



Preparing Your Autodesk® 3ds Max 2012® Design Models for Autodesk® Showcase 2012®

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Revision

date	version	author	Note
2010/07/20	draft	Jean-Francois Yelle, 3ds Max technical PM	Aggregation of all information, first texts
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1 Introduction

This document is targeted at content vendors, design/visualization artists familiar with 3ds Max who desire to port their work to Autodesk Showcase. Following these guidelines will help you be more successful bringing your 3ds Max scene into Showcase.

You can use these instructions to modify existing 3ds Max content so that it looks and works better in Showcase, but bear in mind your task will be much easier if you specifically create your content for Showcase.

1.1 If you would like to know more about preparing content consistently for sharing/selling to other users, we invite you to consult the “Babylon format specification” About the products

1.1.1 [Autodesk® Showcase](#) - Interactive, Accessible 3D Visualizations

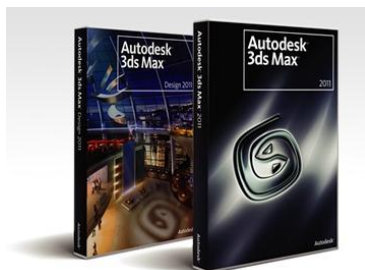


Autodesk® Showcase® 3D visualization software offers product designers, engineers, and marketing professionals the ability to transform digital prototypes into highly realistic imagery and immersive, interactive presentations. You can more easily evaluate designs in detail and in context, explore alternatives in real time, and communicate the story of your design. Showcase eliminates the need for physical prototypes to convey design intent, enabling more economical, efficient review processes in which teams can make better informed decisions.

Showcase is for creators and users of 3D digital designs who need to sell the functional and aesthetic elements of their design concepts

Showcase is a 3D design communication facilitation tool that lets you sell the story of the design by exploring the design intent in context interactively with stakeholders.

1.1.2 [Autodesk® 3ds Max® and Autodesk® 3ds Max® Design](#)



Autodesk® 3ds Max® and Autodesk® 3ds Max® Design software provide powerful, integrated 3D modeling, animation, rendering, and compositing that enable artists and designers to more quickly ramp up for production. The two versions share core technology and features, but offer differentiated experiences and specialized toolsets for game developers, visual effects artists, and graphic designers on the one hand, and architects, designers, engineers, and visualization specialists on the other.

1.2 Interop from 3ds Max 2012 into Showcase 2012 using FBX

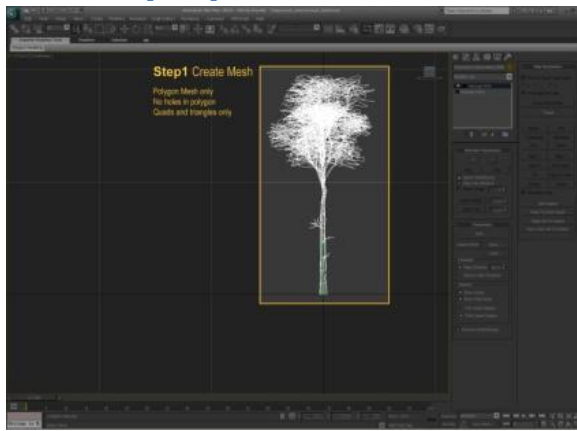
1.2.1 How we do it

3ds Max scenes are shared with Showcase through the FBX file format. The following list presents a high-level view of what is supported. Please consult the [appendix](#) for a more detailed interop support chart.

