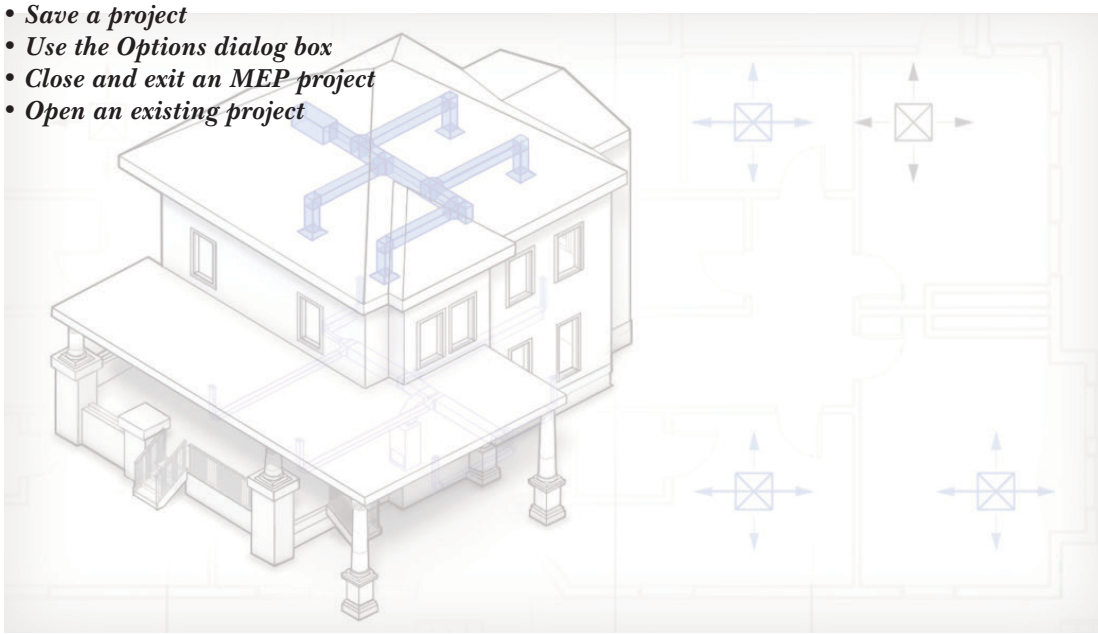
Chapter 2

Getting Started with an MEP Project

Learning Objectives

After completing this chapter, you will be able to:

- *Understand the essentials of an MEP project*
- *Start a new project*
- *Set the units of various measurement parameters in a project*
- *Use project templates*
- *Understand the concept of snaps, dimensions, and object snaps*
- *Save a project*
- *Use the Options dialog box*
- *Close and exit an MEP project*
- *Open an existing project*



OVERVIEW OF A BIM-MEP PROJECT

In BIM environment, a project is delivered as an integrated model comprising elements of various disciplines such as Architecture, Mechanical, Electrical, Plumbing, Structure, and Coordination. This means that the project file that you create will contain all the information related to building design from geometry to various construction documentations such as schedules and legends. Generally, this information includes the details of the building elements like walls, doors, windows, beams, columns, ducts, pipes, equipment, fixtures, and others. The information in the project also includes different views of the project, working drawings created from the building elements, and the documentation related to design of the model.

In Revit, you can generate different views such as plan, elevation, and sections from a 3D building project. These views are associative in nature which means when you change the building design in one view, it is propagated throughout the project.

In Revit, the project file in which you will create the MEP project is based on a Revit Template File (*.rte*). This template provides initial settings for the project such as its units, material used, and display settings. You can customize the default settings of a project as required. The basic template file has predefined information and settings for a project.

Generally, each organization has its own standard of working in a building project. Based on the standard, a user can customize the template and then save it for further use.



Tip

It is recommended to follow a slower approach to set up a project and give more time to create the standard template for practice and to organize the structure of the required components in a project. This helps in carrying out the project smoothly and efficiently.

ESSENTIALS FOR AN MEP PROJECT

Before starting up an MEP Project, there are some essential tips that are recommended to be followed for smooth functioning of a project. The essential tips are as follows:

Arrange a BIM Project Kick-off Meeting. It is recommended to arrange a BIM project kick-off meeting for the people involved in all disciplines and the BIM modeler. This meeting is essential as it brings all the people involved in the project in a single platform and provides everyone an opportunity to share the information about the expectation of the clients and the firms from the building model. Also, the information is shared on the expected Level of Development (AIA Document E202) of the building model.

Establish a common Project Settings and Project Goal. It is required to establish project settings and goals before starting up a new project in Revit. Following are the project settings and goals that you need to establish for the MEP project: File Structure, Shared Coordinates, and project milestones.

Communicate with the Architects. Since the architects have been using Revit for a long time, it is required to communicate with those who are involved in the project regarding the design.

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STARTING A NEW MEP PROJECT

File Menu: New > Project
Shortcut Key: CTRL+N

To start a new MEP project in Revit 2021, choose **Start> Autodesk > Revit 2021 > Revit 2021** (for Windows 10) or double-click on the Revit 2021 icon available on desktop; the Autodesk Revit interface will be displayed. Next, choose **New > Project** from the **File** menu, as shown in Figure 2-1; the **New Project** dialog box will be displayed, as shown in Figure 2-2.

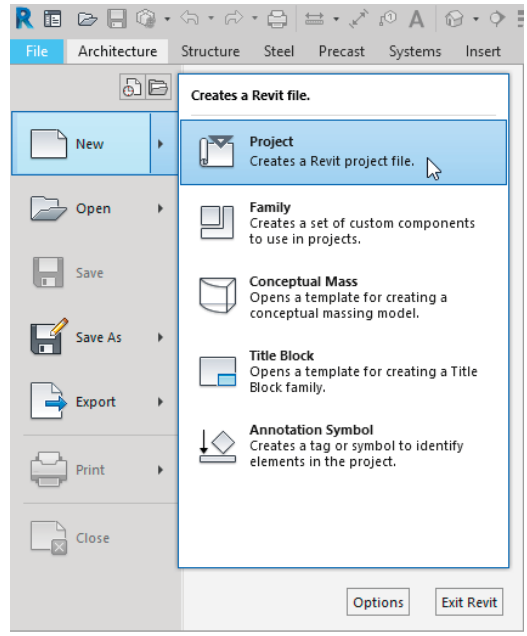

Figure 2-1 *Choosing the* ***Project*** *option from the* ***File*** *menu*

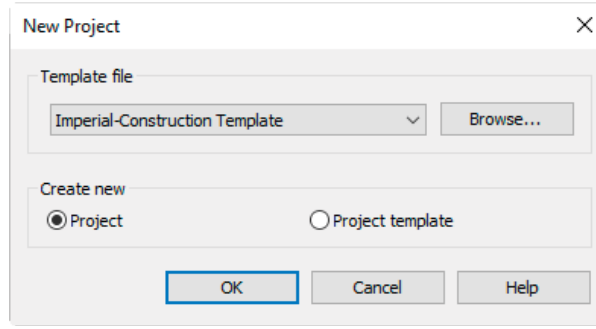

Figure 2-2 *The* ***New Project*** *dialog box*

In this dialog box, the **Imperial-Construction Template** option is selected by default in the drop-down list in the **Template file** area. As a result, the new project will adopt the settings of the *Imperial-Construction-Default* template file. Alternatively, you can select any of the following options from the drop-down list in the **Template file** area: **Imperial-Architectural Template**, **Imperial-Structural Template**, **Imperial-Mechanical Template**, and **<None>**.

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Note

The selection of the option from the drop-down list depends on the MEP discipline or discipline that you are going to work within the project.



Tip

*For an MEP project, it is recommended to start with the **Systems.rte** template file. To use this file, you need to select the **Systems Template** option from the drop-down list in the **Template file** area of the **New Project** dialog box. The **Systems.rte** template file provides a useful set up for all the disciplines such as Mechanical, Electrical, and Plumbing.*

A template file has various project parameters saved in it such as units, views, and so on. When you apply the template file to a new project, it will adopt the same parameters as that of the template file. The difference between a template file format and a project file format is that the former has a *.rte* extension, whereas the latter has a *.rvt* extension. You can either select any of the template files provided in Revit or create your own template file. You can also save any project file as a template file.

You can select a file as template by choosing the **Browse** button in the **Template file** area of the **New Project** dialog box. On doing so, the **Choose Template** dialog box will be displayed. In this dialog box, you can browse to the specified file location and select the desired template file. After selecting the template file, choose the **Open** button; the **Choose Template** dialog box will be closed and the selected file will be displayed as an option in the drop-down list that is displayed in the **Template file** area of the **New Project** dialog box.

In the **New Project** dialog box, you can select the **Project** radio button to create a new project. Alternatively, you can select the **Project template** radio button to start with a new project template.

After specifying the various options in the **New Project** dialog box, choose the **OK** button; the **New Project** dialog box will be closed and the Revit project interface will be displayed with the applied settings.

PROJECT UNITS

Ribbon: Manage > Settings > Project Units
Shortcut Key: UN



Units are important parameters of a project as they provide a standard of measurement for different entities. While installing Revit, you are prompted to set the Imperial (feet and inches) or Metric (meter) unit as the default unit system. Setting a default unit system helps you start your project with a specific type of unit. To set units, choose the **Project Units** tool from the **Settings** panel; the **Project Units** dialog box will be displayed, as shown in Figure 2-3. Under the **Units** column in this dialog box, you can specify various units that are relevant to the building project.

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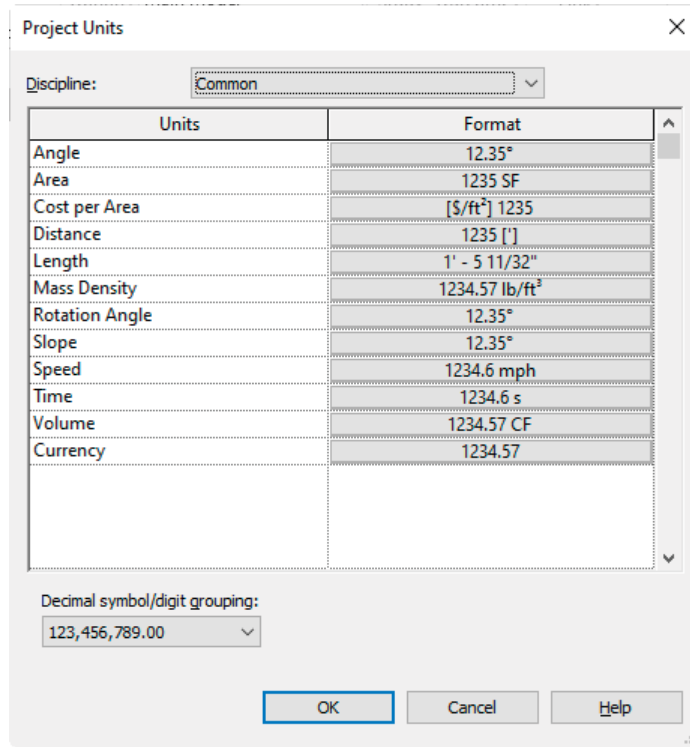


Figure 2-3 *The* ***Project Units*** *dialog box*

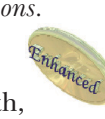
In the **Project Units** dialog box, units are grouped into six disciplines: **Common**, **Structural**, **HVAC**, **Electrical**, **Piping**, **Infrastructure**, and **Energy**. Each discipline has a set of measurement parameters. You can select any of these disciplines from the **Discipline** drop-down list in the **Project Units** dialog box. The **Format** column in this dialog box displays the current unit format for the corresponding parameter in the **Units** column. You can preview and select the possible digit grouping and decimal separators from the **Decimal symbol/digit grouping** drop-down list, which is at the lower left corner of the dialog box. Some of the disciplines that are used in MEP projects are discussed next.



Note

The values for different parameters displayed in the ***Format*** *column of the* ***Project Units*** *dialog box may differ depending upon the type of unit system, Imperial or Metric, selected for the project. In this textbook, the Imperial unit system has been used in the tutorials and illustrations.*

Common Unit Type



The **Common** unit type used in an MEP project includes the parameters such as length, volume, angle, slope, and so on. In the **Project Units** dialog box, the **Common** option is selected by default in the **Discipline** drop-down list, refer to Figure 2-3. The **Common** unit type used in Revit is similar to that used in other Revit platforms. Moreover, the settings of the parameters of common units are similar to those used in other CAD programs. The methods of setting various parameters under the **Common** unit type are discussed next.

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Setting Length Units

In an MEP project, you can assign a unit for the measurement of length. To do so, click on the field corresponding to the **Length** parameter in the **Format** column of the **Project Units** dialog box; the **Format** dialog box will be displayed. This dialog box displays the units of length and their settings, as shown in Figure 2-4. Select the required unit from the **Units** drop-down list in the dialog box: **Decimal feet**, **Feet and fractional inches**, **Decimal inches**, **Fractional inches**, **Meters**, **Decimeter**, **Centimeters**, **Millimeters**, and **Meters and centimeters** and so on. After selecting the desired unit, you can specify the rounding value for the selected unit. To do so, select the desired option from the **Rounding** drop-down list. For units other than **Feet and fractional inches**, **Fractional inches**, and **Meters and centimeters**, you can specify custom rounding value using the **Rounding increment** edit box placed next to the **Rounding** drop-down list. This edit box is inactive by default. To make it active, first select any option from the **Units** drop-down list and then the **Custom** option from the **Rounding** drop-down list. Once the **Rounding increment** edit box is activated, you can specify the desired rounding value in it for the selected unit.

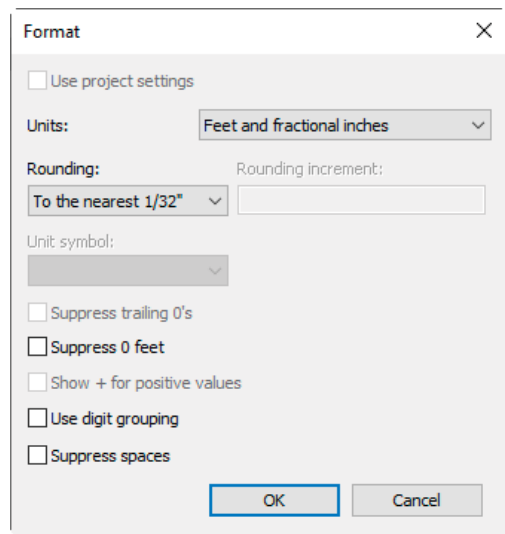

***Figure 2-4** The **Format** dialog box*

The **Unit symbol** drop-down list will be inactive if the **Feet and fractional inches**, **Fractional inches**, or **Meters and centimeters** option is selected from the **Units** drop-down list. Once you make the **Unit symbol** drop-down list active, you can select the desired option from it to specify the measurement symbol to be used along with the unit of length in a project. For example, to use the symbol 'm' after you select the **Meters** option from the **Units** drop-down list, select **m** from the **Unit symbol** drop-down list as the measurement symbol. You can select the **Suppress spaces** check box for the **Feet and fractional inches** option to remove all spaces around the dash from the length strings.

Setting Area Units

In the **Project Units** dialog box, you can assign a unit to the measurements of areas. To do so, click on the field corresponding to the **Area** parameter in the **Format** column of the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, you can set the unit for measuring the area by using the options in the **Units** drop-down list. This drop-down

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list contains various options for the units of area such as **Square feet**, **Square meters**, **Acres**, and so on. By default, the **Square feet** option is selected in this drop-down list, if the **Imperial** units system is selected at the time of installing Revit. The settings for rounding, rounding increment, and unit symbol for the area units can be made from their respective drop-down lists and edit box.



Tip

*While selecting a rounding value from the **Rounding** drop-down list in the **Format** dialog box, you should consider the extent of detailing required for the project. For projects that require too much detailing, a lower rounding value may be set. This parameter, however, can be modified at any time during the project development.*

Setting the Volume Units

Similar to setting the units for the length and area, you can set units for volume. To set unit for the volume measurement, click in the field of the **Format** column corresponding to the **Volume** parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, click in the **Units** drop-down list and select any of the following options: **Cubic yards**, **Cubic feet**, **Cubic meters**, **Liters**, and so on. After selecting a suitable option from the **Units** drop-down list, choose the **OK** button; the **Format** dialog box will be closed and the selected unit for the volume measurement will be displayed in the field of the **Format** column corresponding to the **Volume** parameter in the **Project Units** dialog box.

Setting the Angle Units

You can specify the unit for the angle measurement by selecting the required option from the **Units** drop-down list in the **Format** dialog box for the **Angle** parameter.

Setting the Slope Units

To specify the unit for the slope measurement, click on the field corresponding to the **Slope** parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, you can specify the desired unit by selecting it from the **Units** drop-down list. The **Units** drop-down list contains options such as **Ratio : 12**, **Ratio : 10**, **Rise / 12"**, **Rise / 1'-0"**, **Rise / 1000mm**, **Decimal degrees**, and **Percentage**. By default, **Rise / 12"** is selected as unit for the slope measurement, if the **Imperial** unit system is set while installing Revit.

Setting the Currency Units

In Revit, you can set the unit for currency as well. To do so, click on the field corresponding to the **Currency** parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, select the required currency symbol and rounding value from the **Unit symbol** and **Rounding** drop-down lists, respectively.

