


Unit 2 Modeling the Sustainable Building Site Exercise: Permeable/Non-permeable

Permeable / Non-permeable Surface Analysis with Areas and Color Fills

Analysis type:	Software required:	Starting Point Dataset:
 Visual Analysis	Revit® Architecture 2008	<i>Unit 2_i_Start.rvt</i>

Permeable surfaces act to passively harvest rain water and enable it to percolate into the soil, where it can be used by onsite landscaping or to recharge the ground water system. Projects containing higher percentages of permeable surfaces also reduce the amount of pollutants (e.g. surface oils and litter) that are washed off site into the environment's water system.

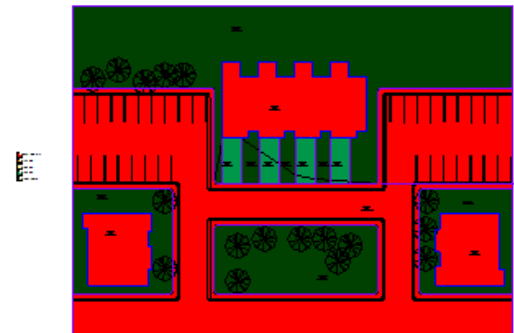
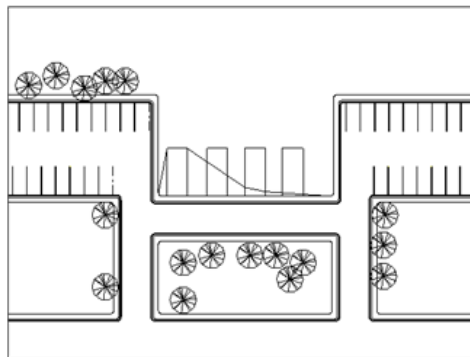
The exercise for this unit outlines how to create a visual analysis that compares permeable and non-permeable surfaces in a site plan. To contrast the site's permeable surfaces with the non-permeable ones, use Revit Architecture software's Area object to delineate areas with different permeability characteristics. When you finish, apply a color scheme so you can visually analyze the site.

You can use the Area tool to provide customized plan visualizations (with color fill schemes) or calculations. If you generate calculations, make sure that you also generate an area schedule after you are done. In this exercise, color schemes provide a visual representation of the permeable parameter you add to the areas. See Unit 18 in the Revit Architecture Building Information Modeling Education Curriculum workbook for more information on schedules and color fill schemes.

This exercise consists of the following tasks:

- Creating a new area scheme.
- Creating a new area plan and adjust the view settings to make the site elements visible.
- Creating boundaries and areas.
- Adding and applying a Permeable Project Parameter.
- Adding color fill.
- Creating a color fill scheme.

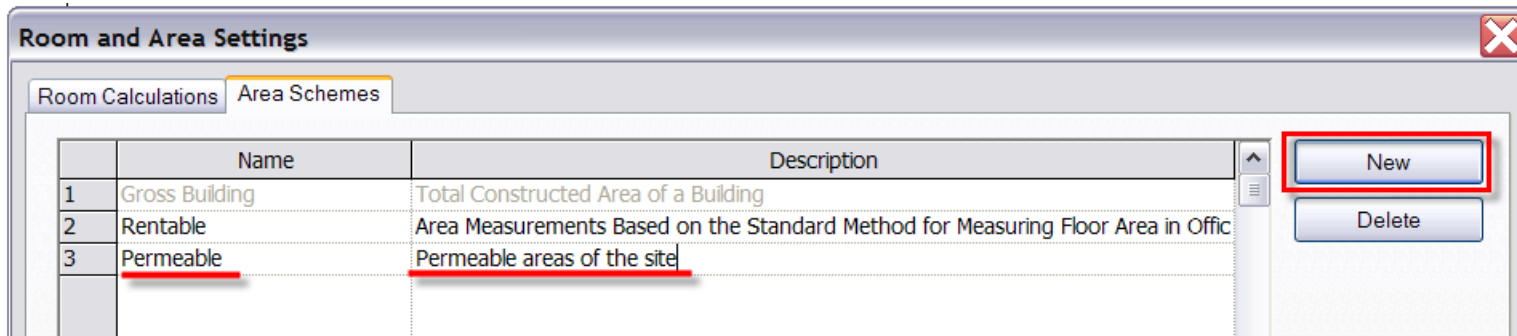
Use dataset *Unit 2_i_Start.rvt* as a starting point for this exercise. You may also use your own dataset. Even if you have only a drawing or image of your site, you can import these and draw the area lines directly on top of the image or drawing file. See Revit Educational Curricula, Unit 12, Exercise A for information on how to link a drawing created using AutoCAD® software into a Revit Architecture project. Linking an image is a very similar process.