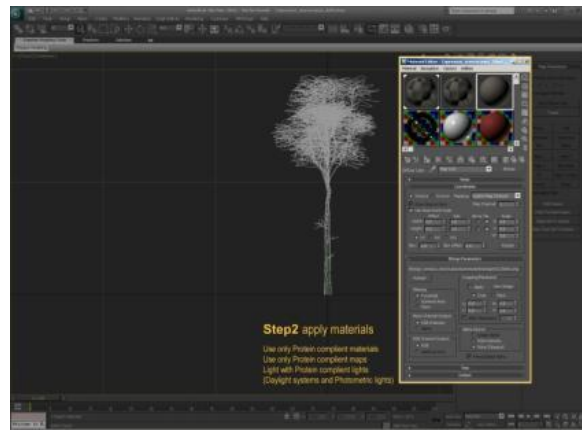
Supported	Unsupported
<ul style="list-style-type: none">• Mesh, patches• Simple materials• Autodesk Materials• multi-sub object	<ul style="list-style-type: none">• NURBS• Particles• Hair, Fur• RPC billboards

- Animation
- Arch and design materials
- Light

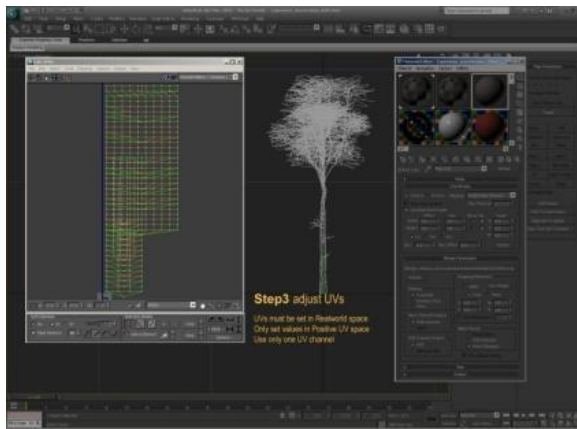
1.2.1.1 Export process overview



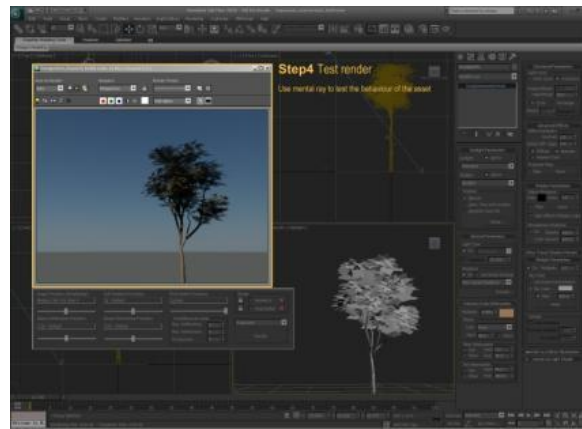
Step 1: Create Mesh



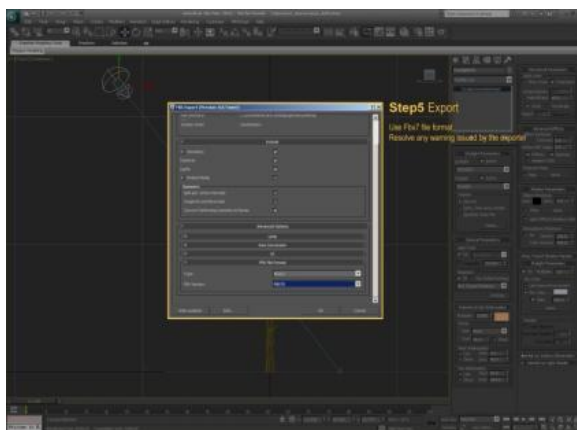
Step 2: Apply Materials



Step 3: Adjust UVs

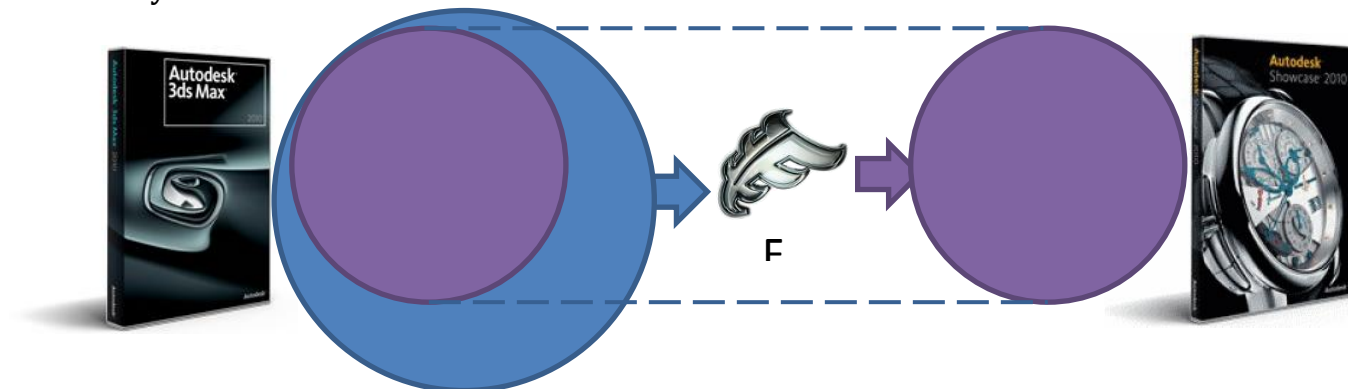


Step 4: Test Render



Step 5: Export to FBX

1.2.2 Why we do it



*Fun fact #1: 3ds Max exports to FBX a lot more than what Showcase can import.
Please consult the [appendix](#) for a more detailed interop support chart*

There are a number of relevant workflows that will require a user to do some work in both 3ds Max and in Showcase. 3ds Max is the premier content creation and visualization tool, but when you are ready to show your work to a client or colleague, the real-time interactivity and presentation capabilities of Showcase make it the tool of choice.

We have characterized the most common scenarios into 3 user workflows: a dedicated 3ds Max designer who is preparing content for a Showcase-based presentation; a skilled 3ds Max designer who is preparing content (entourage / decoration) for general use within Showcase scenes; an occasional 3ds Max user who wants to enhance the basic model they have exported from their CAD application and then present it in Showcase.

1.2.2.1 User workflows

1.2.2.1.1 Full production in 3ds Max

Personas : 3ds Max design/AEC artist