Setting the Mass Density Units

In Revit, you can set the unit for mass density. To do so, click on the field corresponding to the **Mass Density** parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, you can specify the desired unit by selecting it from the **Units** drop-down list. The **Unit** drop-down list contains options such as **Kilogram per cubic meter** and **Pound per cubic foot** for mass density measurement. By default, the **Pound per cubic meter** option is selected in this drop-down list, if you had selected the **Imperial** unit system at the time of Revit installation. The settings for the parameters of the rounding, rounding increment, and units symbol can be set by selecting the required option from the respective drop-down lists.

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Setting the Rotation Angle Units

In Revit, you can set the unit for rotation angle. To do so, click on the field corresponding to the **Rotation Angle** parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, you can specify the desired unit by selecting it from the **Units** drop-down list. The **Unit** drop-down list contains options such as **Degrees**, **Gradians**, **Multiples of n**, **Radians** for rotation angle measurement. By default, the **Degrees** option is selected in this drop-down list. Also, in the **Format** dialog box, the settings for the parameters of the rounding, rounding increment, and unit symbol can be specified by selecting the required option from the respective drop-down lists.

Setting the Cost per Area Units

In Revit, you can set the unit for cost per area. To do so, click on the field corresponding to the **Cost per Area** parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, you can specify the desired unit by selecting it from the **Units** drop-down list. The **Unit** drop-down list contains options such as **Cost per square foot** and **Cost per square meter.** By default, the **Cost per square foot** option is selected in this drop-down list, if you had selected the **Imperial** unit system at the time of Revit installation. Also, in the **Format** dialog box, the settings for the parameters of the rounding, rounding increment, and unit symbol can be specified by selecting the required option from the respective drop-down lists.

Setting the Speed Units

In Revit, you can set the unit for speed. To do so, click on the field corresponding to the **Speed** parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, you can specify the desired unit by selecting it from the **Units** drop-down list. The **Units** drop-down list contains options such as **Miles per hour**, **Feet per minute**, **Feet per second**, **Kilometers per hour**, **Meters per second**, and **Centimeters per minute** for the measurement of speed. By default, the **Miles per hour** option is selected in this drop-down list, if you had selected the **Imperial** unit system at the time of Revit installation. Also, in the **Format** dialog box, the settings for the parameters of the rounding, rounding increment, and unit symbol can be specified by selecting the required option from the respective drop-down lists.

Setting the Time Units

In Revit, you can set the unit for time. To do so, click on the field corresponding to the **Time** parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, you can specify the desired unit by selecting it from the **Units** drop-down list. The **Units** drop-down list contains options such as **Hours**, **Milliseconds**, **Minutes**, **Hours**, and **Seconds** for speed measurement. By default, the **Seconds** option is selected in this drop-down list, if you had selected the **Imperial** unit system at the time of Revit installation. Also, in the **Format** dialog box, the settings for the parameters of the rounding, rounding increment, and unit symbol can be specified by selecting the required option from the respective drop-down lists.



Note

*You can format only the display of units on the screen or in the printout using the **Project Units** dialog box. The actual values for these units in the project may be different. For example, if you set the wall length rounding to the nearest value 1', the wall may show this rounded value, but the actual length of the wall might be in fractional feet.*

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HVAC Unit Type

HVAC units are commonly used while working in the Mechanical discipline of an MEP Project. Some of the frequently used HVAC units are Density, Power, Pressure, Velocity, Air Flow, and more. In Revit, you can set the HVAC units in the **Project Units** dialog box. To do so, select the **HVAC** option from the **Discipline** drop-down list in the **Project Units** dialog box, as shown in Figure 2-5. Some of the important HVAC units are discussed next.

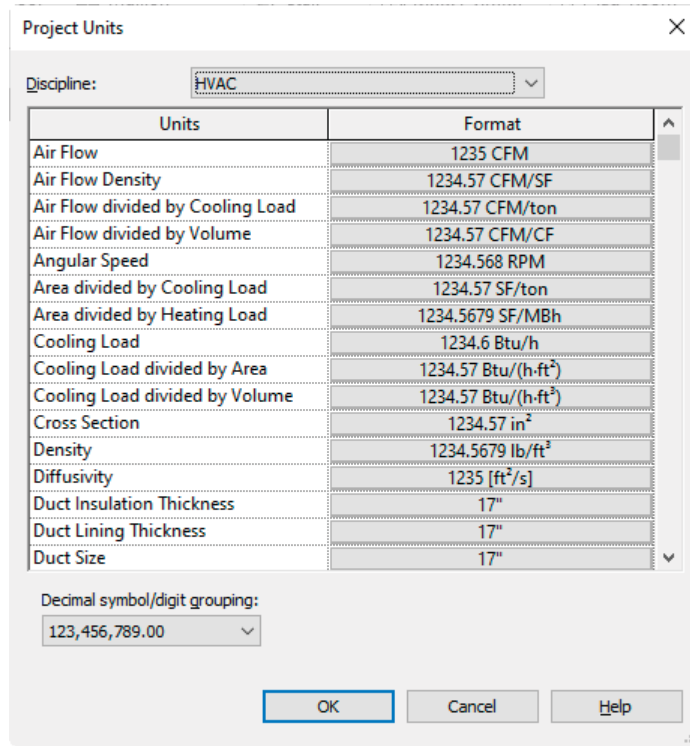

Figure 2-5 *The* ***Project Units*** *dialog box with the* ***HVAC*** *option selected in the* ***Discipline*** *drop-down list*

Setting the Unit for Power

To specify the unit for the power used for various HVAC units, click on the field corresponding to the **Power** parameter in the **Format** column; the **Format** dialog box will be displayed. In this dialog box, specify a unit by selecting the required option from the **Units** drop-down list. The **Units** drop-down list contains the options such as **Watts, Kilowatts**, **BTU (British Thermal Units) per second**, **BTU (British Thermal Units) per hour**, and so on. For the **Imperial** unit setting, **BTU (British Thermal Units) per hour** is the default option selected in the drop-down list. For the **Metric** unit setting, **Watts** is the default option selected in the drop-down list.

Setting the Unit for Pressure

The pressure in an HVAC system implies the static pressure of the system and of the air flowing inside the duct. To specify unit for the pressure, click on the field corresponding to the **Pressure** parameter in the **Format** column of the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, specify the desired unit by selecting an option from the **Units** drop-down list. The **Units** drop-down list contains options such as **Inches of water(60 °F)**,

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Pascals, **Kilopascals**, **Megapascals**, **Bars**, and so on. The default unit selected for the **Imperial** unit setting in the drop-down list is **Inches of water(60 °F)**. The default unit selected for the **Metric** unit setting in the drop-down list is **Pascals**.

Setting the Unit for Air Flow

The **Air Flow** parameter specifies the flow rate of the air flowing in the ducts in an HVAC system. In Autodesk Revit, to set the unit for the **Air Flow** parameter, choose the button corresponding to this parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, you can select various options such as **Cubic feet per minute**, **Liters per second**, **Cubic meters per second**, and so on. The default unit selected for the **Imperial** unit system for this parameter is **Cubic feet per minute**. The default unit selected for the **Metric** unit setting in the drop-down list is **Liters per second**.

Setting the Unit for Heating Load

The **Heating Load** parameter specifies the heating load of the space for which the HVAC system has to be designed. To set the unit for the **Heating Load** parameter, choose the button corresponding to this parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, you can select any option such as **Watts**, **Kilowatts**, **BTU (British Thermal Units) per second**, **BTU (British Thermal Units) per hour**. The default unit selected in the imperial unit system for this parameter is **BTU (British Thermal Units) per hour**. For the **Metric** unit setting, **Watts** is the default option selected in the drop-down list.

Electrical Unit Type

Electrical units are commonly used while working in the Electrical discipline of an MEP Project. Some of the frequently used Electrical units are Current, Electrical Potential, Frequency, Illuminance, and more. To specify these units, invoke the **Project Units** dialog box and then select the **Electrical** option from the **Discipline** drop-down list. Some of the frequently used Electrical units are discussed next.

Setting the Unit for Illuminance

The Illuminance in an Electrical system refers to the measurement of the illumination of the surface. To specify unit for the illuminance, click on the field corresponding to the **Illuminance** parameter in the **Format** column of the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, specify the desired unit for the illuminance by selecting an option from the **Units** drop-down list. The **Units** drop-down list contains two options **Footcandles** and **Lux**. The default unit selected for the **Imperial** unit setting in the drop-down list is **Footcandles**. For the **Metric** unit setting, **Lux** is the default option selected in the drop-down list.

Setting the Unit for Electrical Potential

In the Electrical discipline, the Electrical Potential refers to the potential difference of two points in the distribution. Generally, it is the voltage of the electrical supply to the equipment. In Autodesk Revit, to set the unit for the **Electrical Potential** parameter, choose the button corresponding to this parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, you can select the required option from the various options provided such as **Volts**, **Kilovolts**, and **Millivolts**. The default unit selected in the **Imperial** and **Metric** unit systems is **Volts**.

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Setting the Unit for Demand Factor

The Demand factor for an electrical system is the ratio of the maximum electrical load required in given time period to the maximum possible electrical load available. In Autodesk Revit, to set the unit for the **Demand Factor** parameter, choose the button corresponding to this parameter in the **Project Units** dialog box; the **Format** dialog box will be displayed. From this dialog box, you can select any of the two available options: **Percentage** and **Fixed**. The default unit selected for the **Imperial** and **Metric** unit systems is **Percentage**.

Piping Unit Type

Piping units include units for Density, Flow rate, Pressure, Velocity, and so on. In Revit, you can set the piping units in the **Project Units** dialog box. To do so, select the **Piping** option from the **Discipline** drop-down list in the **Project Units** dialog box. Some of the piping units are discussed next.

Setting the Unit for Flow

The flow in the piping system implies the flow rate of the water or fluids. To specify unit for flow, click on the field corresponding to the **Flow** parameter in the **Format** column of the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, specify the desired unit for the flow by selecting an option from the **Units** drop-down list. The **Units** drop-down list contains options such as **US gallons per minute**, **US gallons per hour**, **Cubic meters per hour**, and so on. The default unit selected for the **Imperial** unit setting in the drop-down list is **US gallons per minute**. For the **Metric** unit setting, **Liters per second** is the default option selected in the drop-down list.



Tip

*In Revit, you can also select the piping flow unit as **Liters per minute**.*

Setting the Unit for Velocity

The velocity in the piping system implies the velocity of water or fluids. To specify unit for velocity, click on the field corresponding to the **Velocity** parameter in the **Format** column of the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, specify the desired unit for the flow by selecting an option from the **Units** drop-down list. The **Units** drop-down list contains options such as **Feet per second** and **Meters per second**. The default unit selected for the **Imperial** unit setting in the drop-down list is **Feet per second**. For the **Metric** unit setting, **Meters per second** is the default option selected in the drop-down list.

Setting the Unit for Pipe Size

The pipe size in the piping system implies the size of the pipes used in the piping distribution system. To specify unit for pipe size, click on the field corresponding to the **Pipe Size** parameter in the **Format** column of the **Project Units** dialog box; the **Format** dialog box will be displayed. In this dialog box, specify the desired unit for the pipe size by selecting an option from the **Units** drop-down list. The **Units** drop-down list contains options such as **Fractional inches**, **Decimal inches**, **Decimal feet**, and more. The default unit selected for the Imperial unit setting in the

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drop-down list is **Fractional inches**. For the **Metric** unit setting, **Millimeters** is the default option selected in the drop-down list.

PROJECT TEMPLATES

Project templates are commonly known as template files. These files contains predefined settings for projects for the display of annotations, graphics, and so on. In a project, these files contain predefined settings for units, mechanical components, electrical components, and piping components. Similarly, for the display of graphics, the template files contain predefined settings for materials, line styles, line weights, line patterns, and various symbols relevant to the MEP project.

When you install the Revit software, you will find in-built templates that are saved with *.rte* as file extension. You can also create your own template based on the project requirement. In Revit, any new template-based project inherits all families, settings (such as units, fill patterns, line styles, line weights, and view scales), and geometry from the template.

The use of template file is quite extensive and it helps in reducing the cycle time of a project. In the following sections, you will learn to create custom templates and then to use them in a structural project.

Creating a Custom Project Template

In Revit, there are various methods to create a custom project template. The common method is to open an existing template file and modify its settings based on the project requirement and then save it as a different template file. You can also create a custom project template by starting a blank project file, defining all settings such as naming the viewports, creating levels, adding grids, and others, and then saving it as a template (.rte) file. For certain projects, you can create a template file which includes geometry that can be used repeatedly as a base for the new projects. For example, if you have defined geometry for a hospital project and want to include this geometry whenever you start a new project, you can save the file that includes this geometry as a template. Each time you open a project with this template, the geometry will be included.

Creating a New Template from a Blank Project File

In Revit, you can create a new template file from a blank project file or use any of the default template files (*Mechanical-Default.rte*, *Electrical-Default.rte*, *Plumbing-Default.rte*, and *Systems-Default.rte*). To create a template file from a blank project file, choose **New > Project** from the **File** menu; the **New Project** dialog box will be displayed. In the **Template file** area of this dialog box, select the **None** option from the drop-down list. Next, select the **Project template** radio button in the **Create new** area and choose the **OK** button; the **Undefined System of Measurement** message box will be displayed, prompting you to select the system of measurement that you want to use in your project, as shown in Figure 2-6. You can select the **Imperial** or **Metric** option from this message box. If you choose the **Imperial** option, a template file containing all default unit settings for the Imperial unit system will open. Similarly, if you select the **Metric** option, the template file containing default units for the **Metric** system will open. After opening the template file, you can modify its existing settings based on your project environment and then save the modified file as a template file. To do so, choose **Save As > Template** from the **File** menu; the **Save As** dialog box will be displayed. In this dialog box, select a folder from the **Save in** drop-down list and enter a name for the template file in the **File name** edit box. Note that the **Template Files (*.rte)** option is selected from the **File of type** drop-down list. After entering the file name, choose the **Save** button; the template file will be saved with the settings defined in the blank project file.

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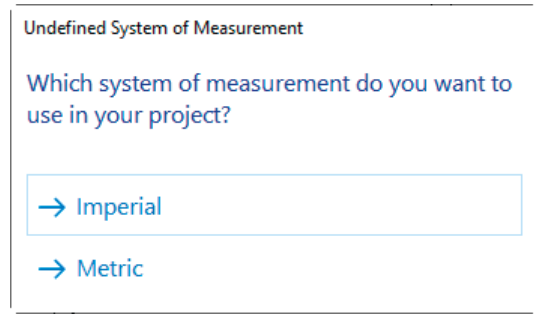

Figure 2-6 *The* ***Undefined System of Measurement*** *message box*

Note

You can also select the default template file, ***Systems-Default.rte****, to create a new template file for a blank project. To do so, select the* ***Systems Template*** *option from the drop-down list in the* ***Template file*** *area of the* ***New Project*** *dialog box, and then choose the* ***OK*** *button.*

Creating a New Project Template from an Existing Project Template

To speed up your project, you may be required to use predefined template files. These template files contain predefined information or settings pertaining to the project you need to start. To use these template files, choose **New > Project** from the **File** menu; the **New Project** dialog box will be displayed. In this dialog box, ensure that the **Project template** radio button in the **Create new** area is selected. Now, to select the desired template file for your project, choose the **Browse** button; the **Choose Template** dialog box will be displayed. In this dialog box, browse to the desired folder to locate the template file. Next, select the template file from the folder and choose the **Open** button; the **Choose Template** dialog box will close and the **New Project** dialog box will be displayed again. Choose the **OK** button; a new project file will open, which inherits all project settings from the selected template file.

Settings for the Project Template



While creating a project template, you can predefine certain settings based on your project requirement. To start a new project template, you need to fill in the information specific to the project. The information includes the name of the project, project number, client's name, and so on. This information is useful while publishing or plotting the drawing. Next, you need to enter the project settings. These settings include units, snaps, the line styles for components and lines, fill patterns for materials, and more.

After modifying the project settings, you can create settings for families. The families in a project template can be system families and loaded families. While defining the settings for the project template, you can modify or duplicate system families (for example, walls) as required for the project. You can also load the commonly used families, user-defined families, and title blocks. After setting families in the project template, you can modify or create settings for project views. The other settings that can be made for the project template are visibility/graphics settings, and the plot (Print) settings. The settings for the project information are discussed in the next section.

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Setting the Project Information

When you create a project template, you can also set the project information. To do so, choose the **Project Information** tool from the **Settings** panel of the **Manage** tab; the **Project Information** dialog box will be displayed, as shown in Figure 2-7.