Before: Initial site plan from sample

After: A color-filled area plan that shows permeable and non-permeable site areas

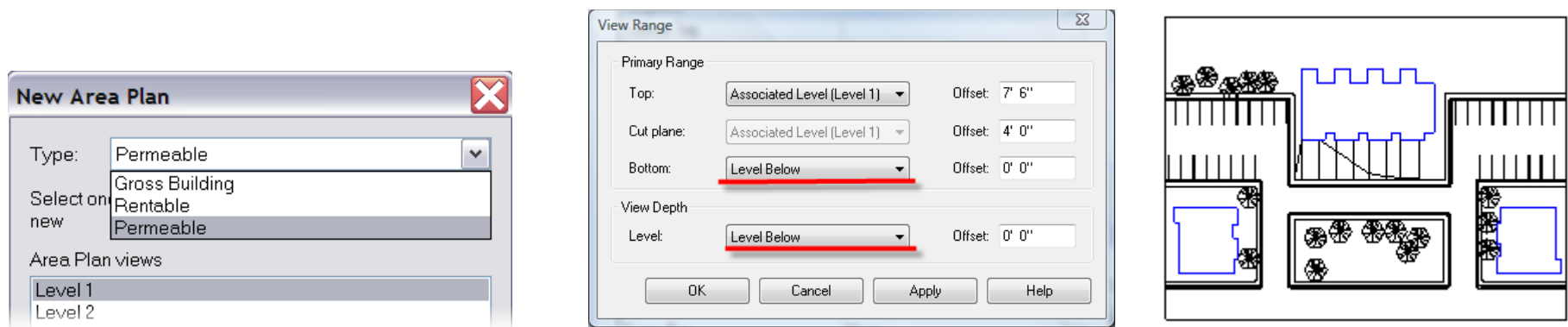
1 Create a New Area Scheme



On the Settings menu, access the Room and Area Settings dialog box, Area Schemes tab. Click New. Add a new area scheme and name it Permeable.

Note: Area Schemes are used to create separate area boundaries for different purposes. For each Scheme you create, you may also create an associated Area plan. In each Area plan you may add area boundary lines and area objects to calculate the square footages of different aspects of your project. For example, you might have a department area scheme, a building code area scheme, and this permeable scheme. Each separate scheme enables you to place the boundary lines according to the needs of the respective area divisions.

2 Create a New Area Plan



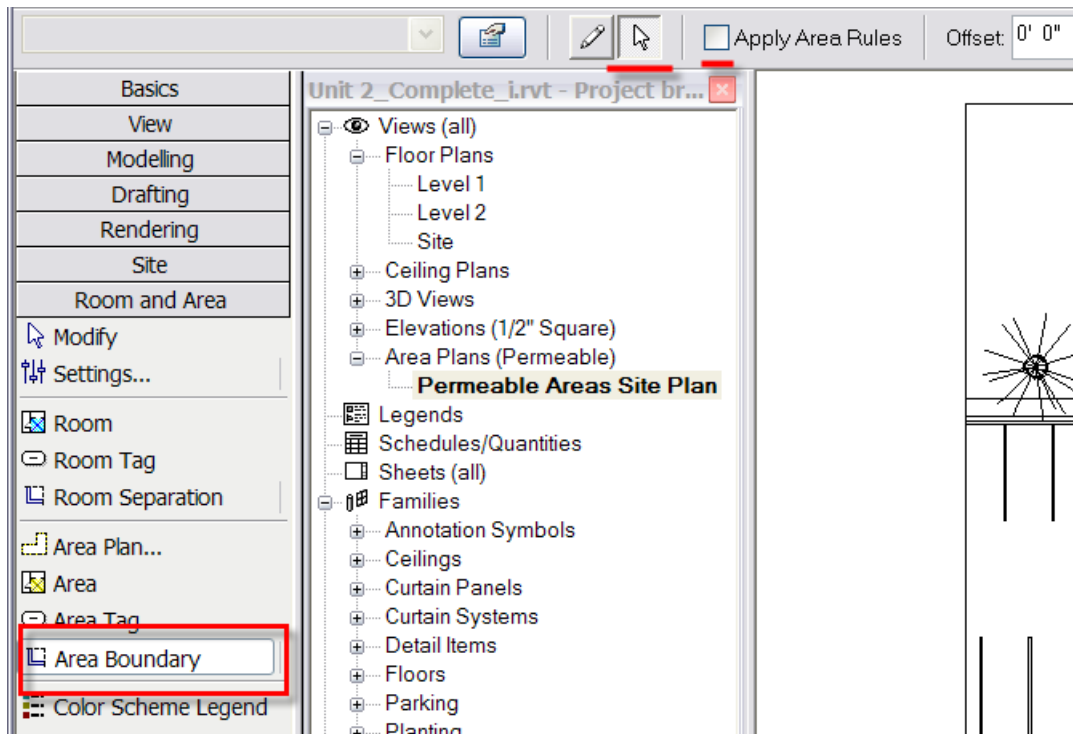
To create a new Level 1 area plan of the permeable area scheme type you just created, click View menu > New > Area Plan. Do NOT associate lines with exterior walls when prompted. Use the option bar filter to copy just the detail lines from the Level 1 floor plan. To place them in the Permeable Areas Site Plan, click Edit menu > Paste Aligned. Click View menu > Properties. Finally, select Level Below from the lists under Primary Range Bottom and View

Depth Level.

