Twilight Render
Part 9 includes companion chapters for the book Rendering in SketchUp and are intended to be used with the book itself. All models and renderings are by Daniel Tal unless otherwise noted.

Acknowledgments

I would like to thank two individuals for their contributions to these chapters. They have both been mentioned in the main book text, but deserve another round of appreciation. Avraham Zohari and Kara Letts both provided models for rendering. Their work is exceptional.

Avraham is only 13 years old at the time of this writing and has proven that he can design and model as a professional. You can see more of his work at www.3dezine.com.

Kara Letts is a talented and rising star in the interior design industry. She won the Easter Seals SketchUp Ur Space competition in 2011.

About Twilight Render

Part 9, “Twilight Render,” details how to use the IRP Twilight Render, called Twilight throughout these chapters. You can download Mac and Windows versions of Twilight at www.twilightrender.com. Please use these chapters to learn how to work with Twilight menus, tools, and settings.

Twilight Render is an excellent IRP and should be seriously considered by anyone who wishes to create high-quality, realistic renderings. With enough practice, it can provide some of the best rendering results from an IRP (see Fig. 42.1, Fig 42.2, Fig 42.3). These chapters are intended to get users started and make them feel comfortable using Twilight. The resources on Twilight’s website are worth delving into when you are ready to advance your Twilight skills.

Twilight Render is referred to in these chapters as Twilight, TW, and Twilight Render.
Fig. 42.1: Twilight exterior render of European street. Model by Avraham Zohari, model adjustments and rendering by Daniel Tal. Postproduction in Photoshop.

Fig. 42.2: Interior Twilight render. Model by Kara Letts, model adjustments and rendering by Daniel Tal.
Chapter 42: “Introduction to Twilight Render”: Menu and tool overview.
Chapter 43: “Twilight Render Iterative Rendering Settings”: Twilight Render iterative rendering process and settings
Chapter 44: “Twilight Render Texture Settings”: Texture menus and category settings
Chapter 45: “Exterior Lighting and Backdrops”: Exterior lighting and backdrops
Chapter 46: “Twilight Render Simulated Lighting”: Simulated lighting, including point, spot, IES profiles, and other lighting options
Chapter 47: “Twilight Render Special Features”: Special features including how to use Instancing and create Clay renders.

Part 9 is not a software manual that describes every tool and aspect of Twilight. In some instances, settings are provided without an explanation of the specific options. For the software manual and other resources, visit Twilight’s website, www.twilightrender.

Due to the changing nature of many rendering plug-ins, including Twilight, some of the specifications in this Part could become outdated. Some settings and options might change with software patches and updates.

The settings outlined in these chapters are for the full version of Twilight. Some of these settings can be used in tandem with the demo version; however, the demo version has limited settings and does not include all of the features and options available in the full version.
Twilight Render Options, Resources, and User Manual

Twilight Render comes with many more options and settings than the typical IRP. These chapters focus only on the settings that have the most use for any given render. They provide enough information to get started with Twilight and settings useful in producing high-quality renderings, but they do not describe all of Twilight’s nuances and options.

Thankfully, Twilight’s developers have produced a detailed user manual that reviews its many options and is an excellent supplemental resource for referencing material not covered in these chapters (Fig. 42.4). Users can download the Twilight Render User Manual, which contains a list of all of the program’s functions and what they do.

Furthermore, doing a Google search on a specific Twilight question can yield good results. A good search result will point you towards the Twilight Render forum where a user or developer has posted a short tutorial.

For example, searching on Google for “Twilight Render Water,” yields the top result of an excellent link to forums providing a short but detailed tutorial on how to create rendered water (Fig. 42.5). It is strongly recommended that you do searches on specific topics that might not be covered in these chapters when you need additional information.
Menu Overview

Once Twilight Render is installed, go to View ➤ Toolbars and look for Twilight Render in the list. In most cases, the toolbar will already be active within SketchUp space (Fig. 42.6). While the menu has seven options (and might seem intimidating), the options are easy to navigate and all do not need to be used to generate a rendering. They are, from left to right:

- **Open Twilight Render**: Clicking this button will launch the options for quality and resolution. This menu also includes the start rendering button (Fig. 42.7).
- **Twilight Render Point Lights**: This is a simulated lighting option used to place Point Lights in the model.
- **Twilight Render Spot Lights**: This is a simulated lighting option used to place Spot Lights in the model.
- **Twilight Render Light Editor**: This menu is used to set Physical Sky, backgrounds, and HDRI images (Fig. 42.8).
- **Material Editor**: This option opens a menu for editing textures and materials so that they will render (Fig. 42.8).
- **Twilight Render Options**: This menu is used to activate the software after purchase and allows for setting file paths to texture libraries.
- **Twilight Render Position Scene**: This feature helps compose a scene for rendering.
Fig. 42.7: The Open Twilight Render button opens the preview screen and additional options menus, including Quality and Resolution settings.

Fig. 42.8: On the right is the Twilight Material Editor menu. The Light Editor, left, controls settings for exterior and simulated lighting.
The three main menus to focus on are Open Twilight Render, Light Editor, and Material Editor. The other menus are used for specific situations (placing simulated lights, for example). The last two selections, Options and Position Scene, are not described in these chapters.

**Special Features**
Below are features reviewed in these chapters and in Chapter 47.

**Progressive Render Settings**
Twilight has unique quality render settings—called progressive—that are not found in other IRPs. These settings go beyond the highest-quality settings found in other IRPs. These settings will render the image, layering finer and finer clarity onto the generated image. You stop the rendering when you are happy with the results. These settings are discussed in detail in the next chapter.

**Instancing**
Twilight instances components. Any copy of a component is processed once by the IRP when generating the image. All other copies are rendered without having to be processed. This means that you can place a large number of detailed components, such as trees, in your model (Fig. 42.9). When you start the render, Twilight will sample one of the components and process all of the copies instantly (Fig. 42.10).

![Image](image_url)  
**Fig. 42.9:** The SketchUp model includes many copies of the same type of tree component.
Fig. 42.10: Twilight samples one of those trees and is able to quickly process the rest without impeding performance or running out of memory. This allows you to render large, geometry-filled models quickly.

Render Styles

Twilight has many quality presets for different types of rendering styles, including the typical clay model render (Fig. 42.11). Clay render options are reviewed in Chapter 47.

Fig. 42.11: Clay render of building in Twilight.
This chapter reviews settings related to the iterative rendering process outlined in Chapter 20 and includes precise resolution, quality, and draft-to-final-render options for Twilight Render.

The Render Settings Menu

The Open Twilight Render menu is where you set the values for resolution and render quality (Fig. 43.1). Correctly using these settings is of paramount importance for the draft-to-final iterative rendering process.

Clicking on the Open Twilight Render button will reveal a large menu. The menu window dominates the SketchUp screen, and you will need to close it or resize it to see your SketchUp model. The menu view viewport can be resized as needed.

This menu has many options, including the main render preview screen. Below is a list of the relevant options found in this menu. Not all menus and options are covered. For additional information, please read the Twilight Render software manual that can be found on Twilight’s website.

**Start Render** from Current View: This option starts the rendering process.

**Stop Current Render:** Clicking this button will cause the rendering process to stop.

**Pause Render:** The option allows you to pause the rendering. Clicking this button again will resume the rendering process.

**Save Render:** The Save button can be clicked at anytime to save the current or final progress of a rendering.

**Render Preview Window:** The area below these buttons is where the rendering will appear as it’s being processed.
Fig. 43.1: Twilight Render options window. This menu is where you start, stop, and save renderings. It includes Resolution, Quality, and Exposure settings.

Fig. 43.2: Enlargement of the Resolution menu found under the main render options window in Twilight.
Resolution

Twilight requires that you set a resolution manually or by using a viewport option (see chapter 22 for more on viewports). It does not include preset resolution values. Under Settings to the right, the selected tab by default is Render. The Render tab contains resolution and render quality settings (Fig. 43.2).

Under width and height, simply enter the resolution that you want. You will need to click on the Unlock/Lock aspect ratio button (to the right of these options) to set custom height and width for your image.

Viewport Size

One excellent option for setting resolution is to match the viewport size. Clicking the Set viewport size options will set the resolution to match your SketchUp viewport. This makes creating focused, wide-angle, or narrow views easy (Fig 43.3). Simply adjust the SketchUp viewport by dragging on the corners of the SketchUp application window to the intended width and height. Clicking the Viewport size options will cause Twilight to automatically calculate the screen’s width and height resolution (Fig. 43.4).

Fig. 43.3: The SketchUp application viewport is adjusted to a narrow view. The viewport size button is clicked on the Twilight Resolution menu. Twilight calculates the width and height of the SketchUp viewport.
Fig. 43.4: Twilight renders the exact viewport scene of 532 x 873.

Fig. 43.5: Increasing or decreasing the resolution with the aspect ratio locked allows you to resize the image while keeping the same proportions. In this case, the width is increased to 1280, which will automatically increase the height in a proportioned manner.
If the aspect ratio is locked, you can increase and decrease the size of the viewport to maintain the correct proportions. This allows you to control the resolution for draft and higher-quality settings (Fig. 43.5).

Quality

Twilight Render quality settings use named or preset options. The ones you will use the most (and first) are under Presets --> Express --> 1) Easy. There are many presets under Easy, ranging from preliminary to low, medium, high, and progressive (Fig. 43.6). These represent the incremental increase in quality useful to the draft to final render process.

The quality settings under Easy are important to understand for the iterative rendering process. You will want to start all initial renders using 01. Prelim or 02. Low options and steadily increase the quality with each iteration.

Fig. 43.6: The Quality preset menu shown collapsed (top) and expanded (below), revealing the key settings under the Express: 1) Easy options.