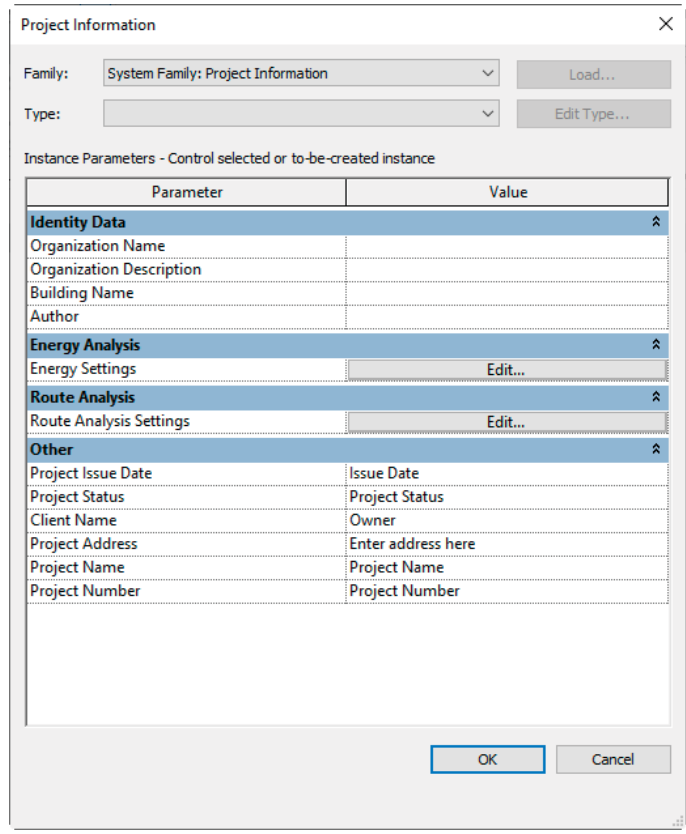

Figure 2-7 *The* ***Project Information*** *dialog box*

In this dialog box, you can specify various settings related to the project information. To enter information regarding the organization name, organization description, building name, and author of the project, click on the value fields of their corresponding parameters and enter appropriate values in them.

Similarly, to edit the energy setting of the project, choose the **Edit** button in the value field under the **Value** column of the **Energy Settings** parameter; the **Energy Settings** dialog box will be displayed. In this dialog box, you can specify various settings related to the type of the building, site location of the building, and the level that will represent the ground plane of the site. To do so, click on the value fields corresponding to the **Ground Plane** and **Other Options** parameters in **Value** column and specify the desired values in them. On choosing the **Edit** button corresponding to the **Other Options** parameter, the **Advanced Energy Settings** dialog box will be displayed. In this dialog box, you can specify various parameters under the **Detailed Model** head to set the level of detail of the MEP model for the purpose of exporting it to a third party software or use it for energy analysis. In the **Advanced Energy Settings** dialog box, you can also set various parameters for the energy model of MEP project under the **Building Data**,

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Room/Space Data, and **Material Thermal Properties** heads. Next, choose the **OK** button; the **Advanced Energy Settings** dialog box will be closed and the **Energy Settings** dialog box will be displayed. In this dialog box, choose the **OK** button; the **Project Information** dialog box will be displayed. In this dialog box, you can enter information regarding the start date or the issue date of the project. To do so, click on the value field corresponding to the **Project Issue Date** parameter in the **Value** column and enter a valid date. Similarly, to specify the status of the project, click on the value field corresponding to the **Project Status** parameter in the **Value** column and specify a valid status of the project.

To specify the location of the project, click in the **Value** field of the **Project Address** parameter; a browse button will be displayed. Choose the browse button; the **Edit Text** dialog box will be displayed. In the text area of this dialog box, specify the location and choose the **OK** button; the location of the project will be updated. Next, specify the name and number of the project in the **Value** fields of the **Project Name** and **Project Number** parameters, respectively.

In the **Project Information** dialog box, you can specify the settings for the route analysis. To do so, choose the **Edit** button corresponding to the **Route Analysis** parameter; the **Route Analysis Settings** dialog box will be displayed. In this dialog box, you can specify settings related to route analysis such as defining the obstacles in the path to defining the extent vertical extent of the analysis zone. After specifying the required settings choose the **OK** button; the **Route Analysis Settings** dialog box will be closed and the **Project Information** dialog box will be displayed.

Now, after specifying the appropriate information in the **Project Information** dialog box, choose the **OK** button; the **Project Information** dialog box will close and the specified project information will be updated.

In addition to the parameters discussed in the **Project Information** dialog box, you can add more parameters for entering project information. These parameters can be a local parameter or a shared parameter. To add a local parameter, choose the **Project Parameters** tool from the **Settings** panel of the **Manage** tab; the **Project Parameters** dialog box will be displayed. Choose the **Add** button from this dialog box; the **Parameter Properties** dialog box will be displayed, as shown Figure 2-8.

In the dialog box, ensure that the **Project parameter** radio button is selected in the **Parameter Type** area of this dialog box. Next, in the **Categories** area, ensure that the **Architecture** option is selected in the **Filter list** drop-down list. Also in the list box of this area, select the **Project Information** check box. In the **Parameter Data** area, enter the name of the parameter data in the **Name** edit box. For example, you can specify **MEP Consultant** as the name of the parameter data. Next, you need to assign a discipline for the new parameter. To do so, select an appropriate option from the **Discipline** drop-down list. For example, to assign a discipline for the **MEP Consultant** parameter, ensure that the **Common** option is selected in the **Discipline** drop-down list. To assign type and group for the **MEP Consultant** parameter, select the **Text** and **Other** options from the **Type of Parameter** and **Group parameter under** drop-down lists. Next, choose the **OK** button twice; the **Parameter Properties** and the **Project Parameter** dialog boxes will be closed and the **MEP Consultant** parameter will be added in the **Project Information** dialog box. Figure 2-9 shows the **Project Information** dialog box for the project information with **MEP Consultant** as the added parameter.

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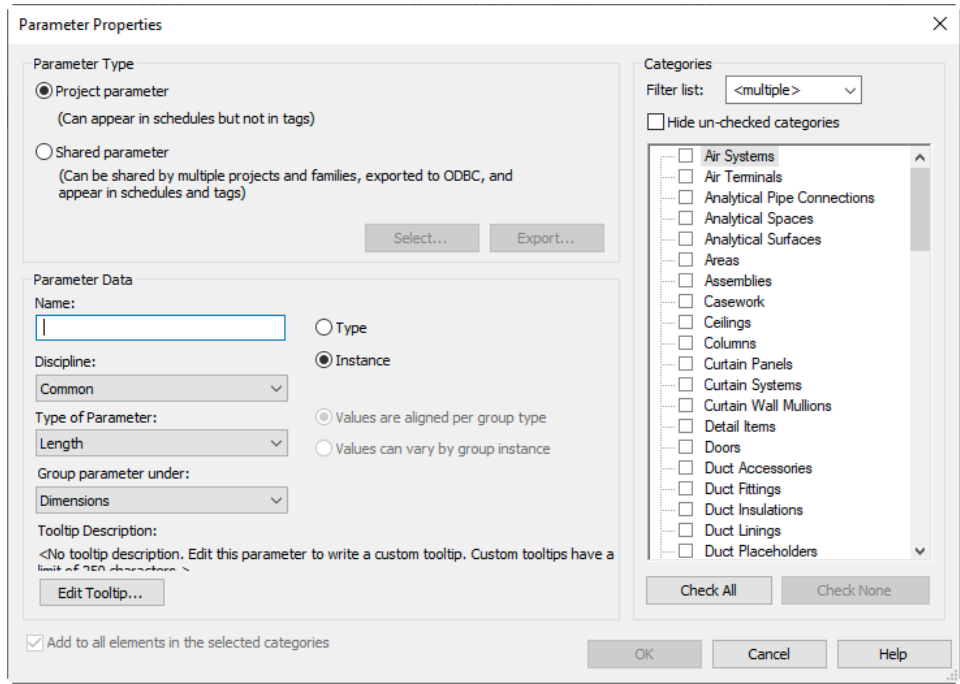

Figure 2-8 *The* ***Parameter Properties*** *dialog box*

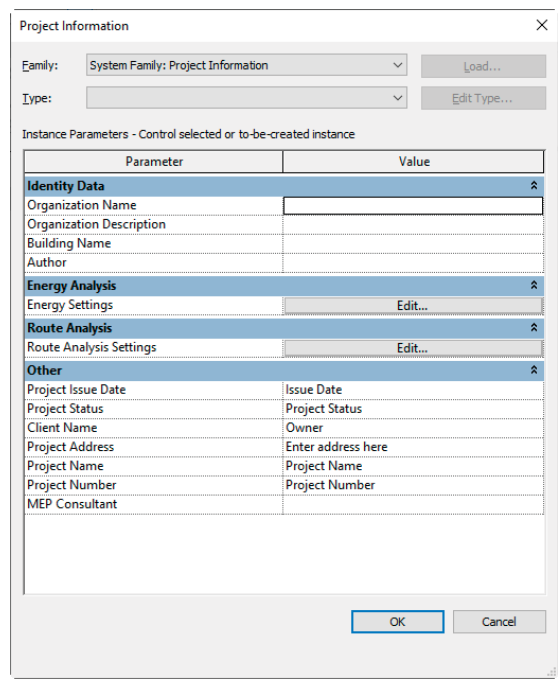

Figure 2-9 *The* ***Project Information*** *dialog box with the* ***MEP Consultant*** *parameter added to it*

Setting the Project Location

For every project in MEP, you need to define its geographical location (azimuth), which includes the latitude and longitude of the nearest city and the coordinate system of the host model and the linked model (if present). To do so, choose the **Location** tool from the **Project Location** panel of the **Manage** tab; the **Location Weather and Site** dialog box will be displayed, as shown in Figure 2-10.

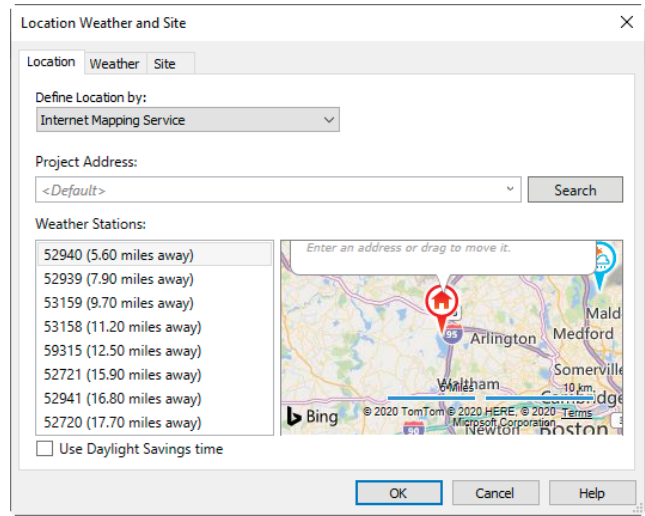

***Figure 2-10** The **Location Weather and Site** dialog box*

This dialog box contains three tabs: **Location**, **Weather**, and **Site**. The **Location** tab is chosen by default. In the **Define Location by** drop-down list of this tab, the **Internet Mapping Service** option is selected by default. As a result, you can use the **bing** map service to find out the geographical location of the desired place. To find out the geographical location, type its name in the **Project Address** edit box and then choose the **Search** button; the location searched will be displayed in a map. Alternatively, you can select the **Default City List** option from the **Define Location by** drop-down list to specify the city and to define the latitude and longitude of the location. To specify the city, select an option from the **City** drop-down list; the **Latitude** and **Longitude** edit boxes will display the corresponding values for the latitude and longitude of the selected city. If the name of a city is not available in the **City** drop-down list, then enter the values of its latitude and longitude in the **Latitude** and **Longitude** edit boxes, respectively. You can choose the **Weather** tab in the **Location Weather and Site** dialog box to specify the cooling and heating design temperature of the site throughout the year. In this tab, the **Use closest weather station** check box will be selected by default. As a result, the value of the cooling design temperature of the proposed project will be taken from the data of the weather station to the location specified in the **Location** tab. You can clear the **Use closest weather station** check box and specify the value of the cooling and heating design temperature for all months in the table displayed under the **Cooling Design Temperatures** head. In the **Weather** tab, you can specify the value for the **Heating Design Temperature** and the **Clearness Number** in their respective edit boxes.

You can choose the **Site** tab in the **Location Weather and Site** dialog box to name the current settings for the location. The options in the **Site** tab are shown in Figure 2-11. In this tab, the name(s) of location(s) is (are) displayed in the **Sites defined in this project** list box. By default, the

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Internal (current) location is listed and selected in the list box. To define a different location for the project, choose the **Duplicate** button; the **Name** dialog box will be displayed. Enter a name in the **Name** edit box and choose the **OK** button; the **Name** dialog box will be closed and the name of the new location will be listed in the **Sites defined in this project** list box. After you have added a location, you will notice that the **Delete** and **Make Current** buttons are active. You can choose the **Delete** button to delete location(s) apart from the current location. Current location is the location currently being used. To make a location current, select the location from the **Sites defined in this project** list box and choose the **Make Current** button. Note that after you have made a location current, the name of the location is suffixed with the word **(current)**.

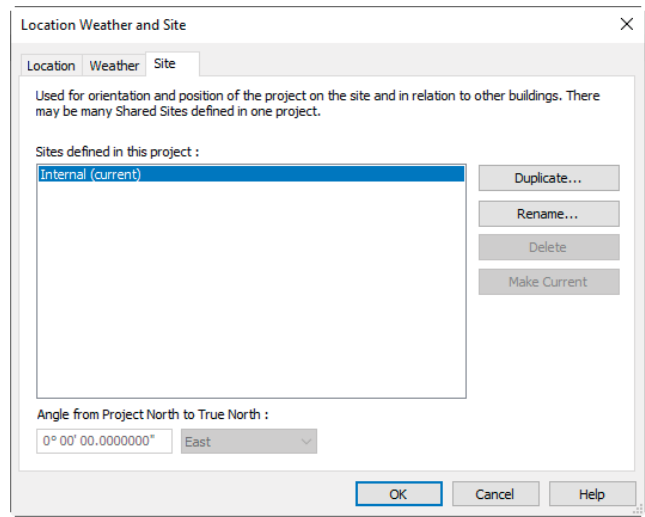

Figure 2-11 *The options in the* ***Site*** *tab of the* ***Location Weather and Site*** *dialog box*

Transferring Project Standards

When you create a template file, you can copy project standards from some other project to the current file. These standards include various project settings such as Family Types (only system families, not loaded families), line weight, line styles, line patterns, materials, view templates, and so on. To transfer project standards to the template file (target file), open the source file from which the standards are to be copied. Next, choose the **Transfer Project Standards** tool from the **Settings** panel of the **Manage** tab; the **Select Items To Copy** dialog box will be displayed, as shown in Figure 2-12.



Note

If you invoke the ***Transfer Project Standards*** *tool without any opened files in the current session, the* ***Revit*** *message box informing that there are no open projects to transfer project from will be displayed. Choose the* ***Close*** *button in this message box and then open a project in the current session from which you want to transfer the project standard to the current project.*

In the **Select Items To Copy** dialog box, click on the down arrow in the **Copy from** drop-down list; a list of opened projects will be displayed in the drop-down list. Next, select the project from which you want to copy the project standards. Note that when you select a source project from this list, the standards included in the project are displayed along with their respective check

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boxes. By default, all check boxes in the list box are selected. You can keep the check boxes selected corresponding to the standards to be copied to the template file and clear the rest of them. If you want to clear all check boxes for fresh selection, you can choose the **Check None** button located on the right of the list box. Similarly, to select all check boxes, you can choose the **Check All** button. After selecting the check boxes for the standards that you want to transfer, choose the **OK** button; the **Select Items To Copy** dialog box will be closed. Note that if the selected standards are already present in the template file, the **Duplicate Types** message box will appear, as shown in Figure 2-13. You can choose the **Overwrite** button from this message box to overwrite the common standards or choose the **New Only** button to transfer the standards that are present in the template file. After you have chosen the required options, the selected standards will be copied to the destination file.

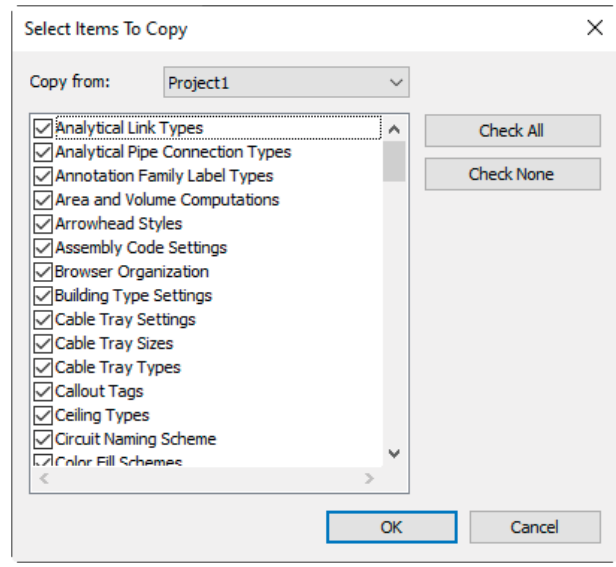

Figure 2-12 *The* ***Select Items To Copy*** *dialog box*

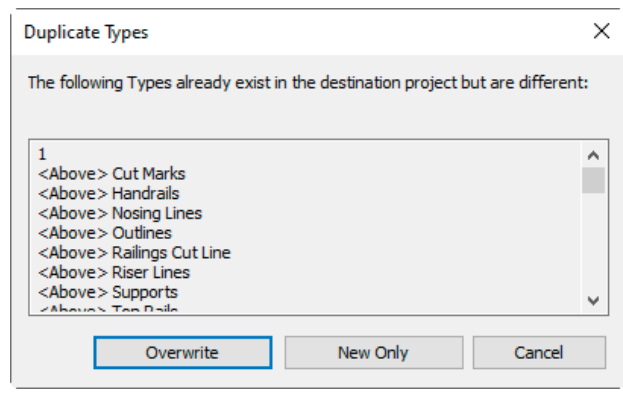

Figure 2-13 *The* ***Duplicate Types*** *message box*

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Setting the Browser Organization

While creating a project template, you can organize the **Project Browser**. To do so, choose the **Browser Organization** tool from the **Windows** panel of the **View** tab; the **Browser Organization** dialog box will be displayed, as shown in Figure 2-14. This dialog box contains three tabs: **Views**, **Sheets**, and **Schedules**. The **Views** tab is chosen by default. The options in this tab are used to select, edit, or create a browser organization for the views present in the project. In the list box of the **Views** tab, a list of default browser organizations is displayed with their respective check boxes.