3

Create the Area Boundaries and Areas

Next, use the area boundary tool to generate the lines that will form the edges of the areas. In this particular exercise, establish these boundaries at the edge of the sidewalk and building footprints. The sidewalk in this example abuts the curb, so the entire area from the grass side of the curb across the driving area to the far side of the adjacent sidewalk is all non-permeable area (see end result image at beginning of exercise).



To establish the bounds of the permeable and non-permeable areas, click Area Boundary. Then, click the pointer arrow and pick the lines from the existing geometry. After establishing the boundaries, use the Area tool to add areas inside each boundary.

- TIPS
- On the Hover tab, select multiple lines at once while using the Area Boundary Pick tool.
 - Clear the Apply Area Rules check box. Use this option for picking walls.

4

Add and Apply a Permeable Project Parameter

Parameter Properties

Parameter Type

☒ Project parameter
(Can appear in schedules but not in tags)

☐ Shared parameter
(Can be shared by multiple projects and families, exported to ODBC, and appear in schedules and tags)

Select... Export...

Parameter Data

Name: Permeability

Group parameter under: Other

Discipline: Common

Type of Parameter: Number

☒ Instance ☐ Type

☒ Add to all elements in the selected categories

Categories

- ☒ Areas
- ☐ Casework
- ☐ Ceilings
- ☐ Columns
- ☐ Curtain Panels
- ☐ Curtain Systems
- ☐ Curtain Wall Mullions
- ☐ Detail Items
- ☐ Doors
- ☐ Drawing Sheets
- ☐ Electrical Equipment
- ☐ Electrical Fixtures
- ☐ Fascias
- ☐ Floors

Check All Check None

☐ Show categories from all disciplines

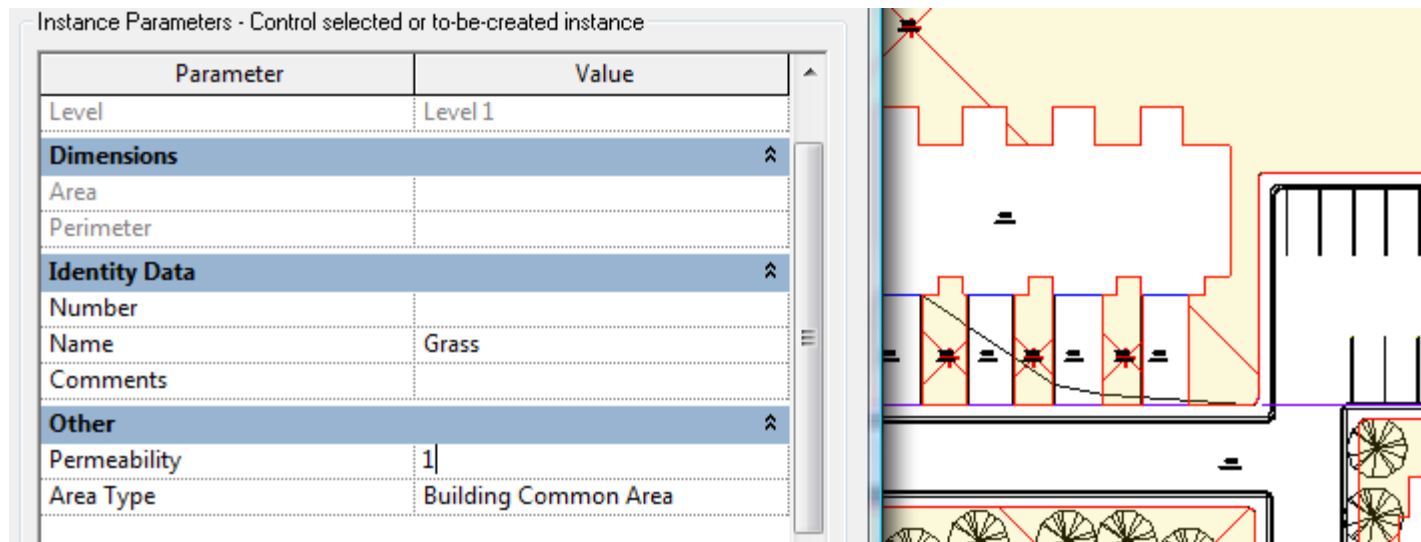
☐ Hide un-checked categories

OK Cancel Help

Click Settings menu > Project Parameters to access the Project Parameters dialog box. Add a new parameter that uses the settings shown in the figure above. Under Categories, select only Areas.

