

Creating Site Plans (Part II)

Visualization Insider

Creating 3D Site Plans – Part II

Prerequisites – a foundation level understanding of 3ds Max and an intermediate level understanding of AutoCAD.

Paver Bandings

Paver bandings provide a great accent to the pavers in any project and 3D artists often make the mistake of not taking the extra step of adding this key element to their work or not orienting the bandings correctly. Whether around a pool, on a sidewalk, or in a street, bandings make a big difference in the look of a rendering; when placed improperly, they can stand out like a sore thumb. The below images show several different examples of paver bandings oriented in a specific manner around other paver bricks. Imagine how these images would look if the paver bandings didn't exist or if they were all oriented in an inappropriate manner, for example if all the pavers were aligned in the same direction when they should instead be oriented in a radial fashion.



Figure 1: Examples of paver bandings

In this tutorial, the paver bandings used are nothing more than applications of poured concrete, rather than individually placed bricks. This makes creating the bandings in this scene very quick and easy. If paver bricks were required in the banding, applying the paver banding maps in the appropriate manner may have taken several hours. Instead, the bandings we will need to create will take just a few minutes.

To create the bandings, we can once again return to the **Boolean > Cut > Split** feature to cut the banding out of the existing pavers, which in turn were cut out of the road object, which in turn was cut out of the terrain, and so on. It becomes quickly obvious how important this feature is in creating 3D sites. But rather than using this procedure once again, we can take a short-cut. In this project the paver bandings are going to be white and appear very similar to the curb object, so much so that we can use the same material on both objects. Because both objects will have the same color, we can simply extrude the bandings through the pavers and not worry about the fact that they occupy the same space as the curbs.

1. Continue from the previous exercise or open the file **My_Uno_06.max**.
2. Select the **0-Site-Pavers_Banding1.01** object and rename it to **Site-Pavers_Banding1**.
3. Enter **Vertex** sub-object mode and weld all vertices.
4. Extrude the banding **6 inches**.

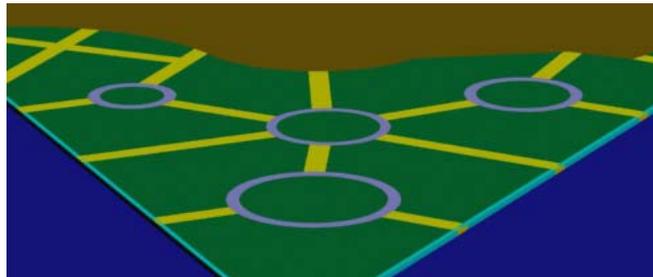
Notice that the banding overlaps the **Site-Curb2** object and is extruded to the exact same height as the curb, as shown in the image below. So instead of cutting the banding out of the pavers, this time we just extruded the banding through the pavers. This has a few advantages:

- It's slightly faster
- We can keep the original splines intact if we are unsure about any future changes that might be made to the pavers later on
- We can minimize the number of faces in our scene.

Sometimes, if the object that we cut out of contains a very large number of polygons, cutting out shapes can drastically increase the overall number of faces in the scene. That wouldn't be the case in a scene this simple, but the principle behind using the extruded method is valid in many cases.



5. Select the **0-Site-Pavers_Banding2.01** object and rename it to **Site-Pavers_Banding2**.
6. Extrude the object by 6 inches. There is no need to weld vertices in this case because the original lines were circles that did not undergo any polyline editing in AutoCAD. However, if you zoom in closely to the newly extruded bandings, you might determine that the curves are not smooth enough. Like before, this is because there are not enough steps used to interpolate the curves.
7. Go down one step in the modifier stack to the **Editable Spline** level and open the **Interpolation** rollout.
8. Change the number of steps to **20**. This might be more than is needed, but the number of faces that the extruded object will contain is still under 3000, which is still a relatively small amount.
9. Render the scene. It should look like the image below.
10. Save your file as **My_Uno_07.max**.

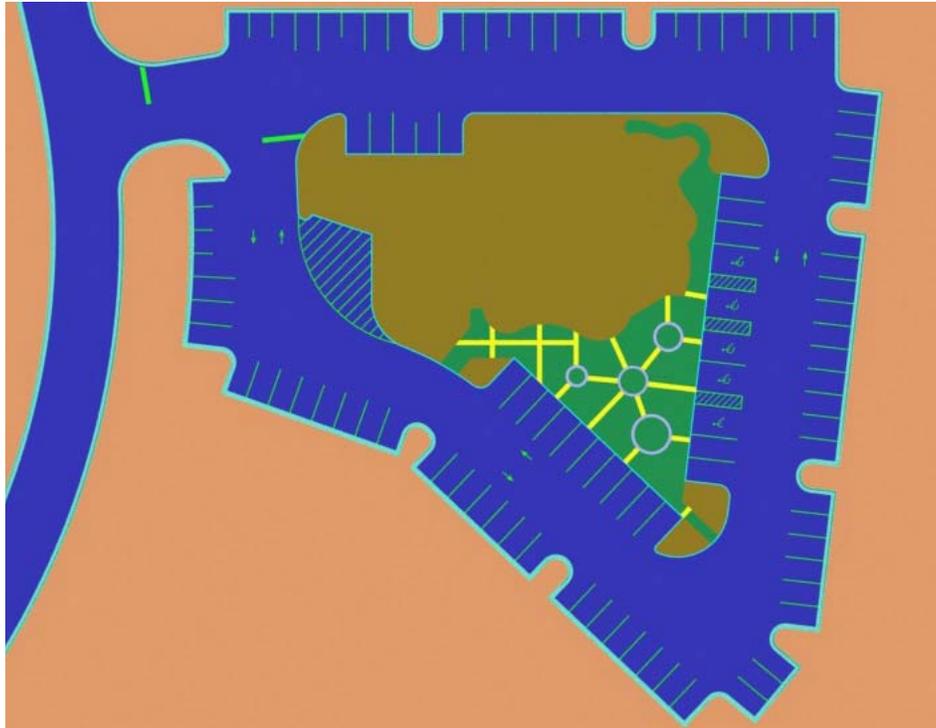


Road lines

Road lines are a simple yet critical element of many 3D sites. If our road was truly 3D with varying elevation, the process we would use to create this object type would be similar to the way many of the site elements are created; with the **Boolean > Cut > Split** feature. Since our road is completely flat, however, the process is much easier and can be completed in much less time. The AutoCAD drawings we started with displayed the road lines as simple '**plines**' with a width of 6 inch (the standard thickness for most road lines). When imported into 3ds Max, '**plines**' become perfect splines to work with and need only to be turned into mesh or poly objects to be renderable.