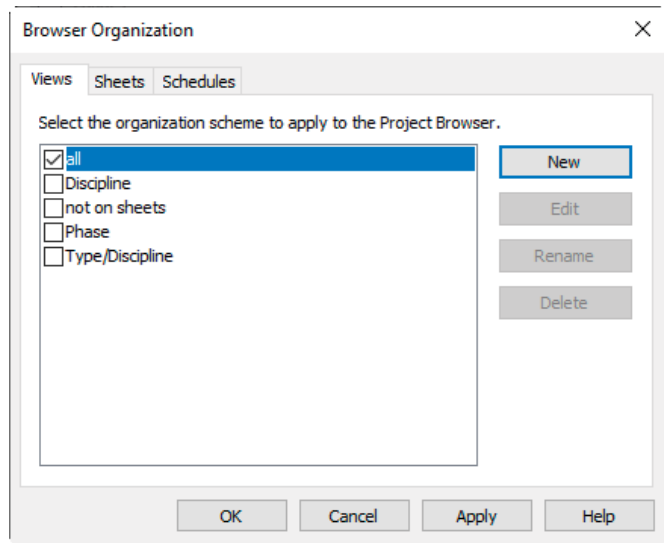

Figure 2-14 *The* ***Browser Organization*** *dialog box*

By default, the check box for all browser organization is selected. You can edit the settings of the check boxes displayed. To do so, click on the name of the browser organization whose settings you want to change, and then choose the **Edit** button; the **Browser Organization Properties** dialog box will be displayed, refer to Figure 2-15.

This dialog box contains two tabs: **Filtering** and **Grouping and Sorting**. The **Filtering** tab is chosen by default. You can use various options in this tab to apply a filter to project views. In the **Filter by** area of this tab, you can specify view property, filter operator, and filter value required for sorting and grouping the project views. After specifying various options in the **Filtering** tab, you can choose the **Grouping and Sorting** tab to create group by sorting the project viewing, refer to Figure 2-15. Next, choose the **OK** button from this dialog box; the **Browser Organization Properties** dialog box will close and the settings for the selected browser organization will be edited. Similarly, you can create a new browser organization for the project views. To do so, ensure that the **Views** tab is chosen from the **Browser Organization** dialog box and then choose the **New** button from it; the **Create New Browser Organization** dialog box will be displayed. In this dialog box, you can enter the name of the new browser organization in the **Name** edit box and then choose the **OK** button; the **Browser Organization Properties** dialog box will be displayed. The options in this dialog box have already been discussed. Similar to creating browser organization for a project view, you can also create browser organization for sheets. To do so, choose the **Sheets** tab from the **Browser Organization** dialog box. The **Sheets** tab displays a list

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box containing the list of default browser organizations for sheets. The options in this tab are similar to those discussed for the **Views** tab. Similarly, you can also create browser organization for schedules. To set the browser organisation for the schedules, select the **Schedules** tab from the **Browser Organisation** dialog box and then choose the required check box from this tab. The **all** check box is selected by default.

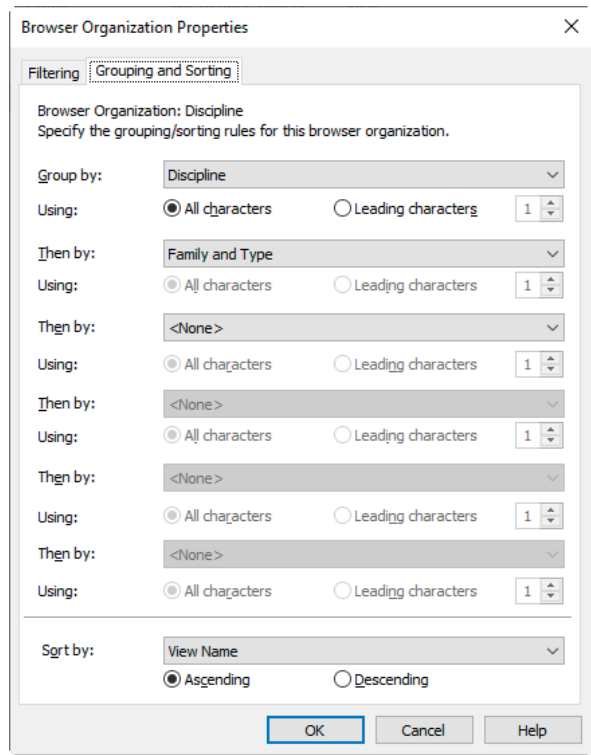

Figure 2-15 *The* ***Browser Organization Properties*** *dialog box*

LINKING REVIT MODELS AND SHARING COORDINATES

In a Design Build project, you need to link the architectural and structural models to the current MEP project. After linking, you can coordinate and monitor the changes in the architectural and structural models, respectively within the MEP model. In addition, you can use various tools in Revit to check for correct interference condition between the elements in the Architectural and Structural models and the elements in the MEP model. Linking Revit models is very similar to Xrefs (External Reference) in AutoCAD.

When you link a model, you need to share the coordinates of the host model with the linked model so that the linked files retain their positions. To do so, invoke the **Acquire Coordinates** tool from **Manage > Project Locations > Coordinates** drop-down and then select the linked project in your drawing. On selecting the linked project, the origin of the linked project's shared coordinate becomes the origin of the host project's shared coordinates. Revit provides the flexibility and easy management of the linked models by enhancing the linking of the models and organizing the linked files in the **Project Browser**. You can easily access the linked files, the nested link files, and the link manager from the **Project Browser**. The nested Revit links are also listed under the **Revit Links** head with the host link in the **Project Browser**.

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To link or import the Revit files, choose the **Link Revit** tool from the **Link** panel of the **Insert** tab; the **Import/Link RVT** dialog box will be displayed, as shown in Figure 2-16. In this dialog box, navigate to the desired folder and select the file to be linked with the host project; the preview of the selected project file will be displayed in the **Preview** pane. Choose the **Open** button to open the file. Select the appropriate positioning option from the **Positioning** area to position the model automatically or manually in the host project.

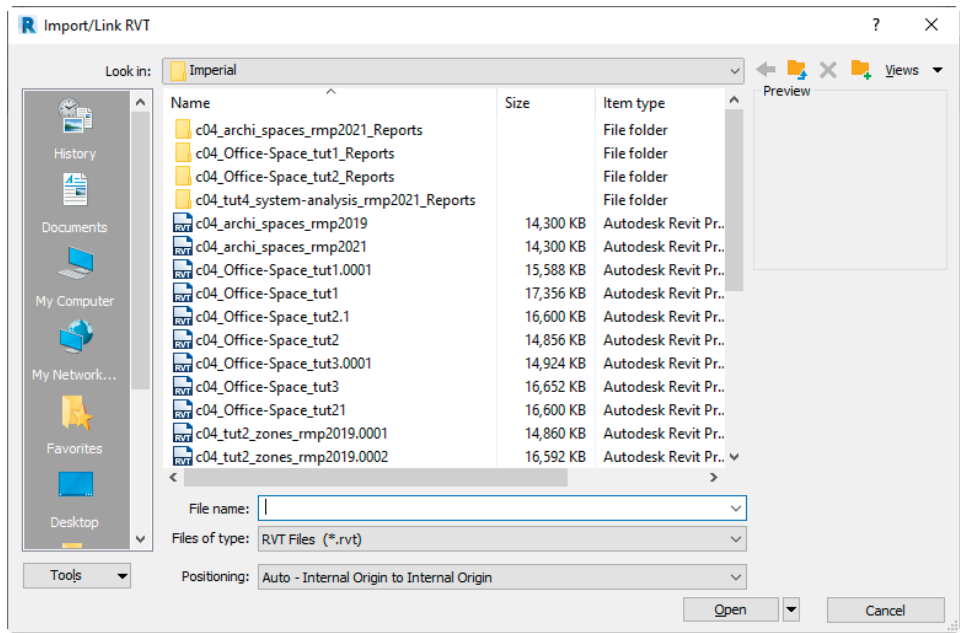

Figure 2-16 *The* ***Import/Link RVT*** *dialog box*

Managing the Linked Revit Models in the Project Browser

The linked Revit models are listed in the **Project Browser** under the **Revit Links** head. You can access the linked model files and also link a new file from the **Project Browser**. To do so, select the **Revit Links** sub-node in the **Project Browser** and right-click; a shortcut menu will be displayed. Choose **New Link** from the shortcut menu; the **Import/Link RVT** dialog box will be displayed. Select the file to be linked from this dialog box. Similarly, you can access the link manager by choosing **Manage Links** from the shortcut menu and manage the links. You can also open the linked model in the project by dragging it from the **Project Browser** and dropping it in the project view.

Converting Linked Models to Groups - Binding Links

You can convert the linked Revit models into groups in the host project. You can do so by binding the linked model with the host project, thereby making it a part of the host project. After binding the linked model, the model geometry will be transformed into a group, and therefore making changes in the host project will be easier for you. To bind and group a linked model, select the linked model in the drawing; the **Modify | RVT Links** tab will be displayed. Choose the **Bind Link** tool from the **Link** panel; the **Bind Link Options** dialog box will be displayed, as shown in Figure 2-17. In the dialog box, select the **Attached Details**, **Levels**, and **Grids** check boxes to include them in the group and then choose the **OK** button; the linked model will be converted into a group. If there is any group in the project with the same name as that of the linked Revit

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model, a dialog box with a message will be displayed prompting you whether or not you want to replace the group. Choose **Yes** to replace the existing group or choose **No** to rename the group. On choosing **Yes**, the **Autodesk Revit 2021** warning message box will be displayed, informing you to remove the link from the current project. Choose the **Remove Link** button in the message box or choose the **OK** button to remove it later; the linked model will transform into a group and will be listed in the **Project Browser** under the **Groups** head.

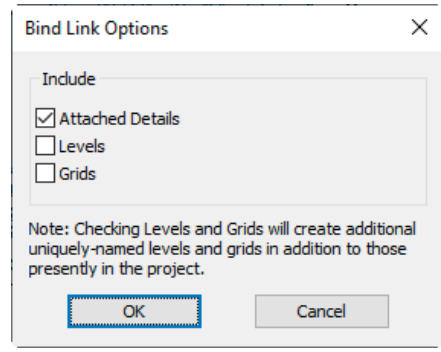

***Figure 2-17** The **Bind Link Options** dialog box*

Controlling the Visibility of Linked Models

You can control the visibility of the linked and nested Revit linked models in the host project file. Also, you can control the visibility settings, detail level, and display settings of the building elements in the linked project. To modify the visibility settings in the host project, open the view in which the visibility settings are to be modified. Choose the **Visibility/Graphics** tool from the **Graphics** panel in the **View** tab to display the **Visibility/Graphic Overrides** dialog box. The **Revit Links** tab in this dialog box displays the linked projects, as shown in Figure 2-18.

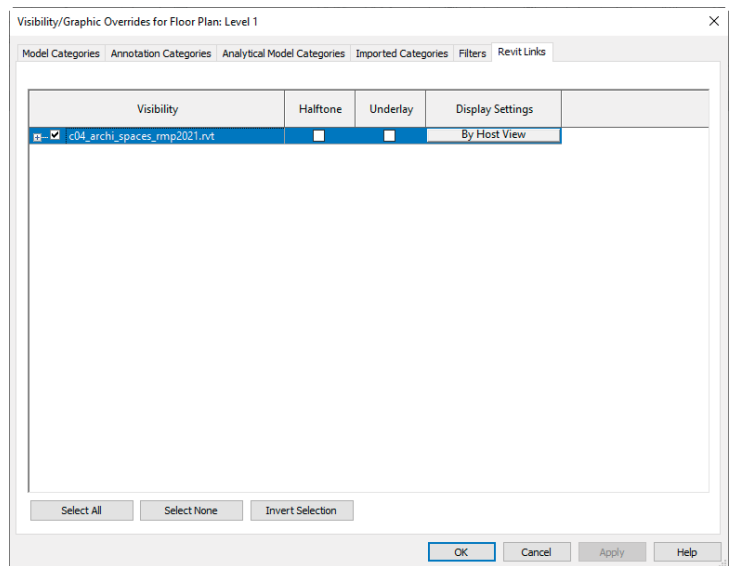

***Figure 2-18** The **Visibility/Graphic Overrides** dialog box with the **Revit Links** tab chosen*

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Note that this tab will be displayed only when the files are linked in your project. Click on the project name to display the categories of components in the building model. Use the **Halftone** and **Display Settings** columns to modify the visibility settings and the filters of the components of each linked project. The **By Host View** button in the **Display Settings** column can be used to control the visibility of the nested links, phases, and phase filters. Click in the **Display Settings** column; the **RVT Link Display Settings** dialog box will be displayed. Choose the **Basics** tab from the dialog box. If you select the **By host view** radio button in this tab, the nested linked model will be able to use the same visibility and graphics settings as in the host view. On selecting the **By linked view** radio button, the nested linked model adopt the visibility settings of the parent model to which it was linked originally. Also, the **Linked view** drop-down list will be enabled. You can select the view in which you want to display the linked model from this list. On selecting the **Custom** radio button, all the options in the **Basics** tab will be enabled. From the **Nested links** drop-down list, select the **By parent link** option to apply the visibility settings of the parent model to the nested link model. If you select the **By linked view** from the drop-down list, the visibility and graphics override settings of the top level nested model will be applied to the linked model. The top level model is the first nested linked model. In the example explained earlier, project A will be the top-level nested model. Choose the **Apply** button to view the changes in the project and then choose the **OK** button.

Managing Links

In an MEP project, you can manage links between the host and the linked projects. To do so, choose the **Manage Links** tool from the **Link** panel of the **Insert** tab; the **Manage Links** dialog box will be displayed with a list of linked projects, as shown in Figure 2-19.

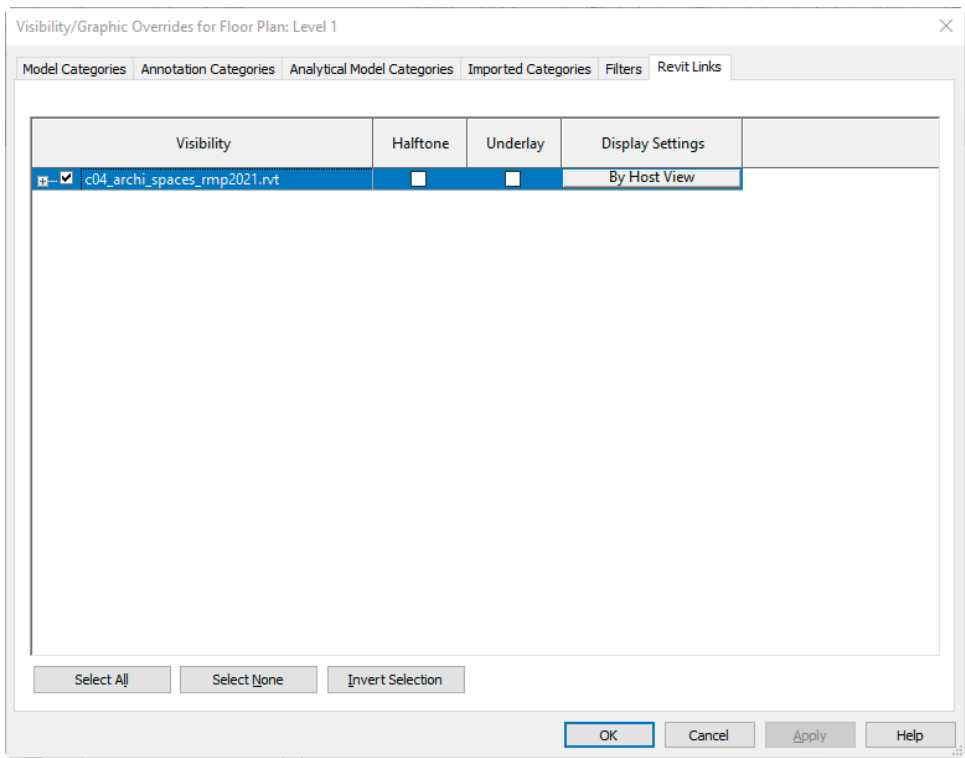

Figure 2-19 *The* ***Manage Links*** *dialog box*

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The **Status** column in the **Manage Links** dialog box informs whether the linked project file is loaded in the host project. The **Reference Type** column in the dialog box provides you with the options to display or hide the nested linked Revit models. The default **Overlay** value in the **Reference Type** column restricts the loading and display of the nested linked models in the host project. The **Position Not Saved** column of the dialog box indicates whether or not the linked models location is saved in its shared coordinate system or not. The shared coordinates take care of the mutual positions of multiple interlinked files. The **Saved Path** column shows the path of the linked file on your computer. The **Path Type** column is used to specify whether the saved path of the linked file is relative or absolute. It is recommended to keep the linked path relative because it enables Autodesk Revit to trace and re-establish the link, if the host and linked projects are moved to a different folder.

