



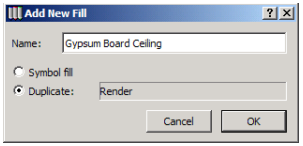
2. Create a Ceiling for the Exhibition Space

P-3, S-14, M-A

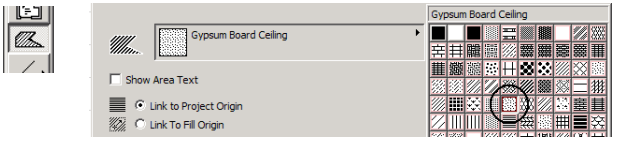
A gypsum board ceiling is used in the Exhibition Space. To create a gypsum board pattern, select **Fill Types** from the Options menu. Click the popup menu and select the **Render** fill pattern.



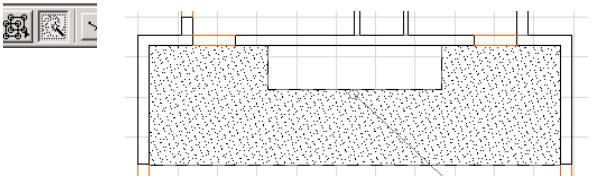
- Click the New button, select Duplicate and enter "Gypsum Board Ceiling" for the fill name.
- Click OK, and then click OK in the Fill Types dialog box.



- Go to the **Fill Tool** and double click the tool to open the Fill Settings dialog.
- Select the new fill "Gypsum Board Ceiling" and click OK.



- Click the **Magic Wand** and click the cursor under the balcony within the Exhibition Space.



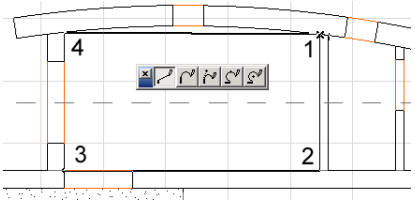
3. Create a Ceiling for the Entrance

The Entrance will use the ceiling pattern we created in Step 3.

P-3, S-14, M-B

- Open the Fill Settings dialog by double clicking the Fill Tool.
- Select "Ceiling Tile" from the popup menu and click OK.

- With the Fill Tool selected, click your cursor on the top right corner of the Entrance area and click the other 3 corners. To close the Fill, click your cursor on the start point (point no. 1).



Now modify the northern edge of the fill pattern to align it with the curved wall:

- Select the fill.
- Make sure the **Fill** tool is active in the **Toolbox**.
- Hold down the mouse button over the edge of the fill (between points 4 and 1) and select the second icon as shown from the pet palette (as shown).

- Pull the edge of the fill over the curve of the wall to align

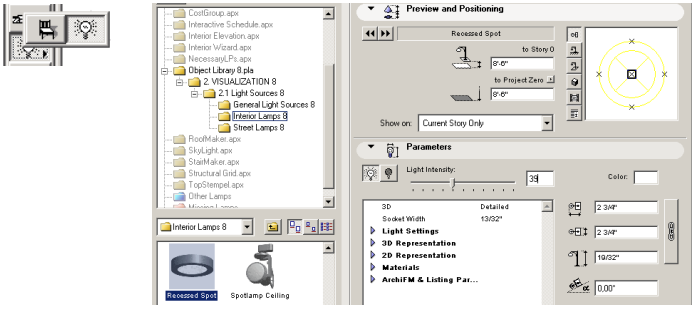
To center the fill pattern within the room and open the Fill Settings dialog. Change the origin point to **"Link to Fill Origin."** Click **OK**.

4. Select a Light

To add a light to the ceiling plan we must select a lamp object from the Lamp Tool.

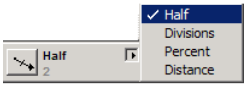
P-3, S-14, M-C

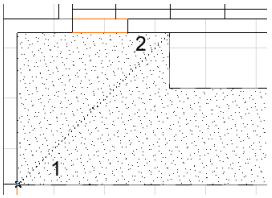
- Open the **Lamp** Tool.
- Select the Recessed Spot lamp from the ArchiCAD library.
- Select the center insertion point on the light.
- Click **OK**.



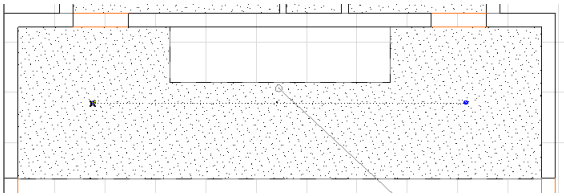
To insert this lamp in the center of the space, we must use the Special Snap Point in the Control Box.

- Set the Snap Point to Half.
- Select the Special Snap Point in the Control Box.
- Click the first corner of the room (point 1) and the opposite corner of the room (point 2).



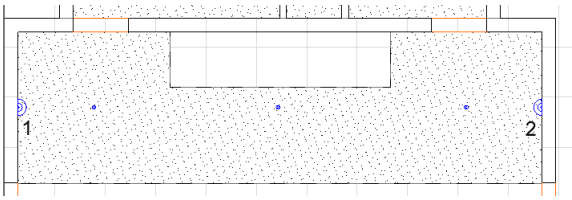


Repeat this for the opposite side of the Exhibition Space. Once completed, place a Recessed Spot in the center of the two lights by repeating the same steps.



Finally, we need to place wall lamps on the east and west walls of the Exhibition Space.

- Open the **Lamp** Tool.
- Select the Wall Lamp object.
- Enter 90 degrees as its rotation value and click **OK**.
- Use the same steps as previously used to place the lamp on the center point of the wall (point no. 1) between the edge of the balcony above and the north wall.



- Place the east Wall Lamp (point 2) using the same steps above except enter 270 as its rotation value.

Step 15: Placing the Building on a Site

Overview

*This step will demonstrate several techniques for creating a site. Both the **Slab** Tool and the **Mesh** Tool can be used to create a site plan. The Slab Tool creates flat horizontal surfaces which can be stacked while the Mesh Tool creates a topographic surface. We will also learn how to use the **Spline** Tool to create contour lines and transform them into a mesh.*

Process to Learn

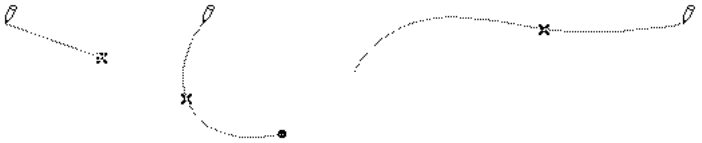
- Spline Tool
- Converting Splines to Mesh
- Mesh Tool
- Level Dimension Tool
- Gravity Tool

Starting the Step

Use your file from the previous step or open the file named *Step-15.pln* contained in the *Step Files* folder.

Introduction

- **Spline Tool**: The Spline Tool is capable of generating an infinitely variable series of custom curves. These curves are commonly defined as Natural Splines, Bézier Curves or Freehand Splines. The Tool gives greater freedom in defining free-form structures and objects without the constraint of the circular Arc Tool.



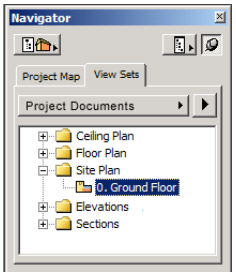
- **Mesh Tool:** The Mesh Tool allows for the creation of an editable and continuous 3D surface made up of triangular polygons. This mesh is appropriate for a variety of uses, but the most obvious one is for terrain and site creation.

- **Gravity Tool:** This tool allows the user to access vertical (Z) data from existing slab, roof and mesh objects in both the **Floor Plan** and **3D Windows**. When a wall is drawn or an object is placed using the **Gravity** Tool, it will automatically snap to the Z coordinate.

What to Do

1. Set the View Set to "Site Plan" using the Navigator

To set the View Set to the Site Plan, click the View Sets tab in the **Navigator** palette and double-click the **"Ground Floor"** in the Site Plan view set.



2. Define the Site Property Line and Building Cut

Using the Mesh Tool's line type option we can assign the property line type we created in Step 3.

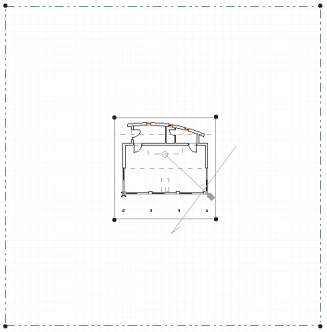
P-3, S-15, M-A

- Open the **Mesh Settings** dialog from the **Toolbox**.
- Select the "Property Line" type from the Floor Plan attributes.
- Select the "Terrain" layer.

Zoom out to see more of the project. With the Mesh Tool selected, select the **Rectangular** geometry method from the Info Box and draw a rectangular mesh as shown in the

following picture. Now cut a hole on it around the paving slab of the building:

- Select the Mesh so that its corners are highlighted.
- Make sure the **Mesh** tool is active in the **Toolbox**.
- Click on a corner point of the site mesh to start cutting a rectangular hole.
- Click on the diagonally opposite corner point of the paving slab to finish the rectangular hole. When the dialog box appears, select **"Create a Hole"** in the dialog and click OK.



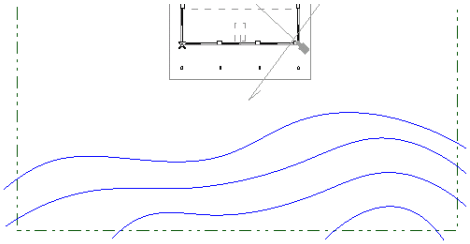
3. Create Contours with the Spline Tool

Before we can create a 3D mesh, we must define the contours of the site.

P-3, S-15, M-B

To do this we will use the **Spline** Tool and the natural spline drawing process.

- Open the **Spline Settings** dialog from the **Toolbox**.
- Select the "Terrain" layer and click **OK**.
- Select the Spline Geometry method from the Info Box.
- With the Spline Tool selected, draw several contour lines as shown below. Start and end each spline so that the spline **overlaps** the edge of the property line.



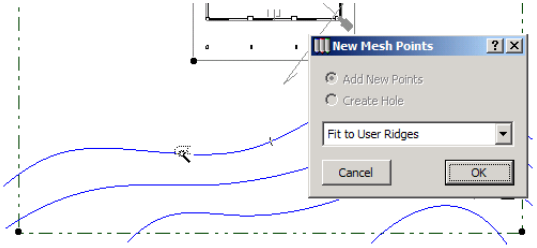
4. Convert the Splines into a 3D Mesh

The next step is to convert the splines to a mesh.

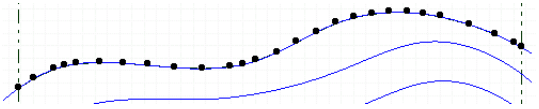
P-3, S-15, M-C, 4-5

This is done using the **Magic Wand**, an auto-trace tool.

- Select the Mesh so that its corners are highlighted.
- Select the **Mesh** Tool so that it is active.
- Select and activate the **Magic Wand**.
- Drag your cursor over the edge of the first spline until the Magic Wand changes shape and click.
- In the dialog that appears, select "Fit to User Ridges" and click **OK**.



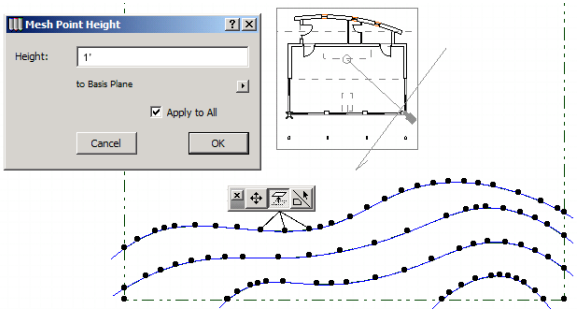
- Repeat this step for each of the contours until all contours/ splines have been converted into mesh points.



5. Define a Height for each Contour

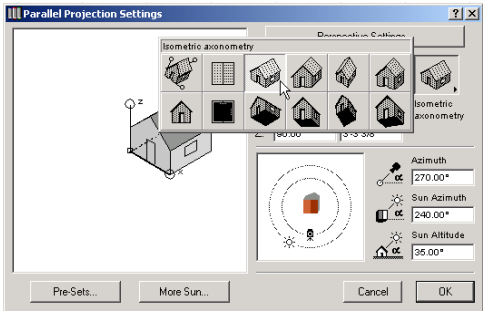
Mesh points can be assigned a Z value to establish their height. This value can be applied to all points along a spline.

- With the mesh selected, drag your cursor to a mesh point along the first contour and click the node.
- In the Pet Palette, click the middle button.
- In the dialog that appears, select "Apply to All" and enter 1' (300mm) as the height. Click **OK**.
- Repeat this step with each contour.



6. Create a 3D View

Check your mesh work. If you want to see all the Model and not just the terrain, deselect the Mesh that is currently selected. Go to the **Image** Menu and select **3D Projection Settings**. Make sure you are in the **Parallel Projection Settings** dialog box. Select **Isometric** and click **OK**.

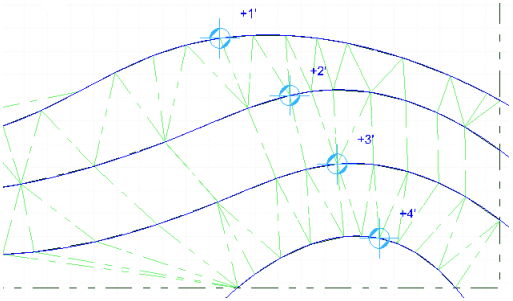


7. Place the Level Dimension using the Gravity Tool

Using the Level Dimension Tool we can place dimensions that are automatically linked to the terrain. To do this we must activate the Gravity Tool.

- **Deselect** the mesh in the Floor Plan Window.
- Open the Level Dimension Tool from the Toolbox and select the **Notes-Site Plan** layer. Click **OK**.
- With the Level Dimension Tool selected, activate the Gravity snap for the Mesh from the Control Box.

- Drag the cursor to a contour mesh point and click to place a level dimension.
- Repeat these steps for the remaining contours.



Part Four: Measuring and Costing a Building

Step 16: Calculating Building Information

Overview

This step will demonstrate how to list the project information you assigned to elements and objects. We will review several types of list options provided with ArchiCAD and discuss how you can customize these templates for your specific project use.

Process to Learn

- Descriptions of List Schemes
- List Elements
- List Components
- List Zones
- Calculate Menu Appearance

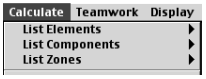
Starting the Step

Use your file from the previous step or open the file named *Step-16.pln* contained in the *Step Files* folder.

Introduction

ArchiCAD's integrated Virtual Building construction database can reveal the number of elements in a project, the elements' spatial disposition or the quantity of the elements' components through the complex feature set of the **Calculate** Menu.

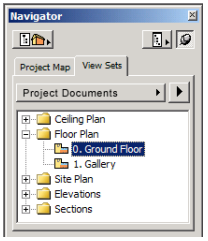
Having analyzed project data and relevant database information, ArchiCAD can generate three fundamental types of calculation reports: **Elements List**, **Components List** and **Zone List**.