(+ ) Quality Settings

Some of the quality options have a (+) next to them, for example, 03. Low+, 05. Medium+, and 07. High+. These options have higher anti-aliasing or smoothing of the image. They take longer to complete but produce a better image relative to settings without the (+). The iterative rendering process outlined in this chapter does not focus on these settings, but feel free to experiment with them to see the results.
Progressive Quality Settings

Quality options 08 to 11 are special quality settings that render the model using a progressive render system. Progressive quality settings continue to render the scene until you manually stop it. You can let you render run for as long as you want, ending the process when you have the quality you wish. The longer it renders, the better the image will be. Using these settings produces very high quality results not easily achieved with other IRPs. Typically, letting a render run for one and half to two hours (or longer) produces the needed results with progressive quality.

There are two types of Progressive settings: one for exterior and three for interior. These settings take into account if you are using physical sky (SketchUp Shadows) or simulated lighting, refining the render based on lighting allowing for even sharper graphics. The three interior settings include a preview, a regular and a high-resolution anti-alias setting. Use 10. Interior+ if you have the time to wait for this render to complete and want the best possible image.

Using Quality Settings

To simplify the iterative rendering process, use the following quality settings for your Twilight renderings (Fig. 43.7):

02. Low,
04. Medium
08. Exterior Daytime Progressive for exteriors
09. Interior Progressive settings for interiors

Fig. 43.7: Suggested preset quality settings when first rendering with Twilight.
Some examples of how these settings are used to generate a draft to final render can be seen in Figures 43.9, 43.10, and 43.11. The draft to final render settings provided below include examples of exterior and interior draft images rendered with the various presets.

It is worth using some of the other quality settings even though they are not referenced in the settings below. It might be useful to use 01 Prelim to get a quick view of the render. Furthermore, 06. High and 11. Interior Preview (Fig 43.8) are also very useful, providing different results. 06. High is useful for exterior renderings producing a quality image in a definite amount of time. Use this as an alternative to progressive render settings for exterior scenes. 11. Interior Preview is ideal for a scene with many simulated lights before you run the final progressive render.

Experiment with these other quality settings once you are comfortable using Twilight.
Fig. 43.9: Three initial draft renders. Top used 01. Prelim, the middle and bottom used 02. Low.
Fig. 43.10: Secondary drafts using 03. Medium for the top three images and 11.Interior Preview (Progressive) for the bottom two.
Exposure

As was noted in earlier chapters of the book, Exposure is an important setting to adjust for all renderings. For Twilight, two exposure options are found under the Camera Tab: Exposure and Gamma (Fig. 43.12). Both of these can be adjusted dynamically while the model is being rendered and once the render is complete.

- Exposure increases or decreases how bright the render appears.
- Gamma increases or decrease overall contrast.

You will want to use these settings in tandem. When starting, keep their values at 1.0, which is the default option. Adjust these values in small increments. You will only need to adjust the values by tenths to tweak the rendered results. [Fig. 43.13 and Fig. 43.14].
For most renderings, both exterior and interior, it is useful to increase Exposure and decrease Gamma. A typical range of values is: Exposure from 1.0 to 1.35 and Gamma from 1.0 to 0.85. Remember that these values range in tenths (1.1, 1.15, 1.2, 1.25, etc.).

Exposure and Gamma are further reviewed in the exterior and simulated lighting chapters.

Fig. 43.13: The interior scene was rendered using Light Emitting Materials (LEMs) and could be further enhanced using the Exposure settings. The three images are the same finished render: the exposure and gamma were increased going from top to bottom.
Fig. 43.14: The exterior scene had its exposure and gamma settings adjusted from exposure of 1.0 and gamma of 1.0 (top) to exposure of 1.2 and gamma 0.9 (bottom).
Draft-to-Final Settings

The following settings are based on the iterative rendering process outlined in Chapter 20. They include specific settings for exterior and interior renders, starting with the initial and subsequent draft iterations and leading to the final graphic.

Exterior Draft to Final

Exterior renders can use the following settings for draft-to-final images (Fig. 43.15, Fig. 43.16, Fig. 43.17, Fig. 43.18, Fig 43.19, and Fig 43.20). The quality and resolution settings are increased throughout the process, increasing the render time. For final renders use 08.

Fig. 43.15 In the Light Editor menu under the Sun/Sky tab ensure that Physical Sky is set under Background/Sky Type and that Sunlight Enabled is checked. Most of the options are already set by default to render the exterior scene.
Exterior Daytime quality and allow the rendering to process for an hour and a half or longer. Make sure lighting is set to exterior lighting (reviewed in Chapter 45) (Fig 43.15).

Initial Exterior Draft Rendering (Fig. 43.16)

- **Low Resolution**: Set the resolution to 800 x 600 or one-third of the final resolution aspect.
- **Quality**: 02. Low
- **Lighting Type**: Physical Sky (under the Lighting Menu)
- **Detail Layers**: Off

![Initial Exterior Draft Rendering](image)
Secondary Exterior Draft Rendering (Fig. 43.17 and Fig 43.18)

**Increase Resolution:** Set the resolution to 1280 × 720 or one-half of the final resolution aspect.

**Quality:** 04. Medium

**Lighting Type:** Physical Sky

**Detail Layers:** Turn on some layers that contain detail.

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**Fig. 43.17** Secondary renderings are run at 04. Medium quality.

**Fig. 43.18** Secondary render run at an increased resolution (04. Medium). The interior building detail was turned on and is visible through the windows.
Semifinal Exterior Draft Rendering (Fig. 43.19)

**Keep Resolution:** Set the resolution to 1280 × 720 or one-half of the final resolution aspect.

**Quality:** 08. Exterior Daytime (Progressive render, stop when desired). Run the render only until you can determine that the textures, lighting, and detail look correct and require no additional adjustments. Then stop the render (saving is always useful) and move on to the final render. If you make changes, re-run using this setting again.

**Lighting Type:** Physical Sky

**Detail Layers:** All On

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Fig. 43.19 The semifinal draft has all the detail turned on, in this case trees and vines. Everything looks complete and is ready for the final render.
Final Exterior Rendering (Fig. 43.20)

**Set Final Resolution:** 1980 × 1020 or the final desired resolution.

**Quality:** 08. Exterior Daytime (Progressive render, stop when desired)

**Detail Layers:** All On

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*Fig. 43.20* The final exterior render is created using 08. Exterior Progressive quality and is run for two hours. The image is then postprocessed in Photoshop, adding sky and adjusting contrast and light values (see Part 8 of the book on post processing).
Interior/Simulated Lighting Draft to Final

For renders with simulated lighting, use the following settings (Fig. 43.21, Fig. 43.22, Fig. 43.23, Fig. 43.24, Fig. 43.25, Fig. 43.26, Fig 43.27, and Fig 43.28). Remember that you will be using exterior lighting (Physical Sky settings) for the initial draft renders, and then add simulated lights as needed. Simulated lighting is reviewed in chapter 46.

Initial Interior Draft Rendering (Fig. 43.21)

- **Low Resolution:** Set the resolution to 800 x 600 or one-third of the final resolution aspect.
- **Quality:** 02. Low
- **Lighting Type:** Physical Sky
- **Detail Layers:** Off

*Fig. 43.21* Exterior light settings (see Fig. 43.15) are used on the interior model initial drafts. The roof layer is turned off to allow daylight to stream in. The model textures are assessed using exterior light settings allowing for quicker drafts to be run. Once the textures are assessed correctly, start adding lights.
Secondary Interior Draft Rendering
(Fig. 43.22, Fig 43.23, Fig 43.24, Fig 43.25, and Fig 43.26)

**Start adding simulated lights:** Add point, spot, and IES lights as needed.
**Low Resolution:** Set the resolution to 800 x 600 or one-third of the final resolution aspect.
**Quality:** 01. Low and 02. Medium
**Lighting Type:** Uncheck Sunlight Enabled in the Light Editor
**Detail Layers:** Off

Fig. 43.22, Secondary drafts are run at low resolution and 02. Low quality. These drafts are used to place and assess different light groups. Each light group is tested and adjusted until the lights illuminate in the desired manner.

Fig. 43.23, Secondary drafts are run at low resolution and 02. Low quality. These drafts are used to place and assess different light groups. Each light group is tested and adjusted until the lights illuminate in the desired manner.
Fig. 43.24 Secondary drafts are run at low resolution and 02. Low quality. These drafts are used to place and assess different light groups. Each light group is tested and adjusted until the lights illuminate in the desired manner.

Fig. 43.25 Secondary draft run at low resolution and 04. Medium quality. In this instance, the combined lights are rendered and assessed.
Secondary interior draft increased draft settings (Fig 43.26)

**Have all simulated lights in place:** All simulated lights should be added and set in the model for rendering.

**Medium Resolution:** Set the resolution to 1280 × 720 or one-half of the final resolution aspect.

**Quality:** 02. Medium

**Lighting Type:** Uncheck Sunlight Enabled in the Light Editor. Insure simulated lights are in the scene.

**Detail Layers:** On

![Simulated Light secondary draft #2](image)

*Fig. 43.26* Simulated Light secondary draft #2. The rendering is run at higher resolution and 04. Medium quality. All or most of the details are visible. All lights are placed and turned on.
Semifinal interior draft increased draft settings (Fig 43.27)

**Increase Resolution**: Set the resolution to 1280×720 or one-half of final resolution aspect.

**Quality**: 11. Interior Preview. Run for 10 to 15 minutes then stop the render

**Lighting Type**: Uncheck Sunlight Enabled in the Light Editor. Ensure that simulated lights are in the scene.

**Detail Layers**: On

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![Image](image_url)  
*Fig. 43.27* Interior Preview (Progressive) is used on the semifinal render. All model details are turned on and visible. The render ran for 30 minutes.
Final Resolution: 1980 × 1020 and higher
Quality: 09. Interior (Progressive Render Stop When Desired) or 10.Interior+ for BEST results (though will take much longer)
Lighting Type: Uncheck Sunlight Enabled in the Light Editor. All simulated lights should be present in Scene.
Detail Layers: On

Fig. 43.28 Final interior rendering using 09. Interior Progressive. The rendering took four hours to complete and includes postproduction adjustments in Photoshop (removal of hotspots, increasing hue saturation, and adjusting contrast - see Part 8 of the book).
This chapter is intended to be used with Chapter 21 to help you better understand how texturing for renders work.