1. Open 3ds Max, do everything in Max
 - a. modeling,
 - b. texturing,
 - c. animation
2. Prepare for Showcase
3. Export to Showcase in FBX

1.2.2.1.2 Porting to Showcase






Personas : content developer, 3ds Max design/AEC artist

1. Open Max file
2. Prepare for Showcase
3. Export to Showcase in FBX

1.2.2.1.3 Revit to 3ds Max to Showcase

Personas : Occasional User (Architect), 3ds Max design/AEC artist

1. You start in Revit and export using FBX to 3ds Max
2. Import into 3ds Max
 1. Change materials
 2. Setup camera views
 3. add some modeling detail
 4. add some trees/people
 5. animate the cars driving around
3. Prepare for Showcase
4. Export to Showcase

	Marian - 3ds Max design/AEC artist	Davy - content developer	Rob - Occasional User (Architect)
Full production in 3ds Max			
Porting to Showcase			
Revit to 3ds Max to Showcase			

1.3 Target Audience

1.3.1 Content Creators and Vendors

By 2014, the world’s content vendors will publish their content in Autodesk certified FBX format, which we call a ‘Babylon Asset’. This content will be usable and interoperable in all Autodesk applications, consistent in visual fidelity, interactivity, and taxonomy, **parametrically configurable**, and optimized for real-time and software rendering workflows.

A Babylon Asset is an object that is *consistent in visual fidelity, interactivity, and taxonomy*, can be exchanged freely with all Autodesk 3ds Max 2012, Autodesk 3ds Max Design 2012 and Autodesk Showcase 2012 software by leveraging Autodesk Common Materials, FBX Mesh, and FBX Camera, and which provides consistent visual results when moved around the above software.