What to Do

1. Set the View Set to "Floor Plan" using the Navigator

To set the View Set to the Floor Plan, click the View Sets tab in the Navigator palette and double click the "Ground Floor" in the Floor Plan view set:

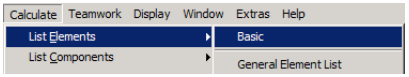


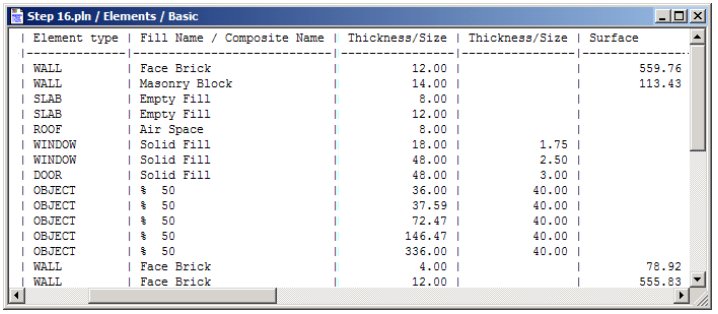
2. Create an Elements List

The Elements Lists are best used for creating schedules and inventories, and to display the parameters of construction elements in a project. Parameters, components and descriptors can also be included in the lists.

P-4, S-16, M-A, 2-4

To create an Elements List, select the **Basic** option from **List Elements** in the **Calculate** menu.



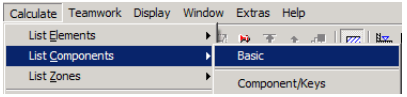


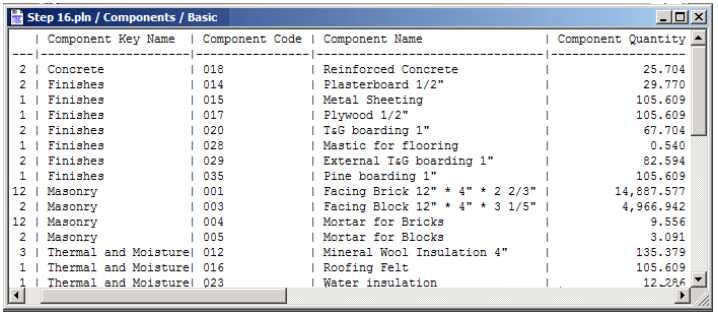
Element type	Fill Name / Composite Name	Thickness/Size	Thickness/Size	Surface
WALL	Face Brick	12.00		559.76
WALL	Masonry Block	14.00		113.43
SLAB	Empty Fill	8.00		
SLAB	Empty Fill	12.00		
ROOF	Air Space	8.00		
WINDOW	Solid Fill	18.00	1.75	
WINDOW	Solid Fill	48.00	2.50	
DOOR	Solid Fill	48.00	3.00	
OBJECT	% 50	36.00	40.00	
OBJECT	% 50	37.59	40.00	
OBJECT	% 50	72.47	40.00	
OBJECT	% 50	146.47	40.00	
OBJECT	% 50	336.00	40.00	
WALL	Face Brick	4.00		78.92
WALL	Face Brick	12.00		555.83

3. Create a Component List

The Component Lists are generated when bills of materials, quantity takeoffs or price lists are required. Typically in these reports, Component type properties are summed and displayed. However, certain element parameters can also be listed.

To create a Components List, select the **Basic** option from **List Components** in the **Calculate** menu.

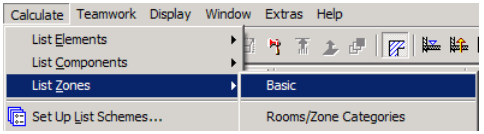




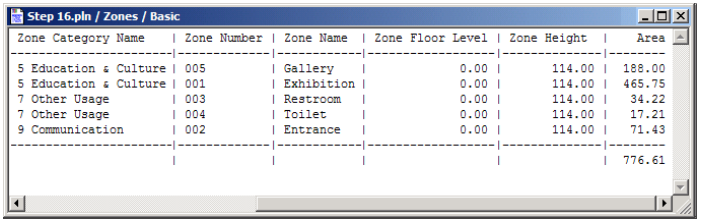
	Component Key Name	Component Code	Component Name	Component Quantity
2	Concrete	018	Reinforced Concrete	25.704
2	Finishes	014	Plasterboard 1/2"	29.770
1	Finishes	015	Metal Sheeting	105.609
1	Finishes	017	Plywood 1/2"	105.609
2	Finishes	020	T&G boarding 1"	67.704
1	Finishes	028	Mastic for flooring	0.540
2	Finishes	029	External T&G boarding 1"	82.594
1	Finishes	035	Pine boarding 1"	105.609
12	Masonry	001	Facing Brick 12" * 4" * 2 2/3"	14,887.577
2	Masonry	003	Facing Block 12" * 4" * 3 1/5"	4,966.942
12	Masonry	004	Mortar for Bricks	9.556
2	Masonry	005	Mortar for Blocks	3.091
3	Thermal and Moisture	012	Mineral Wool Insulation 4"	135.379
1	Thermal and Moisture	016	Roofing Felt	105.609
1	Thermal and Moisture	023	Water insulation	12.286

4. Create a Zone List

Zone Lists are generally used to create room schedules and finish schedules. Zone Lists can include parameters of zones and related construction elements.



To create a Zone List, select the **Basic** option from **List Zones** in the **Calculate** menu.



Zone Category Name	Zone Number	Zone Name	Zone Floor Level	Zone Height	Area
5 Education & Culture	005	Gallery	0.00	114.00	188.00
5 Education & Culture	001	Exhibition	0.00	114.00	465.75
7 Other Usage	003	Restroom	0.00	114.00	34.22
7 Other Usage	004	Toilet	0.00	114.00	17.21
9 Communication	002	Entrance	0.00	114.00	71.43
					776.61

Step 17: Creating Building Schedules

Overview

Using the Interactive Schedule editor, you can create a schedule a variety of project information such as door and window schedules, furniture schedules, equipment schedules and more.

The schedules are linked to the parameters within each object in order to link information such as size, UV rating, number of items, hardware type, and material.

Process to Learn

- Interactive Schedule
- Door and Window Parameters
- Editing the Parameters
- Creating a Window Schedule
- Viewing the Schedule

Starting the Step

Use your file from the previous step or open the file named *Step-17.pln* contained in the *Step Files* folder.

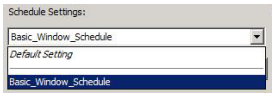
What to Do

1. Format the Window Schedule

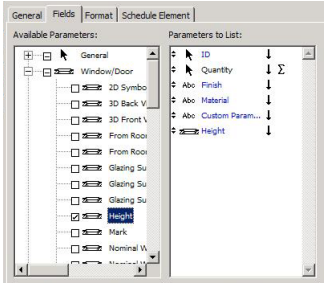
P-4, S-17, M-A

To format the Window Schedule, go to the **Calculate** Menu and select **Settings...** from the **Interactive Schedule** option.

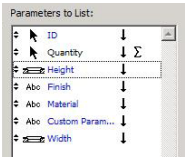
- Select **Basic_Window_Schedule** from the **Schedule Settings** popup option. We will use this as a template for our custom Window Schedule.
- Click the **Duplicate** button.
- Enter a new name for the Window Schedule called *Project_Window_Schedule* and click **OK**.



- Click the **Fields** tab
- Open the Window/Door tree from the Available Parameters and select the **Height** option so that its check mark appears in the selection box.
- Scroll down further and select the select the **Width** option.



- In the Parameters to List column, select the left edge of the **Height** parameter and drag it up to set the sequence in which the columns will appear within the schedule.
- Repeat this for the **Width** parameter and click **OK** when finished.

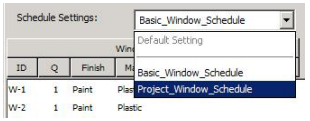


2. Preview the Window Schedule

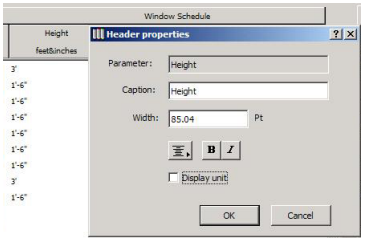
The Preview option can be used to view how the schedule will appear. The Preview option can also be used as an editable spreadsheet that can update information within the model.

P-4, S-17, M-B, 2-3

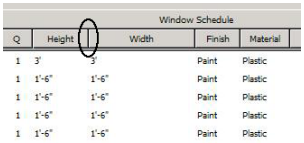
- Go to the **Calculate** Menu and select **Preview...** from the **Interactive Schedule** option.
- Select **Project_Window_Schedule** from the **Schedule Settings** popup option. The schedule will reflect the changes to the Settings dialog.



- Next, edit the title for the window height. Double-click the **Height** column header.
- In the Header Properties dialog, click the Display Units checkbox to **OFF**. Click OK.
- Repeat this for the Width header.



- Now adjust the column widths. To do this, click and drag your cursor at the top edge of a column.
- Drag the column edge to the position width desired.

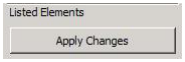


3. Edit the Window Schedule

The interactive schedule is an editable spreadsheet that can update information within the model.

- Select the **first row** within the schedule so that it is highlighted.
- Click your cursor within the **ID** section
- Change the ID to **W-1.**
- Click your cursor within the **Material** section.
- Change the material to **Wood.**

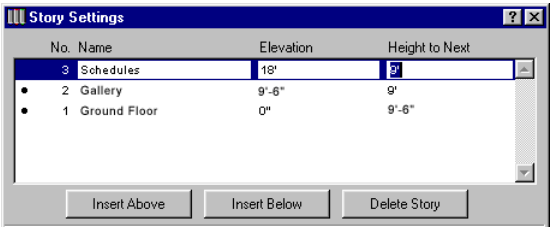
- When you are finished updating the schedule, click the **Apply Changes** button to change the objects in the model to reflect the updated schedule.
- Click the **Close** button when finished.



4. Create a Window Schedule

To view the Window Schedule you can either place it on the drawing or open a list window. For this exercise we will place it on the floor plan. First create a story that is dedicated to schedules.

- To do this, go to the **Options** Menu and select **Stories/ Story Settings**.
- In the dialog box highlight Gallery and click **Insert Above**.
- Now name the new story *Schedules*. Click **OK**.



- Go to the **Calculate** Menu and select **Preview...** from the **Interactive Schedule** option.
- Click the **Place** button within the Schedule on Drawing section of the dialog.

ArchiCAD will place the schedule onto your floor plan.

Window Schedule

ID	Q	Height	Width	Finish	Material	Notes
W-1	1	3'	3'	Paint	Wood	
W-2	1	1'-6"	1'-6"	Paint	Plastic	
W-3	1	1'-6"	1'-6"	Paint	Plastic	
W-4	1	1'-6"	1'-6"	Paint	Plastic	
W-5	1	1'-6"	1'-6"	Paint	Plastic	
W-6	1	1'-6"	1'-6"	Paint	Plastic	
W-7	1	1'-6"	1'-6"	Paint	Plastic	
W-8	1	3'	3'	Paint	Wood	
W-9	1	1'-6"	1'-6"	Paint	Plastic	

Part Five: Presenting the Design to a Client

Step 18: Using Perspectives

Overview

In this Lesson, you will learn how to create and store single point perspectives, how to use the camera settings, how to edit the PhotoRendering Effects settings and how to create a final PhotoRendering using different rendering backgrounds, effects and sizes.

Process to Learn

- Camera Tool
  - Placing a Camera
  - Placing Multiple Cameras
- Camera Settings
- PhotoRendering Settings
  - Effects
  - Size & Background

Starting the Step

Use your file from the previous step or open the file named *Step-18.pln* contained in the *Step Files* folder.

Introduction

Double-clicking on the **Camera** Tool's icon in the ArchiCAD Toolbox will open the **Camera Settings** dialog box. The contents of the Camera Settings dialog box is different for all three types of Cameras.

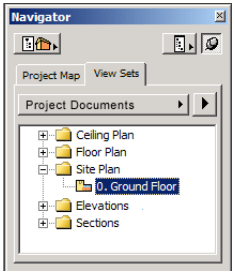
This dialog box and the Floor Plan are simultaneously active, so you can alter the settings, the camera locations and orientations without repeatedly opening and closing the window. However, the dialog box disappears while the 3D Window is open.

You can choose the camera type either by clicking the corresponding tab at the top part of the dialog box or as a Construction Method from the **Info Box**.

What to Do

1. Set the View Set to "Site Plan" using the Navigator

To set the View Set to the Site Plan, click the View Sets tab in the Navigator palette and double click the **"Ground Floor"** in the Site Plan view set.

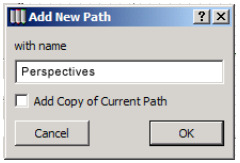


2. Set up the Camera

P-5, S-18, M-A, 2-3

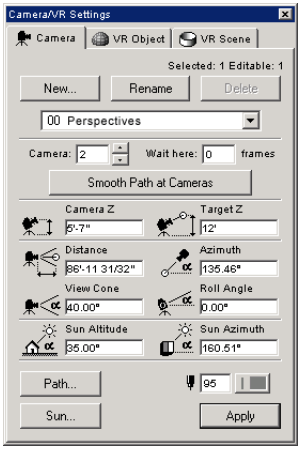
When you take a photograph with a real camera, you must adjust the camera height, view, view angle, etc. Similarly, we must set the camera settings before placing using the Camera Tool.

- Open the **Camera** tool from the **Toolbox**.
- Click the Camera tab at the top of the dialog box.
- Click the **Rename** button.
- Type the name "Perspectives".



Now we can create the new perspective camera settings.

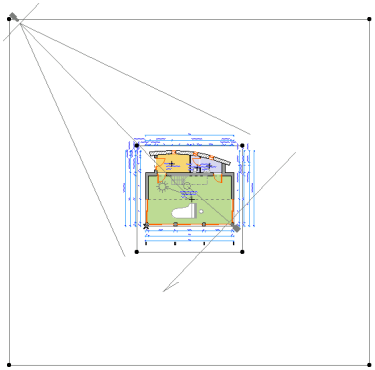
- Adjust its view cone angle to 40 degrees and its target Z height value to 12' (3600mm).
- Click **Apply** to confirm the settings.



3. Place the Camera

Once the camera settings are set, we can place the camera in the Floor Plan Window.

- Place the camera near the top left corner of the site to view towards the building.
- Select it with the Arrow Tool and open the 3D Window.



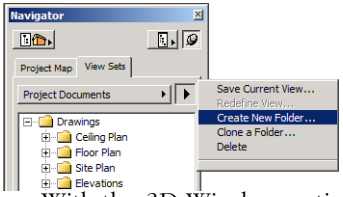
Now click the Project Map tab and notice that there are now two perspective cameras listed.