1. Continue from the previous exercise or open the file **My_Uno_07.max**.
2. Select the **0-Site-RoadLines.01** object and rename it **Site-RoadLines**.
3. Click the **Zoom Extents All Selected** icon.
4. Go to the **Vertex** sub-object level of the **Edit Spline** modifier and weld all vertices.
5. Add the **Edit Mesh** modifier to the road lines object.

6. Render the **Top** view. Since the road lines still exist at an elevation of zero along with the road object, you may see some noticeable problems in the display of the road lines. To fix this, we can either move the road lines object ever so slightly above the road object or simply apply the **Extrude** modifier so that it shows up through the road. Since the number of additional faces is so small, let's just use the **Extrude** modifier.
7. Remove the **Edit Mesh** modifier.
8. Extrude the **Site-RoadLines** object 0.1 inches. This amount is usually enough to display the road lines properly, however, if the lines ever appear to blend with the road object, you should just apply a slightly larger amount.
9. Render the **Top** view—It should look like the image below.
10. Save your file as **My_Uno_08.max**.



Mulch

More often than not, I find myself having to play the role of landscape architect because at the time that I begin a project, the landscaping plans have not yet been created. Often the client does not even know what he or she wants and says something like “just put in something that looks good.” If you have an understanding worked out ahead of time to ensure that you can be compensated whether the client likes your design or not, proceeding without actual plans is a reasonable option. However, having to spend your valuable time deciding how to place vegetation throughout a project can be difficult, time-consuming, and lead to conflict with the client, regardless what is agreed upon in advance.

One of the most important components of a good landscape plan is the layout of mulch. I use this term generally to describe any type of substance immediately surrounding vegetation—wood chips, gravel, rock, etc. Mulch is usually a very simple object to create and can be created very quickly even for very large developments. If you are fortunate enough to have CAD drawings

from which to pull mulch linework, then your work may be simplified as long as the linework is well-created. If it is not, it's usually better to just import the linework into 3ds Max, quickly trace a similar outline and then delete the original linework. If landscape plans are non-existent, then you may find yourself having to resort to coming up with what you hope your client finds to be good enough.

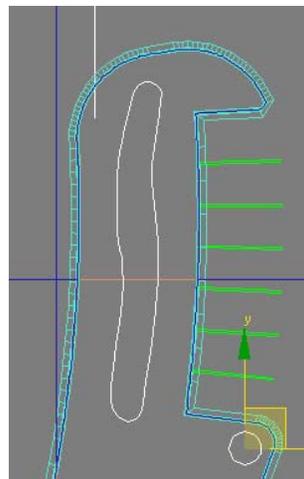
In this project, there was almost no guidance from the owner or architect at the time the animation was created about what was to go on the property. The only instructions I received were to use deciduous vegetation similar to the surrounding properties, use lots of trees around the perimeter to hide the surrounding buildings, and that no color was needed in any area. If you look at the satellite image in Part I of this tutorial, you'll see that the surrounding buildings are closer than they appear to be in the 3D renderings, and the vegetation is not nearly as dense. This is a common approach used to focus attention on the property in question and to prevent having to model other elements that are not part of the project.

With this small amount of guidance, I decided to place a tree in each 'island' around the perimeter of the project, as shown in the image below. To make the trees blend nicely with the terrain, I placed a circular mulch bed where each tree was to be placed.

1. Continue from the previous exercise or open the file **My_Uno_08.max**.
2. In the center of each 'island' surrounding the parking lot, create a circle with a radius of 42 inches, as shown in the image below.



3. Near the entrance to the property, try making a long, slender mulch bed by drawing a line similar to the one shown below. A row of trees will be placed in this mulch bed.



4. Add the **Edit Spline** modifier to this last line you created and attach all other circles to the one spline.
5. Name the single object containing all mulch beds **Site-Mulch**.
6. Add the **Edit Mesh** modifier to the object.
7. Raise the object 0.1 inches above the grass.
8. Render a perspective view of one of the 'islands'. It should look similar to the image below, although the colors will vary.

Notice that the mulch bed shows fine above the terrain, however, the terrain object is much too low and should be raised up close to the top of the curb.

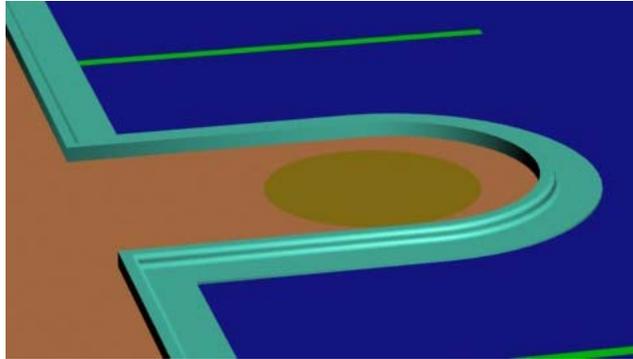


Figure 2: Terrain too far below the edge of the curbs

In the real world, grass is usually growing above the elevation of the surrounding curbs and this is usually desirable to show in 3D modeling as well, however, we're not going to elevate the terrain above the curbs for several reasons. First, you can't elevate the terrain above the curb because you would see a gap between the terrain and the curb. The way around this would be to go to Polygon sub-object mode, select the terrain object and use the Extrude button (not the Extrude modifier) to extend the terrain above the curb. In this case you wouldn't need to elevate the terrain in the first place. But we also don't want to raise the grass above the curbs like this, because there are better ways to show grass above the curbs.

One way is to make a copy of the curb line, extrude it, and apply a nice map to the diffuse and opacity channels, such as those shown below. This method provides a great look to the border of curbs and grass.



