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Autodesk® Revit® 2022 Fundamentals for Architecture

Learning Guide

Metric Units - 1st Edition

AUTODESK
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ASCENT - Center for Technical Knowledge®
Autodesk® Revit® 2022
Fundamentals for Architecture

Metric Units - 1st Edition

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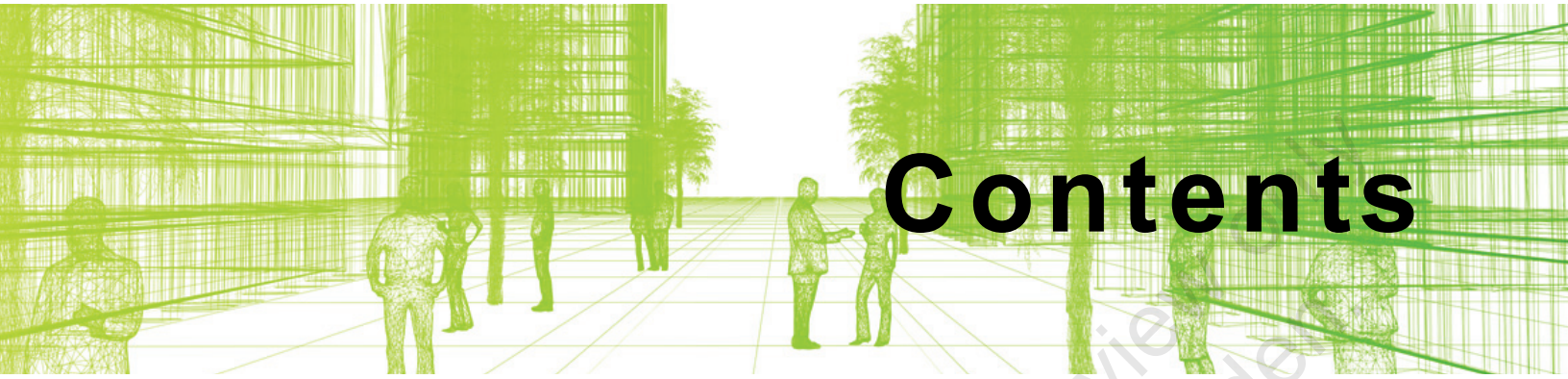

Contents

Construction Documents Phase

Preface

The Autodesk® Revit® software is a powerful Building Information Modeling (BIM) program that works the way architects think. The program streamlines the design process through the use of a central 3D model, where changes made in one view update across all views and on the printable sheets.

The objective of the *Autodesk® Revit® 2022: Fundamentals for Architecture* guide is to enable you to create a full 3D architectural project model, including walls, doors, windows, components, floors, ceilings, roofs, and stairs, using the basic tools that the majority of architectural users need. This includes how to navigate the user interface and use the basic drawing, editing, and viewing tools.The final part of the course focuses on creating construction documents.

Topics Covered

- Understanding the purpose of BIM and how it is applied in the Autodesk Revit software.
- Navigating the Autodesk Revit workspace and interface.
- Working with the basic sketching and modifying tools.
- Review Revit file worksharing, terminology, and workflow.
- Linking CAD and Revit files as the basis of a project.
- Creating Levels and Grids as datum elements for the model.
- Creating a 3D building model with walls, curtain walls, windows, and doors.
- Adding component features, such as furniture and equipment.
- Adding floors, ceilings, and roofs to the building model.
- Modeling stairs, railings, and ramps.
- Setting up sheets for plotting with text, dimensions, details, tags, and schedules.
- Creating details.

Prerequisites

- Access to the 2022.0 version of the software, to ensure compatibility with this guide. Future software updates that are released by Autodesk may include changes that are not reflected in this guide. The practices and files included with this guide might not be compatible with prior versions (e.g., 2021).
- An understanding of architectural terminology is an asset.

Note on Software Setup

This guide assumes a standard installation of the software using the default preferences during installation. Lectures and practices use the standard software templates and default options for the Content Libraries.

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Note: Free products are subject to the terms and conditions of the end-user license and services agreement that accompanies the software. The software is for personal use for education purposes and is not intended for classroom or lab use.

Lead Contributor: Cherisse Biddulph

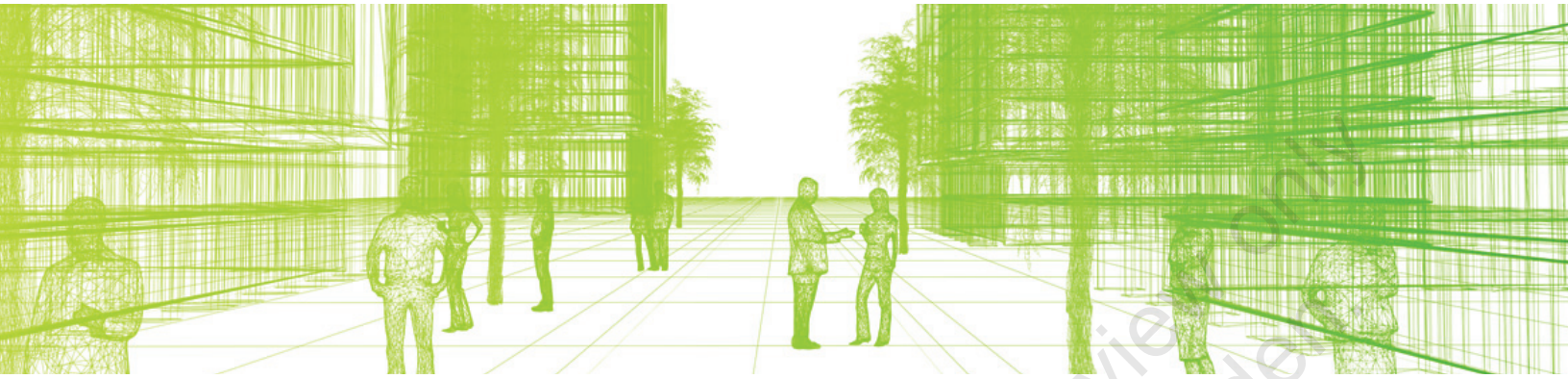
Cherisse is an Autodesk Certified Professional for Revit as well as an Autodesk Certified Instructor. She brings over 19 years of industry, teaching, and technical support experience to her role as a Learning Content Developer with ASCENT. With a passion for design and architecture, she received her Associates of Applied Science in Drafting and Design and has worked in the industry assisting firms with their CAD management and software implementation needs as they modernize to a Building Information Modeling (BIM) design environment. Although her main passion is the Revit design product, she is also proficient in AutoCAD, Autodesk BIM 360, and Autodesk Navisworks. Today, Cherisse continues to expand her knowledge in the ever-evolving AEC industry and the software used to support it.

Cherisse Biddulph has been the Lead Contributor for *Autodesk Revit: Fundamentals for Architecture* since 2020.

In This Guide

The following highlights the key features of this guide.

Feature	Description
Practice Files	The Practice Files page includes a link to the practice files and instructions on how to download and install them. The practice files are required to complete the practices in this guide.
Chapters	A chapter consists of the following - Learning Objectives, Instructional Content, Practices, Chapter Review Questions, and Command Summary. • **Learning Objectives** define the skills you can acquire by learning the content provided in the chapter. • **Instructional Content**, which begins right after Learning Objectives, refers to the descriptive and procedural information related to various topics. Each main topic introduces a product feature, discusses various aspects of that feature, and provides step-by-step procedures on how to use that feature. Where relevant, examples, figures, helpful hints, and notes are provided. • **Practice** for a topic follows the instructional content. Practices enable you to use the software to perform a hands-on review of a topic. It is required that you download the practice files (using the link found on the Practice Files page) prior to starting the first practice. • **Chapter Review Questions**, located close to the end of a chapter, enable you to test your knowledge of the key concepts discussed in the chapter. • **Command Summary** concludes a chapter. It contains a list of the software commands that are used throughout the chapter and provides information on where the command can be found in the software.
Appendices	Appendices provide additional information to the main course content. It could be in the form of instructional content, practices, tables, projects, or skills assessment.



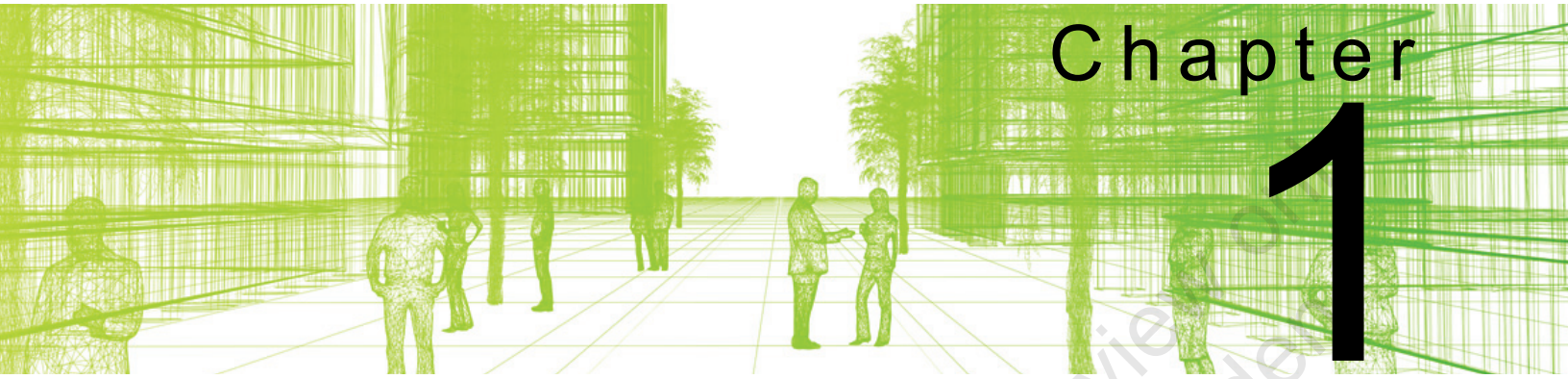
Introduction to BIM and Autodesk Revit

This guide is divided into three sections: Introduction to BIM and Autodesk Revit, Design Development Phase, and Construction Documents Phase.

The first section provides an overview of using Building Information Modeling (BIM) with the Autodesk® Revit® software, working with the software interface, how to use the basic drawing and modify tools, and incorporating datum elements.

This section includes the following chapters:

- Chapter 1: Introduction to BIM and Autodesk Revit
- Chapter 2: Basic Sketching and Modify Tools
- Chapter 3: Starting Architectural Projects



Chapter 1

Introduction to BIM and Autodesk Revit

Building Information Modeling (BIM) and the Autodesk® Revit® software work hand in hand to help you create smart, 3D models that are useful at all stages in the building process. Understanding the software interface and terminology enhances your ability to create and navigate around in the various views of the model.

Learning Objectives in This Chapter

- Describe the concept of Building Information Modeling in conjunction with applying Revit.
- Navigate the graphic user interface, including the ribbon (where most of the tools are found), the Properties palette (where you make modifications to element information), and the Project Browser (where you can open various views of the model).
- Open existing projects and start new projects using templates.
- Use viewing commands to navigate around the model in 2D and 3D views.

1.1 BIM and Autodesk Revit

Building Information Modeling (BIM) is an approach to the entire building life cycle, including design, construction, and facilities management. The BIM process supports the ability to coordinate, update, and share design data with team members across disciplines.

Revit is a model authoring software. It enables you to create complete 3D building models (as shown on the left in Figure 1–1) that provide considerable information reported through construction documents, and enables you to share these models with other programs for more extensive analysis.

Figure 1–1

Revit is a Parametric Building Modeler software:

- *Parametric:* A relationship is established between building elements: when one element changes, all other related elements and/or geometry is modified as well. For example, when you place a door in a wall, the door removes part of the wall and stays inside that wall if it moves.
- *Building:* The software is designed for working with buildings and the surrounding landscape, as opposed to gears or highways.
- *Modeler:* A project is built in a single file based on the 3D building model, as shown on the left in Figure 1–1. All views, such as plans (as shown on the right in Figure 1–1), elevations, sections, details, construction documents, and reports are generated based on the model.
- It is important that everyone who is collaborating on a project works in the same version and build of the software.

Workflow and BIM

BIM has changed the process of how a building is planned, budgeted, designed, constructed, and (in some cases) operated and maintained.

In the traditional design process, construction documents are created independently, typically including plans, sections, elevations, details, and notes. Sometimes, a separate 3D model is created in addition to these documents. Changes made in one document, such as the addition of a light fixture in a plan, have to be coordinated with the rest of the documents and schedules in the set, as shown in Figure 1–2.

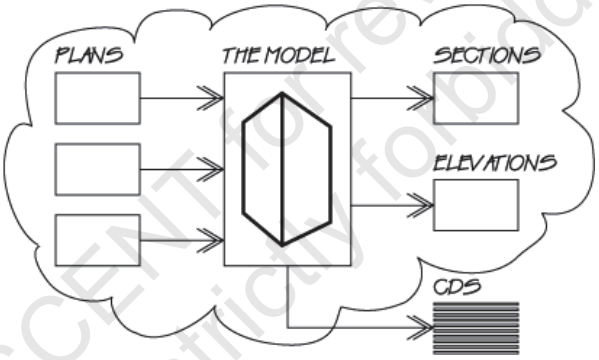


Figure 1–2

In BIM, the design process revolves around the model, as shown in Figure 1–3. Plans, elevations, and sections are simply 2D versions of the 3D model, while schedules are a report of the information stored in the model. Changes made in one view automatically update in all views and related schedules. Even Construction Documents update automatically with callout tags in sync with the sheet numbers. This is called bidirectional associativity.

By creating complete models and associated views of those models, Revit takes much of the tediousness out of producing a building design.