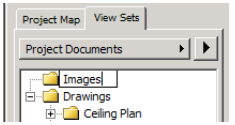
4. Create a View Set for Images

As we create views of the project we can save these views as pre-sets within the Navigator. These views can then be accessed in both ArchiCAD and PlotMaker.

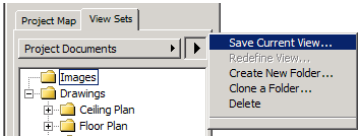
P-5, S-18, M-B

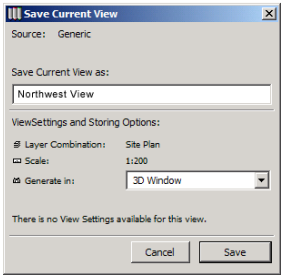
- Click the View Sets tab within the Navigator palette.
- Select "Create a New Folder" from the popup menu.
- With the folder selected, type the new name "Images".

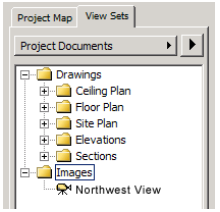




- With the 3D Window active, select "Save Current View..." from the popup menu within the Navigator palette.
- Enter the name "Northwest View" in the text box and the click OK button.

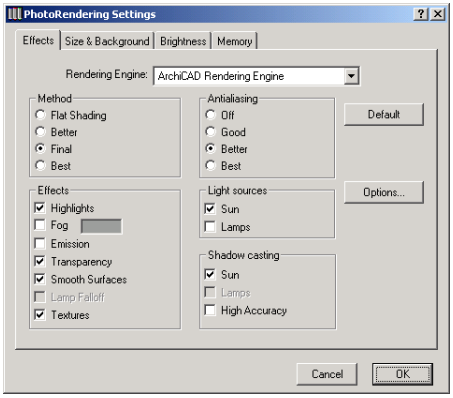




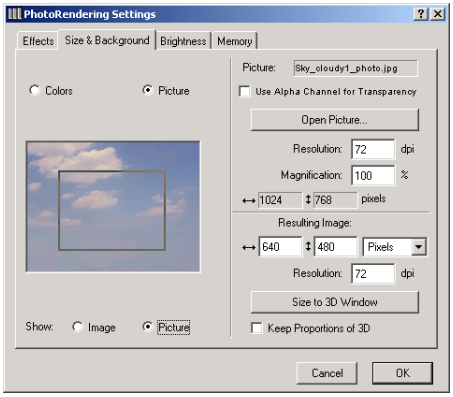


5. Set up the PhotoRendering and Effects Settings

The PhotoRendering settings are controlled from the Image/PhotoRendering Settings/Effects menu point. Be sure to use the ArchiCAD Rendering Engine and that the options are set as displayed.



Change to the Size and Background tab page and check Picture at the top to import a background picture. Select from your Step Library/Background images/ Sky_cloudy1_photo.jpg (select “JPEG Image type” from the “Files of type” popup menu in the dialog to be able to choose the background picture).



Check Show Picture at the bottom of the preview to adjust the frame of the rendering against the background image. Position it as desired and click **OK**.

6. Create a PhotoRendering

Execute the **Image/PhotoRender Projection** command and wait for the result.

When the picture is complete, it can be saved in different formats using the **File/Save as** command.

Step 19: Developing an Animation

Overview

Animations are a great way to present a design and take a guided tour through a project. In this Lesson, you will learn how to define a Fly-Through Path for an animation using the ***Camera*** *Tool and how to create and store multiple animations.*

Process to Learn

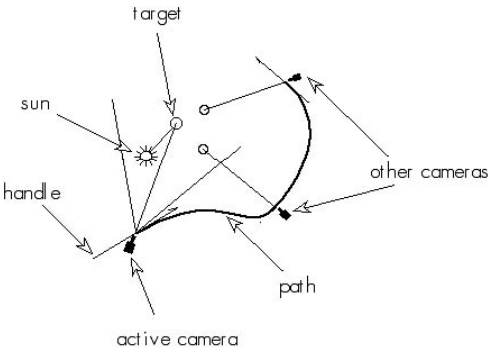
- Camera Tool
  - Placing a Camera
  - Placing Multiple Cameras
- Camera Settings
- Path Settings
- Creating an Animation
- Compression

Starting the Step

Use your file from the previous step or open the file named *Step-19.pln* contained in the *Step Files* folder.

Introduction

Placing several cameras defines a Fly-Through path whose parameters you can adjust in the **Path dialog box.** Open the Path Dialog Box by clicking the **Path button** at the bottom left of the Camera Settings dialog box.



Only one camera will be active at a time. This is the only camera displayed with its sun and view angle markers. The active camera is always the one that was last placed, unless you select another one. Any cameras placed on the Floor Plan will be attached to the current Fly-Through path after the active camera.

What to Do

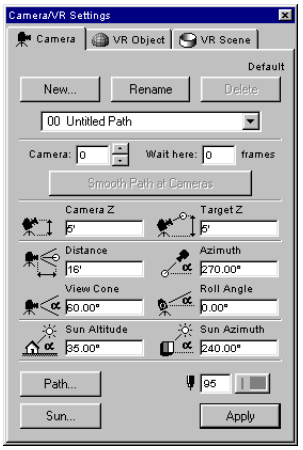
1. Set up the Camera

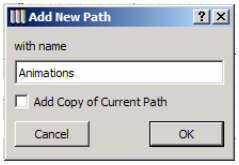
Select the **Camera** Tool from the **Toolbox** and make sure that the Camera tab page is chosen in the **Camera/VR Settings** dialog box.

P-5, S-19, M-A, 1-4

The camera tool allows us to create different camera presets that are saved with the **Camera** Tool. Let's create a new preset for the animation path.

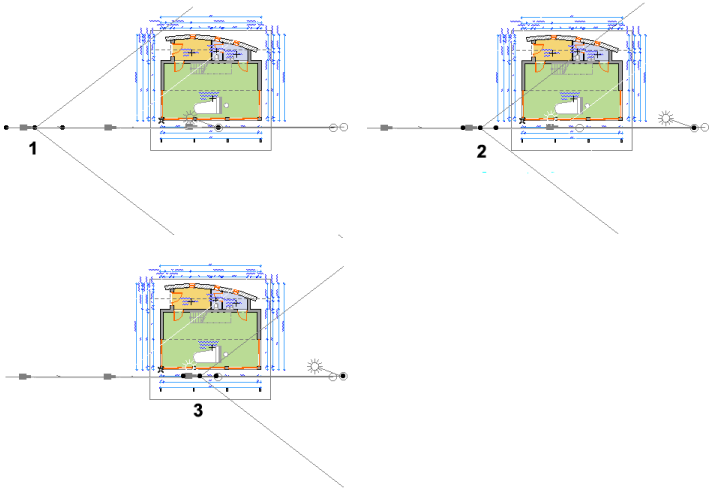
- Click the **New** button.
- Type in the name "Animations" and click OK.



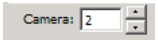


2. Place the Cameras along the Animation Path

Place three cameras along a path as shown below.

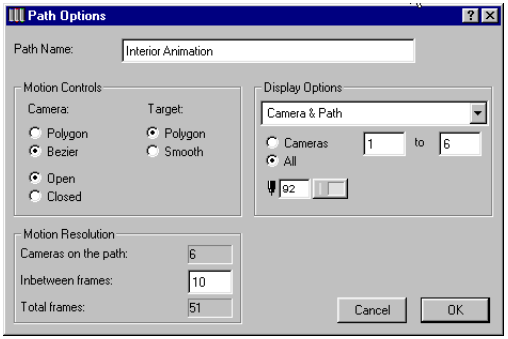


After placing the cameras, a Fly-Through path will be defined automatically. If you want to change the settings of the cameras separately, double-click on the **Camera** Tool and browse among the cameras.



3. Set Animation Path Settings

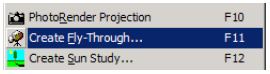
Click the **Path...** button. Set the Motion Controls, the Display Option and the number of the Inbetween frames as indicated.



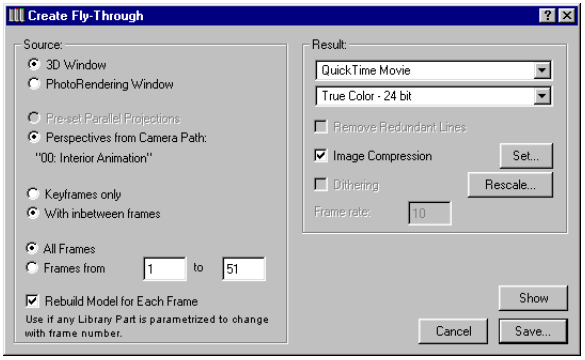
Each camera you add to the path is considered a keyframe. ArchiCAD can interpolate between keyframes to create Inbetween views, which produce a smoother animation. But increasing the number of images requires more time to create and more disc capacity to store.

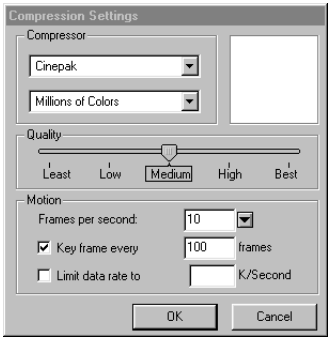
4. Create the Animation

Go to the **Image** Menu and select **Create Fly-Through**. Choose options as desired:



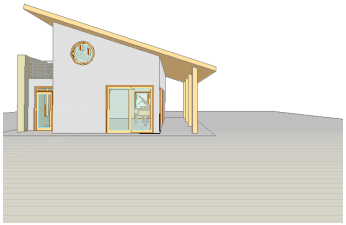
- **Source**: This option allows you to toggle between the **3D Window** or **Photorendering Window** option and to define which frames are rendered.
- **Result**: With this option, choose the number of colors for the animation and the compression. Graphisoft recommends using Cinepak compression. The better the image quality, the longer it will take to process.

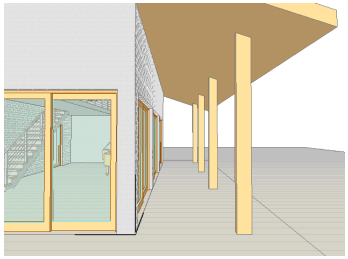


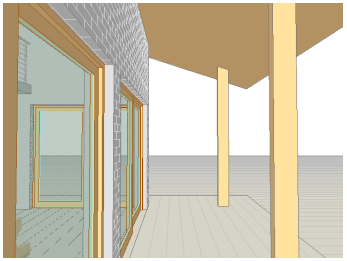


Save, and when ArchiCAD is finished processing, open the Animation file. To open the Animation, go to the location you chose to save the Animation and double-click on the file.

The animation will create a series of images similar to the images shown below:







Step 20: Viewing Virtual Reality

Overview

*This step allows you to create a navigable object or scene taking advantage of virtual reality technology. For a **VR Object**, you define a spherical path for the camera and navigate along the sphere.*

*For a **VR Scene**, you create a navigable panoramic scene. You define one or a series of cylindrical panoramas to be viewed in the virtual reality player application. This allows you to stand at a single point and turn 360 degrees to view the building space of your model.*

> ***Note:** If you only have a demo version of ArchiCAD, you will not be able to do this exercise as described here, because saving files is not available in the demo version.*

Process to Learn

- VR Object Tool
- VR Scene Tool
- Placing a VR Object or Scene
- Creating a VR Movie
- VR Settings
- Compression

Starting the Step

Use your file from the previous step or open the file named *Step-20.pln* contained in the *Step Files* folder.

Introduction

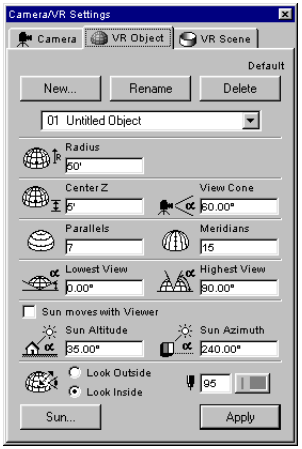
- **Virtual Reality Object**: ArchiCAD allows you to create navigable objects taking advantage of virtual reality technology. You define a spherical path for the camera along which the viewpoint can optionally be positioned and navigated. The navigable object can be viewed in the QuickTime® VR MoviePlayer application.
- **VR Scene:** ArchiCAD allows you to create navigable panoramic scenes using virtual reality technology. You define one or a series of cylindrical panoramas to be viewed in the virtual reality player application.

What to Do

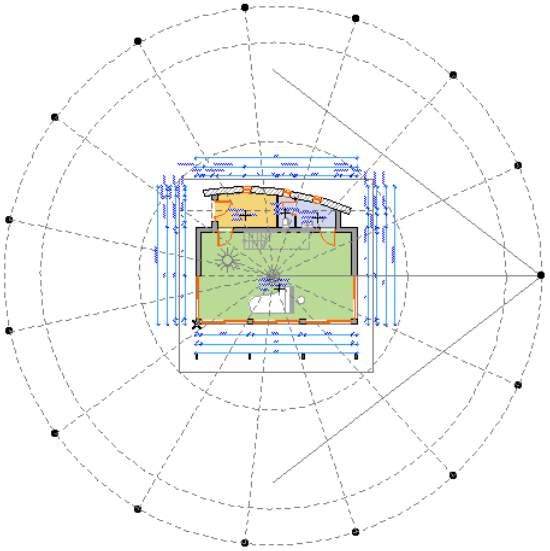
1. Define the VR Object

P-5, S-20, M-A

Open the **Camera** Tool from the **Toolbox**, select the **VR Object** tab page and enter the object information as indicated. Enter the Radius as 50' (15000mm) and Center Z as 5' (2000mm). The remaining parameters can remain at their default settings.



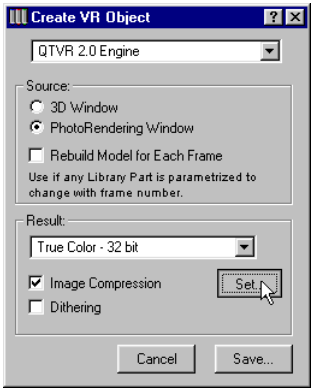
- **Place the VR Object**: A click on the Floor Plan determines the center of the VR Object, which will show both the initial direction of view and the extent of view. Additional clicks on the floor plan will not create new cameras; you can only have one camera active at a time.