Figure 3: Images that can be used in the diffuse and opacity channels to simulate the look of grass along an object's edge

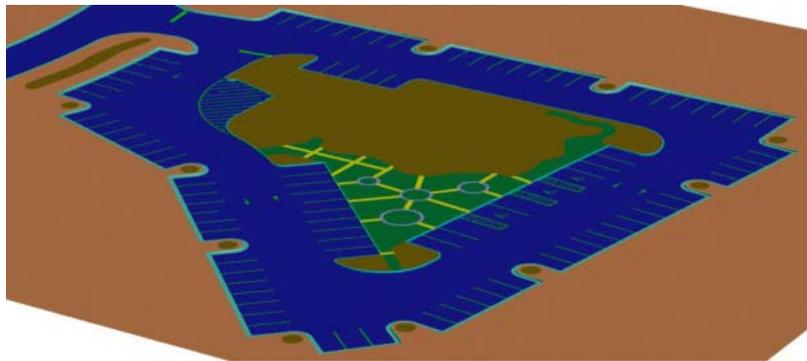
Another way is to use displacement mapping. This method is effective but can drastically increase render times if not used wisely. Rather than applying displacement mapping to the entire grass object, simply cut out a portion of the grass where you really want to see the displacement and apply the displacement to that much smaller object. If you use V-Ray, the V-RayDisplacementMod modifier is simply unbeatable both in terms of quality and speed. One issue you should be aware of with any displacement maps is the possibility of pixel dancing or flickering during animations.

You can also use the Hair and Fur feature to apply very realistic looking grass coming over the edge of the curbs, but like displacement mapping, this must be done in moderation, as it will increase render times.

Finally, extruding terrain above curbs is not always cost effective in terms of your scene's face count. For this particular scene, which is relatively small, face count shouldn't be an issue. However, in more complex projects with high face-count terrain, extruding the terrain object can add a considerable number of faces to your scene.

Despite all these effective methods of displaying grass, in this particular project, the two views that we will use are both a considerable distance away from the terrain object and there would be no discernable benefit in making the grass appear to rise over the curbs. Therefore, we will keep it just below the top of the curbs. Nonetheless, they are all possible options in any 3D site.

9. Raise the **Site-Terrain** object by 5.5 inches. We will decide later which method to use to finish the look of the grass.
10. Finally, raise the **Site-Mulch** object so that it's at an elevation of 5.6 inches - just above the terrain.
11. Render the scene. It should look like the image below.
12. Save your file as **My_Uno_09.max**.

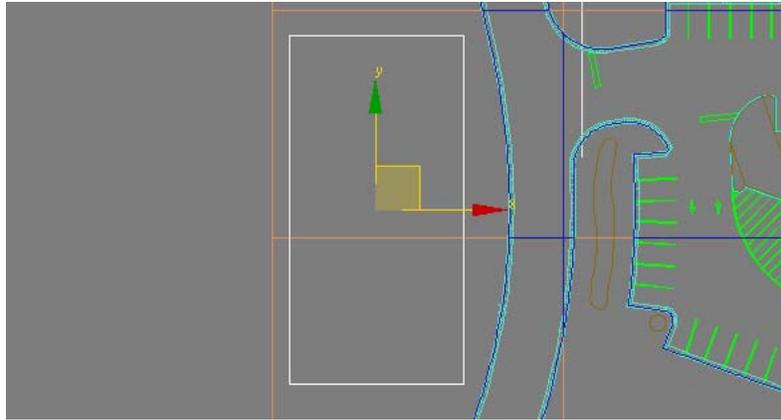


Bodies of water

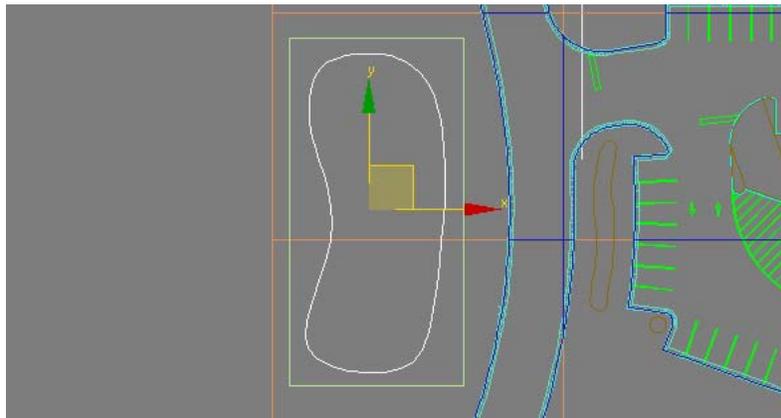
In this scene, the only water that can be found is in a single fountain. At the end of Part II, we will place this in the paved walk area in front of the entrance to the restaurant. Many exterior scenes, however, require the display of any number of types of water. To demonstrate one of the ways that we can create a body of water for an exterior scene, let's add a large retention area to the left side of the project. This area will not be visible in the final animation, but this is for demonstration purposes only.

A retention area is a place where rain water can run off to, so that a building, road, or parking lot doesn't flood so easily. The method that we will use to create the retention area can be applied to the creation of other types of water bodies, such as lakes and rivers.

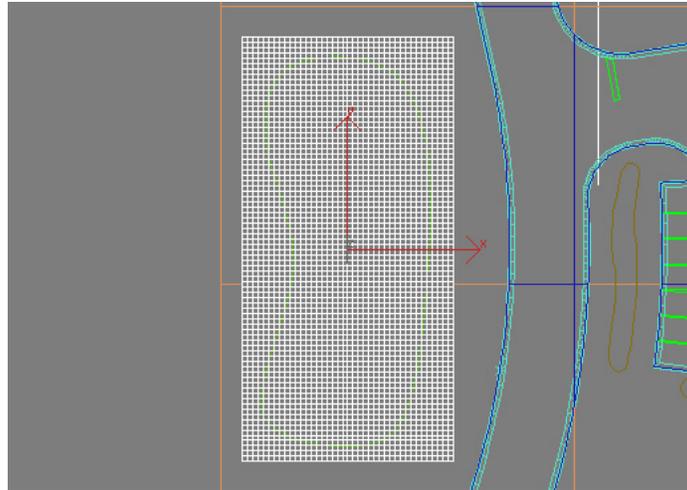
1. Continue from the previous exercise or open the file **My_Uno_09.max**.
2. Maximize the **Top** view. This will facilitate the steps in this particular procedure.
3. On the left side of the project, within the boundary of the terrain object, create a rectangle with a length of 150 feet and width of 75 feet, ensuring that the rectangle doesn't infringe upon the road around it. The placement should be similar to the image shown below.