Twilight Render offers various options for applying texture values to model surfaces (Fig. 44.1). Twilight includes texture presets called Templates. Templates use easy-to-remember names to describe their values—Ceramic, Metal, and Paint, for example. Templates can be further adjusted using custom settings. This allows for a greater range of values and refinement.

Twilight also uses a texture library filled with additional material presets. The library textures provide realistic, high-quality render character for some types of materials.

Twilight’s material editor also includes Bump settings to allow for greater material depth.

Important Texture Considerations

There are two important considerations to keep in mind when working with Twilight materials and rendering.

First, the Twilight user manual states that not all textures require a render value. Textures without reflective requirements should receive no values other than Bump (if needed) (Fig. 44.2).

Not applying a material value will help speed up the rendering time while still producing the desired rendering results. This really emphasizes the point made in Part 2, that there is no substitute for a well-textured model.
Chapter 44: Texture Settings

**Fig. 44.1:** The Twilight Material Editor with main options annotated.

**Fig. 44.2:** The surfaces in this rendering have no applied values, but they still render well.
Second, the render quality setting plays a large part in how textures will render. This can make reviewing draft renders a bit more involved, as the draft images in many cases will not truly display how a texture might render. In particular, reflective materials require longer render times and higher settings for reflections to accurately appear and to create smooth images.

The higher the render Quality setting is, the better the results and the more accurate reflections will be (Fig. 44.3, Fig 44.4).

![Fig. 44.3: The render was completed using a Low quality setting, resulting in grainy materials.](image)

![Fig. 44.4: The rendering was completed using a Progressive setting, providing the best results.](image)
Twilight Texture Values Strategy

Given the many options and menus available for texture values, it might seem daunting at first to work with the Material Editor. Below is a sure strategy that will allow you to immediately start using the material menu for rendering. Read the rest of the chapter for descriptions and settings based on the following approach.

1. Use the Templates: Most materials in your model will benefit from the preset Template values. Start with these first.
2. Apply Bump: This is easy-to-use setting is described below.
3. Texture Diagrams: Refer to the various renderings and charts in this chapter that provide specific settings and attributes for a variety of materials.

Once you are comfortable working with Templates and Bump, consider the following:
• Download and use the Twilight Library Materials. These work great in tandem with Templates.
• Consider refining Template values using the manual settings like shininess, refraction, and alpha.

![Eye dropper](image)

Fig. 44.5: On the left is the Twilight editor when its first opened. Selecting a material with the Twilight Eye Dropper will activate the various options.
Twilight Material Editor

Use the Twilight Material Editor to select, apply, and adjust texture values. It is located on the main Twilight menu. When opened for the first time, it will appear blank (Fig. 44.5). You must select a texture to activate the options. At first glance, the TW Material Editor might seem intimidating. In fact, it’s as easy to use as most of the other options, and menus are not needed to set a texture value.

Materials are picked with the Twilight Render Material menu Eye Dropper, not with the SketchUp Paint Bucket Eye Dropper (Fig. 44.5). The chosen textures will appear in the bottom center of preview window in the Material menu. Once a preset is applied, the Texture preview will update, displaying how the texture will appear once rendered.

Texture Options

There three options for textures values are outlined below. Each topic is expanded upon throughout this chapter.

Template Presets

The Twilight developers have set specific values and parameters for the Template presets. The goal is for these presets to best emulate the material they are named for. Given the number of presets, they can be (Fig. 44.6) used on a wide variety of surface types. For example, the Paint and Plastic presets are useful for some wood materials and even metals (Fig. 44.7).

Ranging from Paint, Porcelain, and Plastic, to Metal, and more, these named options apply set values to selected textures. Select a texture using the Eye-Dropper, and then select one of the Template preset options. The values will be applied to all instances of the texture in the model.

There are 12 main Template values, each option possessing additional sub-settings that further refine the value (Fig. 44.8).
Chapter 44: Texture Settings

Fig. 44.7 Example render showing presets. The annotations call out the object, Template preset with sub-setting.

Fig. 44.8 On the left, the Paint template is selected, displaying corresponding sub-settings. On the right, the Plastic template is shown with corresponding sub-settings.
Texture Attributes

In the main body of the Material Editor are several options and attributes. These include Alpha, Refraction and Shininess. The various Template settings rely on these options. For example, applying the Template --> Plastic --> Shiny, sets the values of Refraction to 1.52 and Shininess to 180. Using the Paint --> SemiGloss value, sets refraction to 1.4 and shininess to 60. These values will change based on the selected template (Fig. 44.9).

Once a template is applied, these values can be further adjusted and fine-tuned to achieve better results. For example, an applied template can be modified, increasing or decreasing transparency, reflection, and material brightness. Adjusting these values affects only the material with the applied template. It does not affect the Template itself.

The values that affect textures are listed below. You should use Template default values as they are with no adjustments when first begin working with Twilight. Adjust these values once you are comfortable rendering in Twilight.
Alpha
This option controls how transparent a material will appear. This option is to be used when controlling the transparency of water, glass, fabrics, and fixtures, to name a few. A value of 100 Alpha means that the material is completely solid (not transparent). A value of 0 means the material is transparent. Most of the templates and the typical material will have an Alpha value of 100.

Refraction
According to the Twilight Manual, refraction is how light bends and bounces off a material to create a reflection or distorts the appearance of objects, for example, as light passes through glass. Adjusting this value is useful in controlling how glass and water display their surroundings.

In real-world terms, all materials have an index of refraction. The various templates in Twilight use the real-world values for refraction on materials. You can further look up refraction indexes, and set them to match using this attribute.

Shininess
This value determines how smooth or rough the texture character. The higher the value and the smoother the surface is, the brighter it will render, with greater reflections. Values range from 7, for rough surfaces, to 50000, which is a reflective mirror. Varnished wood floors, plastics, countertops, and similar surfaces can be fine-tuned with this setting.

Color
The Color option allows you to alter a material’s color in a way similar to the SketchUp Paint Bucket Tool option. However, for most materials, use the SketchUp Paint Bucket tool to adjust color settings.

It is useful to adjust this option when working with glass, water, and some metals. For water, it is imperative to adjust the color setting to achieve the best reflection and result—depending on the desired result. These are reviewed under Glass and Water below.

Additional Settings
There are several additional settings in the Material menu that can be used to further refine textures. These options include Reflection Map, Hard Edge Angle, Edge Line, and SSS Density, none of which are covered in detail here. These settings are ideal for professional users who want to have additional control and options for how textures render. See the Twilight Render User Manual for more information on them.
Material Preview

Like other IRPs, Twilight includes a material preview option found in the Material Editor. Once a material is selected and a value applied, a preview of how the material will render will appear. Anytime a material’s values are adjusted, the material preview will be updated (Fig. 44.10).

Under the preview window is a pull-down menu that allows you to select from a large array of options that control how a texture is displayed in the preview window (Fig. 44.11). These range from cylinders to horizontal surfaces, and more. Twilight provides these options so that a material can be previewed in the closest approximation to how the texture appears in the model.

The most useful setting is Studio Basic, which is found under the preview pull-down menu (Fig. 44.11 and Fig. 44.12). This provides the typical spherical textured ball common to many rendering programs. It is suggested that you set the material preview to this option when viewing most materials.

Bump Values

For an overview on Bump and Bump values, see Chapter 21. Setting Bump in Twilight requires the material to be selected and active in the Twilight Material Editor. Next, click on the “chain” icon to the left of Bump option. This indicates to Twilight that you want to set a Bump...
value for the texture. Once selected, the Size option will become available (Fig. 44.13). The size value represents the amount of Bump applied to the material.

As with other IRPs, a little bit of Bump goes a long way. Increase Bump values by tenths (1.1, 1.2, 1.3). Most material that will use Bump will have a value ranging from 0.1 to 3.0. Higher Bump values (greater than 3.0) can be applied to rough surfaces like stones and ground cover (Fig. 44.14).

Selecting the Invert option will reverse the Bump appearance on a texture once it is rendered. It is identical to applying a negative value for Bump used in many other IRPs. In this instance, you do not need to apply a negative value. Just check the Invert box and provide a value.

![Fig. 44.12 The Studio Basic preview option provides the circular sphere.](image)

![Fig. 44.13 With a texture selected, click the link button (top). This unlocks the Bump menu and allows you to enter a value.](image)
Templates

Templates are the primary settings applied to textures for rendering in Twilight. These settings apply reflection, diffusion, and other effects to materials using pre-established values.

Many of the various settings can be interchanged between surfaces not matching the Templates name. For example, granite countertops benefit from the Paint, Ceramic, or Plastic template, depending on how dull or reflective the surface is. Because these settings can be applied in many situations, it is strongly recommended that you refer to the various charts and annotated renders in this chapter listing the various templates and how they can be used. These annotated renders include Bump values.

These are shown in figures 44.15 through 44.24
**Fig. 44.15** Texture charts showing Twilight Render texture values that loosely parallels the category texture chart from chapter 21, Fig 21.31. Some of the categories show multiple Templates and sub-settings divided by (/).

**Fig. 44.16** Texture charts showing Twilight Render texture values that loosely parallels the category texture chart from chapter 21, Fig 21.31. Some of the categories show multiple Templates and sub-settings divided by (/).
Fig. 44.17 The image shows applied templates presets with sub-settings and Bump values as applied to various surfaces and objects. Use this figure as guides for your own textures.