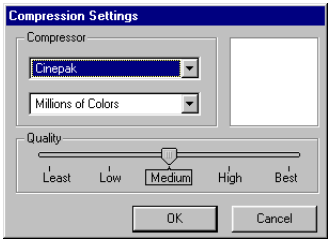


- **Configure the Rendering Settings**: Open the **Photorendering Settings** or **3D Window Settings** from the **Image** Menu to set the effects and settings, depending on which source you choose.
- **Create the VR Object**: Choose **Create VR Object** from the **Image** Menu. Choose options as desired:

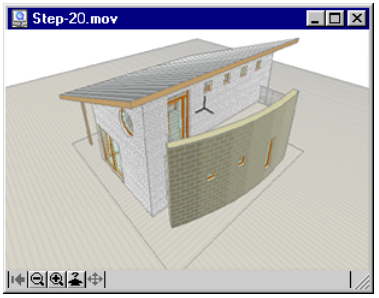
- Source: **3D Window** or **Photorendering Window**
- Result: Choose Millions of Colors for the VR Object and the Image compression. (Image Compression is supported only by QTVR 2.0 Engine.) Graphisoft recommends using Cinepak compression.

Note: You must have the appropriate QuickTime VR Extensions properly installed on your computer in order to take advantage of this option.



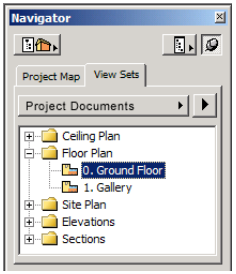


The better the image quality, the longer it will take to process. **Save**, and when ArchiCAD is finished processing, open the VR Object file. To open the VR Object, go to the location you chose to save the VR Object file and double-click on the file.



2. Set the View Set to "Floor Plan" using the Navigator

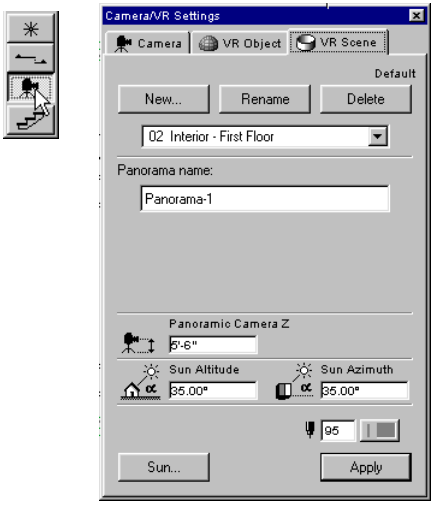
To set the View Set to the Floor Plan, click the View Sets tab in the Navigator palette and double click the "Ground Floor" in the Floor Plan view set:



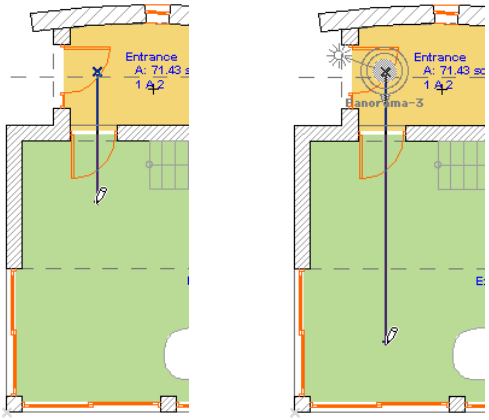
3. Setup the VR Scene

P-5, S-20, M-B

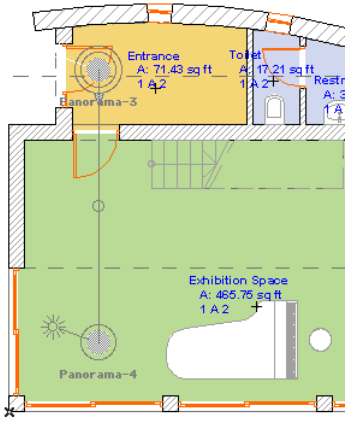
Open the **Camera** Tool from the **Toolbox**, select the **VR Scene** tab page and enter the object information as indicated.



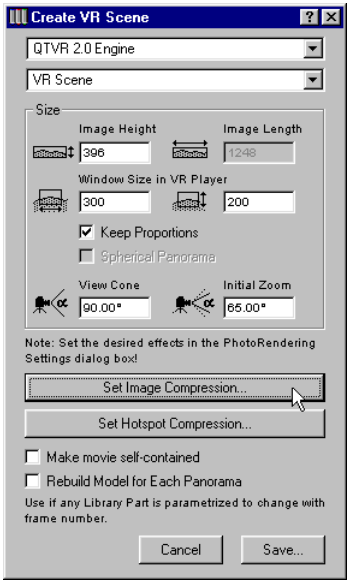
- **Place the VR Scene Nodes:** A click on the Floor Plan places the center of the VR Camera.
  - Panorama 1: The first click places the camera and the second click defines view direction.



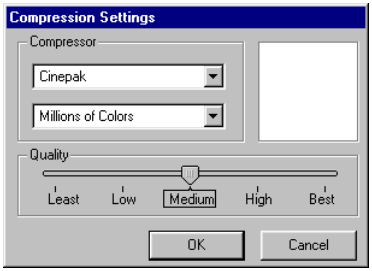
- Additional Panoramas: To place additional panorama cameras that are linked, click the center point of the first camera and click again to place camera or (with **Camera** Tool still selected) draw a line between center nodes of unconnected cameras.



- **Create the VR Scene**: Choose **Create VR Scene** from the **Image** Menu. First choose which type of VR Scene to render. ArchiCAD offers three types:
  - VR Scene - Saves all panoramas defined on the plan and includes a control file to navigate between panoramas.
  - Panoramas - Saves only individual panoramas and does not include the control file.
  - Pictures - Saves pictures of the panoramas for editing as PICTs.
- **Select the VR Scene**. Next enter the final rendered image size of the VR Scene. The parameters are measured in pixels. The Image Height and Image Length refer to the rendering size while the settings for the Window Size in VR Player refer to the size of the VR viewing window. The View Cone is the angle of view of the camera and the Initial View is the angle of the camera when the VR first starts.



Finally, choose Millions of Colors for the VR Object and the Image Compression (image compression is supported only by QTVR 2.0 Engine). Graphisoft recommends using Cinepak compression. The better the image quality, the longer it will take to process.



Save, and when ArchiCAD is finished processing, open the VR Scene file. To open the VR Scene, go to the location you chose to save the VR Scene and double-click on the file.

Step 21: Creating a Sun Study

Overview

*This step uses the **Create Sun Study...** command to generate a series of normal or photorendered 3D pictures defined by the current **3D Projection Settings**, the current **3D Window** or **PhotoRendering Settings** respectively, and the Sun position settings defined in the **Create Sun Study** dialog box, similarly to the Create Fly-Through command.*

Process to Learn

- Sun Settings
- Setting Camera View
- Create Sun Study
- Compression Options
- Source Options
- Camera Settings

Starting the Step

Use your file from the previous step or open the file named *Step-21.pln* contained in the *Step Files* folder.

Introduction

ArchiCAD allows you to generate a series of normal or photorendered 3D pictures defined by the current **3D Projection Settings**, the current **3D Window** or **Photorendering Settings**, and the Sun position settings defined in the **Create Sun Study** dialog box.

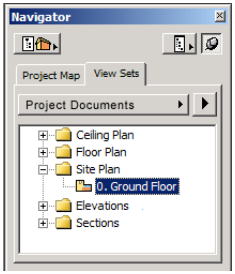
These generated images mimic the effect of the sun and the resulting shadows on the modeled building over a period of time.

What to Do

1. Set the View Set to "Site Plan" using the Navigator

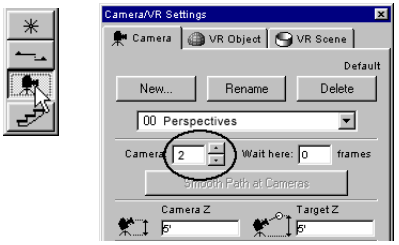
P-5, S-21, M-A

To set the View Set to the Site Plan, click the View Sets tab in the Navigator palette and double click the **"Ground Floor"** in the Site Plan view set.



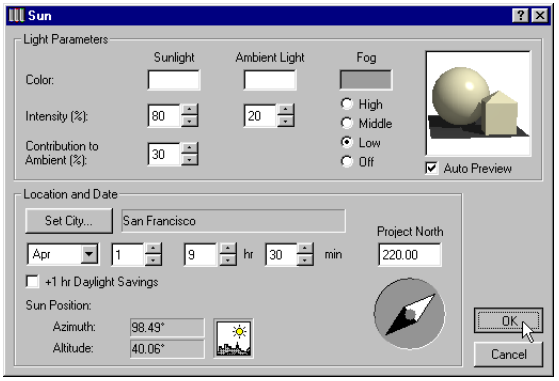
2. Set up and Select the Camera

Open the **Camera** Tool from the **Toolbox**, click the camera tab and select the **"Perspective"** view from the popup menu that you created in Step 19. Select the camera showing the Northwest view by clicking the up/down arrows next to "Camera" as shown.



Now that the view is set, we must define the sun settings for the time of year, time of day and location.

- Click the **Sun** button.
- Set your location in the world by clicking the Set City.
- Set the time as 9:30.



3. Create a View in the 3D Window

With the camera selected, open the 3D window to view the perspective.

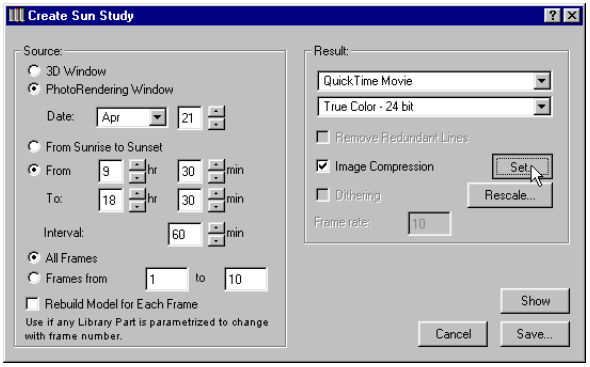
4. Create a Sun Study

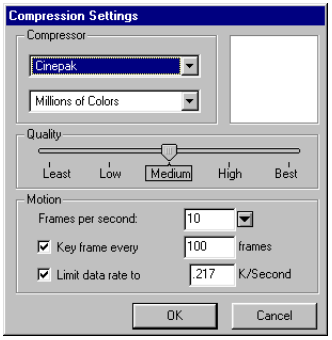
Go to the **Image** Menu and select **Create Sun Study**.

- Select PhotoRendering Window as the source.
- Set the date to April 21.
- Set the start and end time for the study as follows:

  From: 9:30

  To: 18:30 (6:30 pm)
- Set the result as a QuickTime movie from the popup menu. Use the Cinepak compression which Graphisoft recommends for animations.





- **Save**, and when ArchiCAD is finished processing, open the Sun Study file. To open the Sun Study file, go to the location you chose to save the Sun Study and double-click on the file. The file will open as a QuickTime movie. Click the **Play** button on the movie.

Step 22: Defining a 3D Cutaway

Overview

This step introduces you to the option of cutting away your model in 3D. This allows you to create 3D cutaway sections, plan views and details of your model.

Process to Learn

- Marquee Tool
- 3D Cutting Planes
- 3D Cutaway Options
- 3D Cutaway Section
- 3D Cutaway Plan

Starting the Step

Use your file from the previous step or open the file named *Step-22.pln* contained in the *Step Files* folder.

Introduction

Marquee Tool: You can use the Marquee Tool to **view only specific parts** of the 3D model by drawing a marquee area around the details you wish to either include or exclude from the 3D image. This technique can be applied to either the current story or to all stories, depending on the construction method chosen.

3D Cutting Planes: Choosing the **3D Cutting Planes...** command displays the **3D Section** dialog box. By using 3D sections, you can get either ordinary cross sections or special sections to visualize the project in new ways.

3D Cutaway: 3D Cutaway is an imaging mode in ArchiCAD. If it is active, the cutting places defined in the **3D Cutting Planes** dialog box are applied to the model every time it is rebuilt.

Note: that 3D cutting planes can only be defined and the cutaway performed with the **3D Window** active.

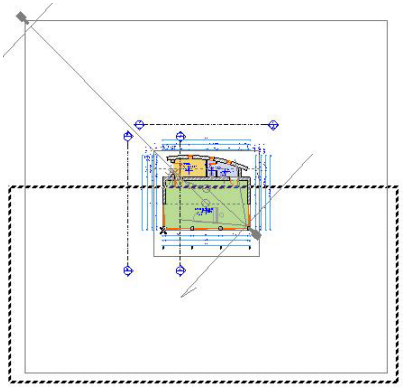
What to Do

1. Marquee Tool

Your **Marquee** Tool can be used to highlight a specific area of the building. The model will be clipped at the Marquee's boundaries. The thin marquee images one floor and the thick marquee images all floors.

P-5, S-22, M-A

- Select the **Marquee** Tool and select the thick Marquee option from the Info Box.
- Go to the Floor Plan and define the area of the building to be clipped. Note that the area to be clipped is **outside** the marquee.



- Now go to the 3D Window to see a clipped area of the building as shown below.

- To cancel the Marquee, activate the Context menu by clicking with the **right mouse button** (Windows) or with the **Ctrl key** pressed (Macintosh), and choose the Remove Marquee command. You can also **double click** anywhere outside the Marquee.

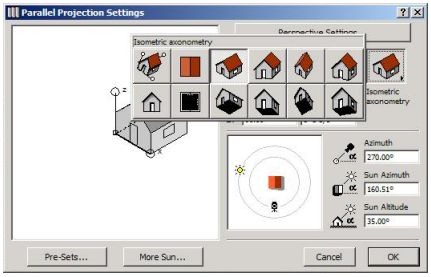
2. 3D Cutting Planes

The three basic orthogonal representations of your building (front, side and top) are displayed in the **3D Section** dialog box.

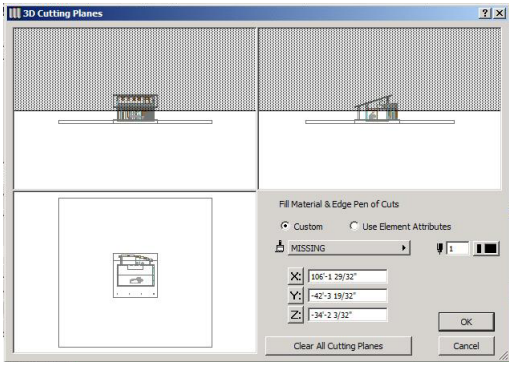
P-5, S-22, M-B, 2-4

Note: This command is not available if the 3D Window is closed or empty.

- Open the **3D Projection Settings** dialog box from the **Image** Menu and click the Parallel Projections button.
- Now select the Isometric Axonometry option from the preset popup menu in the Parallel Projections dialog.

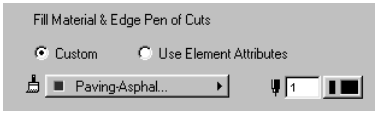


- Open the **3D Cutting Planes** from the **Image** Menu.
- Draw a line through the Ground Floor in one of the two side views. This line represents a cutting plane perpendicular to the given orthogonal view.
- An Eyeball Cursor will appear. Select the lower part of the drawn line indicating the area to be removed.