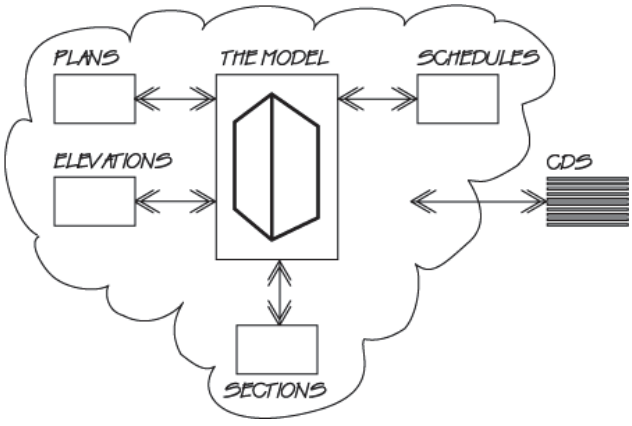


Figure 1–3

Revit Terms

When working in Revit, it is important to know the typical terms used to describe items. Views and reports display information about the elements that form a project. There are three types of elements: Model, Datum, and View-specific, as shown in Figure 1–4 and described below:

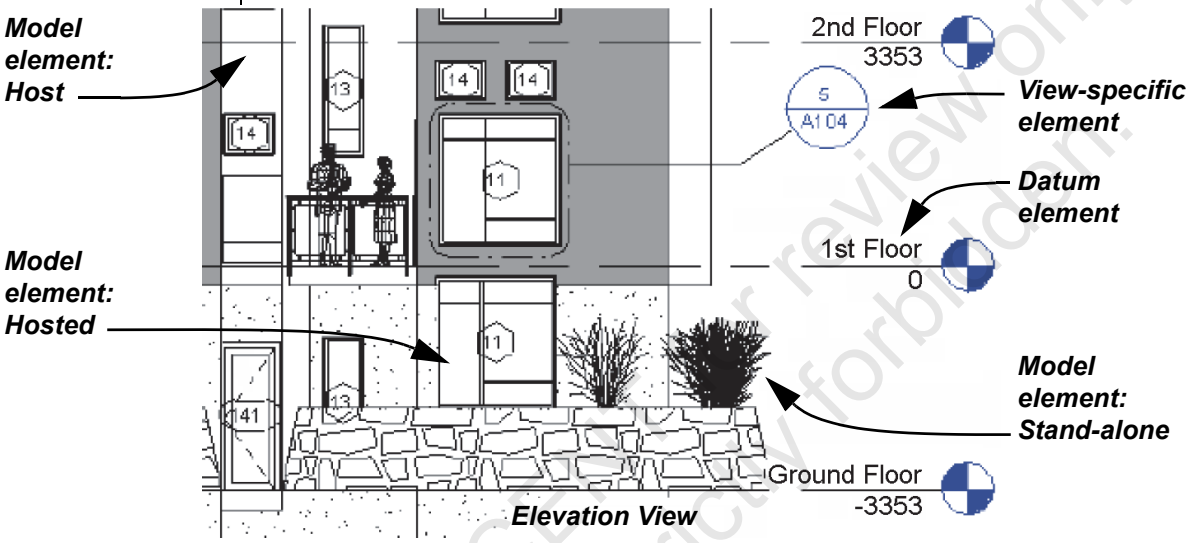


Figure 1–4

Views	Views enable you to display and manipulate the model. For example, you can view and work in floor plans, ceiling plans, elevations, sections, schedules, and 3D views. You can change a design from any view. All views are stored in the project.
Reports	Reports, including schedules, gather information from the building model element that can be presented in the construction documents or used for analysis.
Model Elements	Includes all parts of a building such as walls, floors, roofs, ceilings, doors, windows, plumbing fixtures, lighting fixtures, mechanical equipment, columns, beams, furniture, casework, plants and many more. • Host elements support other categories of elements, such as walls (Host Element). • Hosted elements must be attached to a host element, such as doors must be placed on a (host) wall. • Standalone elements do not require hosts.
Datum Elements	Define the project context such as the levels for the floors, grids, and reference planes.
View-specific Elements	Only display in the view in which they are placed. The view scale controls their size. These include annotation elements such as dimensions, text, tags, and symbols as well as detail elements such as detail lines, filled regions, and 2D detail components.

The software includes tools for architectural, mechanical, electrical, plumbing, and structural design.

- Revit elements are “smart”: the software recognizes them as walls, columns, plants, ducts, or lighting fixtures, etc. This means that the information stored in their properties automatically updates in schedules, which ensures that views and reports are coordinated across an entire project, and are generated from a single model.

Revit and Construction Documents

In the traditional workflow, the most time-consuming part of the project is the construction documents. With BIM, the base views of those documents (i.e., plans, elevations, sections, and schedules) are produced automatically and update as the model is updated, saving hours of work. The views are then placed on sheets that form the construction document set.

For example, a floor plan is duplicated. Then, in the new view, all but the required categories of elements are hidden or set to halftone and annotations are added. The plan is then placed on a sheet, as shown in Figure 1–5.

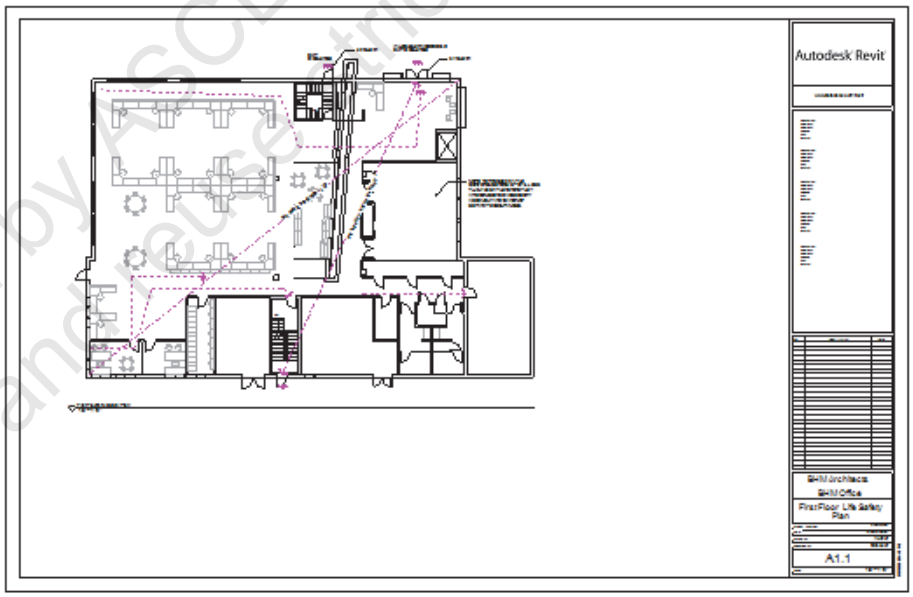


Figure 1–5

- Work can continue on a view and is automatically updated on the sheet.

- Annotating views in the preliminary design phase is often not required. You might be able to wait until you are further along in the project.

1.2 Overview of the Interface

The Autodesk Revit interface is designed for intuitive and efficient access to commands and views. It includes the ribbon, Quick Access Toolbar, Navigation Bar, and Status Bar, which are common to most of the Autodesk® software. It also includes tools that are specific to the Autodesk Revit software, including the Properties Palette, Project Browser, and View Control Bar. Revit includes access to tools for architectural, mechanical, electrical, plumbing, and structural design but can be altered by utilizing the Customized Workspace. Setting up a Customized Workspace tailors your Revit environment to your specific discipline. A breakdown of the Revit interface is shown in Figure 1–6.

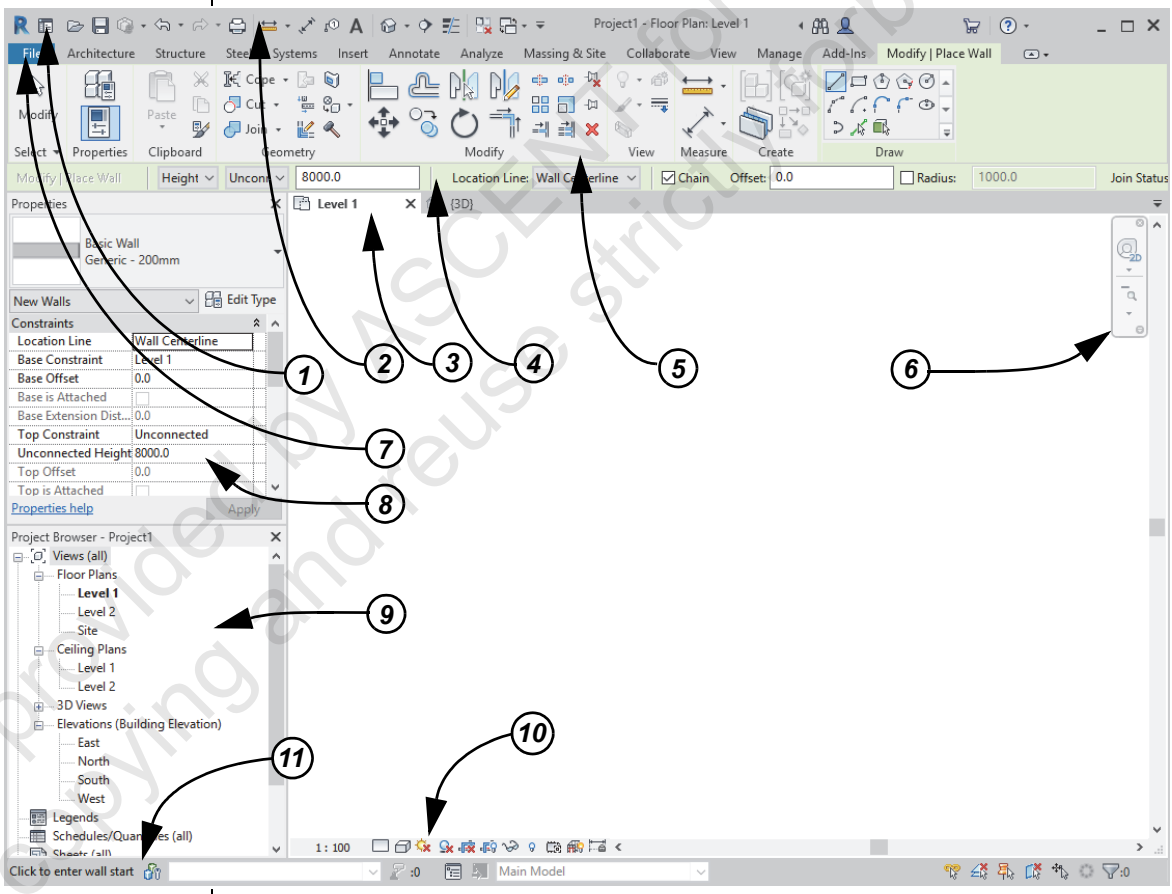


Figure 1–6

1. Home Screen	7. File Tab
2. Quick Access Toolbar	8. Properties Palette
3. View Tabs	9. Project Browser
4. Options Bar	10. View Control Bar
5. Ribbon	11. Status Bar
6. Navigation Bar	

1. The Home Screen

When you first open the Autodesk Revit software, the **Home** screen displays with recently used projects and families, as shown in Figure 1–7.

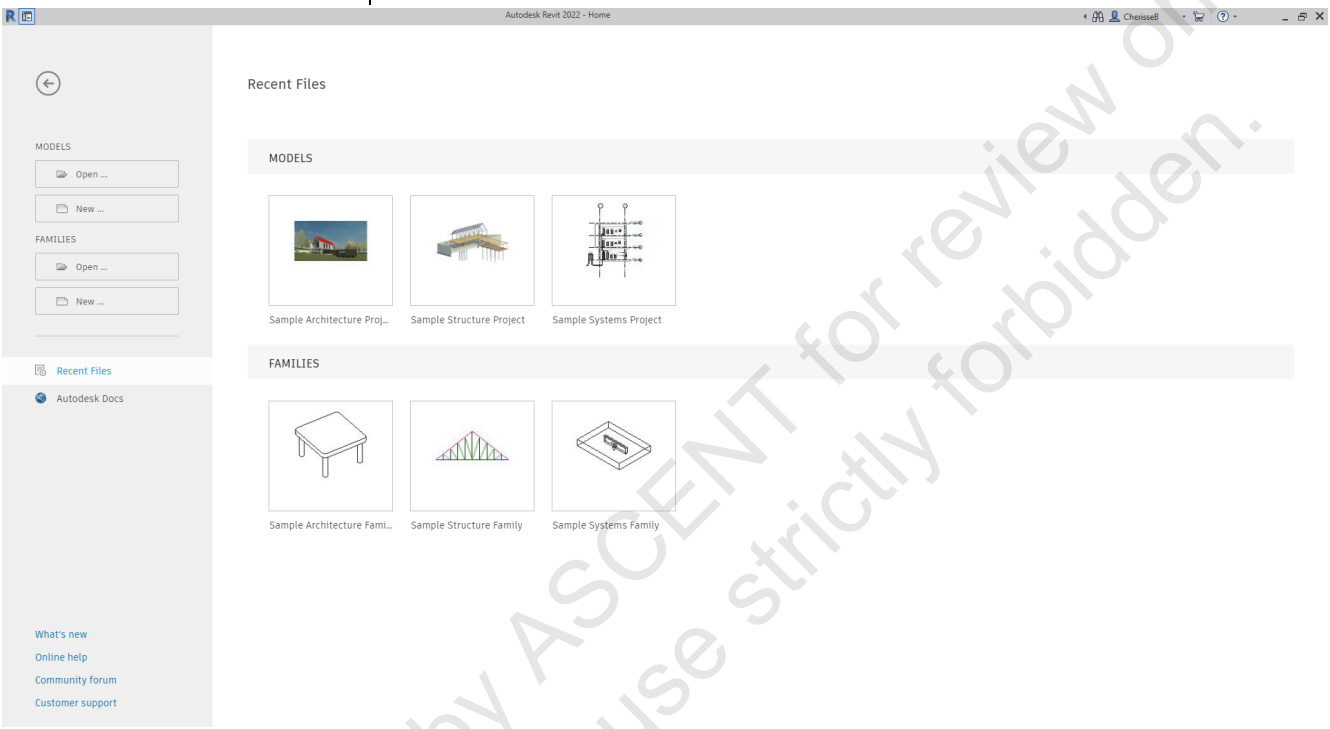


Figure 1–7

- From the Home Screen, you can select the picture of a recently opened project or use one of the options on the left to open or start a new project using the default templates.
- In the Quick Access Toolbar, click (Home) to return to the screen.
- In the Home screen, click (Back) to return to the active model.
- Press <Ctrl>+<D> to toggle between the Home screen and active model.

2. Quick Access Toolbar

The Quick Access Toolbar (shown in Figure 1–8) includes commonly used commands, such as **Home, Open**, **Save**, **Undo**, **Redo,** and **Print**. It also includes frequently used annotation tools, including Measuring tools, **Aligned Dimension**, **Tag by Category**, and **Text**. Viewing tools, including several different 3D Views and **Sections**, are also easily accessed here.