Including Elements of Linked Models in Schedules

In Revit, you can include different model elements such as walls, doors, and windows from a linked file into a schedule. To do so, select the existing schedule of the current project from the **Schedules/Quantities** head in the **Project Browser**; the instance properties of the selected schedule will be displayed in the **Properties** Palette. In the value column of the Palette, choose **Edit** from the **Fields** parameter; the **Schedule Properties** dialog box will be displayed. Select the **Include elements in Linked files** check box to include the elements of a linked file, if required. To include project information from a linked file, select **Project Information** from the **Select available fields from** drop-down list. Choose the **Apply** button to view the changes in the project and then choose the **OK** button.

Copying Linked Model Elements

You can copy the elements of the linked model to the host model. To do so, move the cursor over the linked model and press TAB to highlight the required elements, in case the file has a nested link. Click on the element when it is highlighted and choose the **Copy to Clipboard** tool from the **Clipboard** panel of the **Modify | RVT Links** tab. Next, open the host file in which you want to paste the element and choose the **Paste from Clipboard** tool from the **Clipboard** panel. You can place the element by clicking at the required location in the drawing area.

Copying and Monitoring Linked Model Elements

After linking a Revit Architecture project, you need to constantly monitor the changes made to the elements in the Revit Project. This ensures that there are no conflicts or interference conditions between architectural and MEP elements. You can coordinate and monitor the changes made to Architectural and MEP elements by establishing relationships between them. To do so, choose the **Select Link** tool from the **Collaborate > Coordinate > Copy/Monitor** drop-down; you are prompted to select the linked model. Select the linked model from the drawing area; the **Copy/Monitor** contextual tab will be displayed. In this tab, you can choose the **Copy** tool from the **Tools** panel to copy the desired element in the linked model to the host project. Also, from the **Tools** panel, you can choose the **Monitor** tool to establish a relationship between pair of corresponding elements in the linked model and the host model. An eye symbol is displayed next to the element when an element is monitored, indicating that a relationship is being established. After using various tools in the **Copy/Monitor** contextual tab, choose the **Finish** button from the **Copy/Monitor** panel to finish the process.

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SNAPS TOOL

Ribbon: Manage > Settings > Snaps

The **Snaps** tool is one of the important tools used to snap elements in an MEP model. This tool is used to make the cursor snap or jump depending on the preset increments or on the specific object properties of elements such as endpoint and midpoint of elements. When you invoke the **Snaps** tool from the **Settings** panel of the **Manage** tab, the **Snaps** dialog box is displayed, as shown in Figure 2-20.

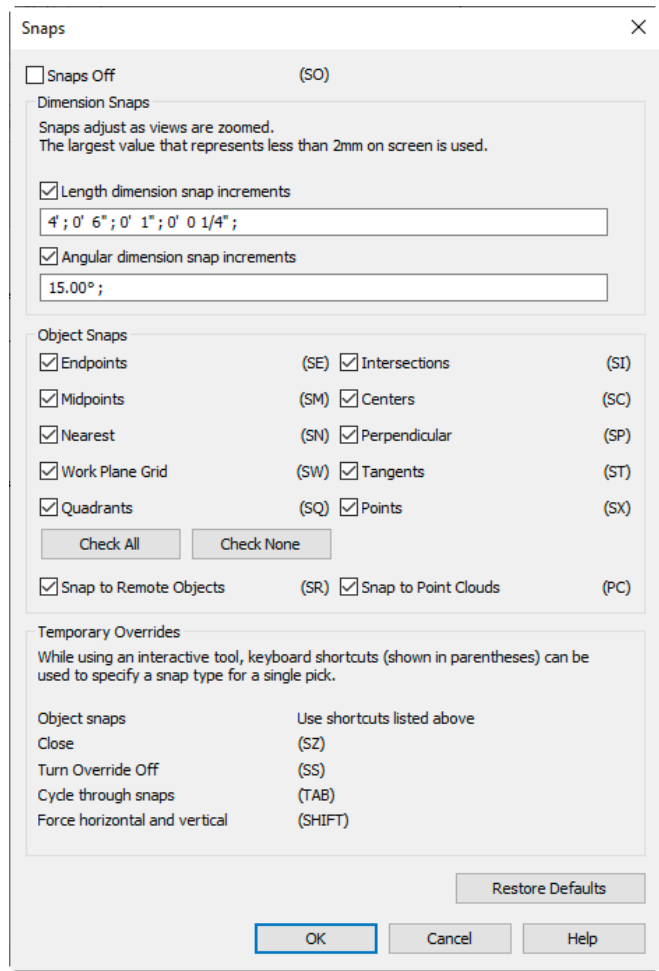

Figure 2-20 *The* ***Snaps*** *dialog box*

This dialog box has three areas, **Dimension Snaps**, **Object Snaps**, and **Temporary Overrides**. These areas are discussed next.

Note

The settings specified in this dialog box will be applied to all the projects opened in the session and will not be saved.

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Dimension Snaps Area

In the **Dimension Snaps** area, you can set the length and angle dimension snap increments for placing the elements and components in a project. The dimension snap determines the increment, linear or angular, by which the cursor will jump/snap linearly or angularly while placing elements and components in a project.

The **Length dimension snap increments** check box is selected by default. As a result, you can set the snap increment value for the length in the edit box below it. The default values in this edit box are: **4'; 0'6"; 0'1"; 0'0 1/4"(1000; 100; 20; 5**). Note that every incremental value is separated by a semicolon (;). You can change these values as per your requirement. For example, to create an interior layout plan in which the length of partitions is in 5' (1500 mm) modules, counter top width is 2'(600 mm), and thickness of partitions is 4"(100), you can enter the values for the dimension snaps as **5'; 2';4"**. In Metric, you can enter the value **1500; 600;100**. This will enable the cursor to move in these increments and help create the layout with relative ease. Similarly, you can set the top-down angular dimension snap increments. However, ensure that the **Angular dimension snap increments** check box is selected and then enter suitable value(s) in the edit box below it. This parameter is quite useful for the projects that have radial geometry.



Note

The reason for specifying multiple length and angle snap increment values in the edit boxes is that the priority of increments may change on changing the zoom level of the drawing. Therefore, when you zoom in the drawing, Revit will use smaller increment values whereas on zooming out, the larger increment values will be used.

Object Snaps Area

Object Snaps refer to the cursor's ability to snap to geometric points on an element such as its endpoint, midpoint, perpendicular, and so on. In the **Object Snaps** area of the **Snaps** dialog box, you can specify options to snap points of elements or objects in a project. The advantage of using these options is that you do not need to specify the exact point in a drawing. When the object snap function is enabled, the suitable object snap is displayed as the cursor is moved close to an element. For example, it is virtually impossible to pick the exact endpoint to start a wall from the endpoint of an existing wall. But when you enable the endpoint object snap, the cursor automatically jumps or snaps to the endpoint of the wall. This helps in identifying and selecting endpoint of the wall and then selecting a new wall from the endpoint. This, besides making the drawing accurate, later helps add dimensions to the project.



Note

The object snapping works only with the objects that are visible on the screen. A tooltip with a name as that of the object snap is also displayed when you bring the cursor close to a snap point.

In an MEP model, you can use various object snaps modes such as **Endpoints**, **Midpoints**, **Nearest**, **Work Plane Grid**, **Quadrants**, **Intersections**, **Centers**, **Perpendicular**, **Tangents**, **Points**, **Snap to Point Clouds**, and **Snap to Remote Objects**.

The name of each object snap option suggests its usage in the project. For example, the **Work Plane Grid** snap option helps you snap the intersection points of grid lines in a work plane grid that is displayed for the current work plane.

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Each object snap mode is represented by a distinct geometrical shape to identify it from other object snaps. For example, the endpoint object snap is represented by a square cursor, midpoint by a triangular error, nearest by a cross, and so on. To use an object snap mode, move the cursor on the object. As you move it close to the snap point, a marker appears. To select the appropriate snap point, click when the corresponding marker or tooltip is displayed.

In Revit, all enabled object snaps work simultaneously. You can turn off all snap options, including dimension snaps and object snaps by selecting the **Snaps Off** check box located at the top of the **Snaps** dialog box. Alternatively, you can type **SO** on the keyboard to turn them off and on, while using a tool. The **Check All** and **Check None** buttons are used to select or clear all check boxes (except the **Snap to Remote Objects**) in the **Object Snaps** area.

Temporary Overrides Area

The options in the **Temporary Overrides** area provide you with an alternative of overriding snaps setting for a single use only. For example, if you have not selected the **Endpoints** check box in the **Snaps** dialog box and you want to use this option while working with a tool, you do not need to open the **Snaps** dialog box to select this option. Instead, you can type the shortcut, **SE** in this case, to temporarily activate the endpoint object snap. Once you have used this object snap option, snapping to the endpoint is automatically turned off.

Using overrides, you can toggle between various object snap options available at the same location. To do so, press the TAB key while snapping the points in the drawing. You can also use other overrides like pressing the SHIFT key to create elements vertically or horizontally. This restricts the movement of the cursor in the orthogonal directions only. Once you release the SHIFT key, the cursor resumes its previous state. You can select the **Snaps Off** check box to disable all types of snapping.

SAVING AN MEP PROJECT

Before you close or exit a Revit session, it is recommended to save the project file. You can save a project file in a permanent storage device, such as a hard disk or a removable storage device like CD or USB. Also, you must save your work at regular intervals to avoid data loss due to any error in the computer's hardware or software.

Using the Save As Tool

In Revit, you can save your project file at the desired location by using the **Save As** tool. To do so, choose **Save As > Project** from the **File** menu; the **Save As** dialog box will be displayed.

In the **Save As** dialog box, the **Save in** drop-down list displays the current drive and path in which the project file will be saved. The list box below the **Save in** drop-down list displays all folders available in the current directory. The **File name** edit box is used to specify the name to be assigned to the project or file. The **Places List** area on the left of the **Save As** dialog box contains shortcuts for the folders that are frequently used.

You can use different file saving features by choosing the **Options** button from the **Save As** dialog box. On choosing this button, the **File Save Options** dialog box will be displayed. In the **Maximum backups** edit box of this dialog box, you can specify the maximum number of backup

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files that you need to store for a project. In Autodesk Revit, the non-workshared projects have three backup files and the workshared projects have twenty backup files by default. The options in the **Worksharing** area are inactive for non-workshared projects. You can use the options in this area to make the current workshared file central compact and select the default workset. The options in the **Thumbnail Preview** area enable you to specify the image to be used as the preview of the project file. This image is used at the time of opening a project file. You can specify a view of the model as a preview image by selecting the corresponding option from the **Source** drop-down list in the **Thumbnail Preview** area of the **File Save Options** dialog box. By default, the **Active view/sheet** option is selected in the **Source** drop-down list of the **Thumbnail Preview** area for the preview of a project file. For example, to make **Floor Plan 1-Mech** as the preview image, select it from the drop-down list. As a result, when you invoke the **Open** dialog box and select a file to open, the view displayed in the **Preview** area will correspond to the selection that is made in the **Source** drop-down list of the **File Save Options** dialog box. In the **File Save Options** dialog box, you can select the **Regenerate if view/sheet is not up-to-date** check box to see the preview with the latest modifications. On selecting this check box, the preview image will be updated when you close the project file.



Note

*Revit updates the preview image continuously. Therefore, selecting the **Regenerate if view/sheet is not up-to-date** check box can consume considerable resources.*

Using the Save Tool

Once a project has been saved using the **Save As** tool, you do not need to re-enter file parameters to save it again. To save a project to the hard disk, choose the **Save** option from the **File** menu. If you are saving the project for the first time, the **Save As** dialog box will be displayed, even if you invoke the **Save** tool. Alternatively, you can save your project by choosing the **Save** button from the **Quick Access Toolbar**. As you save your project file, Revit updates it automatically without prompting you to re-enter the file name and path.

THE OPTIONS DIALOG BOX

In Autodesk Revit, you can configure global settings by using the **Options** dialog box. This dialog box can be invoked by choosing the **Options** button from the **File** menu. The **Options** dialog box, as shown in Figure 2-21, contains ten tabs: **General**, **Graphics**, **File Locations**, **Hardware**, **Rendering**, **Check Spelling**, **SteeringWheels**, **ViewCube**, **User Interface**, and **Macros**. These tabs are discussed next.

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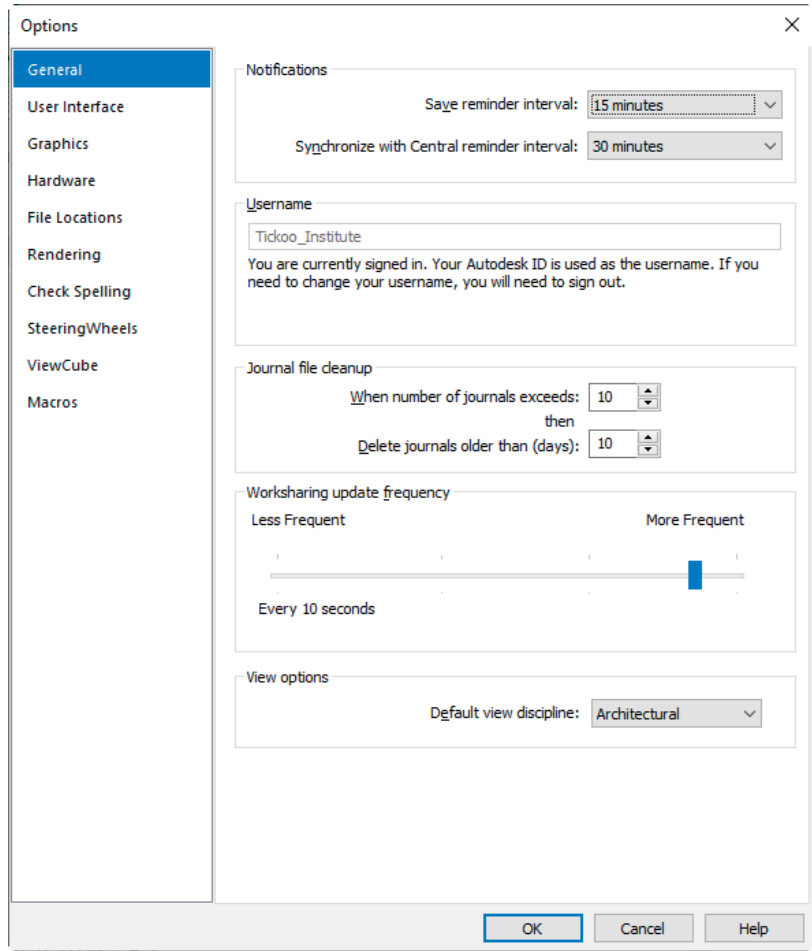

Figure 2-21 *The* ***Options*** *dialog box*

General Tab

The **General** tab is chosen by default and contains five areas: **Notifications**, **Username**, **Journal File cleanup**, **Worksharing update frequency**, and **View Options**. These areas are discussed next.

Notifications Area

Revit provides an option for setting reminders to save the work at regular intervals. To do so, select the desired option from the **Save reminder interval** drop-down list in the **Notifications** area. By default, 30 minutes is selected in this drop-down list. If you do not want a reminder to save your work in the project, select the **No reminders** option from this drop-down list. Similarly, you can select a value from the **Synchronize with Central reminder interval** drop-down list. On doing so, you set the duration for the display of the reminder for synchronization of the local file with the central file.

Username Area

In Revit, you can create a unique identification for a particular session. To do so, enter a name for the session in the edit box displayed in this area. The name entered in this edit box will be

used for granting permissions for editing in a multiuser Revit environment. Note that if you sign in on **Autodesk 360**, the edit box will display the Autodesk ID with which you will sign in.



Note

When you run Autodesk Revit in your system for the first time, you will notice that the Windows login name is displayed as the default username in the edit box in the ***Username*** *area.*

Journal File Cleanup Area

Journal files are the text files that are used to resolve technical problems occurred during the Revit session. These files record every step during the session. Whenever you encounter a technical problem with the software, you can run this file to detect the problem or recover the lost files or to know the steps that may have caused the problem. In Autodesk Revit 2021, these files are saved at the following default location: *C:\Users\<Username>\AppData\Local\Autodesk\Revit\Autodesk Revit 2021\Journals* (for Windows 7 or Window Vista users) and *C:\Documents and Settings\<Username>\Local Settings\Application* (for Windows XP users). These files are saved each time you close the Revit session. Therefore, the number of these files keeps on increasing until you remove these files from their location. However, retain some updated file while removing other files, you can use the **Journal file cleanup** area in the **General** tab of the **Options** dialog box. This area contains two spinners: **When number of journal exceeds** and **Delete journals older than (days)**. You can set the required values in these spinners to retain the recently created files. For example, if you want to delete journal files if their number exceeds 15 and if they were created before 30 days, then in such a situation, set the value in the **When number of journals exceeds** spinner to **15** and the value in the **Delete journals older than (days)** spinner to **30**.

Worksharing Update Frequency Area

In this area, you can set the update frequency that indicates the time interval for updating the project in a worksharing environment. To specify the limits for worksharing, you can set the slider between the **Less Frequent** and **More Frequent** limits.