The Fill Material & Edge Pen of Cuts controls allow you to highlight the edges and surfaces of elements cut in 3D Sections. You can create special section cut surfaces with different colored edges, as well as cut surfaces having custom material definitions.

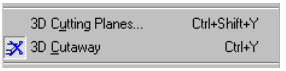
- To create such highlighting, click the **Custom** radio button and choose a material from the popup menu and/or a pen from the palette.



3. Activate the 3D Cutaway

To activate the **3D Cutaway**, select its Menu item. A **Checkmark** placed before the name of the command indicates that it is active. To deactivate **3D Cutaway**, choose the command again and the **Checkmark** disappears.

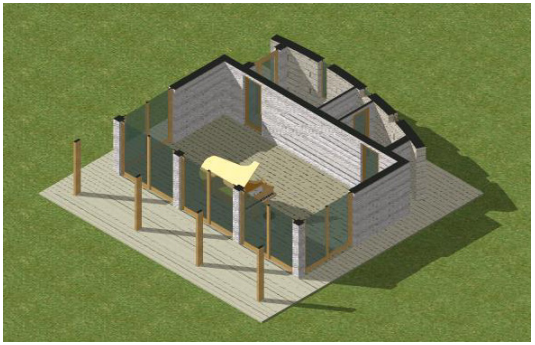
Inactive



Active

4. View the 3D Cutaway from Different Views

Activate the **3D Window** to see the cutaway of the building. To render a final image with shadows, select PhotoRender Projection from the Image menu.



5. Clear All Cutting Planes

To remove all cutting planes, click the **Clear All Cutting Planes** button, then **Rebuild**, and finally choose the **3D Cutting Planes** command.

Hint: The number of cutting possibilities offered here is much greater than you generally need in architecture. You can, however, make good use of them when you are dealing with non-orthogonal details or when showing material cutaways.

6. Save Your File

In the next step we will use the ArchiCAD Model you have been creating to develop Layout Sheets for publishing, printing and plotting. To Save the File, go to the **File** menu and select **Save**. If you have not yet saved your work, then a dialog box will appear. In the dialog select where on your computer you would like to save the file.

Part Six: Producing and Publishing Drawings

Step 23: Creating the Sheet Layouts

Overview

PlotMaker is a stand-alone program for creating, publishing, plotting and printing Layouts into a final architectural documentation.

In this exercise we will review the process of creating sheet layouts in PlotMaker using the Navigator, a Master Layout, Drawing Subsets and the Layout Settings. When we are finished setting up the layouts, we will place the drawings and set the drawing views in Step 24.

Process to Learn

- Using the Navigator Palette
- Creating a Master Layout
- Creating Layout Sheets
- Creating a Titleblock
- Placing Text

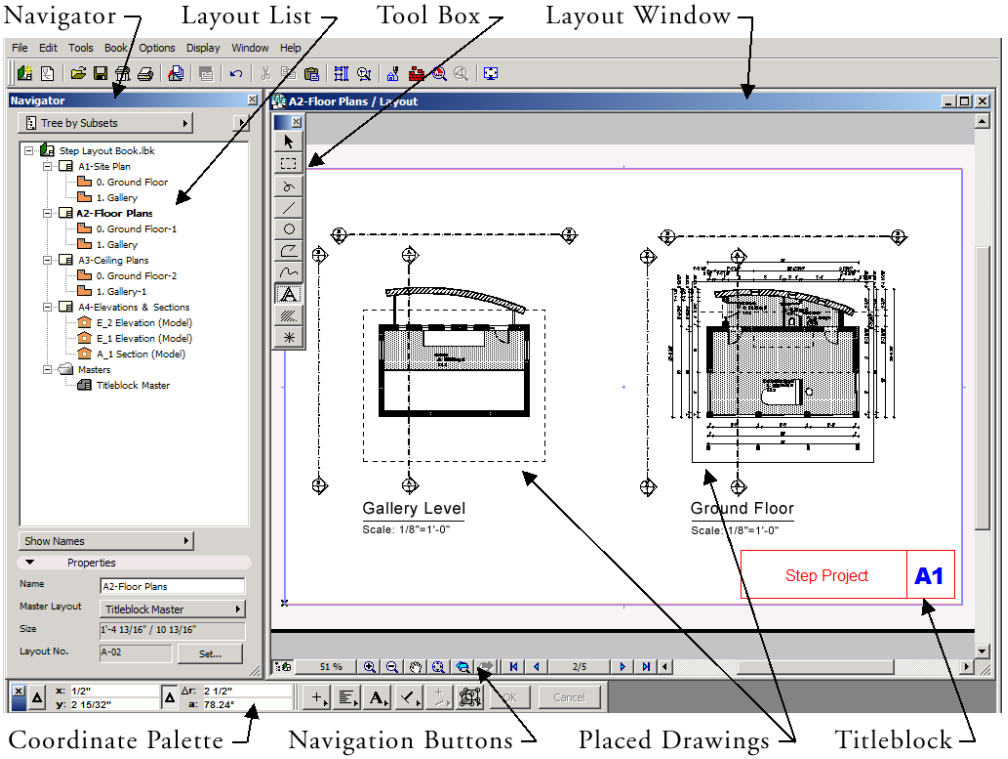
Starting the Step

Open the file named *Step-23.lbk* contained in the *Step Files* folder.

Introduction

Architectural documentation consists of a collection of different drawings – floor plans, details, cross-sections, views, 3D views, etc. In **PlotMaker** you collect and arrange all of these plans in a **Layout Book**. The Layout Book includes all the electronic information necessary for a project's entire documentation in a single file (extension **.lbk**) – similar to the collection of pages and chapters that make up a real book.

A **Layout Book** consists of the following elements: **Layouts, Drawings, Subsets,** and **Master Layouts**. You can navigate among and organize, add or remove these elements using the **Navigator palette**. The Navigator palette also serves as a visual outline of the structure and contents of your Layout Book. The following image is a view of the Navigator, Layouts, Drawing Subsets and placed Drawings that we will develop in the following steps.



Functions of the Navigator

- Create and organize the elements of your Layout Book
- Navigate within the Layout Book
- Open a new Layout Window or Drawing Window
- Set and adjust parameters for a Book, Layouts, Subsets and Drawings
- Update Drawings
- Give a name to Layouts or Subsets

What to Do

1. Set up the Master Layout

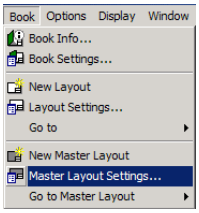
The Master Layout ensures a uniform appearance for your project documentation.

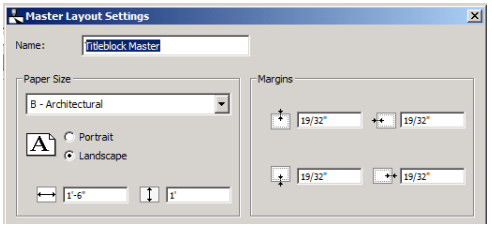
P-6, S-23, M-A, 1-2

Once you create an element (frame, logo, etc.) within the Master Layout, that element will appear on every Layout to which you have applied that Master Layout. You can also define multiple Master Layouts for a single Layout Book.

Let's start by setting up the Master layout.

- Open the **Master Layout Settings...** from the **Book** menu.
- Highlight the default name "Master 001" and rename it "Titleblock Master".
- Set the sheet size to Architectural-B or 1' x 1'-6" (Metric is A3-Oversize or 450mm x 330mm).

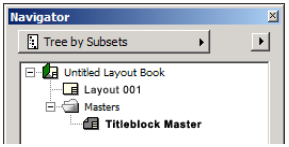




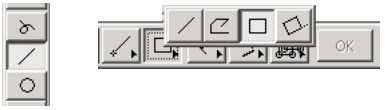
2. Create a Titleblock Master

Now that the master layout settings are saved, let's activate the Titleblock Master so we can create a template.

- Double-click the **Titleblock Master** in the Navigator so that it displays in bold.



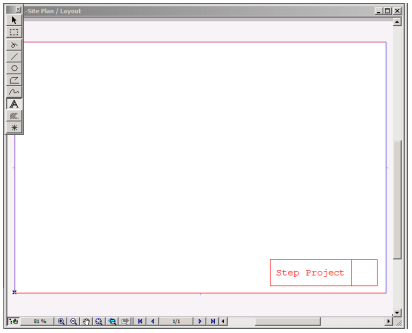
- Select the **Line** Tool from the **Toolbox** and select the rectangular control option in the Control Box.



- Click in the lower right corner and draw a rectangle to create an outline for the titleblock.

- Open the **Text Settings** from the **Toolbox** and enter 20 points for the text size.

- Select the **Text** Tool and click inside the titleblock. When you see a flashing cursor, type in the name "Step Project".
- When finished, click your cursor outside the text box to confirm the text entry.



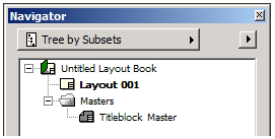
3. Set up the Layouts

The next step is to create a list of sheets for the project.

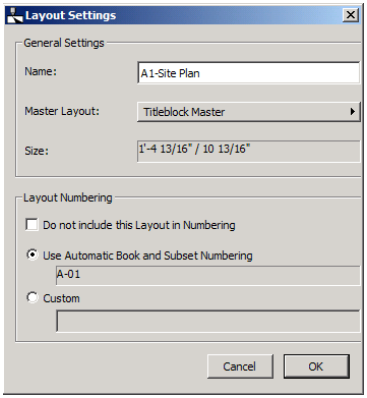
P-6, S-23, M-B

The Navigator is used to create and manage these layouts.

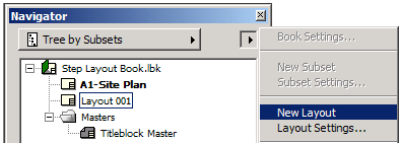
- Double-click **Layout 001** in the Navigator so that it displays as bold.



- Click the arrow popup button next to Tree by Subsets and select **Layout Settings**.



- In the Layout Settings dialog, type the name **A1-Site Plan**.
- Click **OK**.
- Click the arrow popup button next to Tree by Subsets again and select **New Layout.**

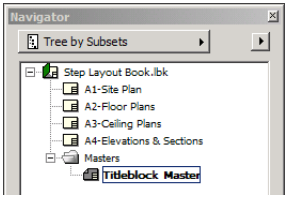


- Repeat these steps to create three additional sheets:

  A2-Floor Plans

  A3-Ceiling Plans

  A4-Elevations & Sections



Step 24: Placing, Positioning and Viewing Drawings

Overview

In this exercise we will add drawings to the layout sheets we created in the previous step. When drawings are added to a PlotMaker layout, the drawings are composed on the layout sheet and are linked to the ArchiCAD model. Any updates and changes to the model will automatically be reflected in the PlotMaker drawing.

Process to Learn

- Linking to ArchiCAD Project
- Composing a Drawing
- Drawing Frame
- Adding Drawing Information
  - Drawing Title
  - Drawing Scale

Starting the Step

Use your file from the previous step or open the file named *Step-24.lbk* contained in the *Step Files* folder.

Introduction

A Drawing is imported and placed on Layouts with its corresponding screen image or as an empty frame. Then, if needed, the Drawing can be edited in the Drawing Window. **A hotlink exists between the imported file and the placed Drawing**. Every time you open or rebuild the Layout, the hotlinks are updated.

PlotMaker supports multiple file formats, so drawings can be added to a Layout Book from any of the following file types:

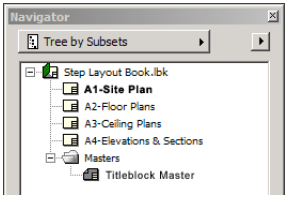
- **PlotMaker Formats**
  - Supports PlotMaker Drawings, Layouts and Layout Book file types.
- **ArchiCAD Formats**
  - Supports ArchiCAD Solo Project, Archive and Backup file types. View sets belonging to an existing ArchiCAD file are recreated in PlotMaker's Navigator palette.
- **Drawing Type Formats**
  - Supports image formats such as JPG, GIF, BMP, PICT and PSD.
- **Linked Drawing Object Formats**
  - Supports OLE (Object Linking and Embedding) Objects coming from any OLE enabled application. OLE applications include Microsoft Excel, Microsoft Word, CorelDraw and Photoshop.
- **HPGL Format**
  - Supports PLT, the industry standard plot file type.

What to Do

1. Set the Layout to A1-Site Plan

P-6, S-24, M-A, 1-2

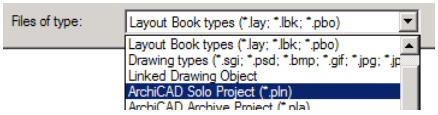
Before we add drawings to a layout, we must activate that layout. To do this, **double-click** the A1-Site Plan layout in the Navigator so that it displays as bold.

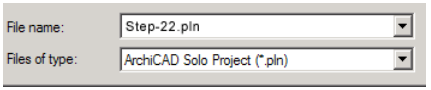


2. Add Drawings to the Layouts

To place a Drawing onto a Layout, use the Import command. This will allow you to add drawings from the ArchiCAD model you created.

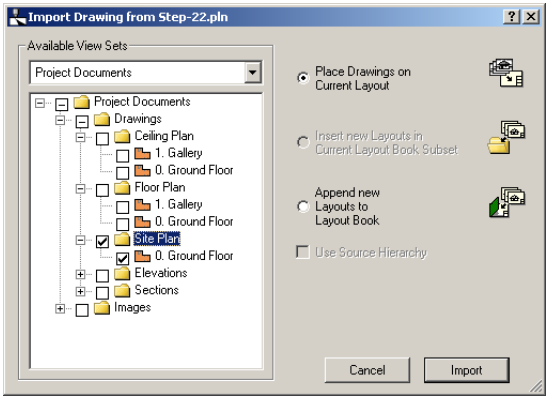
- Select Import from the File menu.
- Select "**ArchiCAD Solo Project**" from the Files of Type popup menu in the Add dialog.
- Select the ArchiCAD file you saved to your computer from Step 22 **or** select the file named ***Step-22.pln*** contained in the *Step Files* folder. Click the **Open** button.





The **Import Drawing** dialog will appear displaying the Project Documents view set we created in the previous steps. We will use this dialog to selectively add drawings to the layout. Let's start with the A1-Site Plan Layout.

- Click the "Place Drawings on Current Layout".
- Check the **Site Plan** and the **Ground Floor** within the Available View Sets.
- Click the **Import** button.