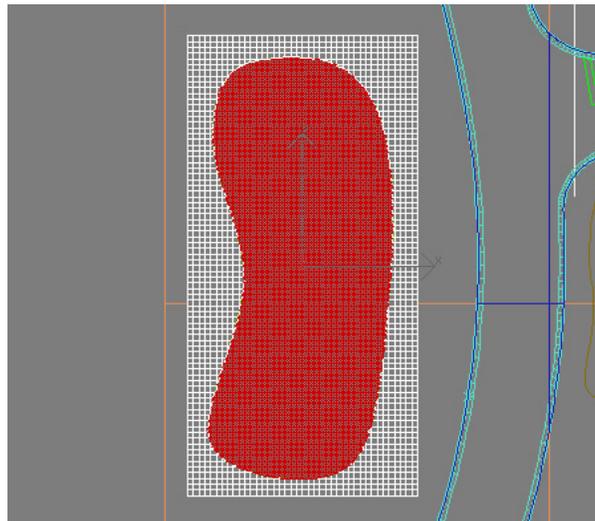
4. Create a bean-shaped closed spline centered on the rectangle to represent the perimeter of the retention area. The spline could look something like the one shown in the image below. If you want to use this same spline, it can be merged in from the file **Shape_Rentention.max**.



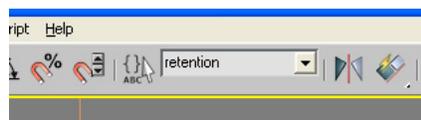
5. Select the object **Site-Terrain**.
6. From the **Command** panel, select **Create > Geometry > Compound Objects > ShapeMerge**. This command is similar to the **Boolean > Cut > Split** feature except that it does not handle complex objects very well so often cannot be used. In this case, we are going to cut out a simple rectangle from the terrain so there won't be any problems.
7. Click the **Pick Shape** button and click on the rectangle you created. An outline of the rectangle is cut into the terrain object.
8. Add the **Edit Mesh** modifier.
9. Go to **Face** sub-object level, and click the **Delete** button. In previous steps, we detached faces; however, this time we want to delete them entirely.
10. Close sub-object mode.
11. Delete the rectangle that was used in the **ShapeMerge** command.
12. Press the keyboard shortcut **S** to turn on snap mode. Ensure that **Endpoint** snaps are the only snaps enabled.
13. Using snaps, create a plane in the place of the faces you just deleted.
14. Name the plane **Site-Retention-Temp**. This object will only be temporary.
15. Press the keyboard shortcut **S** to turn off snap mode.
16. Change the **Length Segs** value to **80** and **Width Segs** value to **40**. The scene should look similar to the image shown below.



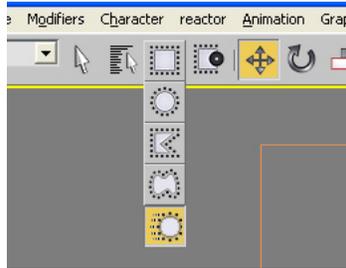
17. From the **Command** panel, select **Create > Geometry > Compound Objects > ShapeMerge**. We will use this command again to cut the shape of the retention area out of the plane.
18. Click the **Pick Shape** button and click on the shape of the retention area. An outline of the retention area is cut into the plane object.
19. Add the **Edit Mesh** modifier.
20. Go to **Face** sub-object level. The faces representing the retention area are selected, as shown below.



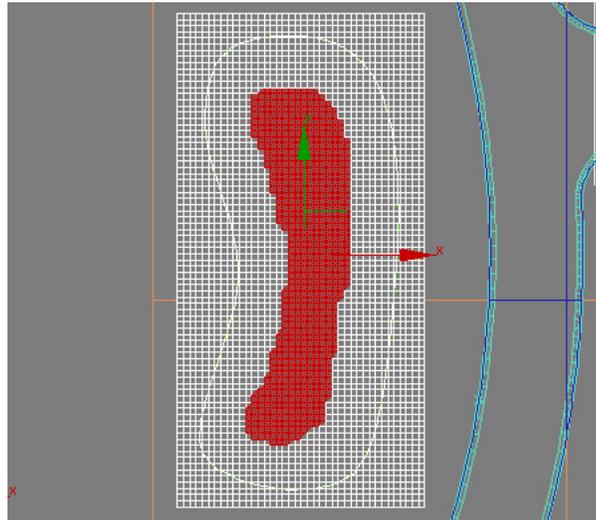
21. In the **Named Selection Sets** drop-down list type **retention**. We will use this named selection again shortly.



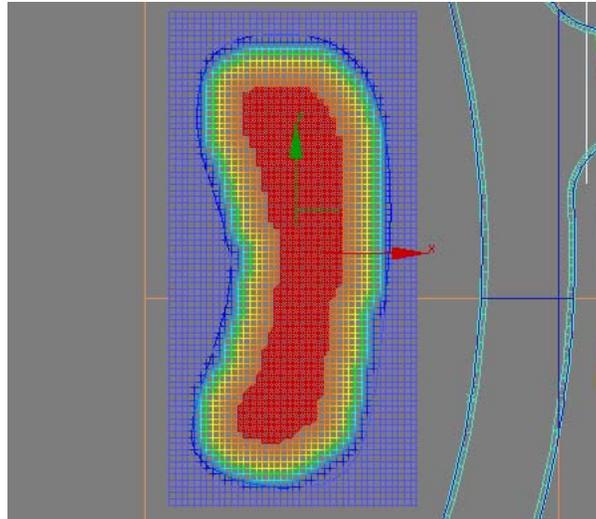
22. In the **Main** toolbar, click and hold the **Rectangular Selection Region** icon and select the **Paint Selection Region** icon. This will allow you to use the cursor to select or deselect sub-object elements the same way you would use a paint tool in a program like Photoshop.