Figure 1–8

Hint: Customizing the Quick Access Toolbar

Right-click on the Quick Access Toolbar to change the docked location of the toolbar to be above or below the ribbon, or to add, relocate, or remove tools on the toolbar. You can also right-click on a tool in the ribbon and select **Add to Quick Access Toolbar**, as shown in Figure 1–9.

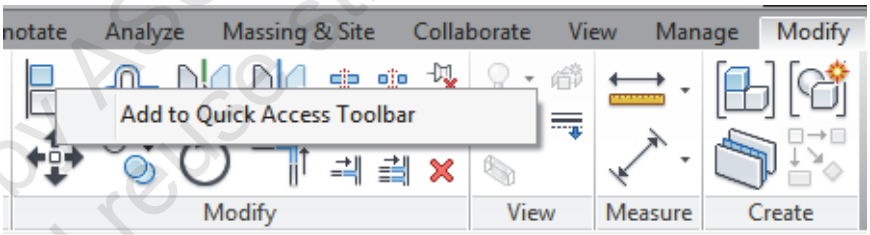


Figure 1–9

The top toolbar also hosts the InfoCenter (as shown in Figure 1–10) which includes the Autodesk sign-in, access to the Autodesk App Store, and Help options. A search field, as shown in Figure 1–11, is also available to find help on the web.

Figure 1–10

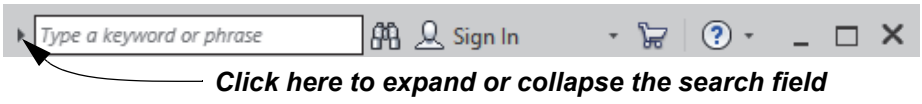


Figure 1–11

3. View Tabs

Each view of a project opens in its own tab and can be pulled out of the application window and moved to another monitor. Each view displays a Navigation Bar (for quick access to viewing tools) and the View Control Bar, and elevation markers, as shown in Figure 1–12.

- To close a tab, press the **X** that displays when you hover over the tab or the name in the list, as shown in Figure 1–12.

In 3D views you can also use the ViewCube to orbit the view.

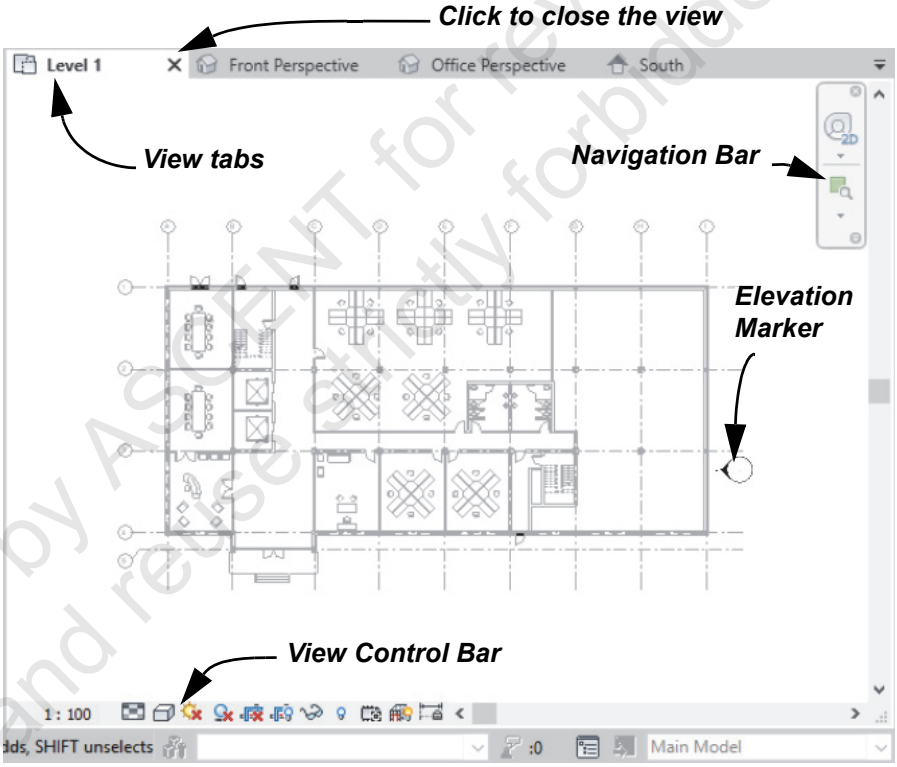


Figure 1–12

- Click on the tab to switch between views. You can also:
  - Press <Ctrl>+<Tab>.
  - Select the view in the Project Browser.
  - In the Quick Access Toolbar or *View* tab>Windows panel, expand (Switch Windows) and select the view from the list.

- Expand the drop-down list at the far end of the tabs, as shown in Figure 1–13.

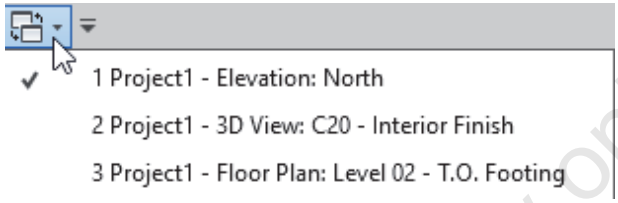
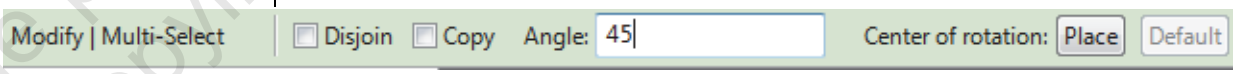


Figure 1–13

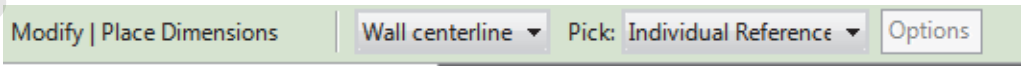
- To close all open views except the current view, in the Quick Access Toolbar or *View* tab>Windows panel, click (Close Inactive Views). If you have multiple projects open, one view of each project remains open. If you have dragged a view to another monitor, that view will need to be manually closed by clicking the **X** in the upper right corner.
- You can switch between tabbed and tiled views from the *View* tab>Windows panel by clicking (Tab Views) or (Tile Views).
- Drag the edge of tiled views to resize them. The other views resize to match.

4. Options Bar

The Options Bar displays options that are related to the selected command or element. For example, when the **Rotate** command is active it displays options for rotating the selected elements, as shown at the top in Figure 1–14. When the **Place Dimensions** command is active it displays dimension related options, as shown at the bottom in Figure 1–14.



Options Bar for Rotate Command



Options Bar for Dimension Command

Figure 1–14

5. Ribbon

The ribbon contains tools in a series of tabs and panels as shown in Figure 1–15. Selecting a tab displays a group of related panels. The panels contain a variety of tools, grouped by task.

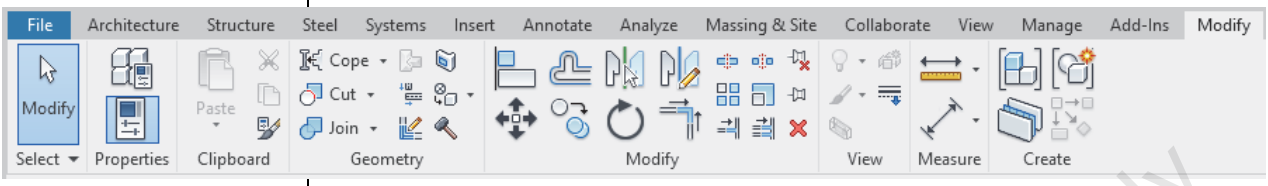


Figure 1–15

When you start a command that creates new elements or you select an element, the ribbon displays the *Modify | contextual* tab. This contains general editing commands and command specific tools, as shown in Figure 1–16.

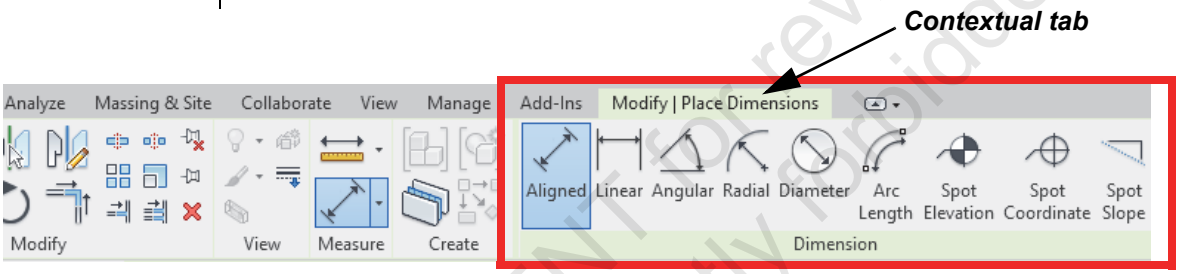


Figure 1–16

- When you hover over a tool on the ribbon, tooltips display the tool's name and a short description. If you continue hovering over the tool, a graphic displays (and sometimes a video), as shown in Figure 1–17.

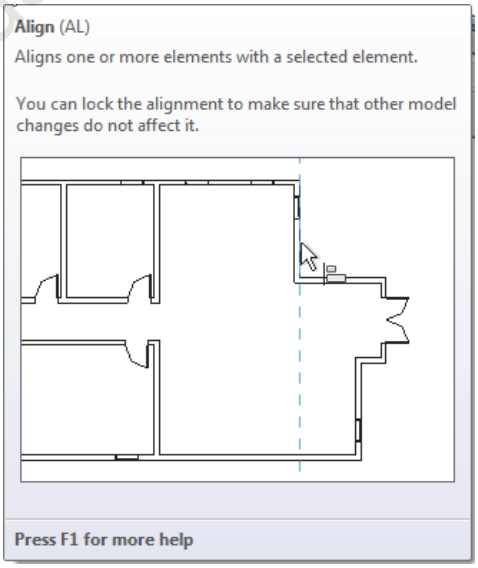


Figure 1–17

- Many commands have shortcut keys. For example, type **AL** for **Align** or **MV** for **Move**. They are listed next to the name of the command in the tooltips. Do not press <Enter> when typing shortcuts.

- To arrange the order in which the ribbon tabs are displayed, select the tab, hold <Ctrl>, and drag it to a new location. The location is remembered when you restart the software.

- Any panel can be dragged by its title into the view window to become a floating panel. Click the **Return Panels to Ribbon** button (as shown in Figure 1–18) to reposition the panel in the ribbon.

Figure 1–18

Hint: You are always in a command when using Revit.

When you are finished working with a tool, you typically default back to the **Modify** command. To end a command, use one of the following methods:

- In any tab on the ribbon, click (Modify).
- Press <Esc> once or twice to revert to **Modify**.
- Right-click and select **Cancel...** once or twice.
- Start another command.

6. Navigation Bar

The Navigation Bar enables you to access the 2D and Full Navigation (3D views) Wheel to navigate the view, as well as the Zoom in Region viewing commands, as shown in Figure 1–19.

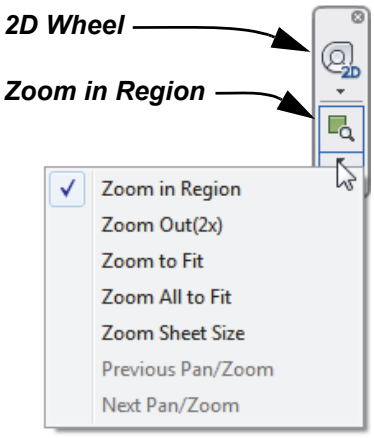


Figure 1–19

7. File Tab

If you click the primary icon, rather than the arrow, it starts the default command.

The *File* tab of the ribbon provides access to file commands, settings, and documents, as shown in Figure 1–20. Hover the cursor over a command to display a list of additional tools.

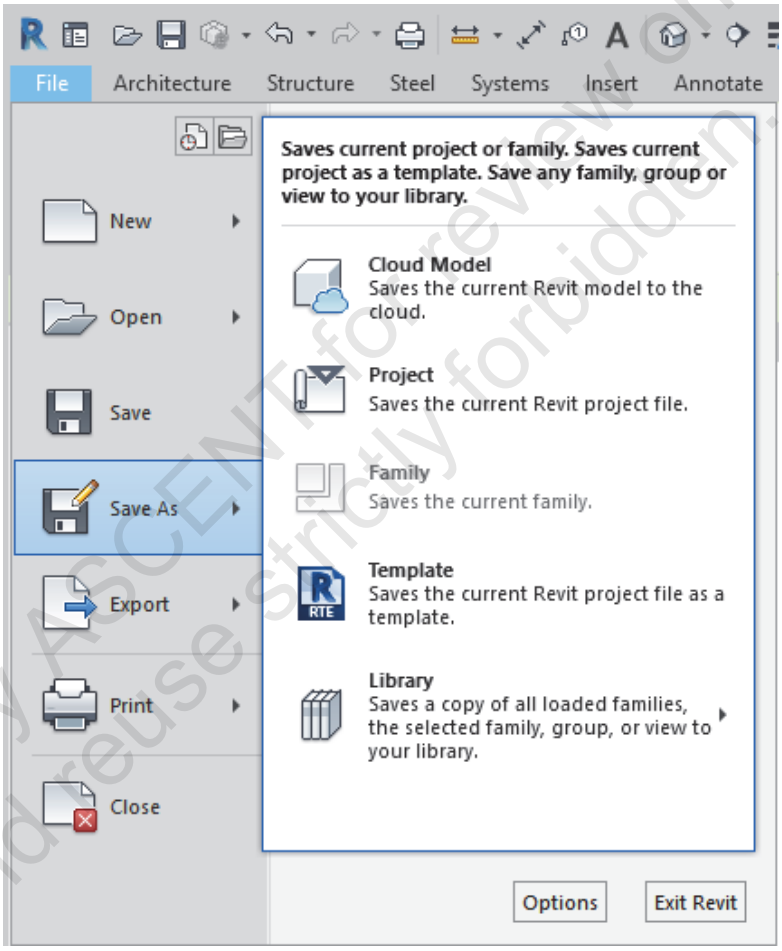


Figure 1–20

- To display a list of recently used documents, click (Recent Documents). The documents can be reordered as shown in Figure 1–21.

Click (Pin) next to a document name to keep it available.