Note: Under Parameter Data, permeability is represented with a number. That enables you to represent a range of permeability rather than simply representing it as permeable or non-permeable. As a result, you can show areas in the parking lot that might have a drivable grid that is neither fully permeable (1.00) nor fully impermeable (0.00) but somewhere in between.

5 **Add the Permeability Information**

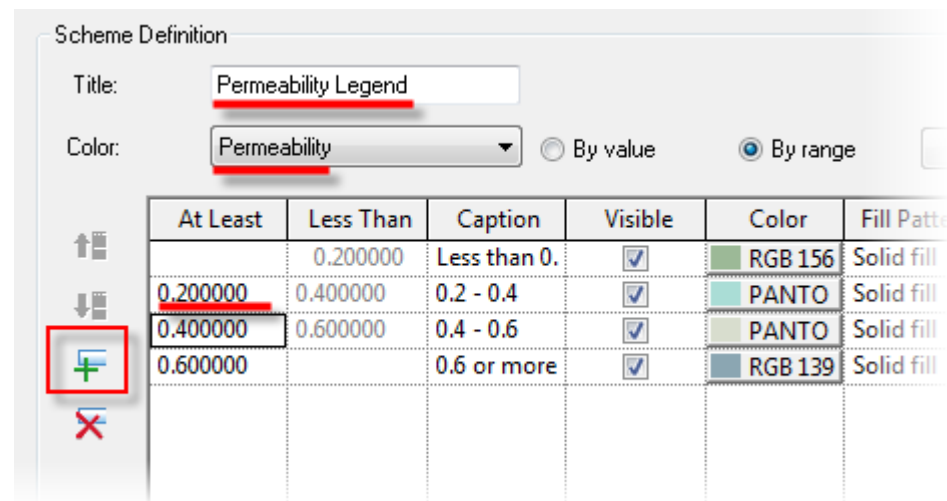
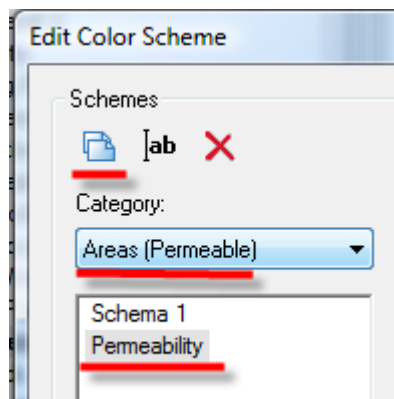


Select multiple areas that have similar permeability levels. Right-click the selected objects. Click Properties. In the Properties dialog box, assign the permeability to the new instance parameter. For example, in the image above, apply a permeability number of 1 to all grassy areas on the site. Repeat this process until you have applied permeability ratios to all areas of the site. If you are using sample project data, assign a permeability of 0 to the drivable areas and a permeability of .75 to the individual parking areas on the north.

6

Create a New Permeable Color Scheme

Click Settings menu > Color Fill Themes. Create a new theme for the Areas (Permeable) category based on the permeable parameter.



Under Category, select Areas (Permeable).

Click the new scheme icon to create a new scheme and enter a title for the new scheme in the scheme definition dialog box that appears. Click OK to return to the Edit Color Scheme dialog box.

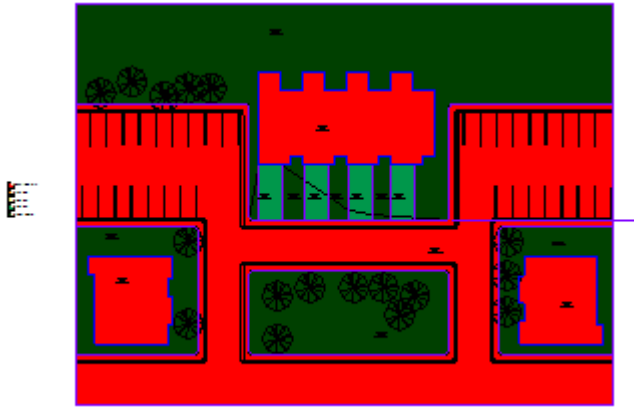
Click the By Range radio button.

Click the green "+" sign in the left margin to add more ranges.

To modify the range, click in the At Least column and modify the values as desired. To change permeability range colors, click on the color you wish to change and select a new one. In this same dialog box, you may also set the options to display color fill in the foreground.

7

Add the Color Scheme



Use the Drafting Design bar Color Scheme tool to add the Permeability color scheme to the view.

Exercise complete.

Because the area objects now contain the permeability properties, you may use schedules to both enter the data, and to create totals and percentages of the whole site with calculated parameters.