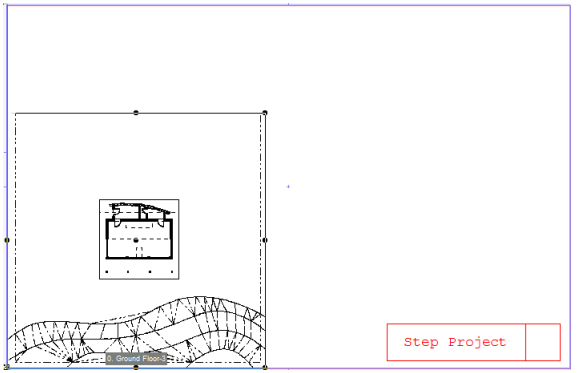
3. Place and Position the Drawings on the Layout

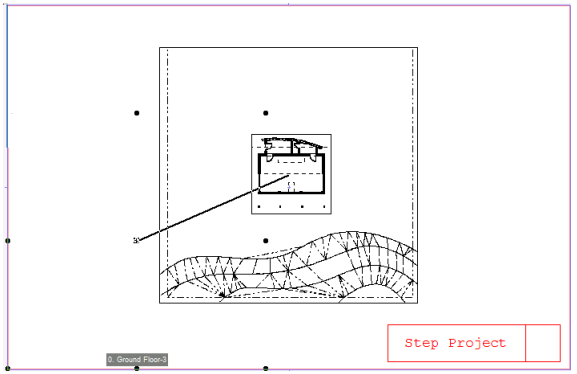
After you click the Import button, PlotMaker will place the drawing at the lower left corner of the sheet.

P-6, S-23, M-A, 2-3

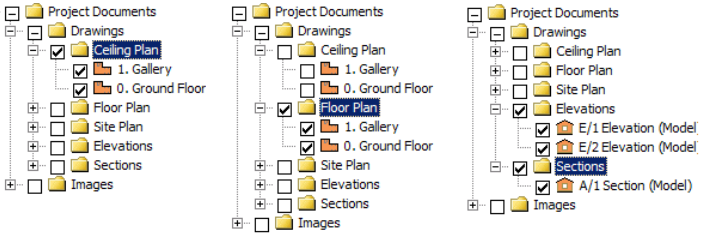
At this point you can select the drawing and compose it.

- Select the **Arrow** Tool from the **Toolbox**.
- Click the corner of the placed drawing to highlight it
- Select **Drag** from the **Edit** menu.
- Click within the drawing and drag to locate the drawing on the sheet.





The next step is to place and position the drawings for the remaining layouts. To do this, repeat the above steps to complete this process for A2-Floor Plans, A3-Ceiling Plans and A4-Elevations & Sections.



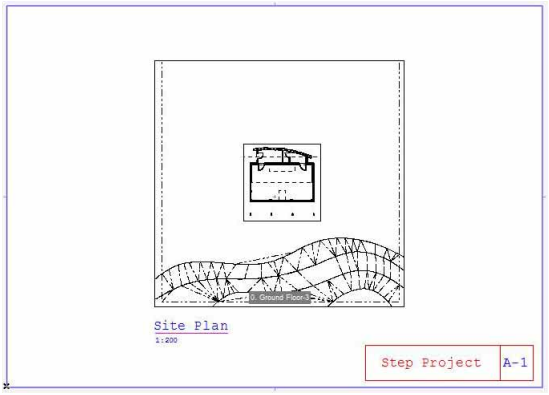
4. Add Drawing Title and Scale

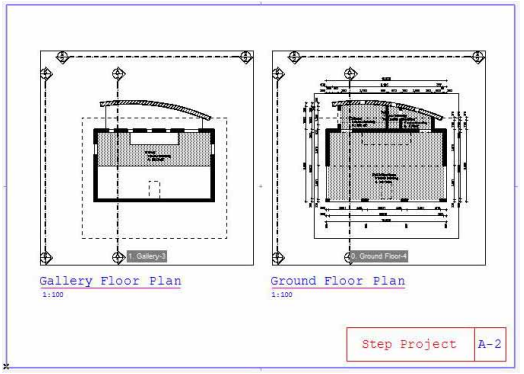
To finish the layouts we need to add a drawing title and scale as well as a sheet number.

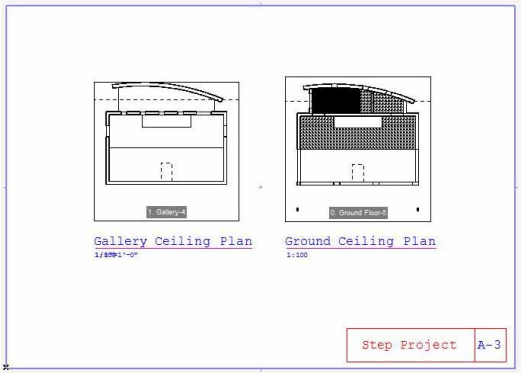
- Select and open the Text Tool in the Toolbox.
- In the Text Settings dialog set the text size to 18 point (6mm) and click **OK**.
- Double click the cursor where you would like the title to begin.
- When the flashing cursor appears, begin typing the drawing title.

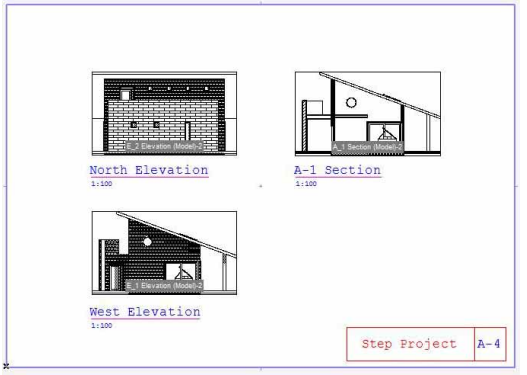
Repeat the above steps for each of the drawing titles in each of the layouts. Use the same steps to create the scale text, but set the font size to 12 point (4mm).

You may also wish to select the Line Tool to draw a line between the title and scale. The finished layouts should look as follows:









Step 25: Publishing, Printing and Plotting

Overview

Both ArchiCAD and PlotMaker contain a Publisher feature. The purpose of the Publisher is to set custom View Sets describing how to publish a drawing using plotters, printers, AutoCAD, DXF files and the Internet.

The Publisher can process individual drawings or an entire set of documents.

Process to Learn

- Creating View Sets
- Publishing
  - Save as Files
  - Upload to Internet
  - Print
  - Plot
- Working with AutoCAD

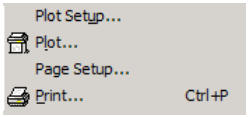
Starting the Step

Use your file from the previous step or open the file named *Step-25.lbk* contained in the *Step Files* folder.

Introduction

PlotMaker uses the **Publisher function** familiar from ArchiCAD. Part or all of a Layout Book can be printed, plotted, saved, or published to the Internet. The Publisher command is found in the File menu. The left side of the Publisher dialog box shows the **Layout Book tree structure**, while the right side contains the **Publisher settings** (as in ArchiCAD).

The save options used by PlotMaker are generally recognized by ArchiCAD (EPS, DXF, DWG, DWF). PlotMaker supports all the popular **raster plotters** and **laser printers** through specific drivers and settings.



PlotMaker uses a new printing/plotting method in which the Layout size (represented by the blue frame), optimized for a particular printing/plotting tool and paper size, can differ from the actual output produced by the printer or plotter. This means that **you can change the print scale**. For example, a Layout Book optimized for a plotter using A1 paper can also be printed, properly scaled down, on an A3 printer.

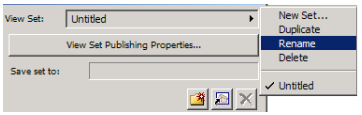
What to Do

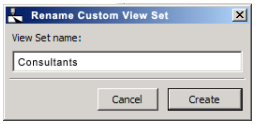
1. Create View Sets for Publishing

The Publisher function within PlotMaker is used to set custom View Sets describing how to publish a drawing (i.e. for a client, a consultant, or a presentation). In this exercise we will create View Sets with custom settings for publishing to the client, the consultants, printing and plotting.

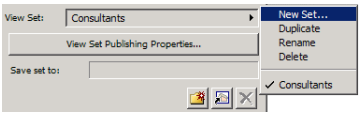
P-6, S-25, M-A

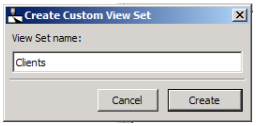
- Go to the **File** menu and select the **Publish** option from Publisher within the pull-down menu and click the "Untitled" View Set and select **Rename** from the popup menu.
- Rename the View Set as **"Consultants"** and click **OK**.





- Now click the "Consultants" View Set and select New Set from the popup menu and Enter **"Client"** as the name for the new View Set.
- Repeat this step and create 2 additional View Sets and name them as follows: **"Printer"** and **"Plotter"**



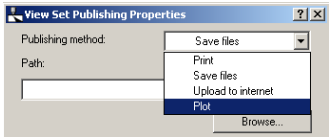


2. Assign Drawings to the View Sets

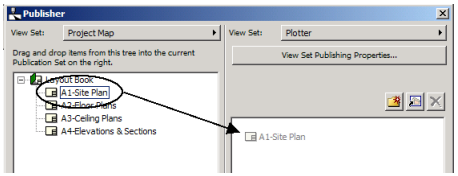
The purpose of Publisher View Sets is to create and save settings for different publishing configurations. In this exercise we will assign drawings to the View Sets created in the previous exercise.

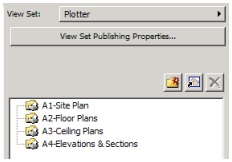
P-6, S-25, M-B

- **Configure the Plotter Publisher View Set:** The settings for a plotter can be saved with the drawing.
- Select the **Plotter** view set from the View Set popup menu.
- Click the **View Set Publishing Properties** button.
- Select **Plot** from the Publishing Method popup menu and click the **OK** button.



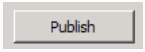
- Select and drag the "A1-Site Plan" from the Layout Book window on the left side of the dialog to the window on the right side.
- Repeat this step for the remaining layouts: A2-Floor Plan, A3-Ceiling Plan and A4-Elevations & Sections.





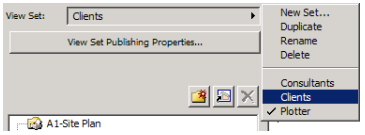
- Click and highlight the A1-Site Plan. Click the **Plot Setup...** and **Plot Settings...** buttons to configure your plotter. Repeat this for the remaining drawings.

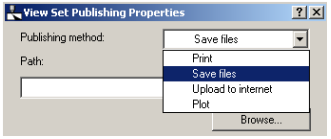
When you ready to Plot, simply select the **Plotter** View Set and click the **Publish** button.



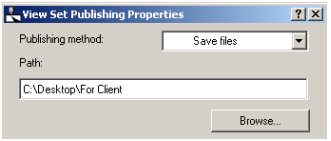
- **Configure the Printer Publisher View Set:** The settings and setup for printing documents is similar to the previous steps for plotter setup.
- **Configure the Client Publisher View Set:** Publishing for a client can produce a variety of results from presentation drawings to visualization to documents for the Internet. For the purpose of this exercise, we will publish drawings and images to be viewed with an Internet browser such as Netscape or Internet Explorer.

- Select the **Client** view set from the View Set popup menu
- Click the **View Set Publishing Properties...** button
- Select **Save Files** from the Publishing Method popup menu (this exercise could also use the Upload to Internet option if we linked these documents to a web page).

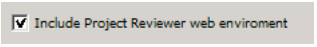




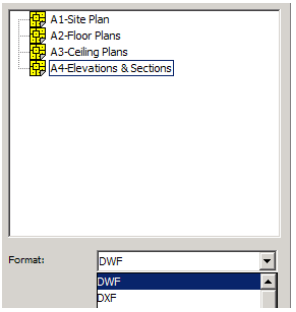
- Click the Browse button, navigate to your computer's Desktop and click the **Make New Folder** button. Type a folder name called "For Client".
- Select the new folder and click **OK**.



- Click the option **"Include Project Reviewer web environment"**. This will allow the client to access the documents and create markups through a web browser.
- Click OK.



- As you did previously, select and drag "A1-Site Plan" from the Layout Book window on the left side of the dialog to the window on the right side.
- Repeat this step for the remaining layouts; A2-Floor Plan, A3-Ceiling Plan and A4-Elevations & Sections.
- Select each file and click the Format popup menu at the bottom of the dialog.
- Scroll up and select the DWF format.



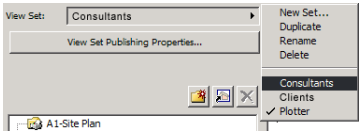
When you are ready to send these documents to your client, select the **Client** View Set and click the **Publish** button. You

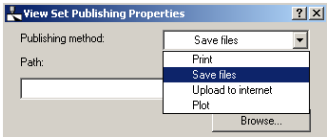
can then attach the documents to an email or burn the information onto a CD-ROM.

To view these documents, go to the folder you created on your Desktop, "For Client," and double click the file **"Client.html."** This file will open your default browser.

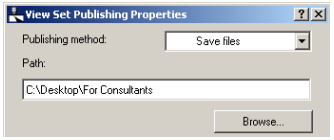
- **Configure the Consultants Publisher View Set:** When you set the configuration for a consultant, the view set can be saved with the consultant's file type defaults such as AutoCAD DWG, Universal DXF or Microstation DGN.

- Select the **Consultants** view set from the View Set popup menu.
- Click the **View Set Publishing Properties...** button.
- Select **Save Files** from the Publishing Method popup menu (this exercise could also use the Upload to Internet option if we wanted to upload the files to an FTP site).

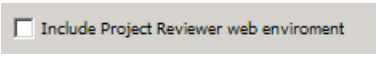




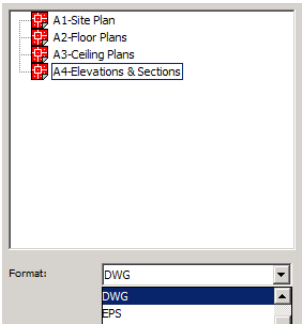
- Click the Browse button, navigate to your computer's Desktop and click the **Make New Folder** button. Type a folder name called "For Consultants".
- Select the new folder and click OK.



- Since these documents will be published as AutoCAD DWG files, we do not need to include the Project Reviewer. Therefore, the "Include Project Reviewer web environment" should be unchecked.
- Click **OK**.



- As you did previously, select and drag "A1-Site Plan" from the Layout Book window on the left side of the dialog to the window on the right side.
- Repeat this step for the remaining layouts; A2-Floor Plan, A3-Ceiling Plan and A4-Elevations & Sections.
- Select each file and click the Format popup menu at the bottom of the dialog.
- Scroll up and select the DWG format.
- You can set the AutoCAD translation defaults (i.e. version, units, paper space/model space) by clicking the **Options** button.



When you are ready to send these documents to your client, select the **Consultant** View Set and click the **Publish** button. You can then attach the documents to an email or burn the information onto a CD-ROM.

Part Seven: Detailing, Management and Archiving

Step 26: Detailing a Project

Overview

As a project grows into design development or construction documents, detailing is the next step in communicating the building construction. ArchiCAD includes a Detail Tool that allows details to be linked to the virtual building model.