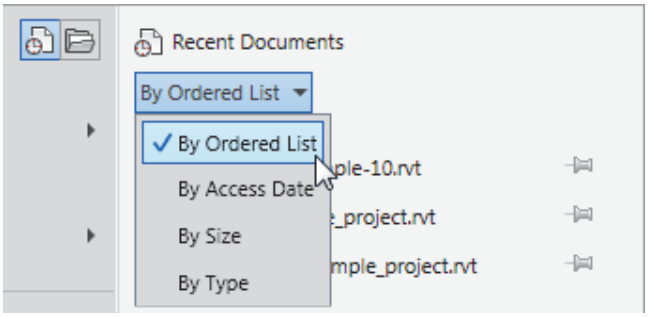


Figure 1–21

You can use the Open Documents list to change between views.

- To display a list of open documents and views, click (Open Documents). The list displays the documents and views that are open, as shown in Figure 1–22.

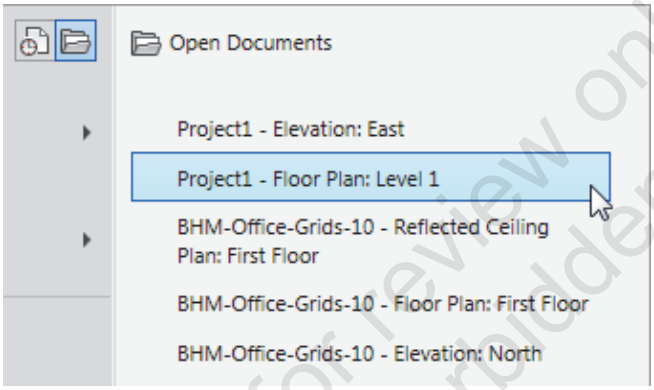


Figure 1–22

- Click (Close) to close the current project.
- At the bottom of the menu, click **Options** to open the Options dialog box or click **Exit Revit** to exit the software.

8. Properties Palette

The Properties palette contains several parts, as shown in Figure 1–23. The Type Selector can be found at the top, which enables you to choose the size or style of the element you are adding or modifying. The options available on the palette enable you to make changes to information (parameters). There are two types of properties:

- **Instance Properties** are set for the individual element(s) you are creating or modifying.
- **Type Properties** control options for all elements of the same type. If you modify these parameter values, all elements of the selected type change.

The Properties palette is usually kept open while working on a project to easily permit changes at any time. If it does not display, in the *Modify* tab>Properties panel, click (Properties) or type **PP**. Alternatively, you can right click in the view and select Properties.

Some parameters are only available when you are editing an element. They are grayed out when unavailable.

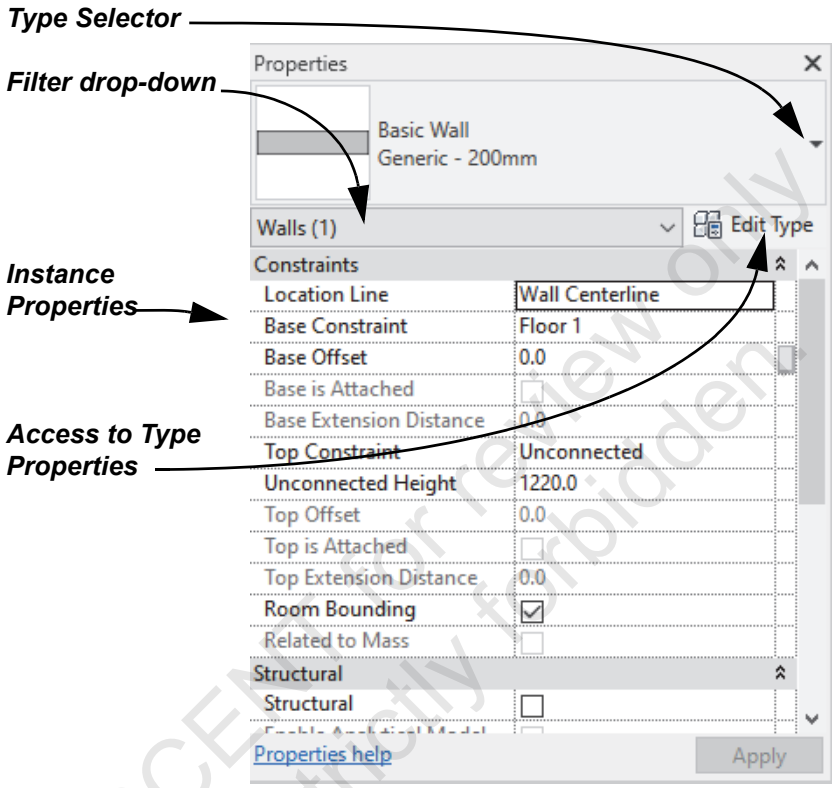


Figure 1–23

- Options for the current view display if the **Modify** command is active, but you have not selected an element.
- If a command or element is selected, the options for the associated element display.
- You can save the changes by either moving the cursor off of the palette, or by pressing <Enter>, or by clicking **Apply**.
- When you start a command or select an element, you can set the element type in the Type Selector, as shown in Figure 1–24.

You can limit what shows in the drop-down list by typing in the search box.

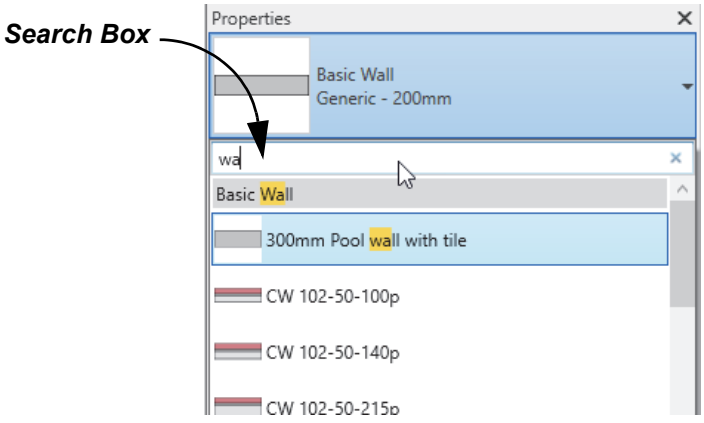


Figure 1–24

- When multiple elements are selected, you can filter the type of elements that display using the drop-down list, as shown in Figure 1–25.

The Properties palette can be placed on a second monitor, or floated, resized, and docked on top of the Project Browser or other dockable palettes, as shown in Figure 1–26. Click the tab to display its associated palettes.

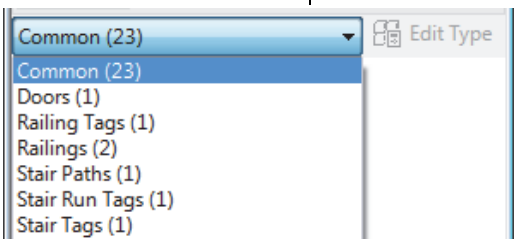


Figure 1–25

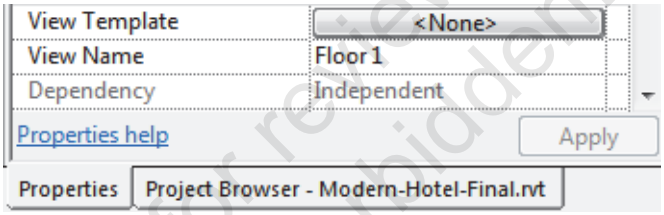


Figure 1–26

9. Project Browser

The Project Browser lists all views of the model in which you can work (as shown in Figure 1–27) and any additional views that you create, such as floor plans, ceiling plans, 3D views, elevations, sections, etc. It also includes schedules, legends, sheets (for plotting), lists of families by category, groups, and Revit links.

The Project Browser displays the name of the active project.

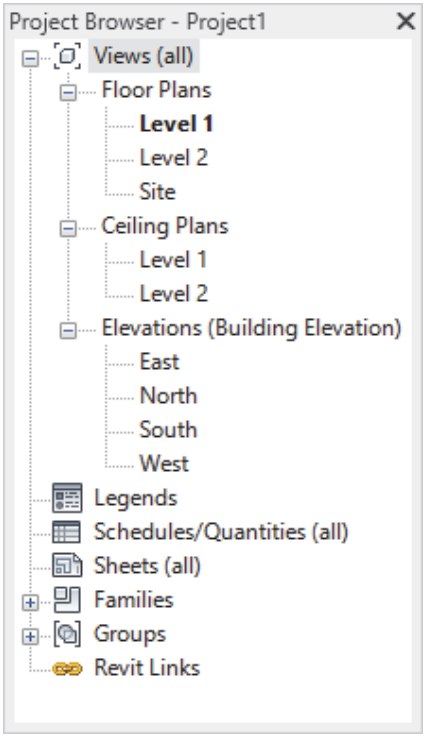


Figure 1–27

- To display the views associated with a view type (i.e. floor plans, ceiling plans, etc.), click (Expand) next to the section name. To hide the views in the section, click (Collapse). You can also expand and collapse sets using the shortcut menu, as shown in Figure 1–28.

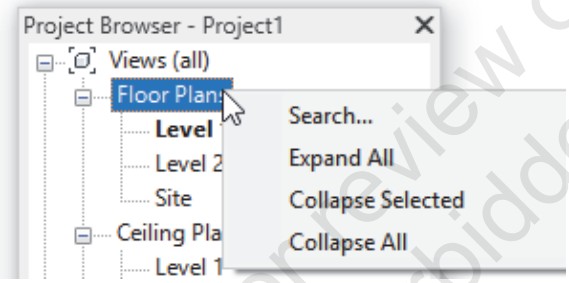


Figure 1–28

- To open a view, double-click on the view name or right-click and select **Open**.
- To rename a view, slowly click twice on the view name and the text highlights as shown in Figure 1–29. You can also right-click on a view name and select **Rename...** or press <F2>.

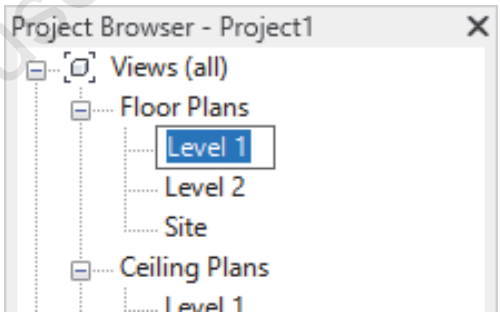


Figure 1–29

- If you no longer require a view, you can delete it. Right-click on its name in the Project Browser and select **Delete**.
- The Project Browser can be customized by changing the Browser Organization or its location within the application. The Project Browser can be floated, resized, or docked on top of the Properties palette.

How To: Search the Project Browser

1. In the Project Browser, right-click on the top level view and select **Search...**, as shown in Figure 1–30.

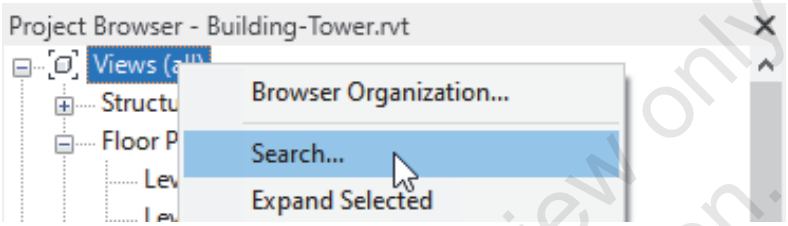


Figure 1–30

2. In the Search in Project Browser dialog box, type the words that you want to find (as shown in Figure 1–31), and click **Next**.
3. In the Project Browser, the first instance of that search highlights, as shown in Figure 1–32.

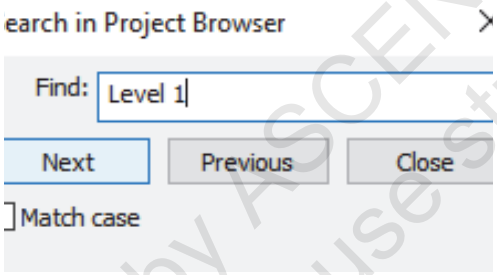


Figure 1–31

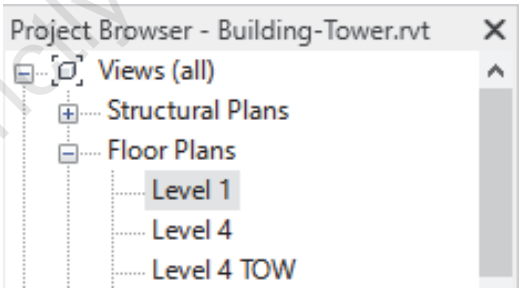


Figure 1–32

4. Continue using **Next** and **Previous** to move through the list.
5. Click **Close** when you are done.

10. View Control Bar

The View Control Bar (shown in Figure 1–33) displays at the bottom of each view window. It controls aspects of that view, such as the scale and detail level. It also includes tools that display parts of the view and hide or isolate elements in the view.

Figure 1–33

- The number of options in the View Control Bar change when you are in a 3D view, as shown in Figure 1–34.

Figure 1–34

Tool	Tooltip	Description
1 : 100	**View Scale**	Set the scale of individual views.
	**Detail Level**	Set the detail level of a view.
	**Visual Style**	Various graphic style representations.
	**Sun Path On/Off**	Control the visibility of the sun's path.
	**Shadows On/Off**	Control elements' shadow visibility in a view.
	**Show/Hide Rendering Dialog**	Available in 3D only. Shows or hides the rendering dialog box.
	**Crop View**	Define the crop boundaries for a view.
	**Show/Hide Crop Region**	Display the crop region in a view.
	**Unlocked/Locked 3D Views**	Lock a 3D view's orientation.
	**Temporary Hide/Isolate**	Temporarily isolate/hide by category or element.(View specific)
	**Reveal Hidden Elements**	View hidden elements or unhide them in the active view.
	**Worksharing Display**	Available when worksharing is enabled. Control display settings.
	**Temporary View Properties**	Enable, apply or restore view properties and display recent templates and apply them.
	**Show or Hide the Analytical Model**	Only used for Structural and MEP to display the analytical information.
	**Highlight Displacement Sets**	Also known as exploded views.
	**Reveal Constraints**	Temporarily view the dimension and alignment constraints in the active view.
	**Preview Visibility**	Available in the Family Editor only. Control the visibility of the preview.

11. Status Bar

The Status Bar provides information about the current process, such as the next step for a command, as shown in Figure 1–35.

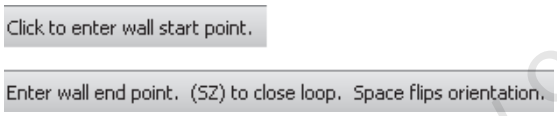


Figure 1–35

Other options in the Status Bar are related to Worksets and Design Options (advanced tools) as well as selection methods and filters.