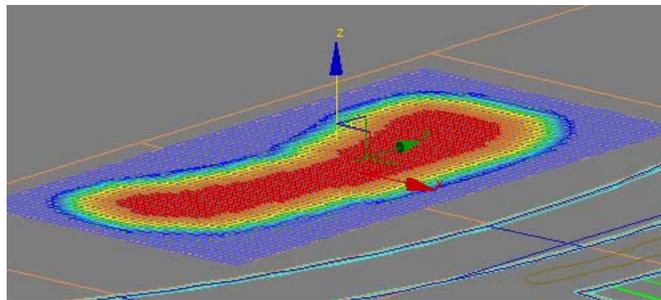
23. While pressing and holding the **Alt** key, use the mouse to deselect the faces around the inside edge of the retention area, as shown in the image below. Delete the faces approximately halfway to the center of the retention area.



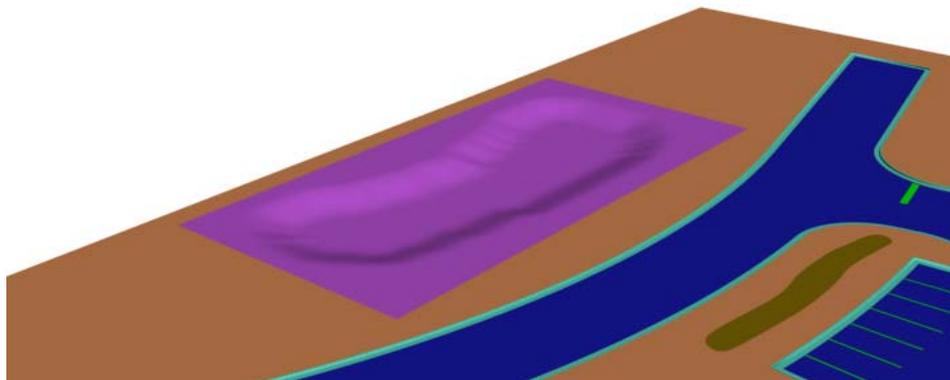
24. In the **Command** panel, open the **Soft Selection** rollout.
25. Select the **Use Soft Selection** option.
26. In the field next to **Falloff**, type **15'** and press **Enter**. A soft selection is now made. In this mode, sub-objects are affected by transforms based on their distance to the selected sub-objects. In this case, we had only the middle portion of the retention area selected so that when we applied the soft selection, the center was affected fully, and the faces further away from the center are affected less.



27. Click the **Maximize Viewport Toggle** to return to four viewports.
28. Create a perspective or user view of the retention area, such as the view shown below, so that you can have a better view of the move transform we're going to make.



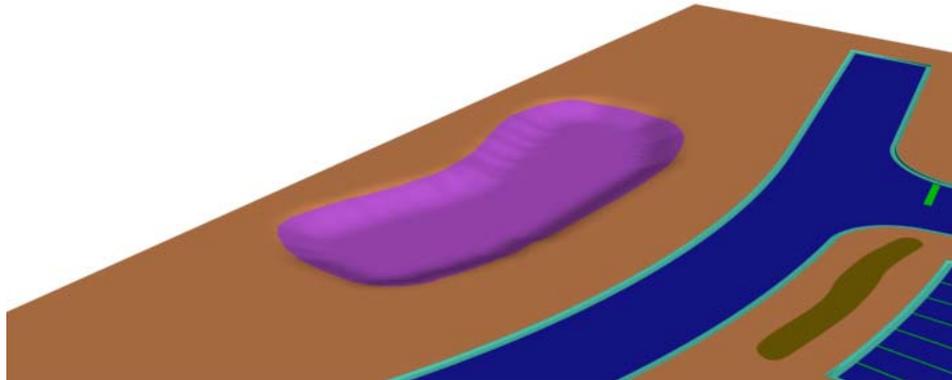
29. Move the selection down by 4 feet. Notice that the faces further away from the selection are affected less than those faces that were actually part of the original selection (faces in red). This will suffice for our retention area, although you could actually show water in the area by creating a simple plane that encompasses the retention area and sits just above the bottom of the retention area. The image below shows the retention area at this point.



30. While still in Face sub-object mode, click the **Named Selection Sets** drop-down list and select **retention**. The named selection you saved before is now recalled. Now let's

separate these faces as an object so that we can apply a unique material to them later. It wouldn't look as good to have the retention area material look the same as the material of the surrounding terrain.

31. Detach the **Faces** as a separate object named **Site-Retention**.
32. Close **sub-object** selection mode.
33. Select the **Site-Terrain** object.
34. Attach the **Site-Retention-Temp** object to the **Site-Terrain** object. The finished retention and terrain area should look like the image below, although your colors will be different.
35. Delete the line you created originally that represents the outline of the retention area.
36. Save your file as **My_Uno_10.max**.



The key ingredient in creating any terrain feature, whether a mountain, a lake, or a retention area, is a sufficient number of faces. Without enough faces, the terrain feature may appear to be chiseled and unnatural looking. On the other hand, with too many faces, you can significantly increase render times. After using the procedure described here, you have the option of using the **Optimize** modifier to help reduce the face count, but in this case it's simply not needed, as the model has so few faces to begin with.