Fig. 44.18 The image shows applied templates presets with sub-settings and Bump values as applied to various surfaces and objects. Use this figure as guides for your own textures.
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Fig. 44.19 The image shows applied templates presets with sub-settings and Bump values as applied to various surfaces and objects. Use this figure as guides for your own textures.

Fig. 44.20 The image shows applied templates presets with sub-settings and Bump values as applied to various surfaces and objects. Use this figure as guides for your own textures.
Fig. 44.21 The image shows applied templates presets with sub-settings and Bump values as applied to various surfaces and objects. Use this figure as guides for your own textures.
Fig. 44.22 The image shows applied templates presets with sub-settings and Bump values as applied to various surfaces and objects. Use this figure as guides for your own textures.
Fig. 44.23 The image shows applied templates presets with sub-settings and Bump values as applied to various surfaces and objects. Use this figure as guides for your own textures.
Fig. 44.24 The image shows applied templates presets with sub-settings and Bump values as applied to various surfaces and objects. Use this figure as guides for your own textures.
Template Presets

There are a total of 12 texture presets available (when including Light Emitter materials). The texture presets, in many cases, are very specific and straightforward in their use. This makes it easy to set values for most of the materials in your model by merely following the preset names. Each preset has additional subsettings that control the range of reflection from none to maximum.

Of those 12 presets, Light Emitting Materials is reviewed in Chapter 46. Architectural Glass and Realistic Glass are described under Glass and Water Materials below. The remaining presets are described immediately below, with descriptions of how they work and when to use them.

Generic

The Generic option at the top of the Template options is intended to provide quick options for material reflections. They are Flat, Soft, Soft Reflective, Reflective, and High Reflective and allow materials to render quickly, while still producing decent reflective values. They do not render as well as the specific Templates (Fig. 44.25).

The Generic option also allows you to reset a material by selecting Reset from the secondary options. This will remove all applied values to the material.

Fig. 44.25 Generic texture values found under Templates.
Stone

This setting is great for concrete, brick, pavers, asphalt, boulders, and stone. In addition, carpets and stucco also benefit from the Stone setting.

The Stone preset has three sub-settings: natural, rough, and polished. Each of these settings provides a steadily increasing amount but still minimal (diffuse) reflection. For most stone surfaces use natural and rough secondary settings (Fig. 44.26).

![Fig. 44.26 Rendering showing the three Stone values applied to surfaces.]

Paint, Ceramic, Plastic

Paint, Ceramic, and Plastic are grouped together as they have a wide variety of application in regard to textures and can be easily interchanged. These three settings can be applied to the materials they are named after and more (Fig. 44.27). Some plastic materials might benefit from Paint, while even some metal textures can use Plastic settings.

Woods ranging from dull to glossy, granite countertops, flatware, appliances, window mullions, and various types of plastic materials will benefit from these settings.

Other than metallic surfaces, most of the reflective materials in your model will be using one of the twelve sub-settings.
Metals

There are two metal categories: Metal and Brushed Metal. They differ in the type of reflection they offer. Metals provide clearer metallic reflections, while Brushed Metals render as the name implies—hazy, indistinct reflections (Fig. 44.28).

The Metal setting is useful for chrome, stainless steel, and other reflective, metallic surfaces. Brushed Metal provides diffuse reflections useful for metallic appliances like brushed stainless steel fridges.

The secondary render settings are the same for both: Aluminum, Silver, Platinum, and Copper. The secondary setting determines the overall cast of color the metal will have. It will not replace the texture image, but will cause the texture to possess a color based on the chosen setting. Light gray for aluminum, lighter gray for silver, regular gray for platinum, and yellow-tinted cast when using copper.
Fast (materials)

To allow for preview and draft rendering, Twilight has provided some common texture settings under the Fast option. These limited options are set to render more quickly but with less quality than their standard options.

If your renderings are taking longer than you want, apply some of these values instead of their standard setting to speed up render times. When getting ready for the final render, replace the Fast material with its standard version.

Subsurface Scattering (SSS)

Subsurface Scattering, or SSS, materials are intended to be used for special types of surfaces. These are surfaces—like candle wax, lamp shades, and rubber balls (yoga balls and balloons, for example)—that scatter light through layers of transparent materials.

These settings combine Alpha (transparency) with reflection and refraction for specific effect. They take practice to use. In many instances, the surface with this applied value might need to include thickness to work correctly. You should search online or post a query on the Twilight forums about how to best use these settings for your specific material.
Library Textures

Twilight includes a library of specific textures that can be applied to a material. These are accessed under the Library tab on the Material menu (Fig. 44.29). Unlike Templates, these settings cannot be further refined once they are applied.

Twilight comes with some Library materials installed, but the full range of options can be downloaded from Twilight’s official website. This content is available for users who have purchased Twilight Render.

To apply a Library material, select the texture. Next, select the Library Tab in the Material Editor. Then select the desired library from the pull-down menu. This will bring up the available options for that library. Double-clicking on an available texture icon will set that option to the material (Fig. 44.30).
Once a Library preset is applied to a texture, it cannot be edited using the manual texture settings. A Library texture setting can be removed by making the material active and then going to Templates --> Generic to select Reset (Fig. 44.25).

If you purchase Twilight, you will have access to the Red Carpet section of the Twilight forums. There you will have access to additional Library preset options. These include car paints, glass fixtures and lamp shades, water, and wood materials. They can be downloaded and installed into Twilight (Fig. 44.31).

 Installing Twilight Library Materials
You will need to log in to the Twilight website to access the Red Carpet Section. Download the selected Library you want to your hard drive.

Open SketchUp and launch the Twilight Material Editor. On the top menu, select Tools. From the pull-down menu, select Install Library (Fig. 44.32). Navigate to the folder containing the zipped file. Double-click on the folder. This will install the Library and will be added as an option to the Library tab.
Glass and Water

Glass and water in Twilight (like other rendering IRPs) require some additional fine-tuning. The following steps are not perfect in their application, and you might find that the results did not provide the desired results. In that case, start over by resetting the materials as instructed in the Texture Troubleshooting section at the end of this chapter.

General Approach

For both glass and water textures, do the following when setting up the material for rendering:

- Apply the glass or water material to both sides of the surface (Fig. 44.33).

- Since part of the goal is to see through or past this material, make sure there is something “behind it.” For glass, have some interior (or exterior) detail directly behind the glass. For water, make sure you model a container, tub, pool, or something similar (Fig. 44.34).

- For both settings, it is imperative that you adjust the Alpha setting in the Twilight Material Editor (Fig. 44.35).

![Fig. 44.33 Apply glass and water textures to both sides of the material faces in SketchUp. In this case, the water material is applied to both sides of the water face.](image)

![Fig. 44.34 Include a “container” or basin when working with transparent materials like water or an interior scene for windows.](image)
GLASS

There are many glass options in Twilight. There are two templates and one library material. The two templates have many sub-settings, including frosted glass, mirrored glass, and true mirrors. The goal of this section is to allow users to set up simple glass materials that provide both reflection and transparency. Not all options are reviewed here, but users should experiment with as many settings as possible.

You will need to adjust the Alpha settings on the Material menu. Lower settings allow for more light to pass through, creating a more transparent window. Higher Alpha values cause greater reflection and less visibility through the glass (Fig. 44.36). Typical Alpha settings will range from 5 percent to 35 percent, the higher value being more solid and reflective).
Architectural Glass -> Common provides the simplest glass option. It is applied to glass materials that have a single face. But other options under Architectural Glass are also worthy of experimentation and use (Fig. 44.37).

Realistic Glass -> Common provides the most realistic result. It imitates how glass would appear when passing through thick or double glass windows. It can only be applied to glass surfaces that have a thickness; that is, the window includes two glass surfaces (Fig. 44.38).

This means you would need to extrude your window or glass surfaces to have a thickness, then apply the material to all thickened surfaces. For glass cups or windows that have double glass, use this setting.

Library -> Architectural Twilight options include additional options for glass and transparent surfaces. However, you cannot adjust the Alpha of an applied Library material (Fig. 44.39).

Each of the different options provides a different and varied result (Fig. 44.40).
Fig. 44.39 Library glass setting.

Fig. 44.40 Each of the glass surfaces has a different (annotated) glass or library template applied to it.
WATER

Setting up water in Twilight can yield good results, but it does require practice and patience. This section reviews the basics of creating a rendered water scene. You will need a water texture applied to the desired surface. (Fig. 44.41).

First, ensure that the surface is sitting in a container of some sort, such as a bath, pool, fountain, or glass. Follow these steps to set up basic water.

Apply the Realistic Glass → Water template from the Material menu (Fig. 44.42). In this instance, the water surface does not require a thickened volume (as mentioned in Realistic → Glass above).

Fig. 44.41 Apply a water texture to the surface.

Fig. 44.42 From Template select Realistic Glass → Water. This will cause the water texture to become opaque.
In the Twilight Material Editor, with the Texture selected, delink the color by clicking on the Color chain (Fig. 44.43).

Next, click the color swatch to the right of Color and select a light gray (Fig. 44.44).

This will lighten the material in the material preview.

**Bump and Alpha**

You can use the Bump and Alpha setting to create a variety of effects with water—from calm and transparent to reflective to turbulent.

The higher the Bump setting is, the more “turbulent” the water will be. Bump values can range from 0.0 to 0.6 or even higher. Alpha settings depend on how transparent or reflective you want the water to be (Fig. 44.45, Fig. 44.46, and Fig. 44.47).
Fig. 44.45 For calm and transparent water, set the Bump to 0.0 and Alpha range between 05 to 20.

Fig. 44.46 For reflective water, set the Bump between 0.05 to 0.2 and Alpha range between 10 to 25.
Troubleshooting Twilight Textures

In some instances you will need to trouble shoot textures in Twilight. You will know when a texture is experiencing issues when it renders black, is overly reflective, or the material image is blotted out.

There are several approaches to fixing these issues. These options can be followed in order if needed.