View Options Area

In the **View Options** area, you can specify the default view discipline to be used in the Revit project. To do so, select an option from the **Default view discipline** drop-down list in this area. In this drop-down list, the **Coordination** option is selected by default.

Graphics Tab

The options in the **Graphics** tab are used to configure the display card of your computer to improve the display performance. You can also use this tab to assign colors to selections, highlights and alerts, and enable anti-aliasing for 3D views. In the **View navigation performance** area, the **Simplify display during view navigation** check box will be selected by default. As a result, certain graphic details will be suspended and details during camera navigation will be reduced. The **Allow navigation during redraw** check box in the above mentioned area will be selected by default. This check box will allow you to improve performance of the model while navigating. In the **Graphics mode** area of this tab, the **Allow control for each view in Graphic Display Options dialog** check box is selected by default. As a result, the hardware accelerators are enabled. Hardware accelerators help in displaying the models of larger size faster on refreshing the views. In addition, the hardware accelerators help you speed up the process of switching between the views of windows. As a result, you will get the improved display while navigating a 2D view or a 3D view using the following methods of navigation: using the **ViewCube**, using

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the tools in the **Navigation Bar**, navigating by scrolling the mouse wheel, and while using the Keyboard shortcuts.

The table given next, shows the list of features barred for visual styles :

Feature	Visual Styles			
	Hidden Line	Shaded	Consistent Colors	Realistic
Edges	----------	Barred	Barred	Barred
Fill Patterns	Barred	Barred	Barred	Barred
Shadows	Barred	Barred	Barred	Barred
Structural Hidden Lines	Barred	Barred	Barred	Barred
Mechanical Hidden Lines	Barred	Barred	Barred	Barred



Note

*While navigating a camera view in the **Wireframe** view style, the fill patterns are not displayed in the model.*

In the **Graphics Mode** area, the **Smooth lines with anti-aliasing** check box is selected by default. As a result, the options for controlling the smooth lines will be enabled. You can clear the check box to disable the options for controlling the smooth lines with antialiasing.

The buttons in the **Colors** area of the **Graphics** tab are used to toggle the color of the parameters. To specify the background color, click the button to the right of the **Background** parameter and select the desired color from the **Color** dialog box. Similarly, you can select the desired color for the **Selection**, **Pre-selection**, and **Alert** parameters. In the **Colors** area, the **Semi-transparent** check box is selected by default. As a result, you can make the selected elements semi-transparent and you can view the elements that are behind the selected elements. In the **Temporary Dimension Text Appearance** area, you can select an option from the **Size** drop-down list to specify the size of the text to be used in temporary dimensions. In this area, you can set the background of the text in the temporary dimensions. To do so, select the **Opaque** or **Transparent** option from the **Background** drop-down list.

Hardware Tab

The options in the **Hardware** tab are used to configure the display card of your computer to improve the display performance. In the **Hardware Setup** area of this tab, the **Use hardware acceleration (Direct 3D@)** check box is selected by default. As a result, the hardware accelerators are enabled. Hardware accelerators help display the larger models faster on refreshing the views. In addition, the hardware accelerators help you speed up the process of switching between the windows of views. The selection of the check box will result in the improvement of the performance of the display while navigating a 2D view or a 3D view.

Note that you can disable the **Use hardware acceleration (Direct 3D@)** check box if you are experiencing graphics issues or have an incompatible card.

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File Locations Tab

The options in the **File Locations** tab are used to set the path for various files and directories that are accessed frequently, refer to Figure 2-22. The path for these files is set while installing Revit. However, you can modify the location of a file by choosing the corresponding **Browse** button and specify a new location. You can also change the default location of a template file, in case you wish to use a customized template file for your projects. In Revit, the default path to save or open a project can be specified in the **Default path for user files** edit box. You can also specify the default path for family template files and for the point clouds by using the corresponding **Browse** button. In the **Systems analysis workflows** area, you can add the system analysis workflow file (*.osw*) to run the system analysis.

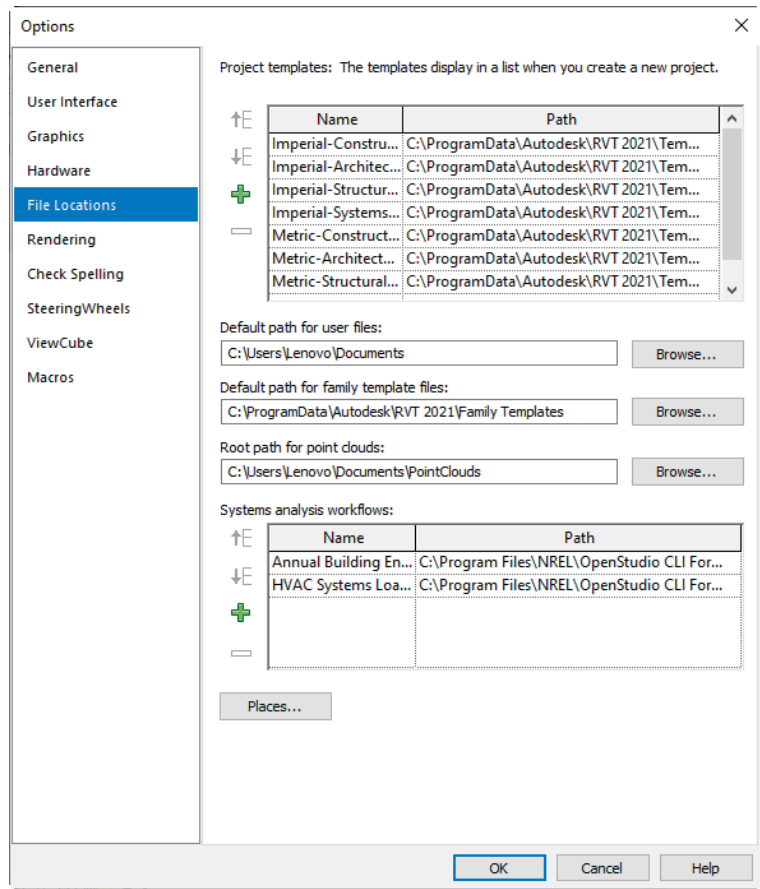

Figure 2-22 *The* ***Options*** *dialog box displaying the options in the* ***File Locations*** *tab*

Rendering Tab

Autodesk Revit uses the mental ray rendering engine for its rendering process. The mental ray has its own library, Render Appearance Library. This library stores information about render appearances for materials, default RPC contents in the software, and other information relevant to the rendering process. The Render Appearance Library is a read-only library and is loaded into the following default location while installing the Revit software: *C:\Program Files (x86)\Common Files\Autodesk Shared\Materials\2021\assetlibrary_base.fbm*. In addition to the default Render

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Appearance Library location, you can also specify paths for the additional image files defining texture, bump map, and custom color for the render appearance that you can use in the project. These image files are not present in the software and therefore, you need to specify their paths to use them. To do so, choose the **Add Value** button in the **Additional Render Appearance Paths** area and specify the required path in the displayed field or choose the browse button; the **Browse for Folder** dialog box will be displayed. In this dialog box, select the desired path and choose the **Open** button to add the path in the field.

Check Spelling Tab

Revit provides you with the option to run spell check to find out spelling errors in text and then rectify them. You can choose the **Check Spelling** tab from the **Options** dialog box to display its options. Figure 2-23 shows various options in the **Check Spelling** tab.

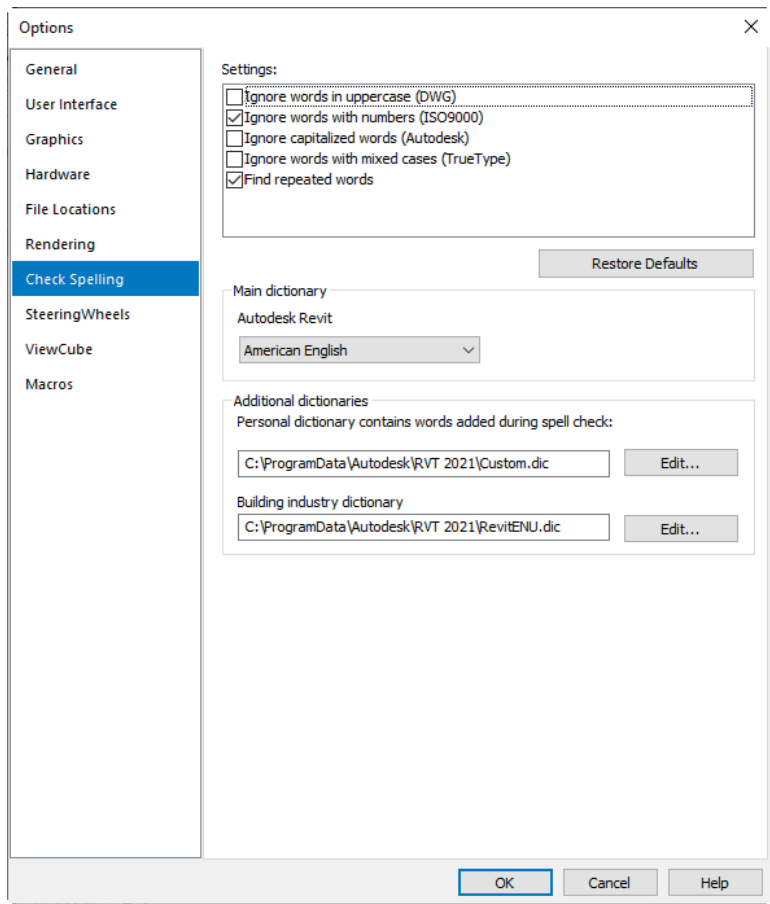

Figure 2-23 *The **Options** dialog box displaying the options in the **Check Spelling** tab*

In the **Settings** list box of this tab, you can specify various self-explanatory settings by selecting their respective check boxes. You can select the type of dictionary to be used as main dictionary for the spell check from the **Autodesk Revit** drop-down list in the **Main Dictionary** area. Apart from the main dictionary, you can also use additional dictionaries available in MEP such as the

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personal and building industry dictionaries. There are many words that are not included in the main dictionary but are frequently used in the building industry. For example, the abbreviation 'conc' for the word concrete is not available in the main dictionary. The additional building industry dictionary has many such words and abbreviations that can be used in the text of a project and therefore, you are not prompted for checking the spelling errors whenever such terms/words appear in the text. You can also add or remove words from your personal and building industry dictionary. To do so, choose the **Edit** button next to the option in the **Additional Dictionaries** area to view the list of words and then enter or remove any word from the lists by using the cursor and keyboard. To run spell check in your drawing, choose the **Check Spelling** tool from the **Text** panel of the **Annotate** tab; the **Spelling** dialog box will be displayed, wherein you can rectify spelling errors in the text by selecting the correct spelling and then choosing the **Change** button in the dialog box. Alternatively, you can press the F7 key to display the spelling dialog box.

SteeringWheels Tab

The **SteeringWheels** tab in the **Options** dialog box has options to control the text visibility, appearance of model, and behaviour of the operational tools of different types of SteeringWheels. This tab has seven different areas, as shown in Figure 2-24. These areas are discussed next.

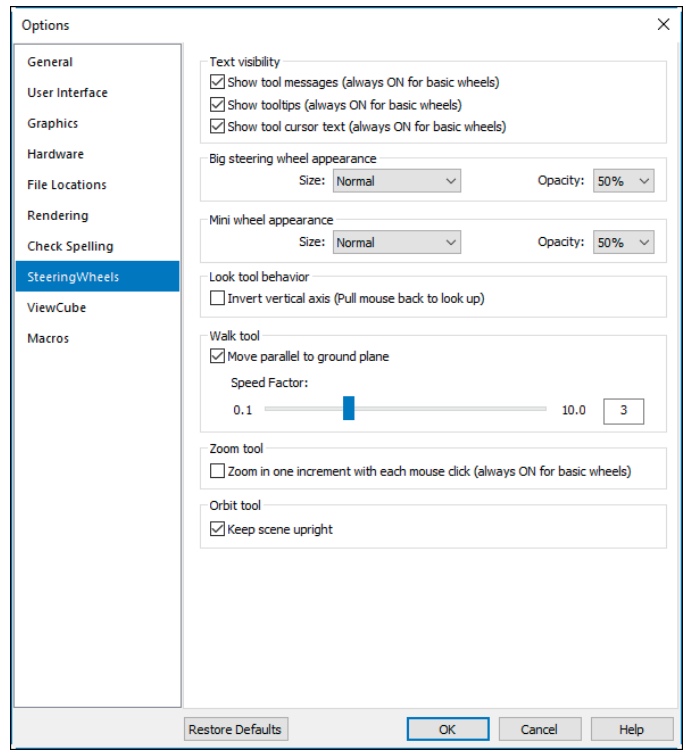

Figure 2-24 *The* ***Options*** *dialog box displaying the options in the* ***SteeringWheels*** *tab*

Text Visibility Area

You can control the display of tool messages, tooltips, and tool cursor of SteeringWheels by using

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the options in the **Text Visibility** area of the **SteeringWheels** tab. You need to select the **Show tool messages** check box to enable the visibility of tool messages in SteeringWheels. To display tooltips along with SteeringWheels, select the **Show tooltips** check box in this area. Similarly, to control the display of the cursor text when a tool is active, select the **Show tool cursor text** check box.

Big Steering Wheel Appearance and Mini Wheel Appearance Areas

The options in these areas are used to set the size and transparency of the SteeringWheels. To set the size of SteeringWheels, select the required option from the **Size** drop-down list in the corresponding areas and set its size to small, normal, or large. Similarly, you can set the transparency of SteeringWheels by selecting the required option from the **Opacity** drop-down list.

Look Tool Behavior and Walk Tool Areas

In the **Look Tool Behavior** area of the **SteeringWheels** tab, selecting the **Invert Vertical Axis** check box enables the view to move in the same direction as does the cursor.

The **Speed Factor** slider in the **Walk Tool** area is used to change the walk speed while using the **Walk** tool of the SteeringWheels. You can also select the **Move parallel to ground plane** check box in the **Walk Tool** area to constrain the angular movement of the walk to ground plane.

Zoom Tool and Orbit Tool Areas

Select the **Zoom in one increment with each mouse click** check box in the **Zoom Tool** area to enable the zooming operation with a single click.

In the **Orbit Tool** area, select the **Keep scene upright** check box to maintain perpendicularity between the sides of the model and the ground plane while using the **Orbit** tool.

ViewCube Tab

The **ViewCube** tab in the **Options** dialog box is used to edit the settings of the ViewCube. It has four different areas: **ViewCube Appearance**, **When Dragging the ViewCube**, **When Clicking on the ViewCube**, and **Compass**, as shown in Figure 2-25. These areas are discussed next.

ViewCube Appearance Area

This area is used to control the appearance and display of the ViewCube. In this area, the **Show the ViewCube** check box is selected by default. As a result, the ViewCube will be visible. If you clear this check box, the ViewCube will disappear and all options in the **ViewCube** tab will be deactivated. In the **ViewCube Appearance** area, you can use the options from drop-down lists to align, resize, and change the transparency of the ViewCube.

Select the options from the **On-screen position** drop-down list to align the ViewCube on the screen. Similarly, if you want to resize the ViewCube, select the required option from the **ViewCube size** drop-down list. You can also set the opacity of the inactive ViewCube by selecting an option from the **Inactive opacity** drop-down list.

When Dragging the ViewCube Area

Select the **Snap to closest view** check box in this area to enable the snap to select the closest view in the ViewCube.

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When Clicking on the ViewCube Area

Select the **Fit-to-view on view change** check box in the **When Clicking on the ViewCube** area to fit the view on the screen while changing the viewing direction. In this area, the **Use animated transition when switching views** check box is selected by default. As a result, the animated transition occurs while switching the views. Clear this check box if you do not want the animated transition. Select the **Keep scene upright** check box to keep the sides of ViewCube and the sides of the view perpendicular to the ground plane. Clear the check box to turn around the model in full 360-degree swing. Clearing this check box can be useful when you are editing a family.

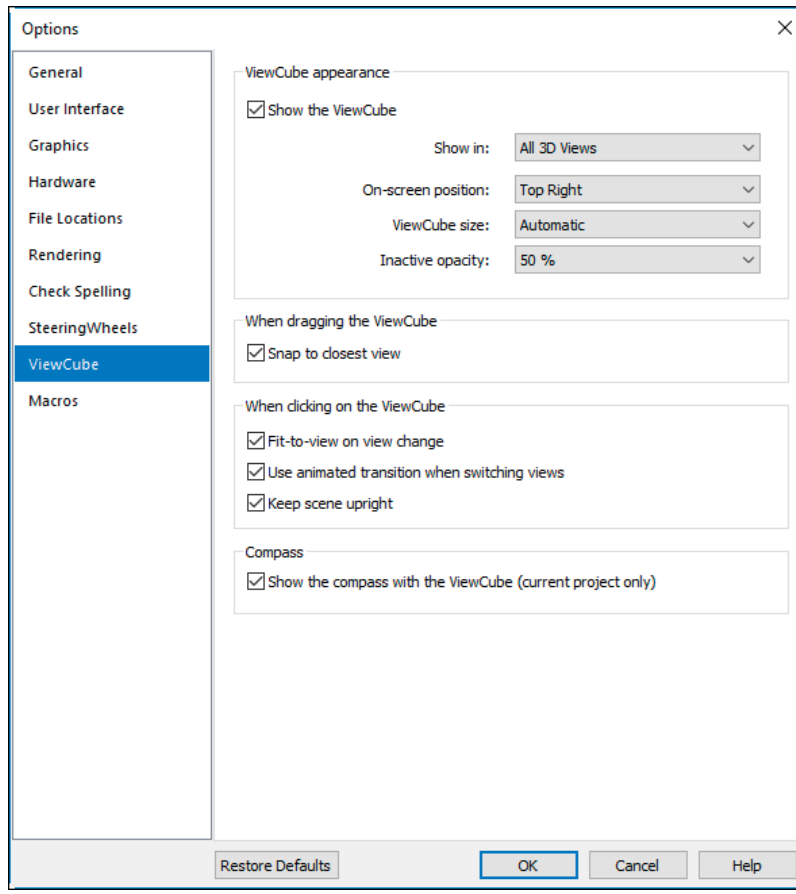

Figure 2-25 *The **Options** dialog box displaying the options in the **ViewCube** tab*

Compass Area

In this area, the **Show the compass with the ViewCube** check box is selected by default. As a result, the compass along with the ViewCube is visible in the drawing. In the **ViewCube** tab, you can choose the **Restore Defaults** button to restore the default settings that were changed in its different areas.