Hint: Shortcut Menus

Shortcut menus help you to work smoothly and efficiently by enabling you to quickly access required commands. These menus provide access to basic viewing commands, recently used commands, and the available Browsers, as shown in Figure 1–36. Additional options vary depending on the element or command that you are using.

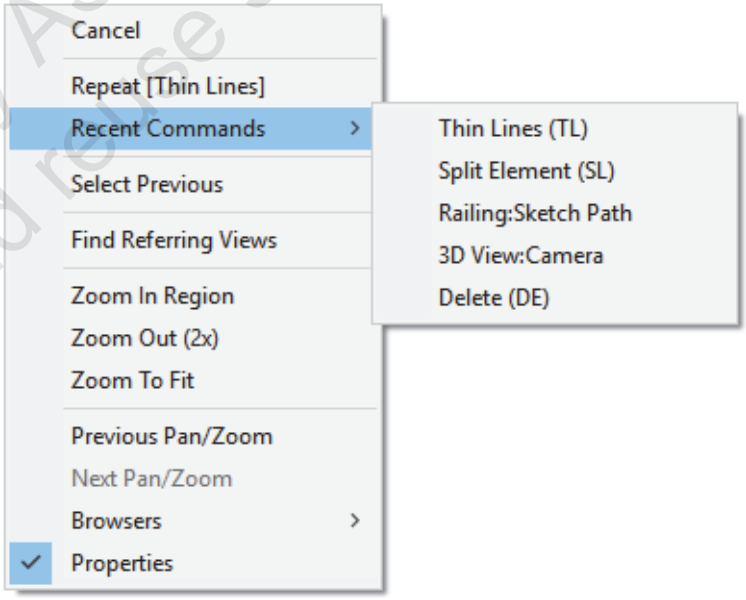


Figure 1–36

1.3 Starting Projects

File operations to open existing files, create new files from a template, and save files in Revit are found in the *File* tab, as shown in Figure 1–37.

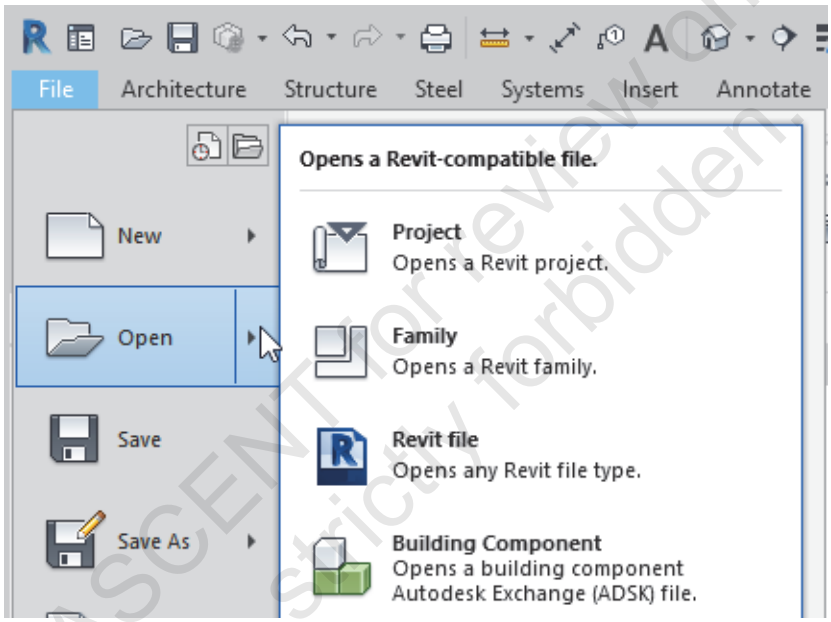


Figure 1–37

There are three main file formats:

- **Project files (.rvt):** These are where you do the majority of your work in the building model by adding elements, creating views, annotating views, and setting up printable sheets. They are initially based on template files.

- **Family files (.rfa):** These are separate components that can be inserted in a project. They include elements that can stand alone (e.g., a table or piece of mechanical equipment) or are items that are hosted in other elements (e.g., a door in a wall or a lighting fixture in a ceiling). Title block and Annotation Symbol files are special types of family files.

- **Template files (.rte and .rft):** These are the base files for any new project or family. Project templates (**.rte**) hold standard information and settings for creating new project files. The software includes several templates for various types of projects. You can also create custom templates. Family templates (**.rft**) include base information for creating families. Template files are usually saved as a new file.

Opening Projects

To open an existing project, in the Quick Access Toolbar or *File* tab, click (Open), or press <Ctrl>+<O>. The Open dialog box opens, and you can navigate to the required folder and select a project file. An example of the Open dialog box is shown in Figure 1–38.

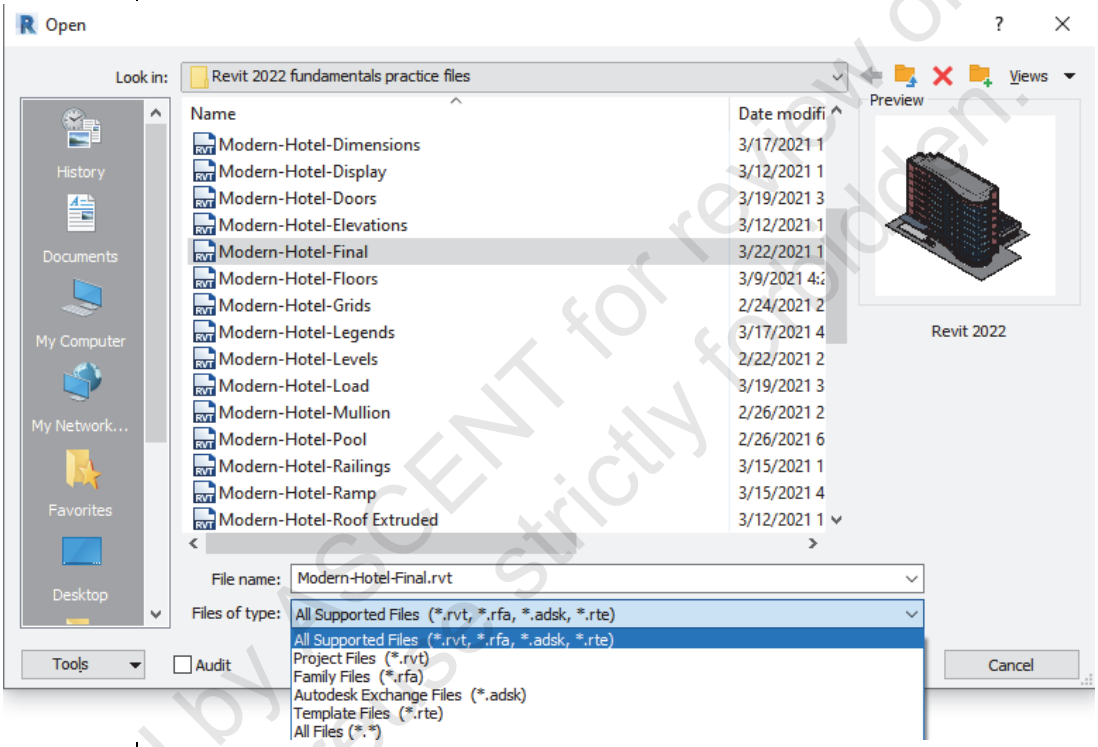


Figure 1–38

- The software release version of the currently selected project displays below the preview. Do not open a drawing that should remain in an earlier version, as you cannot save back to previous versions.

  Note: It is important that everyone working on a project uses the same software version (e.g., 2021) and is on the same updated version (e.g., 2021.1). While your software may be able to open files created in its earlier versions, it will not be able to open files created in versions newer than the one you are using currently. For example, if you are working in Revit 2021, you cannot open a model created in Revit 2022.

- When you open a file created in an earlier version, the Model Upgrade dialog box (shown in Figure 1–39) indicates the release of a file and the release to which it will be upgraded. If needed, you can cancel the upgrade before it completes.

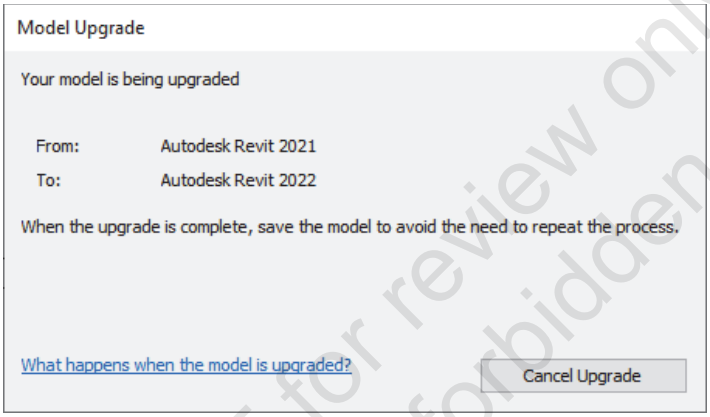


Figure 1–39

Hint: Opening Workset-Related Files

Worksets are used when the project becomes large enough for multiple people to work on it at the same time. At this point, a central file with multiple worksets (such as element interiors, building shell, and site) that are used by the project team members is created.

When you open a workset-related file it creates a new local file on your computer as shown in Figure 1–40. Do not work in the main central file.

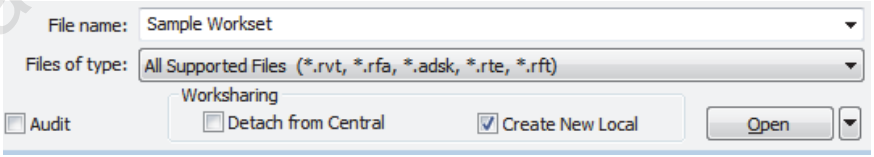


Figure 1–40

- For more information about opening and saving workset-related files, see *Appendix B Introduction to Worksets.*
- When you click on a central model showing in the Home screen, a local copy of the file is created.
- For more information on establishing and using Worksets, refer to the ASCENT guide *Autodesk Revit: Collaboration Tools*.

Starting New Projects

New projects are based on a template file. The template file includes preset levels, views, and some families, such as wall styles and text styles. Check with your BIM Manager about which template you need to use for your projects. Your company might have more than one based on the types of building that you are designing.

How To: Start a New Project

1. In the *File* tab, expand (New) and click (Project) (as shown in Figure 1–41), or press <Ctrl>+<N>.

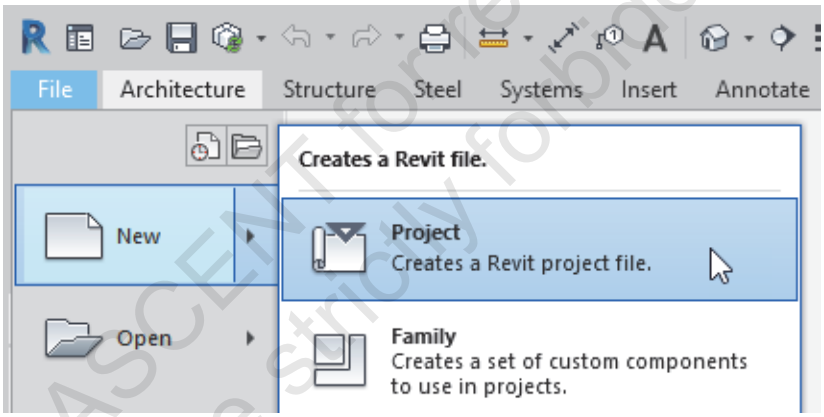


Figure 1–41

2. In the New Project dialog box (shown in Figure 1–42), select the template that you want to use and click **OK**.

The list of Template files is set in the Options dialog box in the File Locations tab. It might vary depending on the installed product and company standards.

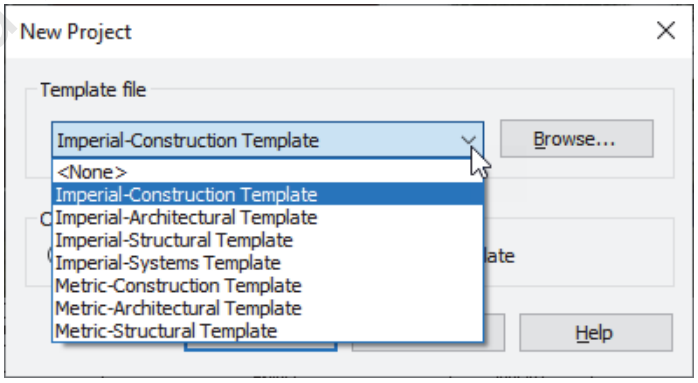


Figure 1–42

You can select from a list of templates if they have been set up by your BIM Manager.

- You can add (New) to the Quick Access Toolbar. At the end of the Quick Access Toolbar, click (Customize Quick Access Toolbar) and select **New**, as shown in Figure 1–43.

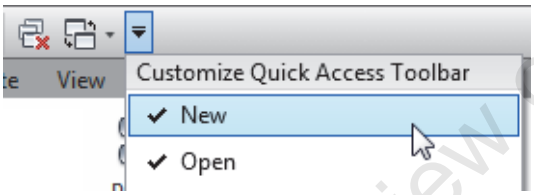


Figure 1–43

Saving Projects

It is important to save your projects frequently. In the Quick Access Toolbar or *File* tab click (Save), or press <Ctrl>+<S> to save your project. If the project has not yet been saved, the Save As dialog box opens, where you can specify a file location and name.

- To save an existing project with a new name, in the *File* tab, expand (Save As) and click (Project).
- If you have not saved in a certain amount of time, the software will notify you with the Project Not Saved Recently alert box, as shown in Figure 1–44. Select **Save the project**. If you want to set reminder intervals or not save at this time, select one of the other two options shown in Figure 1–44.