**Two Faces:** First, apply the material to both sides of the surface or face. One option, so you do not have to navigate under or through objects, is to select the surface, right click over it, select Reverse faces, and apply the material.

**Component Material Override:** As was noted in Chapter 9, a material can be applied to the outside of a component instance. Any unpainted surface in the component will have the texture applied to it. This can occasionally interfere with Twilight Rendering. If this happens, apply the default SketchUp material to the component. This might cause some surfaces to take on the default appearance and will require that a texture be applied to them.
**Reset:** If you are still having issues with the texture rendering, select the material using the Twilight Material Editor, go to Templates ➔ Generic ➔ Reset. Then run a draft render. See if the texture renders normally (without any values). If that fixes the issue, reapply a value to the material. If not, try the two options below.

**Duplicate Material:** One work-around is to select a material that is correctly rendering. Using the SketchUp Paint Bucket, duplicate the material and then apply the duplicated material to the surface with a broken texture. Then, out the material with the one you wish to use (See Chapter 8 for instructions on how to duplicate (Mac) or Create New Material (PC) and swap materials. If this does not work, go to the last option.

**Delete the Surface:** If nothing has worked (sorry about that), delete the offending surface and material, redraw the surface, and reapply the material. You should use this option with the duplicate material work-around described above.
Twilight Render’s exterior lighting options are straightforward and easy to use (Fig. 45.1). For those new to Twilight, using the Physical Sky setting, which references SketchUp’s Shadow Menu, offers the best results with little set up (Fig. 45.2).

For users approaching Twilight for the first time, use the default settings for exterior lighting (Fig. 45.3). These are the values in place under the Light Editor menu under the Sun/Sky tab (see below), and they use Physical Sky as the main sunlight option. This in turn references the SketchUp Shadow menu for specific lighting setting (Fig. 45.4). You must have a good understanding of the SketchUp Shadow menu to set up good lighting options (see Part 4 of the book). The result is that Twilight matches the SketchUp Shadow settings to produce light in the graphic (Fig. 45.5).
Chapter 45: Exterior Lighting

Fig. 45.2: SketchUp Shadow menu and options. The SketchUp Shadow menu sets exterior lighting for the render. It is important to use it correctly.

Fig. 45.3: The Twilight Light Editor Sun/Sky tab controls exterior lighting. The default settings (shown) are the best place to start. Adjust the various values to refine light as needed.
The Light Editor includes settings to control the brightness of the Sun, haze, shadow types, and more. The purpose of these options is to allow for greater artistic and style flexibility. You can learn to adjust these settings to fine-tune the result you are getting. However, start out by using the default options and experiment with altering the various values as needed.

In review, the following menus and options have the greatest bearing on your initial exterior rendering.
• **SketchUp Shadow Menu:** The SketchUp Shadow menu is used to set light strength and direction. The SketchUp Shadow settings will have the largest impact on how the model renders using the settings that are outlined in this chapter. Part 4 reviews how to use this menu in detail.

• **Twilight Light Editor:** To set up all lighting, in both exterior and interior settings, requires the use of the Twilight Light Editor. For exterior lighting it sets lighting type (Physical Sky) and controls the strength and brightness of exterior lighting, shadows, and sky cast.

• **Physical Sky:** This option, found in the Twilight Light Editor, references the SketchUp Shadow menu to establish light settings.

**Twilight Light Editor**
Selecting Open Twilight Light Editor from the main toolbar will cause the lighting menu to open. At the top of this menu are five tabs: Standard, Spot, IES, Projector, and Sun/Sky. The exterior lighting options referred to in this chapter are found under the Sun/Sky tab. The other tabs are for use with simulated lighting. See Chapter 46 for instructions on using these options.

**Sun/Sky**
The Sun/Sky settings do not require many changes, if any, to get started in using exterior lighting. In most cases, you can start with the default options. If you are using SketchUp Shadows to power the lighting, Twilight is set and ready to use those options. The additional options can be used to further enhance exterior lighting, but it does require some getting used to and experimentation, as the results can be subtle.

**Background/Sky Type:** This pull-down menu has a variety of options. Set this menu to Physical Sky (default) to use the SketchUp Shadows to render the scene. The other options allow for the insertion of background images or the use of HDRI lighting (Fig. 45.6).

Fig. 45.6 There are multiple lighting options under the Background/Sky Type, including for adding backgrounds and image-based lighting options).
**Sky Brightness:** This provides ambient or background lighting. Sky Brightness will provide soft background lighting for the entire scene. It differs from Sunlight strength and is visible when the Sun is turned off (see Sunlight Enabled below). This is a useful setting when combined with simulated lights in which no sunlight is visible. But the sky will still have a soft hue while the scene is illuminated by artificial light sources.

Adjusting the value higher or lower will increase or decrease the ambient light in the rendered scene. The values are usually adjusted by tenths. For initial renderings, keep the default value of 1.000 (Fig. 45.7 and Fig. 45.8).

![Fig. 45.7](image1.jpg) Adjusting the Sky Brightness value will increase or decrease the brightness of the sky. This has a direct effect on brightening or dulling reflective surfaces in the model and increasing or lessening exposure of rendered surfaces.

![Fig. 45.8](image2.jpg) Adjusting the Sky Brightness value will increase or decrease the brightness of the sky. This has a direct effect on brightening or dulling reflective surfaces in the model and increasing or lessening exposure of rendered surfaces.
**Dusty Sky (Turbidity):** Turbidity affects how hazy or foggy the sky will appear. The higher the setting is, the more haze or cast will be visible in the sky. This value should be adjusted in tenths. Higher values can distort the sky color of the render. Most users should keep the default setting of 2.000.

It’s worth playing around and increasing the Turbidity setting once you are comfortable with Twilight. The result is a hazier image possessing a more real atmospheric quality. Turbidity does not need to be increase by much and should range from the default of 2.0 to 5.0 (and all increments in between) (Fig. 45.9). A high value will cause the sky to appear discolored. It might be useful to run a render with default Dusty Sky and increased Dusty Sky and overlay them in Photoshop to create a sky haze effect. See Part 7 on postprocessing.

![Fig. 45.9 Example render of increased Dusty Sky. The sky itself appears darker, with the image possessing slightly more haze in the atmosphere.](image)

Another option is to increase both Dusty Sky and Sky Brightness to create a scene that is more exposed, with a more realistic hue and surface exposure. Again, this image makes for an excellent overlay to further enhance the final render during postproduction in Photoshop. In this instance, the contrast between light and dark values and atmospheric haze adds depth (Fig. 45.10).

**Background Options:** Background Color, Image, and Sky Rotation are used when Background/Sky Type is set to anything other than Physical Sky. This allows users to insert background images and adjust their color and position in the render.
Sunlight Enabled: This option is checked by default. When checked, the Sunlight source is on. Unchecking this box turns off the Sunlight for a render. Uncheck this option when you are running simulated lighting renders.

Sunlight Casts Shadows: As the name implies, this option will cause objects to cast a shadow based on the Sun’s position (Fig 45. 11.). Disabling this option prevents objects from casting shadows (Fig. 45.12).

Fig. 45.10 Both Dusty Sky and Sky Brightness are combed in this render. Dusty Sky is set to 3.0 and Sky Brightness to 3 resulting in a more balanced exposure.

Fig. 45.11 Rendered image with Sunlight Casts Shadows enabled.
Soft (Blurry) Shadows: This setting causes shadows to have softer edges. This option is better toggled on, as it results in more realistic shadows in a render. Unchecking this option causes Shadows to have a harder edge and less contrast (Fig. 45.13). When toggled on, the type of Shadows can be further refined (made soft or hard) by using the Sunlight menu (see below).
**Sunlight:** The Sunlight setting has a slider bar ranging from 0 to 100, with 50 being the default. This setting works in tandem with Soft Shadows (above). It allows you to control how hard to soft shadows render. The lower the number is, the harder the shadow edges are. According to the Twilight Render Manual, setting Sunlight (slider) to between 5 and 10 produces the best lighting results (Fig. 45.14). Increasing the value (moving the slider to the right) will further soften the shadows (Fig. 45.15 and Fig. 45.16). Adjust this setting as needed, depending on the results you are getting. Most renders will benefit from the value ranging from 5 to 50.

![Sunlight slider](image)

**Fig. 45.14** The Soft Shadows are set to the Twilight recommended setting, providing a realistic shadow edge.
Fig. 45.15 Increasing the soft shadows value to 50 causes more blurred edges.

Fig. 45.16 Soft Shadows set to the maximum of 100 creates a highly blurred and diffused shadow edge that is not quite realistic in quality.
**Sunlight Color:** You can adjust the color of the light being cast by the Sun. Most users should keep the default of white.

**Maximum Sun Intensity:** The options can be treated as an exposure setting for the rendering. The higher or lower the value is, the greater the exposure or darkness the rendering will have (Fig. 45.17 and Fig. 45.18). For most renders this value will be kept at the default of 5.0 (Fig. 45.19).

In most instances you will adjust the exposure and gamma settings to darkened or lighten the graphic. Since these are dynamic values (you can adjust them during and after the render process), it makes it easier to use than adjusting Sun Intensity. Seeing the results for that would require that the render be done again every time the value is adjusted.

![Figure 45.17](image1.png) *Fig. 45.17* Sun Intensity is set to a high value of 10, creating a bright and exposed render.

![Figure 45.18](image2.png) *Fig. 45.18* Sun Intensity is set to a high value of 1, causing a darker render.
Image-Based Lightings and Backdrops

Twilight Render includes options for inserting background images and for using some forms of HDRI and image-based lighting. These options are not reviewed in these chapters. To learn more about them, see the Twilight User Manual or visit the Twilight website and forums.
Twilight Render offers an easy to use simulated lighting system. The placement and settings for lights is straightforward providing excellent results. This chapter describes the different lighting types and specific settings used to establish lighting for rendering (Fig. 46.1).