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User Interface Tab



The **User Interface** tab contains tools and options that will help to configure the user interface of the Revit software. In this tab, you can access various tools and options from the **Configure** and **Tab Switching Behavior** areas. In the **Configure** area, you can customize the display of the tabs and tools available in the user interface of Revit. This can be achieved by using various options displayed in the **Tools and analyses** list box. For example, you can clear the **Architecture tab and tools** check box to hide the **Architecture** tab in the Revit interface. In the **Configure** area you can specify the options for the display of Revit user interface. You can do so by selecting the **Dark** or **Light** option from the **Active theme** drop-down list in this area. Also, you can choose the **Customize** button corresponding to the **Keyboard Shortcuts** parameter to customize the use of shortcut keys in a project. In the **Configure** area, you can select an option from the **Tooltip assistance** drop-down list to set the extent of the tip that will displayed with the cursor when it is close to a tool. The options in this drop-down list are **None**, **Minimal**, **Normal**, and **High**. By default, the **Normal** option is selected in this drop-down list. Note that the tooltip will appear more frequently in your drawing if you select **High** in the **Tooltip assistance** drop-down list. In the **Configure** area, the **Enable Recent Files page at startup** check box is selected by default. As a result, the recent files will be displayed on starting the Autodesk Revit software. You can clear this check box if you do not want to display the recent files at the startup.

In the **Ribbon tab switching** area, you can specify the tab to be displayed once you clear a selection or exit a tool. In this area, the **Project environment** drop-down list contains two options: **Stay on the Modify tab** and **Return to the previous tab**. Select the **Stay on the Modify tab** option to display the options in the **Modify** tab after exiting a tool or clearing a selection. Alternatively, you can select the **Return to the previous tab** option to display the last used tab after exiting a tool or clearing a selection. In the **Tab Switching Behavior** area, the **Display the contextual tab on selection** check box is selected by default. As a result, the contextual tab is displayed once you select a tool from the Autodesk Revit interface. In the **View switching** area you can select an option from the **Ctrl+(Shift)+Tab** drop-down list to specify the function of the keys. By default, the **Tab position order** option is selected. You can select the **History order** option from the drop-down list to specify the functions of the keys to order the histories of the project.

CLOSING AN MEP PROJECT

To close a project, choose the **Close** option from the **File** menu displayed. If you have already saved the latest changes, the project file will be closed. Otherwise, Revit will prompt you to save the changes using the **Save File** dialog box. You can save the changes by choosing the **Yes** button or discard them by choosing the **No** button. You can also choose the **Cancel** button to return to the interface and continue working on the project file. You can also use the **Close** button (X) in the drawing window to close the project.

EXITING AN MEP PROJECT

To exit a Revit session, choose the **Exit Revit** button from the **File** menu. Even if the project is open, you can choose the **Exit Revit** button to close the file and exit Revit. If the project has not been saved once, the **Save File** dialog box will be displayed on choosing the **Exit Revit** button. In this dialog box, if you choose the **No** button, all unsaved changes will be lost. You can also use the Close button (**X**) in the main Revit window (in the title bar) to end the Revit session.

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OPENING AN EXISTING MEP PROJECT

In Autodesk Revit, there are several options available to open an existing project. These options are discussed next.

Opening an Existing Project Using the Open Tool

To open an existing project file, choose **Open > Project** from **File** menu. Alternatively, you can open the project file by choosing the **Open** button from **Quick Access Toolbar** or by pressing the CTRL+O keys. On invoking the **Open** tool, the **Open** dialog box will be displayed, as shown in Figure 2-26. Using the **Look in** drop-down list in this dialog box, you can access the desired folder and open the desired file.

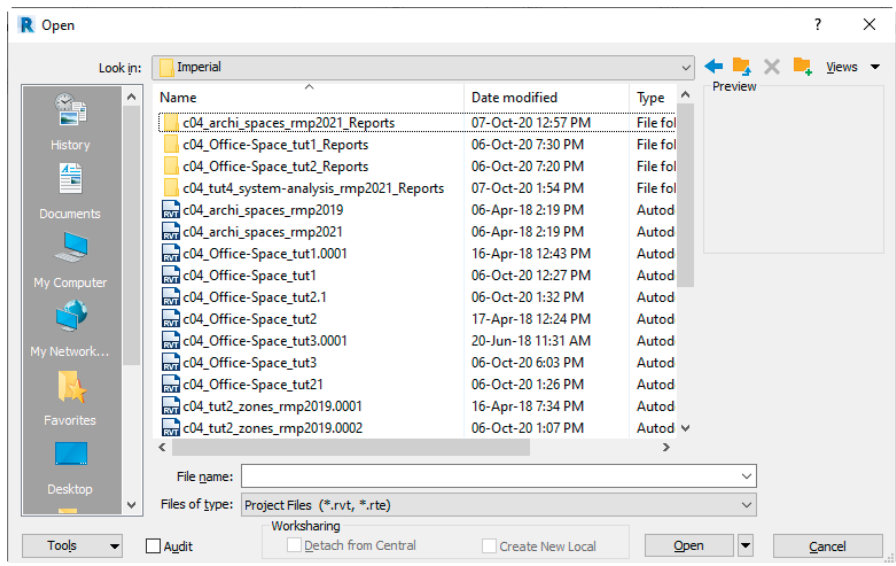

Figure 2-26 *The **Open** dialog box*

The **Preview** area of the **Open** dialog box shows the preview of the selected project file. It helps you select a particular file by viewing its contents even if you are not sure about the name of the file. The window icons such as the **Views** menu, which is placed on the right of the **Look in** drop-down list, helps you select a project file based on its size, type, or date when it was last saved. On choosing the **Thumbnails** option from the **Views** menu, you can preview the contents of the project files inside the selected folder in the file list area. In the **Open** dialog box, you can browse to important locations from the **Places** list. The **Places** list is located on the left side of the **Open** dialog box. In this list, you can add or remove folders as per your requirement. To do so, choose the **Options** button from the **File** menu; the **Options** dialog box will be displayed. In this dialog box, choose the **File Locations** tab and then the **Places** button from it; the **Places** dialog box will be displayed. The **Places** dialog box contains two columns: **Library Name** and **Library Path**.

You can add or remove folders in the libraries list to create a list of frequently accessed folders. The four buttons on the left side of the **Places** dialog box can be used to create or delete a library, or move it up and down in the list. To create a new library, choose the **Add Value** button, which is the third button from the top; a new library will be added to the defined path. By default, the

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name of the new library in the **Library Name** section will be **NewLibrary2**. Change the name of the new library and then click in the **Library Path** column to display the **Browse** button. Choose the **Browse** button and select the folder to be added in the libraries list by using the **Browse for Folder** dialog box. Next, choose the **Open** button; the new folder will get added to the list. If required, choose the upward arrow button from the **Places** dialog box to move the folder up to the top of the list. Similarly, you can choose the down arrow button to move it down. To delete a library, select it and choose the **Remove Value** button. Choose the **OK** button in the **Places** dialog box to exit, and then close the **Options** dialog box. When you invoke the **Open** tool next time, the new folder icon will be displayed in the places list.

Once the file to be opened has been selected, its name will be displayed in the **File Name** edit box of the **Open** dialog box and its preview will be displayed in the **Preview** area.



Note

If you try opening an already opened file that has been modified in the Revit session, a message box will appear prompting you to close the file first and then reopen it. In case you open a file that has been created using an older version of Revit, the ***Program Upgrade*** *message box will be displayed. This message box informs that the file is being upgraded to the latest file format and that this is a onetime process. Once the file is opened, it gets upgraded to Autodesk Revit 2021 version.*

Using the Windows Explorer to Open an Existing Project

Apart from using the **Open** tool from the Revit interface to open a file, you can also open files directly from the Windows Explorer by using the methods discussed next.

A file can be opened by double-clicking on its icon in the Windows Explorer. It opens the project file in the latest Revit session. If Revit is not running, double-click on the file icon to start Revit and then open the file.

Another method of opening a project file is by dragging the project file icon from the Windows Explorer and dropping it in the drawing window of the Revit interface. You can also select, drag, and drop more than one file in the drawing window. In this case, Revit prompts you to open the files in separate windows. Choose the **OK** button to open all files in the same Revit session.

TUTORIAL

Tutorial 1 Office Space

In this tutorial, you will create a project setup for the *Office-Space* project using the following parameters and project specifications: **(Expected time: 45 min)**

1. Template file:
   For Imperial **English-Imperial > Systems-Default**
   For Metric **English > Systems-Default_Metric**
2. Project Units: Refer to Figure 2-29
3. File name to be assigned:
   For Imperial *c02_Office-Space_tut1.rvt*
   For Metric *M_c02_Office-Space_tut1.rvt*

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The following steps are required to complete this tutorial:

a. Start the Revit 2021 session.
b. Use **Systems-Default** (Imperial) or **Systems-Default_Metric** (Metric) as the template file for the project, refer to Figure 2-27.
c. Specify the project units, refer to Figure 2-29.
d. Specify the project information, refer to Figure 2-30.
e. Create the project parameter, refer to Figure 2-31.
f. Add the project parameter to project information.
g. Set the project location.
h. Set the browser organization.
i. Save the project as *c02_Office-Space_tut1.rvt* by using the **Save As** tool.
j. Close the project by using the **Close** tool.

Starting Autodesk Revit 2021

1. Choose **Start > All Programs > Autodesk > Revit 2021** from the taskbar (for Windows 10) or double-click on the Revit 2021 icon on the desktop; the Revit interface is displayed.

Opening a New Project

1. Choose **New > Project** from the **File** menu; the **New Project** dialog box is displayed, as shown in Figure 2-27.

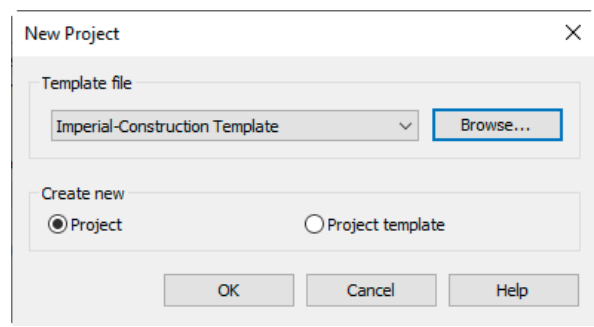

Figure 2-27 *The* ***New Project*** *dialog box*

Selecting the Template File

Before you start a Revit project, it is necessary to select a desired template file.

1. In the **New Project** dialog box, choose the **Browse** button from the **Template file** area; the **Choose Template** dialog box is displayed with a list of template files in the **English-Imperial** folder. Note that for Metric system, the dialog box will display a list of template files in the **English** folder.

2. In the **Choose Template** dialog box, select the **Systems-Default** template file from the list, as shown in Figure 2-28. For Metric system, select the **Systems-Default_Metric** template file from the list. Choose the **Open** button the **Choose Template** dialog box is closed.

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3. Next, in the **New Project** dialog box, ensure that the **Systems-Default.rte** (for Metric system **Systems-Default_Metric.rte)** option is selected in the drop-down list located in the **Template file** area. Also, ensure that the **Project** radio button is selected in the **Create new** area. Now, choose the **OK** button; the **New Project** dialog box is closed and the *Systems-Default.rte* template file is loaded in the current file. For Metric system the *Systems-Default_Metric.rte* is loaded in the current file. Notice that the **Project Browser** now shows different levels and views that have already been created in the selected template file.

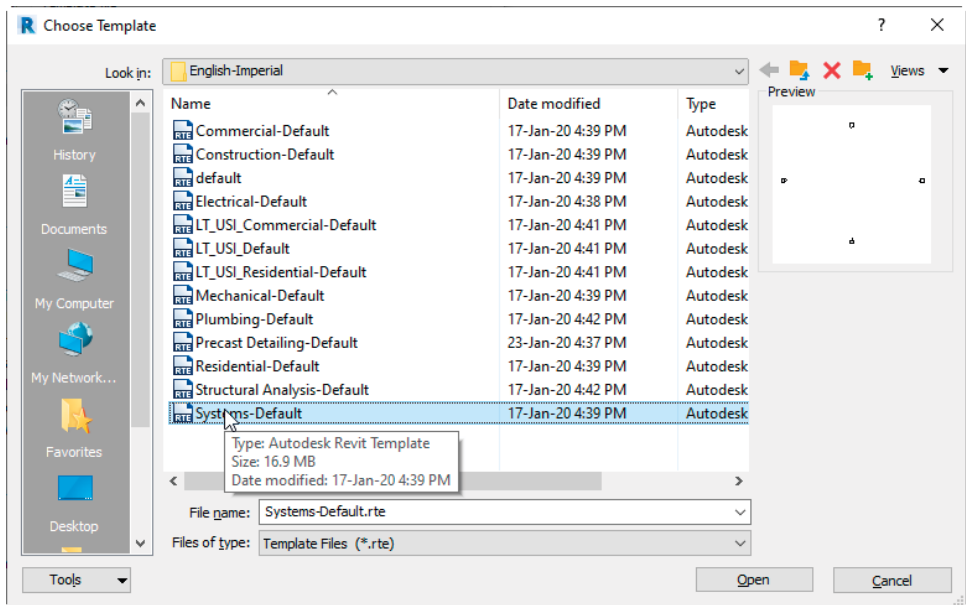

Figure 2-28 *Selecting the* ***Systems-Default.rte*** *file from the* ***Choose Template*** *dialog box*

Setting MEP Units

In this section, you will set the project units for the MEP project.

1. Choose the **Project Units** tool from the **Settings** panel of the **Manage** tab; the **Project Units** dialog box is displayed. Alternatively, you can type UN to invoke the **Project Units** dialog box.

2. In the **Project Units** dialog box, select the **HVAC** option from the **Discipline** drop-down list; various units required in the HVAC workflow are displayed in a table located below the **Discipline** drop-down list, refer to Figure 2-29.

3. Next, choose the button in the **Format** column corresponding to the **Density** parameter; the **Format** dialog box is displayed.

4. In the **Format** dialog box, select the **Pounds per cubic inch** option (for Metric system, select the **kilograms per cubic meter** option) from the **Units** drop-down list and then choose the **OK** button; the **Format** dialog box is closed.

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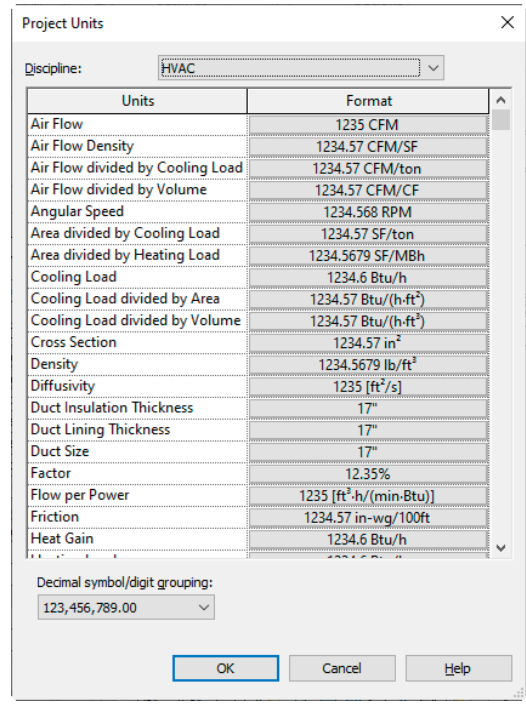

Figure 2-29 *The* ***Project Units*** *dialog box*

5. In the **Project Units** dialog box, repeat steps 2 to 4 and assign different units to the **Electrical**, **Piping**, and **Energy** disciplines. Refer to the table given next for the formats and the discipline of different units needed to be specified.

Discipline	**Unit**	**Format (Imperial)**	**Format (Metric)**
HVAC	Pressure	Pounds per square inch	Pascals
Electrical	Illuminance	Footcandles	Lux
Electrical	Apparent Power	BTU (British Thermal Units) per seconds	Watts
Piping	Density	Pounds per cubic inch	kilograms per cubic meter
Energy	Coefficient of Heat Transfer	BTU (British Thermal Units) per hour square foot degree Farenheit	Watts per square meter kelvin

6. In the **Project Units** dialog box, after specifying the various formats for different units, choose the **OK** button; the **Project Units** dialog box is closed.