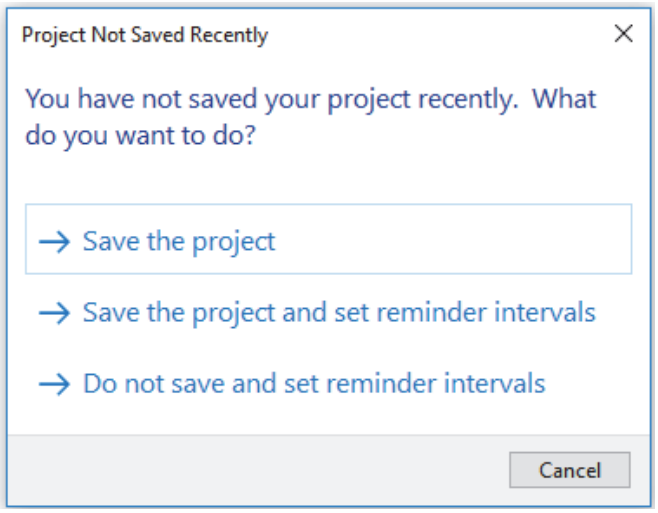


Figure 1–44

- You can set the *Save Reminder interval* to **15** or **30 minutes**, **1**, **2**, or **4 hours**, or to have **No reminders** display. In the *File* tab, click **Options** to open the Options dialog box. Select **General** and set the interval as shown in Figure 1–45.

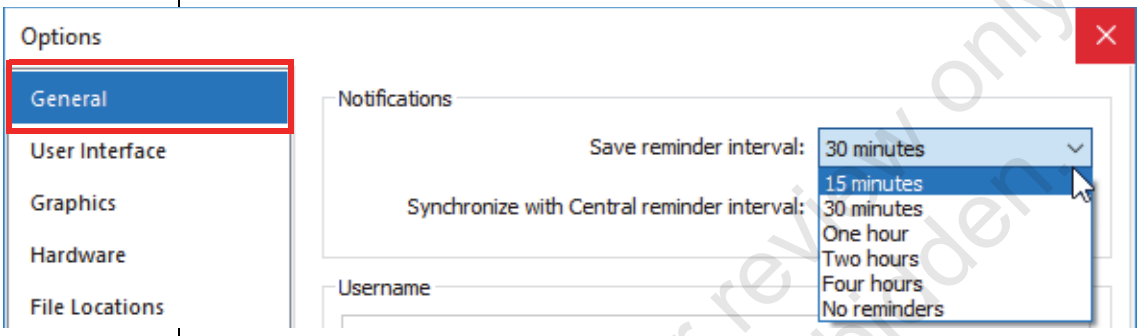


Figure 1–45

Saving Backup Copies

By default, the software saves a backup copy of a project file when you save the project. Backup copies are numbered incrementally (e.g., **My Project.0001.rvt**, **My Project.0002.rvt**, etc.) and are saved in the same folder as the original file. In the Save As dialog box, click **Options...** to control how many backup copies are saved. The default number is three backups. If you exceed this number, the software deletes the oldest backup file.

Hint: Saving Workset-Related Projects

If you use worksets in your project, you need to save the project locally and to the central file. It is recommended to save the local file frequently, just like any other file, and save to the central file every hour or so by synchronizing with the central file.

To synchronize your changes with the main file, in the Quick Access Toolbar expand (Synchronize and Modify Settings) and click (Synchronize Now). After you save to the central file, save the file locally again.

At the end of the day, or when you are finished with the current session, in the Quick Access Toolbar, expand (Synchronize and Modify Settings) and click (Synchronize and Modify Settings) to relinquish the files you have been working on to the central file.

- The maximum number of backups for workset-enabled files is set to 20 by default.
- Note: Workshared files do not have the same backup files as non-workshared files.

1.4 Viewing Commands

Viewing commands are crucial to working efficiently in most drawing and modeling programs and Revit is no exception. Once in a view, you can use the Zoom controls to navigate in it. You can zoom in and out and pan in any view. There are also special tools for viewing in 3D.

Zooming and Panning

Using the Mouse to Zoom and Pan

Use the mouse wheel (shown in Figure 1–46) as the main method of moving around the models.

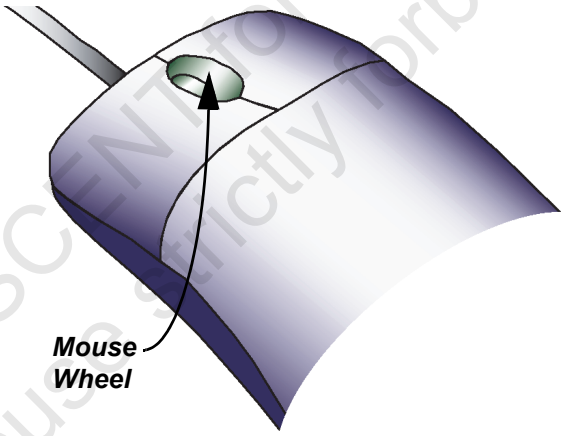


Figure 1–46

- Scroll the wheel on the mouse up to zoom in and down to zoom out.
- Hold the wheel and move the mouse to pan.
- Double-click on the wheel to zoom to the extents of the view.
- In a 3D view, hold <Shift> and the mouse wheel and move the mouse to orbit around the model.

- When you save a model and exit the software, the pan and zoom location of each view is remembered. This is especially important for complex models.

Zoom Controls

A number of additional zoom methods enable you to control the screen display. **Zoom** and **Pan** can be performed at any time while using other commands.

- You can access the **Zoom** commands in the Navigation Bar in the upper right corner of the view (as shown in Figure 1–47). You can also access them from most shortcut menus and by typing the shortcut commands.


*(2D Wheel) provides cursor-specific access to **Zoom** and **Pan**.*

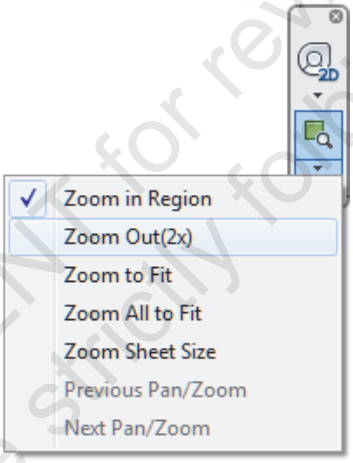


Figure 1–47

Zoom Commands

	**Zoom In Region (ZR)**	Zooms into a region that you define. Drag the cursor or select two points to define the rectangular area you want to zoom into. This is the default command.
	**Zoom Out(2x) (ZO)**	Zooms out to half the current magnification around the center of the elements.
	**Zoom To Fit (ZF or ZE)**	Zooms out so that the entire contents of the project only display on the screen in the current view.
	**Zoom All To Fit (ZA)**	Zooms out so that the entire contents of the project display on the screen in all open views.
	**Zoom Sheet Size (ZS)**	Zooms in or out in relation to the sheet size.
N/A	**Previous Pan/Zoom (ZP)**	Steps back one **Zoom** command.
N/A	**Next Pan/Zoom**	Steps forward one **Zoom** command if you have done a **Previous Pan/Zoom**.

Viewing in 3D

Even if you started a project entirely in plan views, you can quickly create 3D views of the model, as shown in Figure 1–48. There are two types of 3D views: isometric views created by the **Default 3D View** command and perspective views created by the **Camera** command.

Figure 1–48

Working in 3D views helps you visualize the project and position some of the elements correctly. You can create and modify elements in both isometric and perspective 3D views, just as you can in plan views.

- Once you have created a 3D view, you can save it and easily return to it.

How To: Create and Save a 3D Isometric View

1. In the Quick Access Toolbar or *View* tab>Create panel, click (Default 3D View). The default 3D Southeast isometric view opens, as shown in Figure 1–49.

You can spin the view to a different angle using the mouse wheel or the middle button of a three-button mouse. Hold <Shift> as you press the wheel or middle button and drag the cursor.

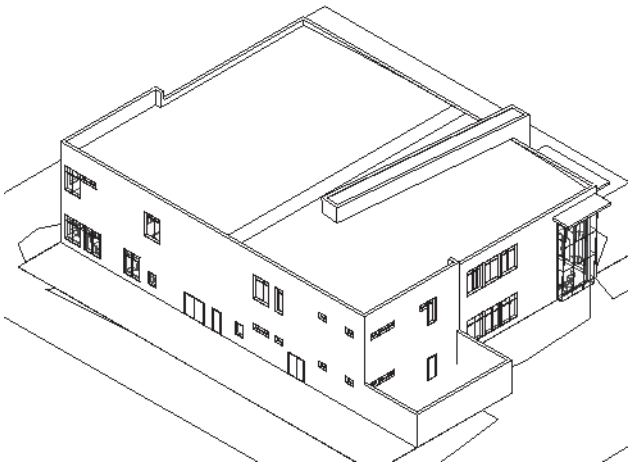


Figure 1–49

2. Modify the view to display the building from other directions.

3. In the Project Browser, double-click slowly or right-click on the {3D} view and select **Rename...**.
4. The name is placed in a text box with the original name highlighted, as shown in Figure 1–50. Type a new name in the Rename View dialog box, as shown in Figure 1–51.

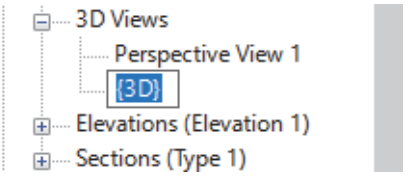


Figure 1–50

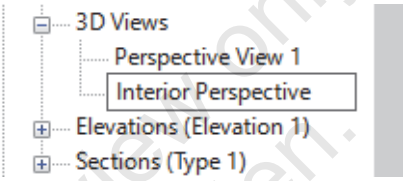


Figure 1–51

All types of views can be renamed.

- When changes to the default 3D view are saved and you start another default 3D view, it displays the Southeast isometric view once again. If you modified the default 3D view but did not save it to a new name, the **Default 3D View** command opens the view in the last orientation you specified.

How To: Create a Perspective View

1. Switch to a Floor Plan view.
2. In the Quick Access Toolbar or *View* tab>Create panel, expand (Default 3D View) and click (Camera).
3. Place the camera on the view.
4. Point the camera in the direction in which you want it to shoot by placing the target on the view, as shown in Figure 1–52.

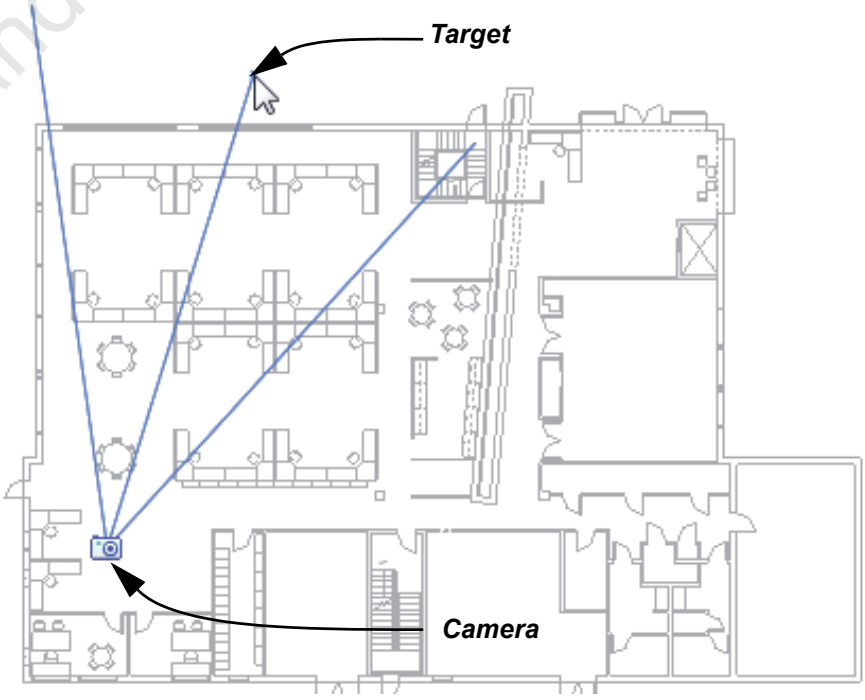


Figure 1–52

Use the round controls to modify the display size of the view and press <Shift> + the mouse wheel to change the view.

A new view is displayed, as shown in Figure 1–53.

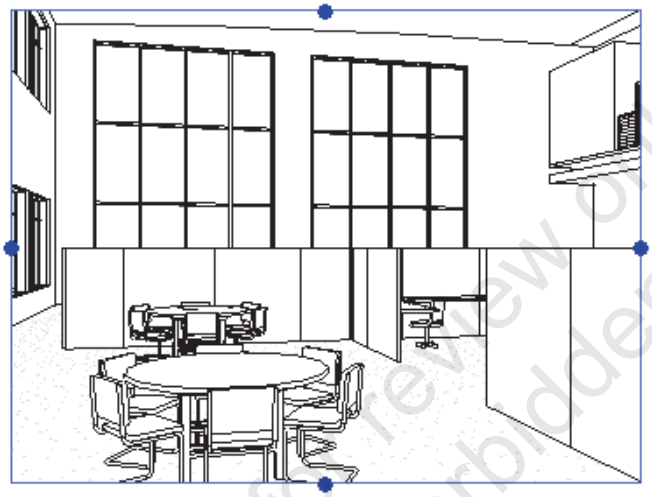


Figure 1–53

5. In the Properties palette, scroll down and adjust the *Eye Elevation* and *Target Elevation* as needed.

- If the view becomes distorted, reset the target so that it is centered in the boundary of the view (called the crop region).

  In the *Modify* | *Cameras* tab>Camera panel, click (Reset Target).

- You can further modify a view by adding shadows, as shown in Figure 1–54. In the View Control Bar, toggle (Shadows Off) and (Shadows On). Shadows display in any model view, not just in the 3D views. To set up the sun location, expand (Sun Path Off) and select **Sun Settings...**. Select (Sun Path On) to see the visual location of the sun.

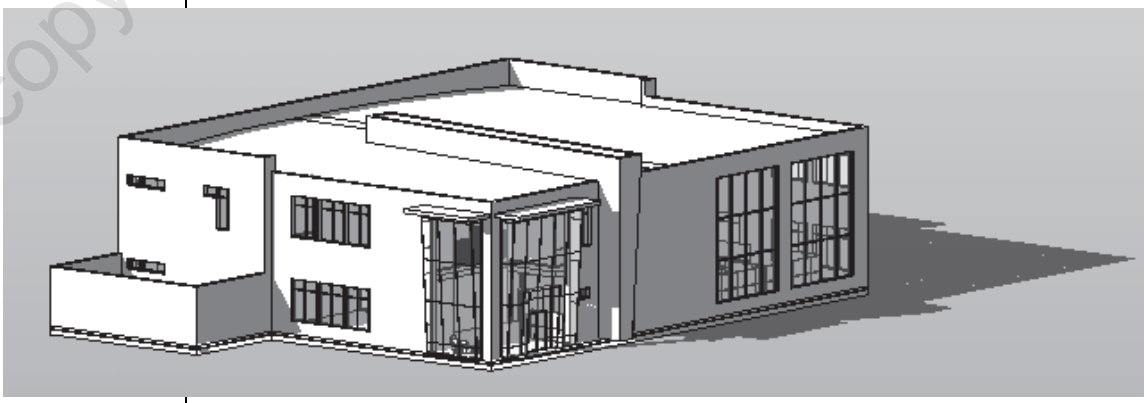


Figure 1–54

Hint: Using the ViewCube

The ViewCube provides visual clues as to where you are in a 3D view. It helps you move around the model with quick access to specific views (such as top, front, and right), as well as corner and directional views, as shown in Figure 1–55.