Twilight has a variety of lighting options, from the typical point and spotlight to the ability to insert IES lighting profiles. Twilight has an excellent Light Emitting Materials options and a special lighting feature called Sky Portals. Sky Portals allows you to stream daylight through windows, doors, and other portals to illuminate an interior space (Fig. 46.2). These options are all reviewed in this chapter.

Fig. 46.1: Example of simulated light rendering using Twilight.
This chapter is designed to be used in conjunction with Chapter 20 and Chapter 24, which provide overviews and strategies for using light emitters. The material in these chapters is key to working with Twilight (and other IRP) simulated lighting options.

**Twilight Render Light Editor**

All lighting options in Twilight (including exterior lighting) are set and controlled using the Light Editor menu (Fig. 46.3). The Light Editor menu provides a high level of control over

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**Fig. 46.2** Example of Sky Portals lighting render.

**Fig. 46.3** The Standard tab options (shown in the Light Editor menu) control the base settings for all simulated lighting. The Light Editor includes additional options like the Eye Dropper and tab menus for other types of lights.
simulated light emitters. The various options associated with simulated lights, such as light strength and color, are found in this menu.

The Light Editor possesses five tabs. These tabs affect the five types of lighting available in Twilight: point, spot, IES, projector, and Sun/Sky.

The Standard tab is reviewed below. The Spot and IES options are reviewed under the specific descriptions of light type. The Sun/Sky tab menu is important to adjust to get simulated lights to function and is reviewed under Twilight Render Simulated Lighting settings below. Please see the Twilight user manual for a discussion of the Projector option.

Standard

The Standard tab contains settings and options that affect point, spot, and IES lighting. You should become familiar with these important but easy-to-use settings when working with simulated lights (Fig. 46.3). The various settings are outlined below.

**Eye Dropper:** This option is mentioned first because of its importance. The Eye Dropper must be used to select Twilight emitters that are present in a scene. Simply select the Eye Dropper, then select a light emitter. This will select a given light and all of its copies. The available light properties reflect the values for the selected light (and all copies). These values can be adjusted and updated (Fig. 46.4).

![Fig. 46.4 The Eye Dropper is used to select a light type in the model. Point, spot, and IES lighting must be selected (once placed in the model) using the Eye Dropper to edit settings. All copied versions of a selected light become active after one light is picked with the Eye Dropper.](image-url)
While you can select light emitters with the SketchUp select tool, they will not become active in the Light Editor tabs. Thus, you cannot edit them.

**Name Lights**: The area under a light name allows you to provide a name for the selected light (using the Light Editor Eye Dropper). Naming lights making it easier for you to select and edit their settings when you are going through the iterative rendering process (see From Scene below) (Fig. 46.5).

![Fig. 46.5](image) Name your lights after they are placed in the model. It's important to help you edit and keep your model organized!

**Light Bulb Size (radius)**: This option increases or decreases the physical size of the light emitter. Increasing the emitter size does not increase the amount of light coming from the source, but it does increase its spread (Fig. 46.6). Larger bulbs cause a greater area to be affected by that light. (Fig. 46.7). When you first use this setting, keep light sizes within the confines of a fixture or lamp.
Light Strength: The higher the light strength value is, the stronger and brighter the emitted light will be. The values start at 1 and can be increased or decreased by increments of tenths (Fig. 46.8 and Fig. 46.9). When you increase or decrease light strength, you should adjust the value in half increments (1.5, 2.0, 2.5) The default value of 1 seems to be equivalent of a 60- to 100-watt bulb.
Fig. 46.8  A point light in the lamp with a default strength value of 1.

Fig. 46.9  The point light strength is increased to 3, adding greater illumination to the area.
**Enabled**: A selected light emitter can be turned off or on. When unchecked, the selected emitter will be off and will not emit light. This useful option allows you to turn off emitters to assess other light sources in the model during the draft render stages.

**Casts Shadows**: When this box is checked, the light from the emitter will cause objects to cast shadows in a normal, real-world fashion. When unchecked, the emitter will still cast light, but objects receiving this light will not cast shadows. This option can be set for individual light sources. For example, a scene with multiple point lights can have some of them cast shadows from objects, while others are turned off.

**Soft (Blurred) Shadows**: The setting turns on or off the type of shadows cast by the light source. Unchecking this option creates hard-edged shadows that may bring unusual results (Fig 46.10). Leaving the option checked provides more realistic illumination (Fig 46.11).

![The emitter is set to produce hard shadows from objects and surfaces, which produces strange unrealistic effects.](image)
Attenuation: This is a hard-to-define setting, but it is useful for professional lighting engineers. This setting controls how far light will be cast or dissipated from the original source. The default is InverseSquared. Experiment with this setting as needed, but bear in mind that most simulated light renders will use the default setting.

From Scene

The From Scene option is located at the top of the Light Editor menu. Selecting From Scene gives you a pull-down menu that allows you to turn on or off all of the lights in a scene (Fig. 46.12). It will also list every placed light in the model. Selecting a light name will select all versions of that light in the model, making them active in the Light Editor and ready for editing. The number of lights in that grouping will appear in brackets to the right of the light name.

From Scene is fairly important, since it allows for the easy selection and editing of placed lights in a scene. If you place lights inside a component by using this option, you do not need to drill down into the component to select the light. Similarly, you do not need to hunt around your
model for all the lights. Simply select them from the list to make them active. This means you should always name lights to make it easy for quick selection and identification.

Selecting All Off or All On allows you to turn off or on all placed lighting in the model. This option is excellent when you want to do draft and test renders with exterior lighting or want to see how some lights illuminate. To have only certain lights work, turn all the lights off, then select the lights you want on and check “Enable.”

Convert

The Convert option, which is located at the top of the Light Editor menu, allows a selected light to be converted into a different type of light (Fig. 46.13). While this option can be useful, it might be easier to simply delete and replace an emitter.
Twilight Render Lighting Options

Twilight Render uses the same basic lighting system that is outlined in Chapter 24. Below is a review of the light types and basic settings.

Lights and Layers

All inserted Twilight Lights are placed on a single layer, TWL_Light_Layer (Fig. 46.14). The layer is created once the first light is placed in the scene. All subsequent lights are placed on that layer when inserted into the model. This is an excellent way to locate and work with all of the lights in your model. Combining this with the ability to name all lights (in the Standard menu) allows you to keep your model and lights organized and makes them easier to edit.

Turning off this layer, on the other hand, turns off all of the lights in the model, preventing them from rendering. Note that LEM lighting is not included on this layer, since it is a Material setting.

Point Lights

This is the same as the standard point light found in other IRPs. It is the basic light source for most simulated lighting renders and is easy to place and set.

Point lights are placed by selecting the Point Light option on the main Twilight Menu (Fig. 46.15). Once you select the option, you will be prompted to place the light. This requires two left-click inputs. The first point/click indicates the starting area in which to place a light; the second click places the light.

For example, placing a light inside a fixture is done by first selecting the initial insertion point, usually the center bottom or center top of the fixture (Fig. 46.15). Next, a line will extend from the selected point as you move your mouse, allowing you to place the point light using the ordinal point as a reference (Fig. 46.16). The second mouse click sets the point light in the location at the end of the dashed line that extends from the first inputted point (Fig. 46.17).
Fig. 46.15 To place a Point Light, select the Point Light option from the main Twilight menu. You will then be prompted to select the initial placement point for the light.

Fig. 46.16 A line will extend from the first initial point to a destination point where the light will be placed.
Point Light Settings

Point Light settings are found under the Standard tab option in the Light Editor. To edit a light’s settings, select the light with the Eye Dropper from the Light Editor (Fig. 46.18). Doing this will make the light and all its copies active (highlighted in blue).

For the initial render after first setting a point light, keep the default values and adjust as needed during the iterative rendering process.

Fig. 46.17  Selecting the second point places the light.

Fig. 46.18  With the light selected, the light strength and other settings are adjusted under the Standard tab of the Light Editor.
Spotlights

This is the same as the typical spotlight found in other IRPs. Selecting it creates a light emitter that can be focused and directed at a single location (Fig. 46.19).

Spotlights are placed by selecting the Spot Light option on the main Twilight Menu (Fig. 46.20). Once you have selected it, you will be prompted to place the light in the same fashion that the point light was placed (Fig. 46.16, Fig. 46.17 and Fig. 46.18). The difference is that a third point of input is required.

The third point (left mouse click) sets the direction in which the light will be emitted from the spotlight (i.e., the object or area you want to illuminate with the spotlight) (Fig. 46.21). Simply select the light destination by clicking on the area you want illuminated.

For example, placing a light inside a fixture is done by first selecting the initial insertion point—usually the center bottom or center top of the fixture. Next, a line will extend from this point showing the exact location of the spotlight. The second click sets the emitter in that location. The third point is then set to the exact area where you want the light to shine.
Chapter 46: Spot Light Settings

Spot Light values are controlled by two menus in the Light Editor: Standard and Spot. The Standard menu options control the same qualities of a spotlight that they control with a point light: you can adjust the light strength, size, color, etc. When you first place a spotlight, use the default values. Adjust them as needed during the iterative rendering process (Fig. 46.22).

The Spot Tab provides additional options for editing a spotlight. The two options represent the overall strength and angle of light emitting from the spotlight.

**HotSpot:** This defines the angle at which the emitted, directed light will be at full strength. A value of 30 means the emitted light will be a full strength at a 30-degree spread from the where the center of the beam of light is focused.

**Falloff:** The falloff value represents the overall spread of light. The minimum angle of the Falloff is defined by the HotSpot (above). Beyond the angle of the HotSpot, the spotlight illumination will start to dim. This is the Falloff. The Falloff value must always be equal to or greater than the HotSpot.