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Setting the Project Information

In this section, you will add the project information to the *Office-Space* project file.

1. To set the project information, choose the **Project Information** tool from the **Settings** panel of the **Manage** tab; the **Project Information** dialog box is displayed.

2. In the **Project Information** dialog box, specify the project parameters as given in Figure 2-30.

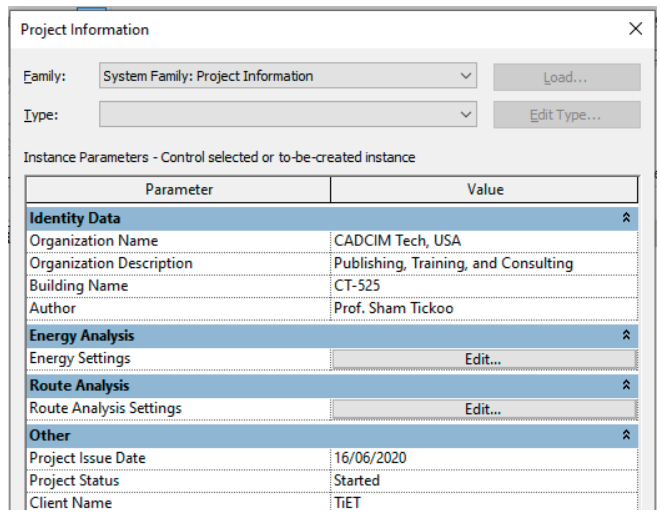

Figure 2-30 *The partial view of the* ***Project Information*** *dialog box*

3. In the **Project Information** dialog box, choose the **Edit** button displayed in the value field corresponding to the **Energy Settings** parameter; the **Energy Settings** dialog box is displayed. In this dialog box, click on the edit box corresponding to the **Mode** parameter and then select the **Use Building Elements** option from the drop-down list displayed.

4. Next, choose the **Edit** button corresponding to the **Other Options** parameter; the **Advanced Energy Settings** dialog box is displayed. In this dialog box, change the parameters as shown in the table given next and retain the other settings.

Parameter	**Value**
Building Type	Office
Building Operating Schedule	24/7 Facility
HVAC System	Central VAV, HW Heat, Chiller 5.96 COP, Boilers 84.5 eff
Export Category	Spaces

5. In the **Advanced Energy Settings** dialog box, choose the **OK** button; the **Energy Settings** dialog box is displayed. Choose the **OK** button in the **Energy Settings** dialog box to close it. The specified values are assigned to the **Energy Settings** parameter in the **Project Information** dialog box.

6. In the **Project Information** dialog box, choose the **OK** button; the dialog box is closed.

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Creating the Project Parameter

In this section, you will create a shared project parameter to be added to the project information.

1. Choose the **Shared Parameters** tool from the **Settings** panel of the **Manage** tab; the **Edit Shared Parameters** dialog box is displayed, refer to Figure 2-31.

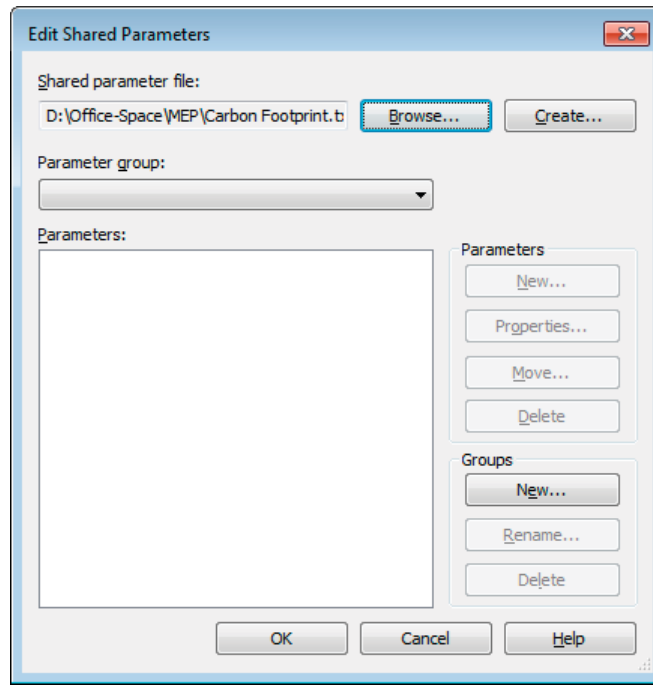

Figure 2-31 *The* ***Edit Shared Parameters*** *dialog box*

2. In the **Edit Shared Parameters** dialog box, choose the **Create** button; the **Create Shared Parameter File** dialog box is displayed.

3. In the **Create Shared Parameter File** dialog box, create a folder as per the following path *C:\Office-Space\MEP.*

4. Next, open the **MEP** folder and then enter the **Carbon Footprint** text in the **File name** edit box and then choose the **Save** button; the dialog box closes and the **Edit Shared Parameters** dialog box is displayed again.

5. In this dialog box, choose the **New** button in the **Groups** area; the **New Parameter Group** dialog box is displayed.

6. In the displayed dialog box, enter the **Green House Gas** text in the **Name** edit box and then choose the **OK** button; the **New Parameter Group** dialog box is closed and the new group is displayed in the **Parameter group** drop-down list of the **Edit Shared Parameters** dialog box.

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7. Now, choose the **New** button in the **Parameters** area; the **Parameter Properties** dialog box is displayed.

8. In this dialog box, enter **Carbon Footprint Factor** in the **Name** edit box and then select the **Energy** option from the **Discipline** and **Type of Parameter** drop-down lists.

9. Now, in the **Parameter Properties** dialog box, choose the **OK** button; the dialog box is closed and the **Edit Shared Parameters** dialog box is displayed with the new parameter added.

10. In the **Edit Shared Parameters** dialog box, choose the **OK** button; the dialog box is closed.

Adding the Project Parameter to Project Information

In this section, you will add the project parameter to the project information.

1. Choose the **Project Parameters** tool from the **Settings** panel of the **Manage** tab; the **Project Parameters** dialog box is displayed.

2. In the **Project Parameters** dialog box, choose the **Add** button; the **Parameter Properties** dialog box is displayed.

3. In the **Parameter Type** area of the **Parameter Properties** dialog box, select the **Shared parameter** radio button and then choose the **Select** button; the **Shared Parameters** dialog box is displayed.

4. In this dialog box, ensure that the **Carbon Footprint Factor** parameter is selected in the **Parameters** area and then choose the **OK** button; the **Shared Parameters** dialog box is closed.

5. In the **Parameter Data** area of the **Parameter Properties** dialog box, ensure that the **Instance** and **Values are aligned per group type** radio buttons are selected. Also, ensure that the **Energy Analysis** option is selected in the **Group parameter under** drop-down list.

6. In the **Categories** area, select the **Project Information** check box from the list box displaying all categories.

7. Now, choose the **OK** button; the **Project Parameters** dialog box is displayed. Choose the **OK** button in the displayed dialog box to close it.

   After assigning the shared parameter to the category of project information, now you need to specify a value to the added parameter in the **Project Information** dialog box.

8. Choose the **Project Information** tool from the **Settings** panel of the **Manage** tab; the **Project Information** dialog box is displayed.

9. In the **Project Information** dialog box, click in the value field corresponding to the **Carbon Footprint Factor** parameter and enter **12000** in it.

10. Next, choose the **OK** button to close the **Project Information** dialog box.

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Setting the Project Location

In this section, you will set the location of the project.

1. Choose the **Location** tool from the **Project Location** panel of the **Manage** tab; the **Location Weather and Site** dialog box is displayed.

2. In this dialog box, ensure that the **Location** tab is chosen by default. Now, select the **Internet Mapping Service** option from the **Define Location by** drop-down list, if it is not selected by default.



Note

*On selecting the **Internet Mapping Service** option from the **Define Location by** drop-down list, the **Google Map** browser is activated for browsing the desired location. You should ensure that the internet connection is active at this stage.*

3. In the **Location** tab of the **Location Weather and Site** dialog box, enter **Schererville, IN** in the **Project Address** edit box and then choose the **Search** button; the **Bing Map** browser is displayed under the **Project Address** edit box showing the desired location in the map, as shown in Figure 2-32.

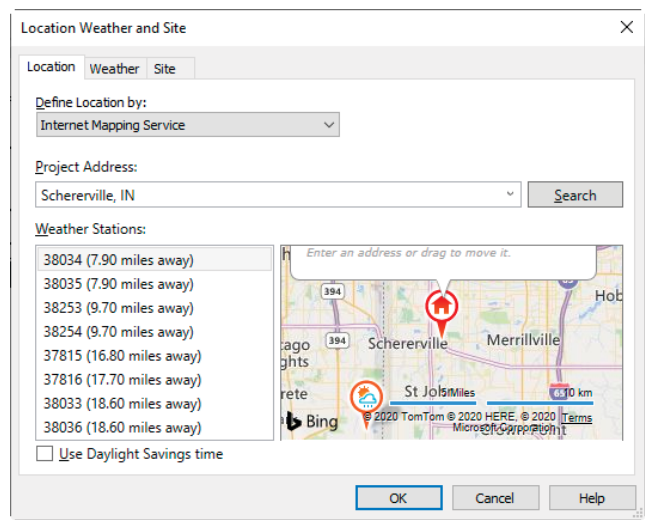

***Figure 2-32** The **Location Weather and Site** dialog box*

4. Now, choose the **OK** button to close the **Location Weather and Site** dialog box.

Setting the Browser Organization

In this section, you will set the **Project Browser** to display various views and information related to the project in the order of their discipline.

1. Choose the **Browser Organization** tool from **View > Windows > User Interface** drop-down; the **Browser Organization** dialog box is displayed.

2. In the displayed dialog box, ensure that the **Views** tab is chosen by default and then choose the **New** button; the **Create New Browser Organization** dialog box is displayed.

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3. In the **Name** edit box of the displayed dialog box, enter **Office-Space-MEP** and then choose the **OK** button; the dialog box closes and the **Browser Organization Properties** dialog box is displayed.

4. In this dialog box, choose the **Grouping and Sorting** tab; various options in this tab are displayed.

5. Select the **Discipline** option from the **Group by** drop-down list.

6. Ensure that the **All characters** radio button located under the **Group by** drop-down list is selected. Now, select the **Family and Type** option from the **Then by** drop-down list.

7. Next, select the **View Name** option from the **Sort by** drop-down list located at the bottom in the **Browser Organization Properties** dialog box. Ensure that the **Ascending** radio button located below the **Sort by** drop-down list is selected.

8. Choose the **OK** button; the **Browser Organization Properties** dialog box is closed.

9. In the **View** tab of the **Browser Organization** dialog box, select the **Office-Space-MEP** check box. Now, choose the **Apply** button and then the **OK** button; the dialog box is closed and the specified settings are applied to the **Project Browser**, refer to Figure 2-33.

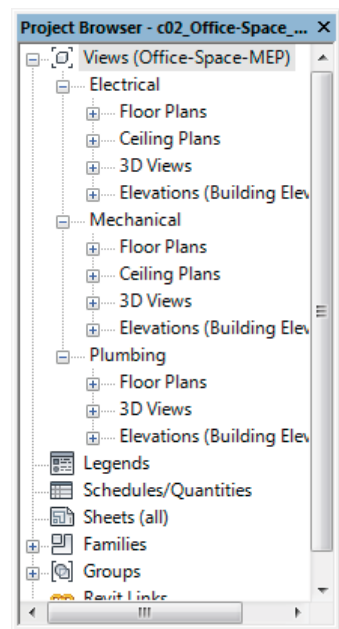

Figure 2-33 *The* ***Project Browser*** *displaying the settings specified in the* ***Office-Space-MEP*** *browser organization*

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Saving the Project

In this section, you need to save the project and the settings using the **Save As** tool.

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

2. In this dialog box, browse to the *C* drive and then create a folder with the name **rmp_2021.** Next, create a sub-folder with the name **c02_rmp_2021_tut** in it.

3. In the **File name** edit box, enter **c02_Office-Space_tut1** for Imperial or **M_c02_Office-Space_tut1** for Metric and then choose the **Options** button; the **File Save Options** dialog box is displayed.

4. In this dialog box, enter **5** in the **Maximum backups** edit box, and then in the **Thumbnail Preview** area, select the **3D View: {3D}** option from the **Source** drop-down list.

5. Select the **Regenerate if view/sheet is not up-to-date** check box in this dialog box.

6 Now, choose the **OK** button; the **File Save Options** dialog box is closed and the **Save As** dialog box is displayed.

7. In this dialog box, choose the **Save** button to save the current project file with the specified name and to close the **Save As** dialog box.

Closing the Project

1. To close the project, choose the **Close** option from the **File** menu.

Self-Evaluation Test

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

1. Which of the following tabs in the **Options** dialog box can be used to set the configuration of the fabrication application?

(a) **User Interface** (b) **File Locations**
(c) **General** (d) None of these

2. Which of the following tools can be used to set the **Project Browser** of a project?

(a) **Keyboard Shortcuts** (b) **Project Browser**
(c) **Object Styles** (d) **Browser Organization**

3. The_____tool can be used to set the disciplines in the **Project Browser**.

4. You can define the geographical location of a project by using the_____tool.

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5. In an MEP project, you can inherit the project standard from another Revit project by using the_____ tool.

6. The _____ button in the **Save As** dialog box can be used to specify the maximum numbers of backup(s) for a project file.

7. The options in the _____ tab of the **Options** dialog box can be used to set the path for various frequently accessed files and directories.

8. You can choose the **Link Revit** tool from the _____tab to link a Revit project to the current project.

9. You can open multiple Revit projects at a time. (T/F)

10. In Revit, you can enable all the object snap options at a time. (T/F)

11. The extension of a template file used in a Revit project is *.rft*. (T/F)

12. The **Options** dialog box is used to configure the global settings of the project. (T/F)

Review Questions

Answer the following questions:

1. Which of the following files are used to resolve technical problems occurred during a Revit session?

(a) Temporary (b) History
(c) Journal (d) Cookies

2. Which of the following options is not an object snap option?

(a) **Endpoints** (b) **Work Plane Grid**
(c) **Dimension** (d) **Centers**

3. Which of the following keys is used to toggle between the object snap options available at the same point?

(a) TAB (b) CTRL
(c) ALT (d) F3

4. You can specify the settings for **ViewCube** and **SteeringWheels** in the_____dialog box.

5. The _____tool can be used to share the coordinates of the host model with the linked model.

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6. In Revit, you can create a unique identification for a particular session. (T/F)

7. The flow in the piping system implies the discharge rate of the water or fluids. (T/F)

8. You cannot control the visibility of an element in the linked model(s). (T/F)

9. The **Save reminder interval** drop-down list available in the **General** tab of the **Options** dialog box is used to specify the time interval between reminder prompts to save a project file. (T/F)

10. If you choose the **Close** button without saving the changes made in a project file, Revit will prompt you to save the changes before closing it. (T/F).

EXERCISE

Exercise 1 Power Plant

In this exercise, you will create a new project file for the *Power Plant* project with the following parameters. **(Expected time: 15 min)**

1. Template file:
   For Imperial **US Imperial > Systems-Default**
   For Metric **US Metric > Systems-Default_Metric**

2. Project information to be added:

Project Issue Date	**10/05/2020**
Project Status	**Started**
Client Name	**CADCIM Technologies**
MEP Consultant	**CADCIM-Technologies**
Mechanical Consultant	**Sham Tickoo**
Project Name	**Power Plant**
Commencement Date	**20/09/2020**
Documented Contract Completion Date	**31/07/2021**
Provisional Period Allowed in Contract	**30 Days**

3. Project Units- Set the various units in the *Power Plant* project as mentioned in the table given next.

Discipline	Units	Format (Imperial)	Format (Metric)
HVAC	Power	Kilowatts	Kilowatts
HVAC	Heat Gain	Kilowatts	Kilowatts
HVAC	Duct Size	Decimal inches	Millimeters
HVAC	Factor	Fixed	Fixed
HVAC	Pressure	Pounds per square inches	Pascals
Electrical	Frequency	Cycles per second	Cycles per second

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Electrical	Current	Kiloamperes	Kiloamperes
Electrical	Illuminance	Footcandles	Lux
Electrical	Electrical Potential	Kilovolts	Kilovolts
Piping	Velocity	Feet per second	Meters per second
Energy	Coefficient of Heat Transfer	BTU per hour	Joules

4. Energy Settings-Set it as specified in the table given next.

Parameter	**Value**
Export Category	Spaces
Mode	Use Conceptual Masses and Building Elements
Project Phase	Existing
Building Type	Automotive Facility
Building Operating Schedule	24/7 Facility
HVAC System	Central VAV, HW Heat, Chiller 5.96 COP, Boilers 84.5 eff

5. File name to be assigned:
   For Imperial *c02_Power_Plant_exer1.rvt*
   For Metric *M_c02_Power_Plant_exer1.rvt*

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Answers to Self-Evaluation Test

1. d, **2.** d, **3. Browser Organization**, **4. Location**, **5. Transfer Project Standards**, **6. Options**, **7. File Locations**, **8. Insert**, **9.** T, **10.** T, **11.** F, **12.** T