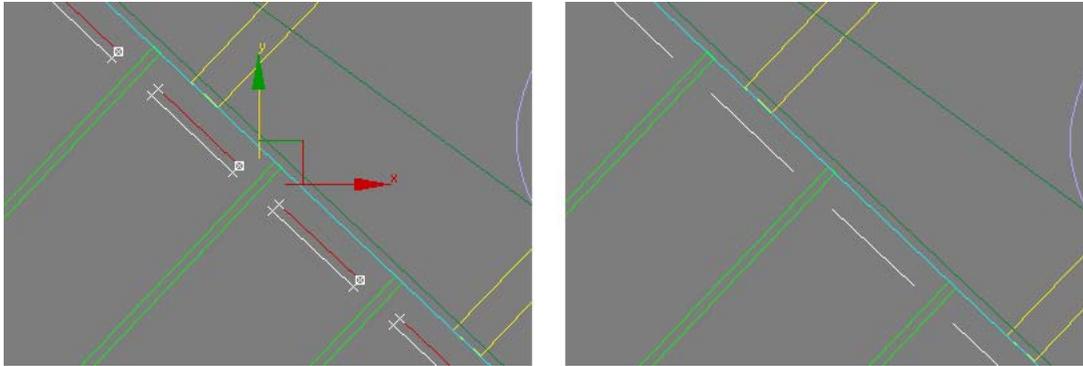
Parking Stops

In the course of creating a 3D site, you may find yourself having to return to the original CAD drawing to retrieve linework that didn't get imported during the first import process. Let's assume that this is the case with the last site element that will be modeled from scratch - parking stops.

1. Continue from the previous exercise or open the file **My_Uno_10.max**.
2. Import the drawing named **Parking_Stops.dwg**. The default import options will suffice.

Notice that the linework representing the parking stops is nothing more than a series of rectangles. You could always just extrude these rectangles to make an object that resembles a series of boxes, and this will be a reasonable option for scenes where the view is far enough away. Since parking stops rarely look like a simple box, however, let's try applying a more realistic shape.

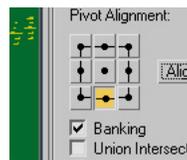
3. Select the **0-Site-ParkingStops.01** object, enter **Segment** sub-object level and select one line segment from each parking stop, making sure that the line selected is the long segment closest to the curbs. An example is shown in the left image below.
4. Detach these selected line segments as a separate object and name the object **Site-ParkingStops**.
5. Close sub-object mode and delete the original object that we detached the lines from.



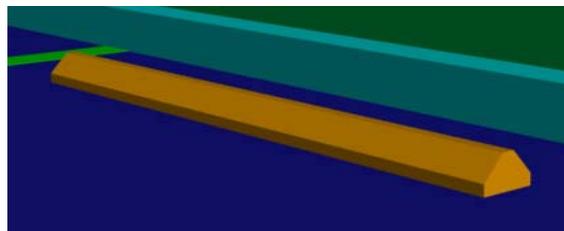
Next we'll apply the **Sweep** modifier to these lines we detached so that we can 'sweep' the shape of a parking stop profile along each line. If the **Loft** feature is a favorite of yours, you might try lofting the shape to this object; however, the **Loft** modifier can't be used in this particular case because lofts can only be created with continuous lines, not a series of lines as we have here.

Before we can use the **Sweep** modifier, let's merge an appropriate shape from an existing scene.

6. Merge the lone object in the scene named **Shape_ParkingStops.max**.
7. Select the **Site-ParkingStops** object.
8. Add the **Sweep** modifier.
9. In the **Section Type** rollout, click the **Use Custom Section** option.
10. In the **Custom Section Types** section of the **Sweep** modifier, click the **Pick Shape** button (next to the **Pick** button). The **Pick Shape** dialog box opens.
11. Double-click the **Shape-ParkingStops** object.
12. Open the **Sweep Parameters** rollout.
13. Click the bottom-middle align option, as shown in the image below. The bottom center of the shape will now be aligned along each line segment.



The parking stops should now look like the image below.



14. Save your file as **My_Uno_11.max**.

Vegetation

Now that all of the site elements that need to be created from scratch are in place, we can start bringing in objects from our libraries to quickly fill the scene with content. The first object type that we will work with is the tree, however, before beginning I would like to start with an excerpt from my book, [Foundation 3ds Max 8 Architectural Visualizations](#), which provides a general introduction and overview on the use of vegetation in visualizations.

Excerpt

"In a 3D scene, one of the most difficult elements to simulate realistically is vegetation. This is especially true when your scenes are animated, and your cameras move in and around the vegetation. Whether a scene contains 2D vegetation, 3D vegetation, or a combination of both depends on numerous factors, such as rendering time available, your vegetation libraries, distance of the vegetation from the camera, camera paths, and available RAM. Too many 3D plants or trees can lead to extremely large files sizes and rendering times, which is why I recommend using a combination of 2D and 3D vegetation in most scenes. When you do decide to use 3D vegetation, one of the ways you might want to create your plants is with the Scatter command.

As Chapter 4 discussed, the Scatter command is used to create copies of one object over the surface or within the volume of another object. In this way, it gives you a quick and easy method to create realistic 3D plants for an entire project, regardless of size. Creating plants this way can produce effective and realistic results with minimal burden on your computer.

It's often unimportant to the client exactly what type of plants they see in their visualization and since landscape drawings are usually one of the last things created during a project's planning, landscaping will often not even be decided by the time your work begins. When this is the case, the client may want you to play landscaper and tell you to simply create something that looks good. This can be a double-edged sword. Although it is nice to not be constrained by placing the exact required vegetation type throughout your scenes, the client may not like what you use. Good communication about landscaping requirements and exactly how you will meet them cannot be overstated. In fact, if anything should be highlighted in your contract, it should be details regarding the landscaping. Whenever possible, I highly recommend gaining flexibility from the client in this area.

When you aren't constrained by creating plants of particular type, I recommend using the Scatter command to create at least a portion of your plants. Doing so can save an enormous amount of time, especially for larger projects. Some projects call for the use of thousands of plants and placing each of these plants one at a time can take hours. With the Scatter command, you can create the appearance of a beautifully landscaped scene in a fraction of the time. The image below shows a few examples of images that can be used to create 3D shrubs and plants. These same types of images can also be scattered around the volume of an object to create the canopy of a tree.



Figure 4: Examples of images that can be scattered to create the look of plants

Regardless of the landscaping constraints detailed in your contract, another great tool that facilitates the placement of landscaping throughout your scenes is the **Spacing** tool. You can use a spline (path) or two points separated by a certain distance to specify exactly where your vegetation is placed."