Fig. 46.21 The last point of input when placing a spotlight is to set the direction in which the light will be emitted.
For example, setting a HotSpot of 30 and Falloff of 50 will project a 50-degree cone of light onto the area (Fig. 46.23). As the light spreads beyond 30 degrees, it will soften and dim (falloff). Setting the HotSpot and Falloff to the same value will result in a solid projected light with hard edges, as the light is uniform all the way around (Fig. 46.24).
You should keep a difference from 5 to 15 degrees between HotSpot and Falloff. For example, a HotSpot of 40 should result in a Falloff of 45 to 60 (Fig. 46.25). This will ensure that a soft, more realistic light is emitted from the spotlight (Fig. 46.26).

Fig. 46.25  Example of a spotlight with a HotSpot of 40 and Falloff of 6.

Fig. 46.26  Library rendering illuminated using several spotlights.
IES Profile

This tab menu allows you to insert an IES profile light into the scene. First, place a spotlight into your scene; then make sure that it is selected (using the Light Editor Eye Dropper). Next, go to the IES tab. Select the Load button and search your computer for the IES profile (Fig. 46.27).

Once you click Open, the selected spotlight will take on the values and characteristic of the IES Profile. This will cause the inserted Spot Light emitter to reform with the IES values you have chosen (Fig. 46.28 and Fig. 46.29).

Fig. 46.27  The IES tab is selected and an IES profile is found and ready to be loaded.

Fig. 46.28  Once the IES profile is loaded, the spotlight takes on the values of the profile.
IES Light Settings

IES lights can use the Standard menu to adjust light strength, size, color, and so on. The Spot Light tab menu option will not affect the IES light; the profile in this case has precedent. A profile can be removed from a light by selecting the light, then selecting Remove from the IES tab.

Projector

Projector is a unique lighting option. You can insert a jpeg image, then project it onto a surface in a manner similar to a real-life slide projector. Think of this option as a wideangle spotlight that will display any image on a wall as a light.

This allows for interesting lighting effects and is worth experimenting with. You can for example, create stained glass window effects or project backgrounds into a scene.

To get started, place a point or spotlight into the scene and select it. Then select Projector from the Light Editor Convert menu. This lets you use the projector tab and its settings. Click the Texture button and navigate to the location of the image you want to have projected. You can adjust the height and width of the projection. See the Twilight user manual for additional information.
Light Emitting Materials (LEM)

Twilight has an excellent, simple-to-use Light Emitting Material option that allows you to convert a material to produce light.

LEMs are accessed through the Twilight Material editor and are not affected by the Light Editor. Using the Texture menu Eye Dropper, select the material that you wish to turn into an LEM (Fig. 46.30). Next, under Templates select Light Emitter, and from the secondary options choose 40, 60, or 100 watts. Once the setting is applied, all versions of the material present in the model will be transformed into an LEM. (See Chapter 43 for information on Twilight Textures and templates.)

The material will now emit an even amount of light from its surface. You can use this option to emit lights from TV, monitors, digital devices, and more (Fig. 46.31). The stronger the light is, the less apparent and visible the material will appear to be.

LEMs are an ideal way to illuminate countertops and shelves or to create fluorescent or tube lighting (Fig. 46.32 and Fig. 46.33). But take care when filling a scene with LEMs. That can cause an increase in render times.

Fig. 46.30  The Twilight Material editor is used to convert a texture into a Light Emitting Material, or LEM.
Fig. 46.31  The computer screen and material above the counter are set to be LEMs. The resulting render is illuminated with these options only (no other lights present).

Fig. 46.32  The material beneath the book shelving is selected and converted into an LEM.
Simulated Light Render Settings

Simulated light settings in Twilight Render are easy to set up. You will need to adjust settings under the Standard, Sun/Sky, and Quality settings for all lights. Additional settings are described below for various light types. It is important to understand how Quality settings affect simulated light renderings. Pay close attention to that section.

Sun/Sky

To render simulated lighting, you’ll need to set specific options in the Twilight Render Light Editor’s Sun/Sky settings menu tab (Fig. 46.34).

The Sun/Sky tab is reviewed in detail in Chapter 45. However, it’s important to adjust some of the settings in this menu to allow simulated lighting to work correctly. For most interior scenes, uncheck Sunlight Enabled to turn off the Sun (exterior lighting). This allows the simulated lights to be the primary source of light in the scene. Next, set Sky Brightness to zero to remove all ambient lighting that might stream in from the outside into an interior.
Chapter 46: TwiLight

Light Strength

While this has already been mentioned under each lighting option, it's worth repeating because it's important for getting the light correct in your scene. For all placed lights and for when you are first learning Twilight, use the default options found under the Standard menu tab (in the Light Editor) for point and spotlights.

It is easy to adjust these settings as needed. Once you start the iterative rendering process, it will become clear which lights needs to have increased or decreased strength (Fig. 46.35, Fig. 46.36, and Fig. 46.37). You should also adjust the exposure and gamma values to refine the lighting in a rendered scene (see below).

Fig. 46.34  The Sun/Sky tab is set to illuminate simulated lighting in the model. Use these settings for your own renderings.

Fig. 46.35  The lamp on the far left (1) has a point light strength of 0.5. The desk lamp (2) has a strength of 0.3. The larger lamp (3) has a strength of 1.0.
Fig. 46.36  The lamp on the far left (1) has a strength of 1.0. The desk lamp (2) has a strength of 0.5. The larger lamp (3) has a strength of 2.0.

Fig. 46.37  The lamp on the far left (1) has a point light strength of 2.0. The desk lamp (2) has a strength of 1.5. The larger lamp (3) has a strength of 3.0.
Exposure and Gamma

Exposure and gamma are important when you adjust simulated lights in Twilight. You also want to adjust these values. In fact, most of the rendered images in the Twilight chapters use adjusted exposure and gamma values to achieve the best result.

The exposure and gamma settings are found under the Open Twilight Render main menu option --> under the Camera tab (Fig. 46.38). These values can be adjusted during and after rendering.

You should adjust these settings prior to increasing or decreasing light strength. Because these settings affect the entire scene, doing that allows for a balanced and quick adjustment to universal lighting when single or multiple light sources are present.

A typical approach is to increase exposure and decrease gamma. As was noted in Chapter 43, a typical range is an exposure of 1.0 to 1.35 and a gamma of 1.1 to .80. Remember: for best results, adjust these values in increments of tenths rather than whole numbers. To illustrate the range and effect of exposure and gamma, the library image was rendered with five point lights, all with a light strength of 2.2. The exposure and gamma value is noted for each image (Fig. 46.39, Fig. 46.40, Fig. 46.41, Fig. 46.42, Fig. 46.43, and Fig. 46.44).

Bottom line, always adjust and experiment with the exposure and gamma settings for all your renderings but especially for those using simulated lighting.
Fig. 46.39  Exposure and Gamma are both set to 0.8.

Fig. 46.40  Exposure and Gamma are both set to 1.0.

Fig. 46.41  Exposure is set to 1.3 and Gamma to 0.8.
Fig. 46.42  Exposure is set to 1.3 and Gamma to 1.2.

Fig. 46.43  Exposure is set to 1.5 and Gamma to 1.0.

Fig. 46.44  Exposure is set to 2.0 and Gamma to 1.5
Combined Lighting

You can combine spotlights, point lights, IES, and LEMS in a single scene (Fig. 46.45). In addition, Twilight allows for an easy adjustment to combine both exterior lighting (Physical Sky) with simulated lights. Since the calculations are more complex for the program these renders take longer to complete. However, they can produce excellent renders illuminating the exterior and interior settings.

Fig. 46.45 The library scene is rendered using spotlights and point lights.

Fig. 46.46 The night scene is rendered with simulated lighting.
To create combined lighting renders, ensure that all simulated lights are placed in the model. Next, under the Sun/Sky tab, enable Sunlight. This will render both the simulated lights and the sunlight in the scene (Fig. 46.46 and Fig. 46.47).

There are some important considerations when doing this.

Test all of the lighting first: Test the simulated lights before rendering with the exterior lighting. You want to be certain that the light strengths and other options are correct.

Test the exterior lighting: Run renders using exterior lighting only. See Chapter 45 for information on exterior light renders. You can turn off any simulated lighting in the scene by turning the light layer off (see Lights and Layers or turning all of the simulated lights off by using the From Scene option (see From Scene, above also).

Combined lighting renders, as noted, take time. You will want to start the draft-to-final render process over. Start with low quality and resolution and steadily build up. Since most of your drafts should have already been complete, do not wait for all these renders to finish. If it looks ok, run the final render. But be prepared for a several hour render. The results will be worth it.

Fig. 46.47 The render uses combined simulated and day lighting. The simulated lights illuminate the building interior.
Quality Settings

Render quality (defined as presets) plays a very important part when rendering a simulated light scene (see the section on Quality in Chapter 43) (Fig. 46.48).

<table>
<thead>
<tr>
<th>Preset:</th>
<th>08. Exterior Daytime (Progressive Render Stop When Desired)</th>
</tr>
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<tbody>
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When you run draft renders of simulated lights, especially when you first use Twilight, the lighting results might appear incomplete. Some material will render dark or washed out, materials might appear grainy, and the quality of the light and appearance of shadows might appear light or unfinished (Fig. 46.49).

You will need to increase the quality presets to get the best final results. Start with low settings and increase to medium and high as needed.

Learn to use the Progressive render settings during this process, in particular 11. Interior Preview preset, to evaluate the simulated light rendering. Use this quality setting after some or all the lights have been placed and their light strengths adjusted. You will be able to get a good sense of how well the image will render. Using this setting, run a rendering for as long as needed, usually less than 15 minutes but as long as an hour.
Fig. 46.49 Simulated light rendering using low- (top) and medium-quality settings (bottom).
Once you are satisfied with sample results, use 09.Interior or 10.Interior+ to obtain the best result for a final render (Fig. 46.50).