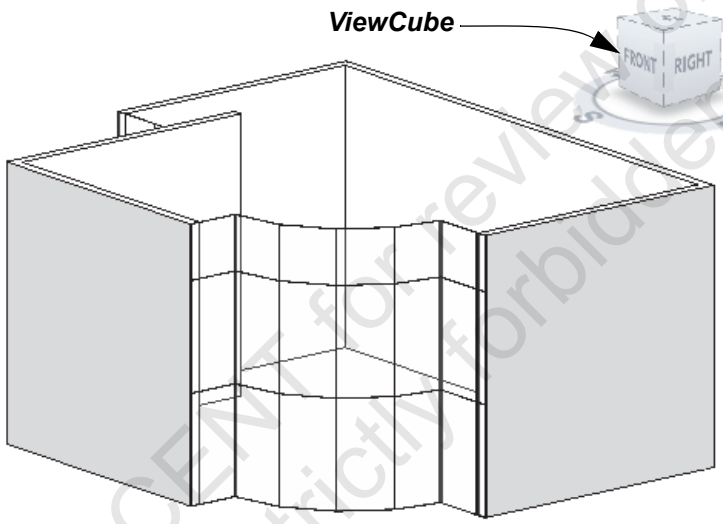


Figure 1–55

Move the cursor over any face of the ViewCube to highlight it. Once a face is highlighted, you can select it to reorient the model. You can also click and drag on the ViewCube to orbit the box, which rotates the model.

- (Home) displays when you roll the cursor over the ViewCube. Click it to return to the view defined as **Home**. To change the Home view, set the view as you want it, right-click on the ViewCube, and select **Set Current View as Home**.
- The ViewCube is available in isometric and perspective views.
- You can switch between Perspective and Isometric mode by right-clicking on the View Cube and selecting **Perspective** or **Orthographic**.

Visual Styles

Any view can have a visual style applied. The **Visual Style** options found in the View Control Bar (as shown in Figure 1–56), specify the shading of the building model. These options apply to plan, elevation, section, and 3D views.

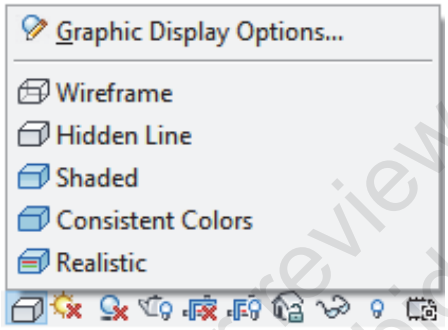


Figure 1–56

- (Wireframe) displays the lines and edges that make up elements, but hides the surfaces. This can be useful when you are dealing with complex intersections.
- (Hidden Line) displays the lines, edges, and surfaces of the elements, but it does not display any colors. This is the most common visual style to use while working on a design.
- (Shaded) and (Consistent Colors) give you a sense of the materials, including transparent glass. An example that uses Consistent Colors is shown in Figure 1–57.

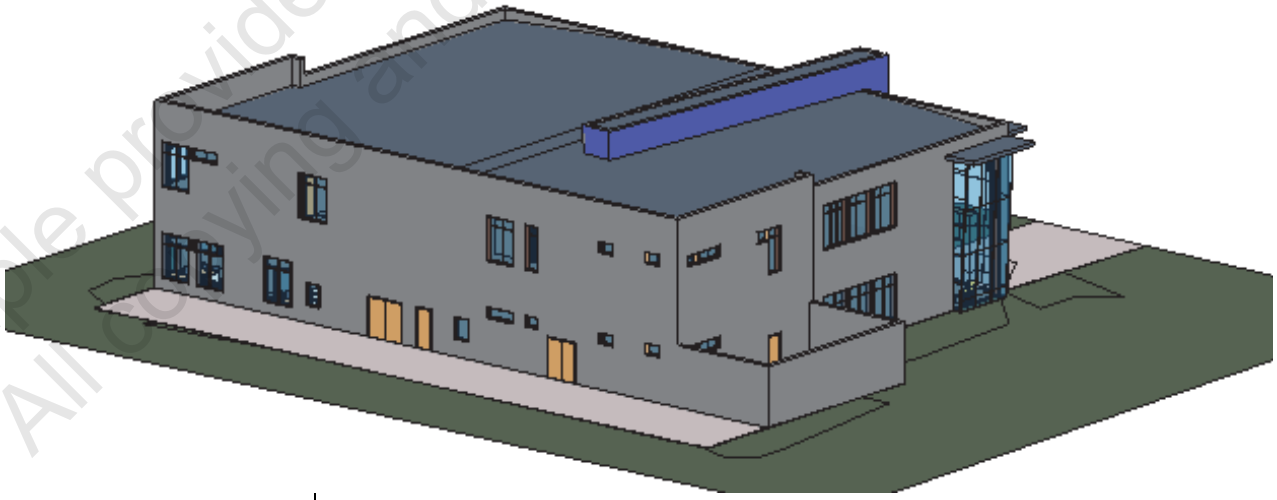


Figure 1–57

- (Realistic) displays what is shown when you render the view, including RPC (Rich Photorealistic Content) components and artificial lights. It takes a lot of computer power to execute this visual style. Therefore, it is better to use the other visual styles most of the time as you are working.

Hint: Rendering

Rendering is a powerful tool which enables you to display a photorealistic view of the model you are working on, such as the example shown in Figure 1–58. This can be used to help clients and designers understand a building's design in better detail.

Figure 1–58

- In the View Control Bar, click (Show Rendering Dialog) to set up the options. **Show Rendering Dialog** is only available in 3D views.

Practice 1a

Open and Review a Project

Practice Objectives

- Navigate the graphic user interface.
- Manipulate 2D and 3D views by zooming and panning.
- Create 3D Isometric and Perspective views.
- Set the Visual Style of a view.

In this practice, you will open a project file and view each of the various areas in the interface. You will investigate elements, commands, and their options. You will also open views through the Project Browser and view the model in 3D, as shown in Figure 1–59.

Figure 1–59

- This is a version of the main project you will work on throughout this guide.

Task 1 - Explore the interface.

1. In the *File* tab, expand (Open) and click (Project).
   - If you are on the Home screen, in the MODELS section, click **Open...**.
2. In the Open dialog box, navigate to the practice files folder and select **Modern-Hotel-Final-M.rvt**.
3. Click **Open**. The 3D view of the modern hotel building opens in the view window.

If the Project Browser and Properties palette are docked over each other, use the Project Browser tab at the bottom to display it.

4. In the Project Browser, expand the *Floor Plans* node. Double-click on **Floor 1** to open it. This view is referred to as **Floor Plans: Floor 1**.
5. Take time to review the floor plan to get acquainted with it.
6. Review the various parts of the screen.
7. In the view, hover the cursor over one of the doors. A tooltip displays describing the element, as shown in Figure 1–60.

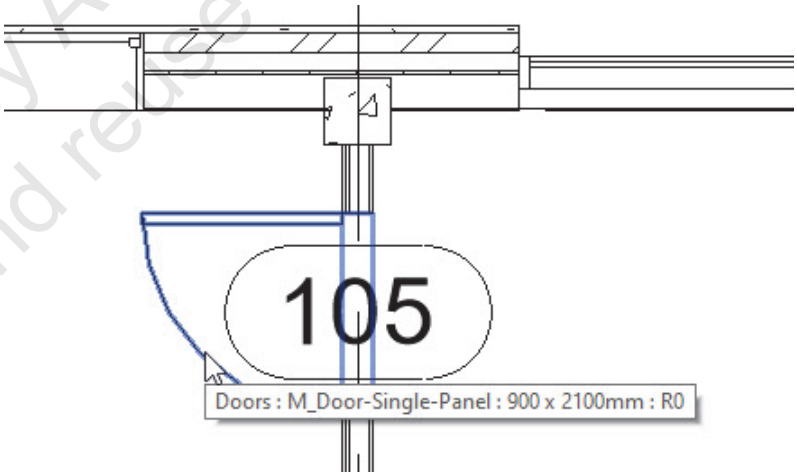


Figure 1–60

8. Hover the cursor over another element to display its description.
9. Select a door. The ribbon changes to the *Modify* | *Doors* tab.
10. Click in an empty space in the view to release the selection.
11. Hold <Ctrl> and select several elements of different types. The ribbon changes to the *Modify* | *Multi-Select* tab.
12. Press <Esc> to clear the selection.

13. In the *Architecture* tab>Build panel, click (Wall) or type the shortcut **WA**. The ribbon changes to the *Modify | Place Wall* tab and at the end of the ribbon, the Draw panel is displayed. It contains tools that enable you to create walls. The rest of the ribbon displays the same tools that are found on the *Modify* tab.

14. In the Select panel, click (Modify) to return to the main ribbon.

15. In the *Architecture* tab>Build panel, click (Door) or type the shortcut **DR**. The ribbon changes to the *Modify | Place Door* tab and displays the options and tools you can use to create doors.

16. In the Select panel, click (Modify) to return to the main ribbon.

17. Save the project.

Task 2 - Look at views.

You might need to widen the Project Browser to display the full names of the views.

1. In the Project Browser, verify that the *Floor Plans* node is open. Double-click on the **Floor 1 - Furniture Plan** view.
2. This floor plan displays with the furniture, but without the annotations that were displayed in the **Floor 1** view.
3. Open the **Floor 1 - Life Safety Plan** view by double-clicking on it.
4. The walls and furniture display, but the furniture is grayed out and red lines describing important life safety information display.
5. At the top of the views, click each tab to switch between the open views.
6. In the *View* tab>Windows panel, click (Tile Views) or type **WT**. All of the open views are tiled. Type **ZA** (for Zoom All) to zoom out to the extents of each view, as shown in Figure 1–61.

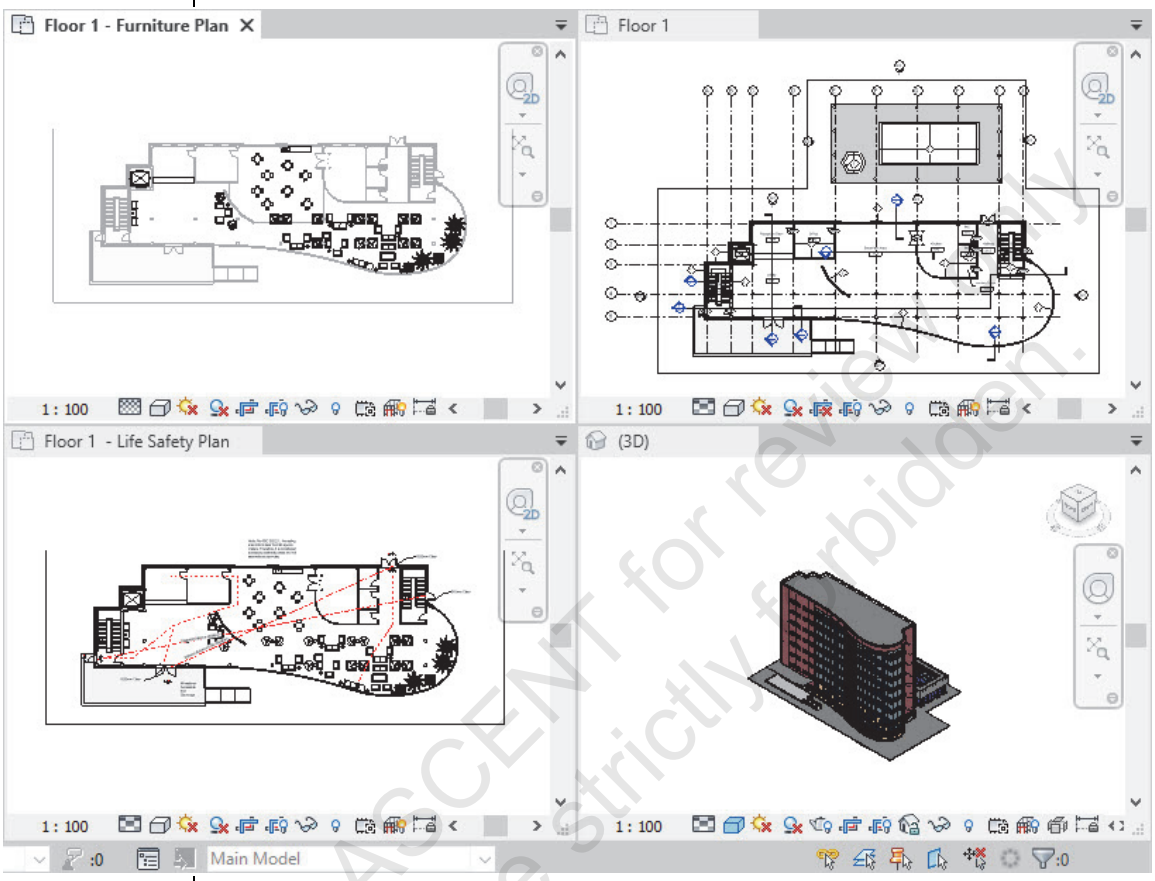


Figure 1–61

7. Click inside the 3D view to make it active.

8. In the *View* tab>Windows panel, click (Tab Views) or type **TW**. The views return to the tabs and the 3D view is first in the group.

*This view is referred to as **Elevations (Building Elevation): East** view.*

9. In the Project Browser, scroll down and expand *Elevations (Building Elevation)*. Double-click on the **East** elevation to open the view.

10. Expand *Sections (Building Section)* and double-click on the **E/W Building Section** to open it.

11. At the bottom of the view window, in the View Control Bar, click (Visual Style) and select **Shaded**. The elements in the view are now easier to read.

12. In the Project Browser, scroll down to the *Sheets (all)* node and expand the node.

13. View several of the sheets. Some have views already applied, (e.g., **A1.5: Floor 2 - Floor Plan View**, as shown in Figure 1–62).