In this exercise we will locate detail markers on the plan and sections. We will then activate the new details from the Navigator and add notes and information in the Detail Window.

Process to Learn

- Detail Tool
  - Selecting a Detail Marker
  - Placing a Detail
- Creating a Plan Detail
- Adding a Detail View Set
- Detail Views in the Navigator

Starting the Step

Open the file named *Step-26.pln* contained in the *Step Files* folder.

Introduction

The Detail tool places **parametric Detail Markers** on floor plans, sections and elevations.

These markers are **linked to Detail Drawings**, just like Section/Elevation markers to their associated drawings. Currently opened Detail Drawings are available from the Window menu while all existing Details are accessible from Project Navigator. They are publishable items.

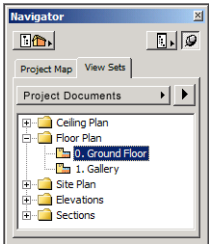
The Detail Drawing consists of drawing primitives (i.e. lines and fills), similar to Sections and Elevations. The user can add dimensions and 2D elements. As in the case of a Section Drawing, the drawing scale of the Detail Drawing can be set independently of the scale of the Floor Plan.

Detail Drawings can either be generated from details of the floor plan, sections and elevations, model based Detail Drawings or Plain Drawings. The content of the Detail Drawing can be generated by using the clipping polygon surrounding the Detail Marker on the floor plan or section. Regeneration does not occur automatically. Similarly to drawing Sections, Detail Drawings can be regenerated by using the appropriate **Display** menu commands.

What to Do

1. Set the View Set to "Floor Plan" using the Navigator

To set the View Set to the Floor Plan, click the View Sets tab in the Navigator palette and double-click the "Ground Floor" in the Floor Plan view set:

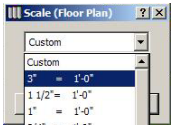


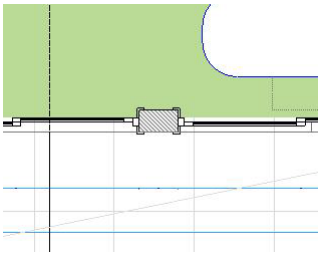
2. Edit the Scale and Zoom In to the Detail

Since this is a detail view, we need to change the scale and zoom into the detail area of the floor plan.

P-7, S-26, M-A, 2-3

- Click the scale button at the bottom left of the Floor Plan Window or Floor Plan Scale from the Options menu.
- Change the scale to 3"=1'-0" (1:5 mm).
- The view will change due to the scale change. Go to the Display menu and select Fit in Window.
- Now select **Zoom In** from the Display menu and zoom to the detail connection between the two sliding doors.





Hint: Notice that the detail of the door jamb has changed to include trim around the door openings.

3. Edit the Layers in the Layer Settings Dialog

The layers are showing information that we do not wish to include in a detail drawing. To change this information we must edit the layers:

- Go to the **Options** menu and Layers. Select the Layer Settings option.

- Scroll through the Layers, select the layer names and click the Hide or Show button as follows:

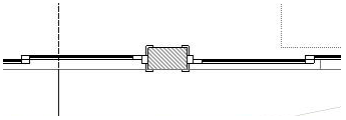
Hide these Layers:

- Furniture & Equipment
- Zones

Show these Layers:

- Fills
- Lines

- When finished, click **OK**.

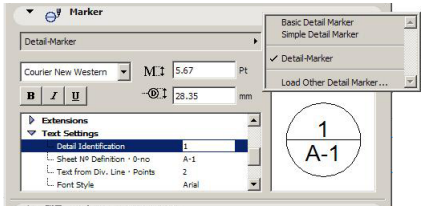


4. Define and Place the Detail Marker

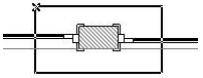
We are now ready to define the detail location and marker on the floor plan. To do this we will use the Detail Tool from the Toolbox.

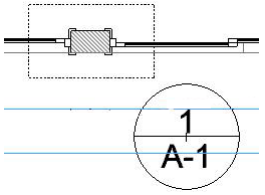
P-7, S-26, M-B, 4-5

- Select and double-click the Detail Tool in the Toolbox to open the Detail Settings dialog.
- Select the **Detail Marker** symbol from the popup menu as shown below and click **OK**.



- Select the rectangle geometry method from the Info Box.
- Drag your cursor to the area you wish to detail. Click the cursor once to begin drawing the rectangle and a second time to finish.
- A hammer will appear. Click the hammer to locate the center of the Detail Marker.

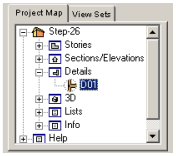


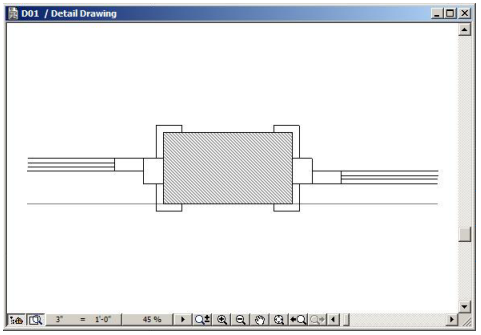


5. Open the Plan Detail from the Navigator

When a detail marker is placed on the floor plan using the Detail Tool, a Detail is automatically generated in the **Navigator** palette.

- Go to the Navigator palette and click the Project Map tab.
- Click the **Details** name to open the tree list. A new detail will appear in the list called **"D01".**
- **Double-click** the "D01" detail to open the detail window.





6. Add Detail Information to the Detail

The Detail Window consists of drawing primitives (i.e. lines and fills) that can be edited to create a final detail. The user

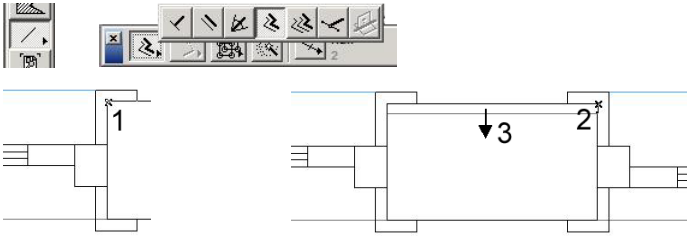
can add dimensions and 2D elements to the detail, similar to a Section/Elevation drawing.

P-7, S-26, M-C, 6-7

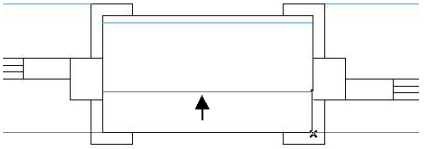
- With the Detail Window active, select the **Line** Tool and draw a line on both sides of the door to indicate the inside line of the threshold. (Hold down the shift key to constrain the line).

- Select the **Arrow** tool and select the fill pattern inside the wall so that its four corners are highlighted.
- Delete the fill pattern by selecting the on the keyboard. We can now add structural detail to the inside of the wall.

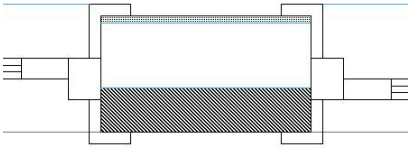
- Select the **Line** Tool.
- Select the Offset command from the popup menu in the Control Box.
- Click the upper left side of the wall (point no. 1) and then click the upper right side of the wall (point no. 2) as shown.
- Now offset a line to represent the edge of the 5/8" (25mm) Gypsum Board. Drag the cursor down in the direction to offset (no 3) and enter a 5/8" (25mm) dimension in the "R" portion of the Coordinate Box. To confirm, select the Enter key (Windows) or Return key (Mac).



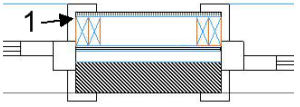
- Repeat the last step and offset a line on the opposite side of the wall to represent the edge of the face brick. Use 3 1/2" (100mm) for the offset dimension.



- Now add a fill pattern to graphically show these components. Open the Fill Tool and select Gypsum Board.
- Select the Magic Wand and click inside the area defining the Gypsum Board. (You can also manually click the cursor at each point to manually define the fill shape).
- Repeat the above step to select and place the Face Brick fill pattern.

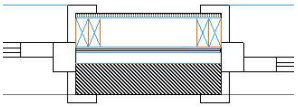


- Next, add some structural components to the wall. Select and open the **Object** Tool.
- Draw the following details into the window with the Line tool.



- Select the upper left insertion point and click **OK**.

- Click your cursor in the bottom left corner of the gypsum board (point no 1).
- Repeat this step for the opposite side of the wall.
- Finally, add 1/2" (20mm) plywood sheathing to the inside of the 2x4 studs. Select the **Line** Tool and draw a line as shown.
- Then offset the line and add a plywood fill as you did in the previous steps.

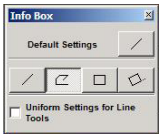


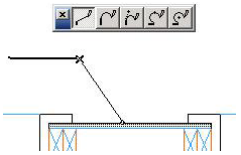
7. Add Notes to the Detail

Now that the detail drawing is completed, we need to add notes to communicate the information in the detail.

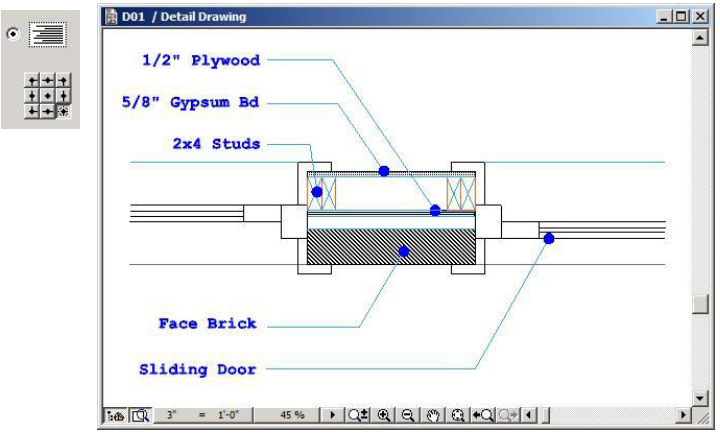
- Open the **Line** Tool.
- Select the Arrow at Start Point option and click the popup button to select the Dot Arrow option. Click **OK**.

- Select the continuous line option from the Info Box.
- Click the start point, click the point where the leader starts, and double-click the final point to finish the line.





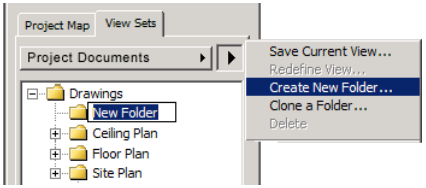
- Open the **Text** Tool, select the bottom right text start point and select the right justify button. Click OK.
- Double-click the cursor next to the end of the note leader. A text cursor will begin to flash. Type in 5/8" Gypsum Board.
- Repeat this step for the remaining leaders and notes.



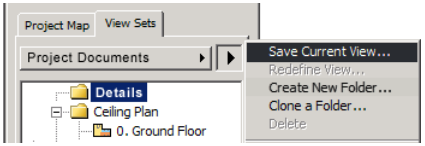
8. Add the Detail to the Project Documents View Set

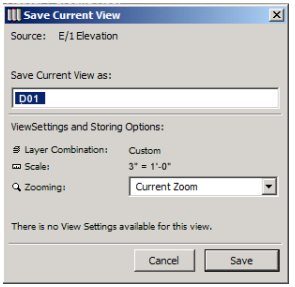
Finally, add the **D01 Detail** to the Project Documents View Set. This will allow us to access the detail as a drawing in PlotMaker.

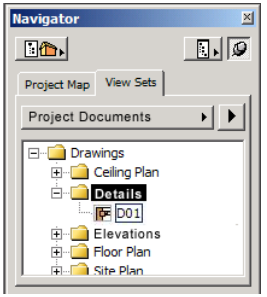
To do this, click the View Sets tab in the Navigator palette, select the Drawings folder so that it is highlighted and choose **Create New Folder** from the popup menu. Name the new folder "**Details**". This is where our project details will be stored. If you want to move the Details folder so that it is organized alphabetically, click to highlight the folder, then drag it to the desired location.



With the detail folder selected, choose "Save Current View" from the popup menu. Use the defaults and click "**Save**".







Step 27: Reviewing a Project

Overview

This exercise will demonstrate how to use the ***Mark-Up Tools*** *command to enter commentary both visually and in words on an existing ArchiCAD Virtual Building design.*

Mark-Up Tools are intended to facilitate communication among project members and designers during a project.

Process to Learn

- Mark-Up Tools
- Adding a Markup Entry
- Highlighting a Correction
- Creating a Discussion
- Correcting a Markup
- Closing an Issue

Starting the Step

Open the file named *Step-27.pln* in the *Step Files* folder.

Introduction

You may wish to mark up a design for many reasons - for example, to correct and manage a colleague's errors or deviations from a project's guidelines, or to make alternative design suggestions. More than one person can mark up a drawing.

Project Mark-Up supports several different commentaries by allowing the use of different colors and highlights for each separate issue.

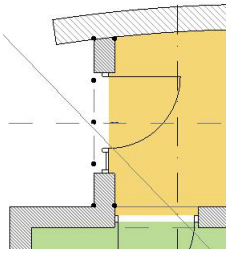
What to Do

1. Create a Mark-Up Entry

The Mark-Up Tools can be used to redline an area that needs to be changed or to highlight an element.

P-7, S-27, M-A,1-3

- Zoom into the upper left corner of the building.
- Select the **Arrow** Tool and highlight the entry wall by clicking one of the corners.



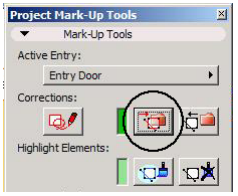
- With the wall highlighted, go to the **File** menu and select **Show Mark-Up Tools** from the pull down menu.

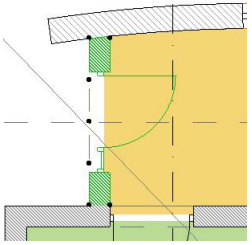
- Click the **Add Entry button** in the Mark-Up Entries section of the Mark-Up Tools dialog.

- In the text field of the New Markup Entry dialog, type in the name "**Entry Door**".

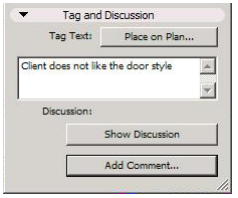
The entry door needs a new door style, so we need to highlight the entry wall as an element that needs to be corrected.

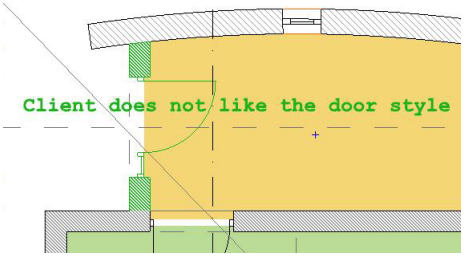
- With the entry wall highlighted, click the **Turn into Corrections** button. This will change the color and status of the wall.