End of Excerpt

Trees

For this project, I used a combination of 3ds Max's **Foliage** object type and **RPCs (Rich Photorealistic Content)**. RPC trees are comprised of a series of images that change depending on viewing angle. Since they are images, they do not cast true shadows and although they contain an option to cast shadows, I generally prefer to disable this feature and use the shadows of a true 3D tree. The image below shows how this is done. The RPC has the **Cast Shadows** option disabled and the 3D tree has the **Visible to Camera** and the **Receive Shadows** options disabled. In this project I used three RPC tree types—**Red Oak**, **Red Ash**, and **Sago Palm**, and the shadow of 3ds Max's **Generic Oak**, which can be found in the **AEC Extended > Foliage** library.

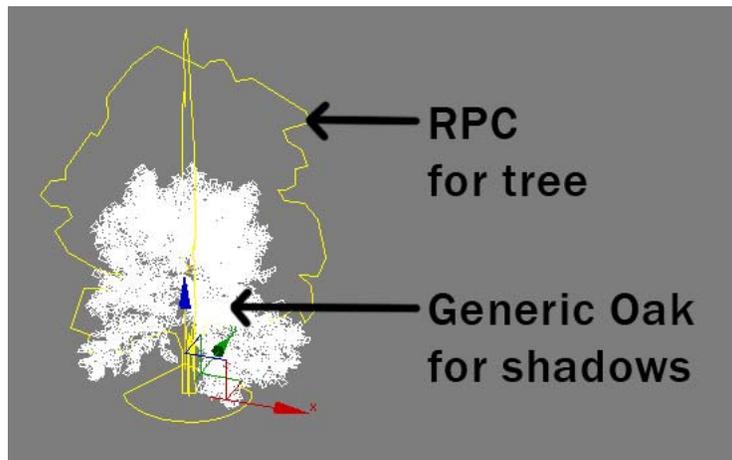


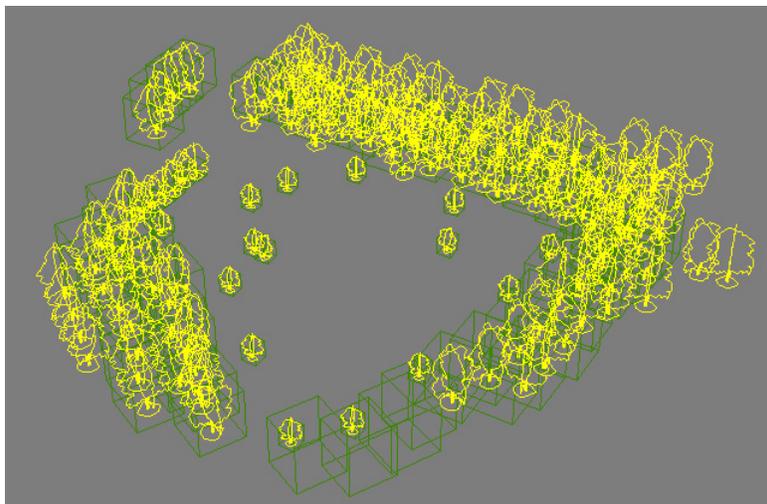
Figure 5: An RPC used in conjunction with the shadows of a 3D object

Although this tutorial uses RPCs and 3ds Max's Foliage object types, you can easily substitute your own content types. To use RPCs, you must first download and install the RPC plugin from www.archvision.com. Using actual 3D modeled trees such as with 3ds Max's Foliage provides a great touch of realism but they must be used wisely so that your scene's face count doesn't become excessively large. Some companies that provide great 3D trees include Onyx (www.onyxtrees.com) and Dosch Design (www.doschdesign.com).

The following steps demonstrate how RPC trees and 3D trees were used in this project. Even if you do not have RPC trees available, you can use the same general approach with other content types.

1. Continue from the previous exercise or open the file **My_Uno_11.max**.
2. If you would like to simply insert the RPCs and generic oaks used in this project (shown in the image below), merge all of the objects from the scene named **3D_Vegetation.max**, and skip the remainder of this part of the tutorial.
3. In each of the mulch beds you created, place an 18 foot **Red Oak**, and ensure that the **Cast Shadows** and **Receive Shadows** options are disabled. These options can be

- found by right-clicking the objects and selecting **Properties** from the quad menu. If you do not wish to use RPCs, then go to **AEC Extended > Foliage**, select the **Generic Oak**, place an **18 foot Generic Oak** in each of these same locations, and **skip step 3 and 4**. When placing RPCs, remember that you can't create instances of this object type because the image of the RPCs will not display correctly.
4. In each of the mulch beds where you placed a RPC, place a 12 foot **Generic Oak**, using the **Instance** object type so that you can change the properties of all of them by changing the properties of one. I chose to make the size of the generic oak 50% smaller than the RPC because the shadow being cast is quite large.
 5. Select one of the Generic Oak instances and, from the **Modify** panel, disable the **Branches** and **Trunk** options. At the distance these trees are being viewed at, having these components is unnecessary and will only lead to longer render times without any perceived improvement in the final product.
 6. Around the perimeter of the parking lot, place approximately 125 **Red Oak** and **Red Ash** trees ranging in size from 40 feet to 50 feet. Ensure that they do not cast or receive shadows. If you do not wish to use RPCs, place generic oaks in their place.
 7. In the same area that you placed the 40-50 foot RPCs, place approximately 60 **Generic Oaks** with a height of 35 feet. Once again, use the **Instance** option to create each of these so that you can easily change the properties later. I chose to use approximately half as many shadow casting 3D trees as I did RPCs to save time on rendering. Because we have so many trees so close together, far fewer shadows will be visible.
 8. Save your file as **My_Uno_12.max**.



Plants

The plants used in this project were not critical to the final animation and I was able to use the Scatter command to quickly simulate the appearance of shrubs around the building. The process we will use involves creating a closed shape that represents the perimeter of the shrubs, extruding the shape to create a 3D volume, and scattering a single face object around the volume. The image below shows a single face with the image of some leaves. The image file used is a .tga containing an alpha channel. When placed in the Opacity channel of a material, this image allows you to control the color of the scatter faces, and therefore the color of the shrubs, by changing the diffuse color of the material. You also have the option of using an actual image in the diffuse color channel.