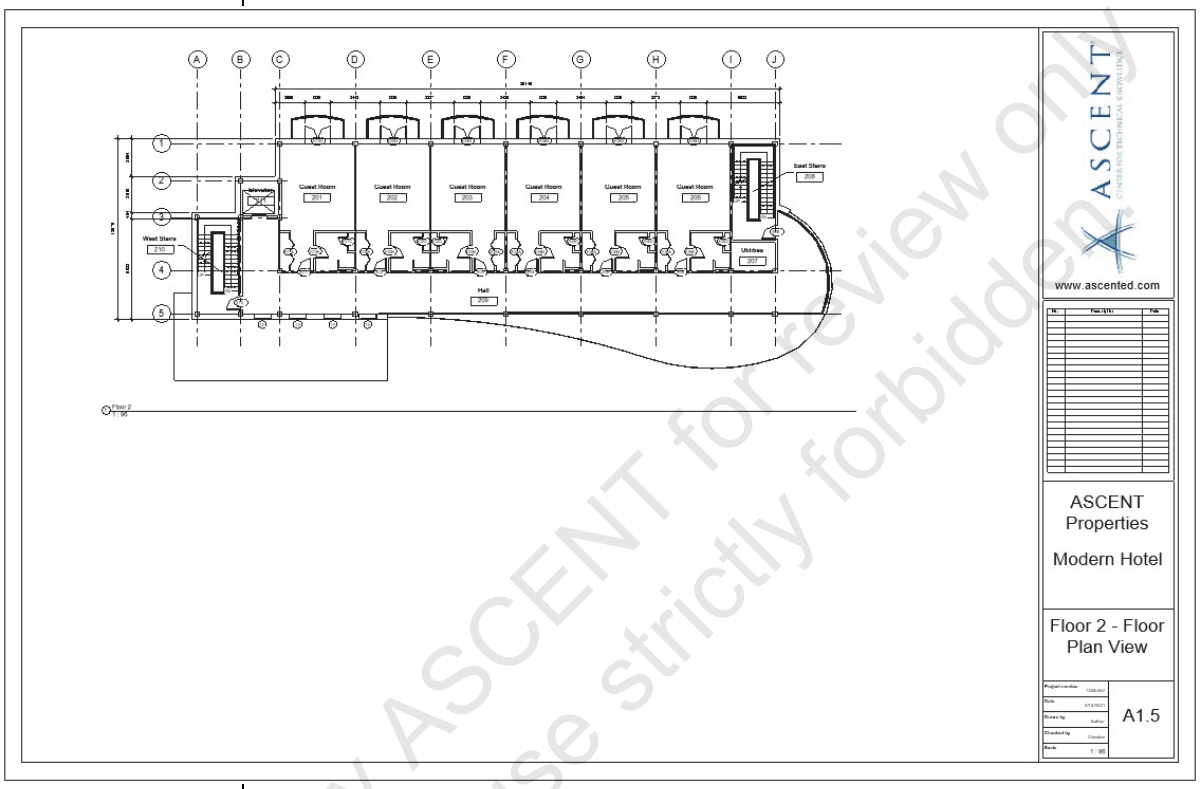


Figure 1–62

14. Save the project.

Task 3 - Practice viewing tools.

1. At the far right of the view tabs, expand Switch Windows and select **Floor 1**, as shown in Figure 1–63.

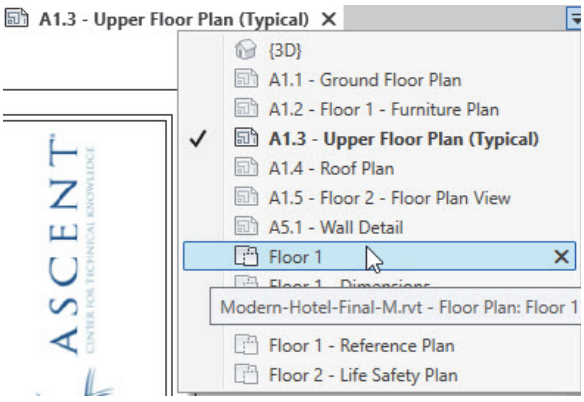


Figure 1–63

2. In the Navigation Bar, click and select **Zoom In Region** or type **ZR**. Zoom in on the stairs.
3. Pan to another part of the building by holding and dragging the middle mouse button or wheel. Alternatively, you can use the 2D Wheel in the Navigation Bar.
4. Double-click on the mouse wheel to zoom out to fit the extents of the view.
5. In the Quick Access Toolbar, click (Default 3D View) to open the default 3D view, as shown in Figure 1–64.

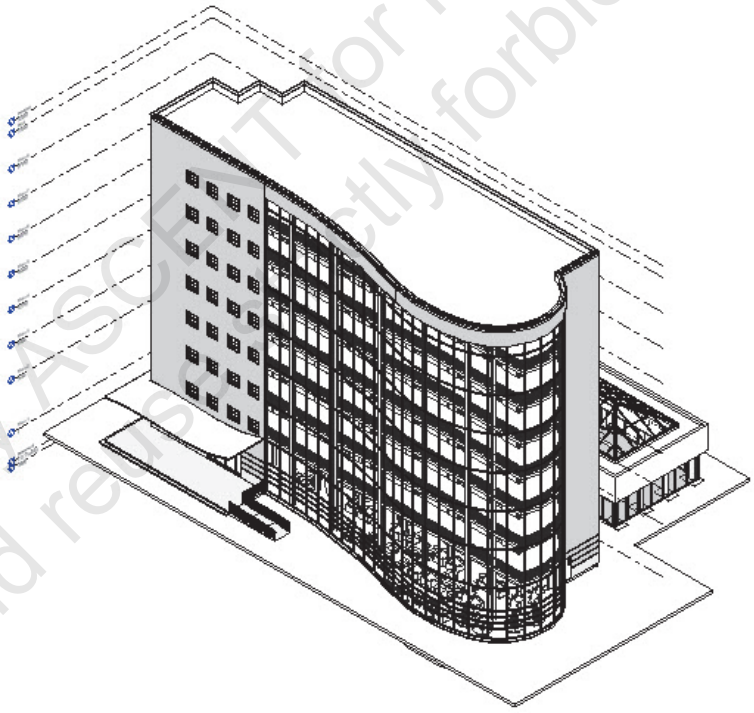


Figure 1–64

6. Hold <Shift> and use the middle mouse button or wheel to orbit the model in the 3D view.
7. In the View Control Bar, change the *Visual Style* to (Shaded). Then try (Consistent Colors). Which one works best when you view the back of the building?

The ViewCube is located in the upper right corner of the view.

8. Use the ViewCube to find a view that you want to use.
9. In the Project Browser, expand *3D Views* and right-click on the {3D} view and select **Rename...**. and type in a new name for the view as **3D Model**. Alternatively, you can slowly double click on the view name to rename the view.

10. Review the other 3D views that have already been created.

11. Press <Ctrl>+<Tab> to cycle through the open views.

12. In the Quick Access Toolbar, expand (Switch Windows) and select the **Modern-Hotel-Final-M.rvt - Floor Plan: Floor 1** view.

13. In the Quick Access Toolbar, click (Close Inactive Views). This closes all of the other windows except the one in which you are working.

14. In the Quick Access Toolbar, expand (Default 3D View) and click (Camera), as shown in Figure 1–65.

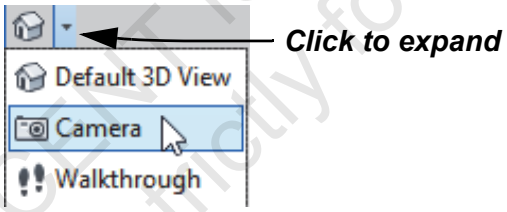


Figure 1–65

15. Click the first point near the Lobby room name and click the second point (target) outside the building, as shown in Figure 1–66.

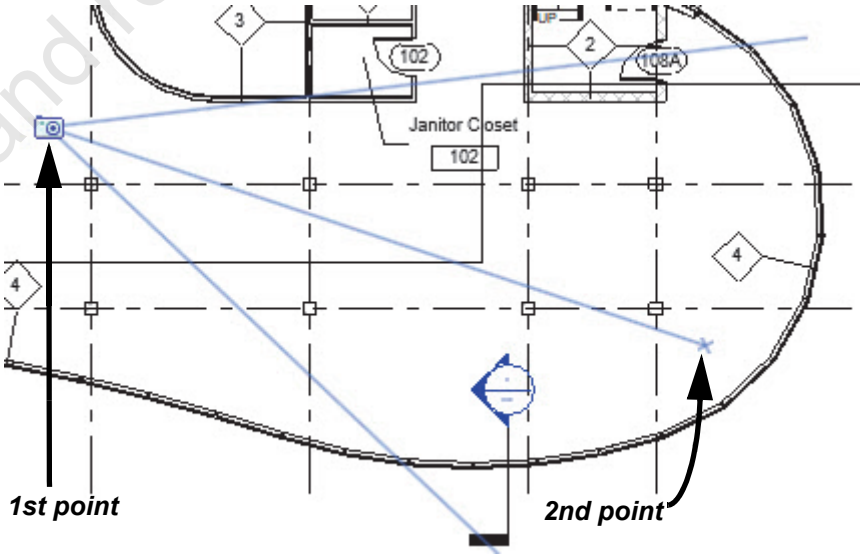


Figure 1–66

16. The furniture and planters display even though they did not display in the floor plan view.

17. In the View Control Bar, set the *Visual Style* to (Realistic).

18. In the Project Browser, right-click on the new camera view and select **Rename...**. Type **CAM Lobby Seating Area**.

19. In the Quick Access Toolbar, click  (Save) to save the project.

20. In the *File* tab, click  (Close). This closes the entire project.

Chapter Review Questions

1. When you create a project in the Autodesk Revit software, do you work in 3D or 2D ?
   a. You work in 2D in plan views and in 3D in non-plan views.
   b. You work in 3D almost all of the time, even when you are using what looks like a flat view.
   c. You work in 2D or 3D depending on how you toggle the 2D/3D control.
   d. You work in 2D in plan and section views and in 3D in isometric views.
2. What is the purpose of the Project Browser?
   a. It enables you to browse through the building project, similar to a walk through.
   b. It is the interface for managing all of the files that are required to create the complete architectural model of the building.
   c. It manages multiple Autodesk Revit projects as an alternative to using Windows Explorer.
   d. It is used to access and manage the views of the project.
3. Where do you change the Visual Style?
   a. Ribbon
   b. View Control Bar
   c. Options Bar
   d. Properties Palette
4. What is the difference between Type Properties and Properties?
   a. Properties stores parameters that apply to the selected individual element(s). Type Properties stores parameters that impact every element of the same type in the project.
   b. Properties stores the location parameters of an element. Type Properties stores the size and identity parameters of an element.
   c. Properties only stores parameters of the view. Type Properties stores parameters of model components.

5. When you start a new project, how do you specify the base information in the new file?
   a. Transfer the base information from an existing project.
   b. Select the right template for the task.
   c. The Autodesk Revit software automatically extracts the base information from imported or linked file(s).
6. What is the main difference between a view made using  (Default 3D View) and a view made using  (Camera)?
   a. Use Default **3D View** for exterior views and **Camera** for interiors.
   b. **Default 3D View** creates a static image and a **Camera** view is live and always updated.
   c. **Default 3D View** is isometric and a **Camera** view is perspective.
   d. **Default 3D View** is used for the overall building and a **Camera** view is used for looking in tight spaces.

Command Summary

Button	Command	Location
General Tools		
	**Home**	• Quick Access Toolbar • **Shortcut:** <Ctrl>+<D>
	**Modify**	• **Ribbon:** All tabs>Select panel • **Shortcut:** MD
	**New**	• • ***File* tab** • **Shortcut:** <Ctrl>+<N>
	**Open**	• **Quick Access Toolbar** • ***File* tab** • **Shortcut:** <Ctrl>+<O>
	**Open Documents**	• ***File* tab**
	**Properties**	• **Ribbon:** *Modify* tab>Properties panel • **Shortcut:** PP
	**Recent Documents**	• ***File* tab**
	**Save**	• **Quick Access Toolbar** • ***File* tab** • **Shortcut:** <Ctrl>+<S>
	**Synchronize and Modify Settings**	• **Quick Access Toolbar**
	**Synchronize Now**	• **Quick Access Toolbar**>expand Synchronize and Modify Settings
	**Type Properties**	• **Ribbon:** *Modify* tab>Properties panel • **Properties palette**
Viewing Tools		
	**Camera**	• **Quick Access Toolbar**> Expand Default 3D View • **Ribbon:** *View* tab>Create panel> expand Default 3D View
	**Close Inactive Views**	• **Quick Access Toolbar** • **Ribbon:** *View* tab> Windows panel
	**Default 3D View**	• **Quick Access Toolbar** • **Ribbon:** *View* tab>Create panel
	**Home**	• **ViewCube**
N/A	**Next Pan/Zoom**	• **Navigation Bar** • **Shortcut Menu**

N/A	**Previous Pan/Zoom**	• **Navigation Bar** • **Shortcut Menu** • **Shortcut:** ZP
	**Shadows On/Off**	• **View Control Bar**
	**Show Rendering Dialog/ Render**	• **View Control Bar** • **Ribbon:** *View* tab>Graphics panel • **Shortcut:** RR
	**Switch Windows**	• **Quick Access Toolbar** • **Ribbon:** *View* tab> Windows panel
	**Tab Views**	• **Ribbon:** *View* tab> Windows panel • **Shortcut: TW**
	**Tile Views**	• **Ribbon:** *View* tab> Windows panel • **Shortcut: WT**
	**Zoom All to Fit**	• **Navigation Bar** • **Shortcut:** ZA
	**Zoom in Region**	• **Navigation Bar** • **Shortcut Menu** • **Shortcut:** ZR
	**Zoom Out (2x)**	• **Navigation Bar** • **Shortcut Menu** • **Shortcut:** ZO
	**Zoom Sheet Size**	• **Navigation Bar** • **Shortcut:** ZS
	**Zoom to Fit**	• **Navigation Bar** • **Shortcut Menu** • **Shortcut:** ZF, ZE
Visual Styles		
	**Consistent Colors**	• **View Control Bar**:
	**Hidden Line**	• **View Control Bar** • **Shortcut:** HL
	**Realistic**	• **View Control Bar**
	**Shaded**	• **View Control Bar** • **Shortcut:** SD
	**Wireframe**	• **View Control Bar** • **Shortcut:** WF