Fig. 46.50  Rendering completed using 09. Interior quality setting.
Fig. 46.51 Rendering using Sky Portals to illuminate the interior.

Fig. 46.52 SketchUp model shadows are directed to cast through windows and openings.
Sky Portals

You can place a material over windows and other openings that will sample the exterior lighting and cast that lighting into the scene (Fig. 46.51). The set up requires some effort, but it can produce unique lighting results.

(1) First, you will need to set up lighting using the SketchUp Shadow menu to cast light into the scene through portals. Make sure portals have transparent materials or are open. Then adjust the Shadows to cast lighting into the scene (Fig. 46.52).

(2) You will need to download the Sky Portal materials to the library. The Sky Portal Library is found at the Twilights website. Download and install them in the appropriate folder (see Chapter 46 the section on Installing Twilight Materials, for more information on Library material options) (Fig. 46.53).

(3) For windows or any other portal that has a material already on it, place a face directly overlapping over these surfaces and openings. Select the portal opening texture with the Twilight Material Eye Dropper. Then select the Sky Portal option from the library (Fig. 46.54).

(4) For any opening that does not have a material (and is simply open), you will need to cover the opening with a face and convert and apply the Sky Portal material to that surface.
Chapter 46:

Fig. 46.54 The face (in red) is applied covering the window surfaces. Then, apply the Sky Portal material from the Library Tab to the portal material.

(5) In either case (2 or 3 above) you must make sure that the front side of the material is facing the interior scene. This is done by selected the Face Styles menu Default Faces. You can tell by the color of the material if it is front or back facing. If the back face is towards the interior scene, select that texture, then right-click and select Reverse Face. This will flip the face so that the front side is facing towards the interior (Fig. 46.55 and Fig. 46.56).

(6) Set the Sun/Sky tab to have Sunlight Enabled. This is a must setting, since the Sky Portals sample the Physical Sky options (again, see Chapter 23 and 45 for Exterior Lighting settings).
Using the SketchUp Face Styles menu (View \ Styles on the PC, View \ Face Styles for the Mac), make sure the front side of the material is facing into the scene. In this image, the applied face in Fig. 46.54 shows that the back side of the material is facing into the scene. It needs to be reversed.

Select and right-click a material and choose Reverse Faces.
Exposure Settings

It will be important to adjust the exposure settings when working with Sky Portals. It most cases you will want to increase the exposure and the gamma to better illuminate the scene.

Background Image

If your camera view faces the sky portals (windows and openings), when the scene renders, the openings will appear white. You can add a background image of the exterior during postproduction (using Photoshop). Or, you can link an image background to Twilight that will render with the scene. This option is tricky, but it does work.

(1) Find an appropriate image that you want to use

(2) Under the Sun/Sky tab, and under Background, select one of the three options: Hemispherical Sky, Spherical Sky or Sky Probe,

(3) Navigate to the location of the image and click Ok.

(4) It might be necessary to try this several times, choosing a different Background option each time, in order to make this work. Each option will display the linked image in a different way. There is no definitive setting that will work 100 percent of the time. Perform low-quality and -resolution draft settings to assess the background image.

Combined Lighting and Sky Portal

In many instances you will want to combine simulated lighting with the Sky Portal. This can be easily done. Make sure all the simulated lights are turned on. However, Sky Portal and simulated lighting have the longest render times of all lighting options in Twilight. Always run draft renders of just the Sky Portals and then the simulated lights to be certain that the settings are correct. Then run the combined lighting.
Twilight Render has special features that enhance renderings. Some of these features, like progressive render-quality presets, were explored as part of the previous chapters, and are an integral part of the rendering work done in Twilight.

The chapter reviews Clay rendering and Instancing. Please review the Twilight User Manual for additional special features and options. Most of the options not reviewed here—animations and different render outputs, for example—are intended for advanced and professional users.

**Render Settings**

Twilight comes with many additional render presets that go beyond the typical quality settings. These include the typical Clay render settings that are reviewed below. These settings are located in the Twilight render menu under the Quality Preset location and are included with Express and Tech headings (Fig. 47.1).

The following preset headings are available under Express: Easy (reviewed in previous chapters), Advanced, Custom, and Animation. Options under Tech include Ambient Occlusion and depth passes (Fig. 47.2 and Fig. 47.3), which are useful for postproduction in Photoshop. Users working with Twilight should explore these options at some point.
Chapter 47: Special Features

Fig. 47.1: Additional render presets are found under Express and Tech in the Twilight render options menu.

Fig. 47.2: Depth Render is one option found under Tech --> Specialized.

Fig. 47.3: Images like this Depth Render can be used during postproduction to help enhance a typical render.
Clay

Twilight Render provides the option for creating Clay renderings. The options are straightforward. You simply select the desired preset and run the render (Fig. 47.4, Fig. 47.5, and Fig. 47.6).

Fig. 47.4 You will need to set Sky Brightness to 0 to ensure that the sky renders white as shown in this example.

Fig. 47.5 This is an interesting Clay render. The color on the trees was not intended and might be a bug. However, the result was useful.
Seven Clay render options are located under the Clay heading on the Advanced tab (Fig. 47.7). These correspond to the presets found under Easy: you can choose from Prelim, Low, Medium, and High. Simply select the desired preset and click Render.

It is best that you start with the Prelim and Low clay render options. A possible bug with Twilight is that the Clay renders do not multithread when processing the image. In other words, the Clay presets do not use all of the computer’s processing power, resulting in a greatly lengthened render times. These long render times are not as apparent with the Prelim and Low settings. Medium and High can take some time to produce, but they are worth the result.
Instancing

One of the most useful aspects of Twilight is its passive ability to instance components. Any copy of a component, such as a tree, is processed once by the IRP when generating the image (Fig. 47.8). All other versions of that component do not need to be processed. This allows endless copies of a component to be present in the model without impacting rendering time and process.

Fig. 47.8 Image of the SketchUp model filled with hundreds of 3D high face count trees.

Fig. 47.9 Twilight instanced all of the trees, creating this render in under an hour (rendering does include postprocessing).
Instancing is ideal when you work with large amounts of vegetation. In fact, it is possible for Twilight to process more geometry than SketchUp can actually handle. While your SketchUp model might be huge, the instancing feature is able to render it with ease (Fig. 47.9).

Loading SketchUp with 3D vegetation, even when correctly organized and using layers, can still cause performance issues. For example, while the trees are visible in Fig. 47.8, SketchUp can barely display the model. However, clicking the Render button in Twilight will quickly produce a rendering. Twilight is instancing a single tree and rendering the copies without any problems.

The goal is to keep SketchUp functional while working with this amount of vegetation for rendering. The guide in the following section shows one option for working with SketchUp and Twilight to create forest renders. This tutorial requires an understanding of SketchUp components, component nesting, and using layers.

**SketchUp and Twilight Forests**

For this example, a FormFonts Geometree (see Chapter 13) is used as the primary tree. It is a high face count tree that renders exceptionally well. The goal is to have a large quantity of these trees (in the hundreds) in the model. The final model size in this example is roughly 80 million faces.

Here is the process for accomplishing a forest render:

1. Create three layers. 00 - TREE MAIN, 00 TREE LINES, and 00 - TREE 3D (Fig. 47.10).

2. Import in a 2D FaceMe tree and place it on the 00 TREE LINES layer (Fig. 47.11).

3. Next, edit the 2D Tree component and delete all of the faces. You want only the line work to remain (Fig. 47.12).

4. Import in the 3D tree you want to use (in this case, the Geometree). Position it directly over the 2D Tree and place the 3D tree on the 00 - TREE 3D layer (Fig. 47.13).

5. Select both components and make them into a single component. Place this new combined component on the 00 - TREE MAIN layer (Fig. 47.14).
Fig. 47.10 Create three layers.

Fig. 47.11 Imported 2D tree component is placed on 00 - TREE LINES layer.

Fig. 47.12 Delete the faces only from the 2D tree. All that should remain is the Tree wireframe (bottom).

Fig. 47.13 Import in a 3D tree to render. Place in the same position / over one of the 2D trees. Place the 3D tree on 00 - TREE 3D layers.
(6) Turn the 00 - TREE 3D layer off. This will hide the 3D tree and make it easier to copy and paste the component around the model. Only the line work of the 2D Tree should be visible.

However, with every copy of the 2D tree, a 3D version is present but not visible. You are using the 2D tree line work as reference to help copy and position the component throughout the model.

(5) Place the combined tree component around the model. For quicker placement, especially when working with terrain models, use the Component Spray Ruby Script (Google search: SketchUp Component Spray) (Fig. 47.15).

You will notice a slowdown in SketchUp performance the more trees you place, even though the 3D tree is not visible. SketchUp still needs to process the invisible 3D tree as you copy and paste the component. For large forest models, you will need patience when working with this process.

Fig. 47.14 Select both tree components and make them into a single component. Place this new combined component on the 00 - TREE MAIN layer.
Fig. 47.15 The combined component tree (with the 3D Tree toggled to off) placed around the model.

Fig. 47.16 Set Twilight to render the hidden 3D Tree layer without it having to be visible in SketchUp.
Do not turn on the 00 - TREE 3D layer if you have placed many of these components in the model. Computers with high-end graphics cards (Nvidia GeForce 580 or better) might be able to display all of the trees, but you run the risk of freezing SketchUp.

(6) With the 00 - TREE 3D layer off, select the wire frame tree component and right click over it. From the Right Click context menu select the Twilight option and select 'Render all Layers in All Components’ (Fig. 47.16). This will indicate to Twilight to render all objects on all layers even if they are not visible in SketchUp. This prevents you from needing to have the 3D version of the tree visible. Twilight still render and instance the 3D Geometree.

You are now ready to render the scene.

Finishing Notes

Be careful of Model Info --> Statistics. Really high face counts will cause Model Info to take a long while to load and display. It won't really freeze, so you can wait it out. Remember that the key to large models like these is layers and organization.