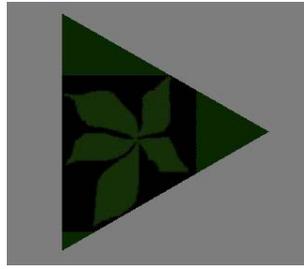
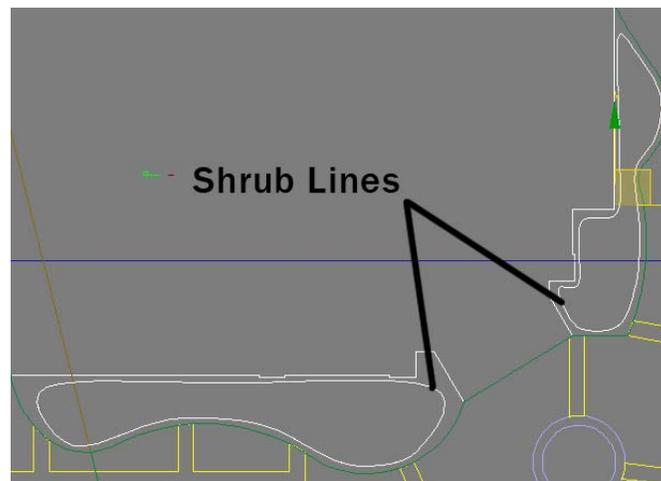


Figure 6: A single face containing a material used to simulate leaves

We will also use the Scatter command to create the appearance of underbrush in the area under the trees that surround the parking lot. The following steps describe this process of creating the shrubs and underbrush.

1. Continue from the previous exercise or open the file **My_Uno_12.max**.
2. Hide the trees you created or merged into the scene during the previous exercise. This will enable you to better see the area you are going to be working in.
3. Merge the four objects in the scene named **Volume-Plants**. This scene contains the volume representing the shrubs immediately surrounding the building, the volume representing the underbrush, and the two separate objects that will be scattered about the two separate volumes. For reference, the image below shows the volume surrounding the building.

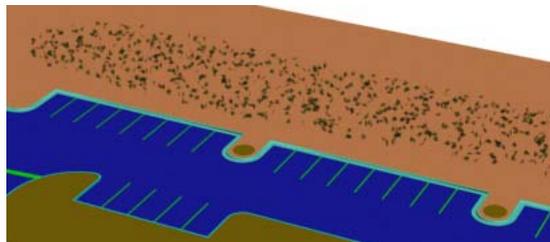


4. Select the object **Site-Shrub-Green**.
5. Select **Create > Geometry > Compound Objects > Scatter**.
6. Click the **Pick Distribution** button.
7. Press the keyboard shortcut **H** to open the Select Objects dialog box.
8. Double-click the object **Volume-Shrubs** (called out in the image above). A single face should appear within the limits of the volume.
9. Select the delete the original **Volume-Shrubs** object.
10. Select the **Site-Shrub_Green** object.
11. Scroll down the **Command** panel and open the **Display** rollout.
12. Click on the **Hide Distribution Object** option. This hides the copy of the **Volume-Shrubs** object that was created when the Scatter command was used.
13. In the **Scatter Objects** rollout, change the **Duplicates** value to **5000**. This will tell 3ds Max to scatter 5000 copies of the leaf object around the volume.
14. From the **Distribute Using** section, select **Area**. This method of scattering provides the best appearance in distribution.

15. Scroll down the **Command** panel and open the **Transforms** rollout.
16. In the **Rotation** section, type **90** in each of the **X**, **Y**, and **Z** fields. This randomly rotates the faces plus or minus **90** degrees about all three axes.
17. Render the scene from a perspective view. It should look similar to the image below. If you want to change the color of the shrubs, simply load the material from the object into the material editor and change the **Diffuse color**.



18. Select the object **Site-Overbrush-Green**.
19. Repeat steps **4 through 12**, this time using the **Volume-Underbrush** object as the distribution object. We are keeping the same number of duplicates, 5000, which when scattered over a larger area gives the illusion of underbrush rather than thick shrubs. If you determine later that the underbrush is too difficult to see against the material used for the terrain object, simply increase the duplicates value to make more leaves visible.
20. Render the scene from a perspective view. With the trees hidden, it should look similar to the image below.



21. Unhide all objects and render a perspective view of your scene. It should look like the image below. Remember that we still have no shadow casting lights in the scene yet, and therefore, no shadows.



22. Save your file as, **My_Uno_13.max**.

Light Poles

Any development such as the restaurant in this project should contain such noticeable objects as light poles. Whether you wish to create a night time scene or not, leaving such an element out will often be noticeable. In the original drawings I received from the architect, this key object type was left out because the drawings were simply not finished at the time the renderings were needed. This is a common problem and the only solution is to use your best judgment and try to find or create something that will fit well in the scene.

If you would like to use the light poles I created for this scene, merge them from the file **Light_Poles.max**.

Cars

Since this animation was created for marketing purposes, the need to populate the scene with cars and people was very important. RPCs were once again used for both these object types, although there are many companies that provide great content of these types. Sugar 3D is a great source for high quality 3D car models and Dosch Design is a great source for 3D people.

If you have the RPC plugin and content and would like to use the same cars that were used in this scene, merge the cars from the file **Cars_RPC.max**. If you would like to use the same people that were used in this project, merge them from the file **People_RPC.max**.

Fountain

This project called for a fountain in the paved walkway area in front of the restaurant and if you would like to include this element, merge it from the file **Fountain.max**.

The Building

The final step in this part of the tutorial is to merge the finished building, which is located in the file **Building.max**.

Summary - Part II

In this part of the tutorial, we completed the modeling process, which included the merging of pre-made library objects. Part III of this tutorial will demonstrate how to apply some great materials to these objects, how to fake global illumination with some standard lights, and how to use V-Ray to add an even greater sense of realism. The tutorial will end with the merging of the camera paths used in the final animation to give you the opportunity to experiment with setting up your own camera paths.