- Click and open the **Tag and Discussion** section at the bottom of the Mark-Up Tools dialog.
- Type in "Client does not like the door style" in the text box
- Click "Place on Plan" and click the cursor at the center of the door to place the note.

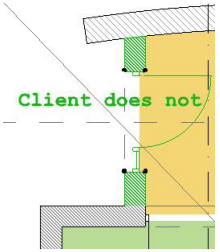


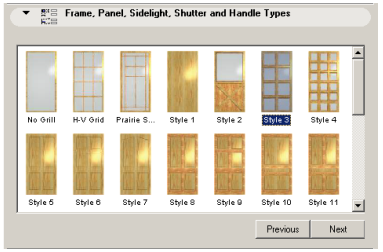


2. Correct the Mark-Up Entry

The purpose of mark-ups is to identify elements of the project that need correction. Project elements can be corrected while the mark-up is still active.

- Select the **Arrow** Tool and highlight the door by clicking one of the corners.
- With the door highlighted, double-click the **Door** Tool and change the door style to Style 3 within the Panel, Sidelight, Shutter and Handle Types section of the dialog.

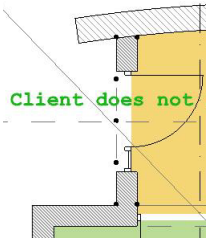


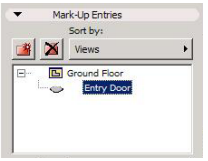


3. Close the Mark-Up Entry

When a Mark-Up Entry is corrected, the mark-up highlight and notes can be turned off while retaining the history of the issue.

- Select the **Arrow** Tool and highlight the entry wall by clicking one of the corners.
- Go to the **Mark-Up** Tools dialog and click the **Remove Corrections** button. This will restore the wall to its original pen color and line weight.
- Finally, turn this issue OFF by clicking the Eye icon to closed next to the Entry Door mark-up entry.





Step 28: Managing a Teamwork Project

Overview

Step 28 demonstrates how team members can access a shared model file. ***Teamwork*** *commands allow a team member to sign out specific layers from the model while retaining a reference to other parts of the project.*

When changes are made, the model is updated by sending changes to the master model.

> ***Note:*** *If you only have a demo version of ArchiCAD, you will not be able to do this exercise as described here, because the demo version does not contain Teamwork functionality.*

Process to Learn

- Rules of Team Members
- Sharing a Project
  - Signing In to a Project
  - Sending and Receiving Changes
  - Project Sharing Info
- Signing Out of a Project
- Types of TeamWork Files
- Changing Workspace

Starting the Step

Open the file named *Step-28.pln* contained in the *Step Files* folder.

Introduction

There are five possible roles in ArchiCAD for Teamwork:

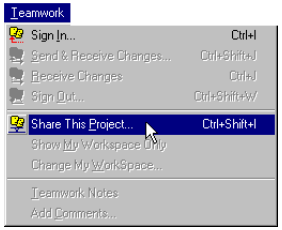
- **Administrator**: The person who coordinates the team and first shares the project. There can only be one Administrator. When signed in as the Administrator, it is not possible to work on the project or reserve areas.
- **Team Leader**: The person responsible for the project. They can modify and create layers, stories, pens, units, etc. Only one person can be signed in as Team Leader at any one time.
- **Teammate**: Any team member working on any part of the shared project.
- **Mark-Up**: If you intend to solely mark up the project, an additional option is available to provide you work in Mark Up Only mode. In this case your contribution will be limited to drawing corrections and highlight elements.
- **Viewer**: Anyone able to access the shared project through the network, but their modifications do not appear in the Team Project.

What to Do

1. Sharing the Project

P-7, S-28, M-A, 1-3

When you have finished making the necessary preparations, you can share the project with the other members of the team.



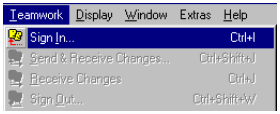
- **Create Administrator and Team Leader**: With the ArchiCAD tutorial file open, choose **Share This Project** from the **Teamwork** Menu. Click on **Set Key Passwords**. Enter the Administrator Name and then click on **Set Administrator Password** and enter a password. You will be required to verify the password. Now click **Set Team Leader Password** and repeat the same steps. Now click **OK** in the **Set Key Passwords** dialog.

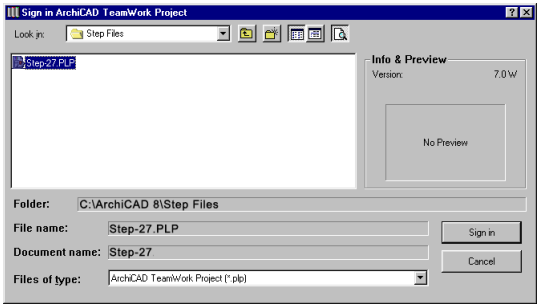
- **Share the Project**: In the **Project Sharing Setup,** click **Share**. Enter the required password. You are prompted to save the .PLP file. Save the file in the appropriate location. This is the Team Project file. The project can now be signed into.

2. Signing into a Project

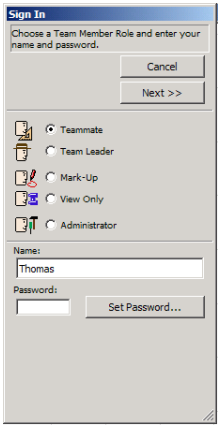
Once the project has been shared, teammates can start signing in to it. Access to the project can either be free (depending on the current network access privileges) or restricted by the Administrator. In the latter case, only users identified by name and an optional password are allowed to participate in the work.

- **Sign In**: Go to the ArchiCAD Menu and select **Teamwork/Sign In**. Select the .PLP project file in the dialog.





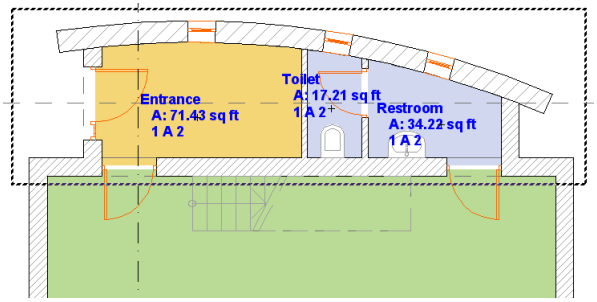
The **Sign In** dialog box appears. Select **Teammate**, and enter a name and password. Click **Set Password**. The first time you sign in, a prompt box asking you whether you want to register as a Team Member will appear. Click on **Yes**.

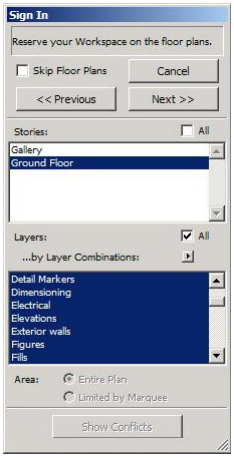


3. Reserving a Workspace

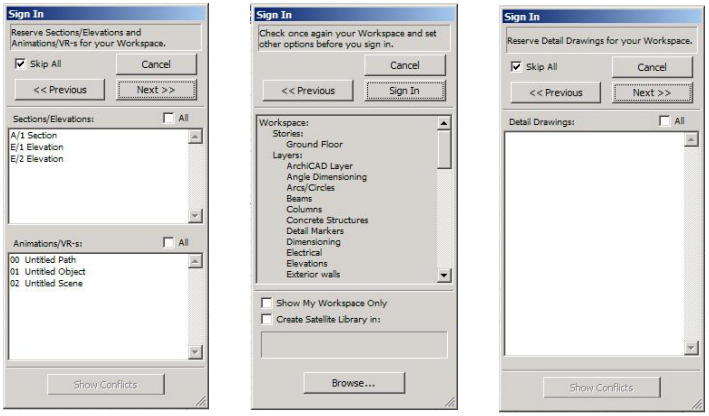
After signing in to a Teamwork project, the **Sign In Wizard** offers a set of options for reserving a part of the shared project.

- **Reserve Floor Plans**: Click on the **Next** button to go to the first option dialog box. Select the Stories and Layers you wish to reserve. If you wish to reserve just part of the project floor plan, click the **Marquee** Tool and select an area of the Floor Plan. You will have exclusive rights to the layers and marquee area that you reserve.





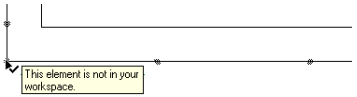
- **Reserve Sections/Elevations and Animation/VRs**: Click on the **Next** button to go to the **Sections/ Elevations** and **Animation/VR**s dialog box. Select the appropriate parts to access.
- **Review the Selected Workspace**: Click on the **Next** button to go to the last option dialog box. This box displays a summary of the selected options that you can review before signing in. Make any changes required by clicking on the **Previous** button. When you are certain of the Workspace options, click **Sign In**.



4. Working within a Reserved Workspace

Elements inside the reserved area can be freely modified or deleted by the teammate who has made the reservations.

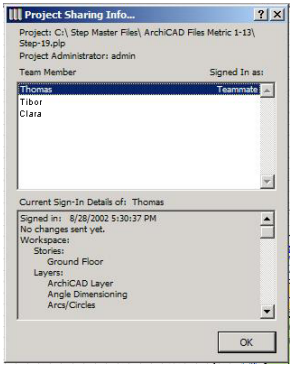
Elements that are locked, reserved by others or not reserved at all cannot be modified, but can be viewed in all windows (Floor Plan, 3D Window, Sections/Elevations, lists). These elements can be selected, their settings dialog boxes can be viewed, their parameters can be copied from there or picked up by Option/Alt-clicking the element.



5. Sharing Info

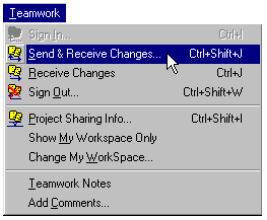
During the course of being signed into a project, the status of Team Members' access details and status can be easily checked.

- **Check Project Sharing Info**: Go to the **Teamwork** Menu and select **Project Sharing Info**. A window appears that shows a list of Team Members and their sign-in status. Select a Team Member to view their sign-in details.



6. Sending and Receiving Changes

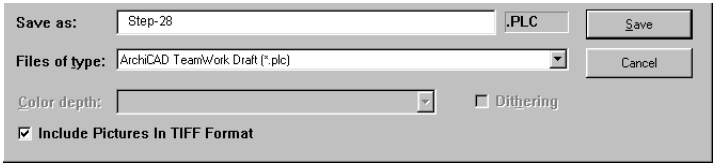
Changes made by any team member are sent to the shared Team Project by choosing the **Send and Receive Changes** command from the **Teamwork** Menu, or (optionally) when signing out. Changes sent to the Team Project do not appear automatically in other teammates' copies. To see changes made by another teammate, choose **Receive Changes**.



7. Working on a Local Copy

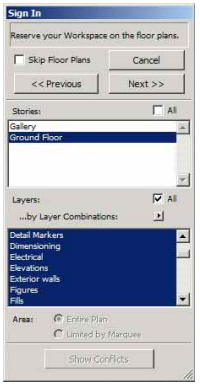
Some team members may need to work at home or in a remote location. In this case, the solution is to make a local draft copy of the Shared Project, preserving the sign-in reservations made.

- **Creating a Local Copy**: To create a local draft copy of the Shared Project, choose the **Save as...** command from the **File** Menu. The created file can be opened similarly to a Solo Project by choosing **File/Open** and the **Draft** option or by double-clicking the file. This file contains all the relevant data about the Team Project, including the reservations made by the Teammate.



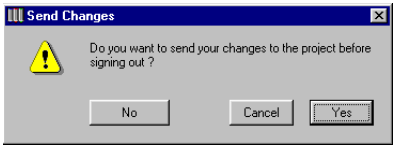
8. Change My Workspace

If a teammate needs access to a layer or area you have reserved, you can change your workspace by selecting **Change My Workspace** from the **Teamwork** Menu. When the dialog appears, you may select new layers or release currently selected layers for other team members.



9. Signing Out of a Project

Choosing this command breaks contact with the Team Project and releases your reserved workspace for other teammates who may wish to sign into it. If you have made any changes, you are prompted to send them in. If you choose **No** in this dialog box, your changes will be lost.



Step 29: Archiving a Project

Overview

At the end of a project it is important to archive your project model and its associated library. To do this, ArchiCAD offers an archive feature that embeds the library parts into a single model file.

> ***Note:*** *If you only have a demo version of ArchiCAD, you will not be able to do this exercise as described here, because saving files is not available in the demo version.*

Process to Learn

- What is an Archive?
- Archive
  - Saving an Archive
  - Open an Archive
- Archive Library
  - Using an Archive File as a Library
  - Creating an Archive Library
  - Selecting a Library

Starting the Step

Open the file named *Step-29.pln* contained in the *Step Files* folder.

Introduction

ArchiCAD Projects may refer to a number of items called *Library Parts*, stored as outside files in *Library* folders or directories. You need to designate one or more active libraries when starting a project. If you then open the project in another environment (for example on a different computer), these outside files may be missing.

If you want to ensure that all files referenced in the project are included, you should use the **Save As.../ArchiCAD Archive Project...** command. Documents saved as Archives are stored together with all the *Library Parts* and properties contained by and defined with the project.

This format is commonly used for saving backups, archives and portable documents of your work.

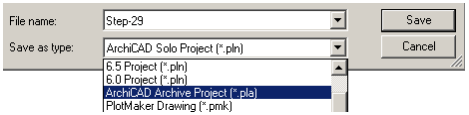
What to Do

1. Saving as an Archive File

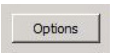
P-7, S-29, M-A

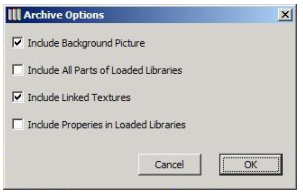
If you are ready to save an Archive of your project, go to the **File** Menu select **Save As..**

- In the Save As Type popup menu, select the **ArchiCAD Archive Project** option. The file will be saved with a .PLA extension.



- Click the **Options** button. This dialog provides Archive Options that allow you to customize how the file is saved and what is saved with the file.
- Use the defaults and click **OK**.
- Choose a location on your computer for the Archive file and click the **Save** button.

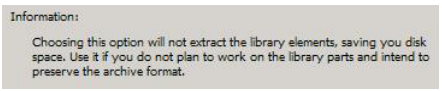




2. Opening an Archive File

When you open an Archive type document using the Project format in the Open dialog box, you can choose from several Active Library Usage options. The archive library contains all the items and properties used with the project, but none other.

- Choose the **Open...** option from the File menu
- Select and Open the Archive file you created
- An Active Library Usage dialog box will appear with several options. Choose the first option, **"Read Elements Directly from Archive".** This option will not extract the library embedded in the archive file but instead will preserve the archive format.



If you should need to extract the archive library or need to reference a different library, select one of the other two options; "Extract elements to a new folder" or "Select a library".