Autodesk customers will benefit from quick and easy access to a wide variety of content, some of which will be included for free with the purchase of their Autodesk applications. Additional content will be available a-la-carte, with the purchase of a content subscription package, and/or with the purchase of Autodesk product subscription.

Content vendors will benefit from reduced costs and simplified access to the entire Autodesk customer base. These improved publishing and fulfillment efficiencies will inspire content publishers to monetize their assets by publishing to Seek.com.

1.3.2 If you would like to know more about preparing content consistently for sharing/selling to other users, we invite you to consult the “Babylon format specification” Showcase Users

Anyone who might want to present their CAD data is going to see the appeal of a specialized tool for presenting 3D content. Showcase is for creators and users of 3D digital designs who need to sell the functional and aesthetic elements of their design concepts. It is a 3D design communication facilitation tool that lets you sell the story of the design by exploring the design intent in context interactively with stakeholders.

To really sell your product, you must enrich the presentation with elements that inform the audience about the essence of the design. Many of these ‘extra’ elements will be produced in 3ds Max. Showcase users will benefit from improved workflow efficiencies and predictability.

2 Geometry Optimization

To ensure your scenes work on the maximum number of machines, across a broad range of hardware capabilities, it is important to optimize as much as possible. This is especially true if you have a particularly large scene. Here we will explore several techniques and tools in 3ds Max that will assist you in optimizing your geometry.

Most CAD applications do not optimize their geometry all at. In fact, it is usually important to maintain as much detail as possible to properly define the attributes of what is being designed for engineering and architectural purposes. 3ds Max on the other hand is completely free to model at any geometric scale, whether for high-end rendering or high-end gaming. Since 3ds

Max is the standard for gaming studios, there are a myriad of tools to help you optimize your geometry.

2.1 Units

Before starting to model products or create materials for surfaces, make sure you set a standard for the **System Units** so that all the files you or your team create are consistent and all the models are modeled in real size.

The unit can be metric or imperial and should be appropriate for the models (**feet, inches, or Meters, centimeters, millimeters**).

2.2 Geometry tips

Whether you import your geometry from other applications, or model it from scratch, make sure you have a “clean” geometry.

- No unwelded vertices or overlapping faces.
- Proper smoothing groups and face normals orientation.
- Gaps, small parts, profiled edges should be modeled properly and with the right dimensions.
- Limit the number of poly to the *minimum necessary* for a good quality at almost close up distance.
 - 1-3k polys for simple objects
 - 12-20k polys for complex models or models with rounded surfaces
- Proper UV mapping where textures are required
 - Real-World UVs for surfaces like wood, stainless steel, granite, etc
 - Regular UVs for labels, tags, control panels

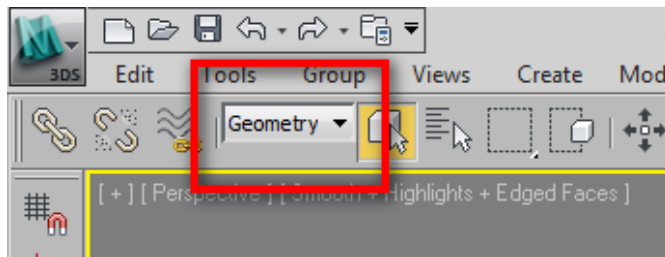
2.2.1 Supported Geometry Type - Editable Mesh

The real-time display engine in Showcase utilizes triangular based geometry. As such, it is necessary to convert your geometry into editable meshes before you export via FBX.

While it might seem easy to just select all of your geometry and convert to an editable mesh, but this process can be rife with problems and therefore you should plan out the process a bit more thoroughly. First, I would recommend that once your scene is ready for export, you should save a copy and call it Myscene_forNewport.max. This will be in essence your scratch scene, a scene that can be hacked up and converted all the day long without any consequences. This way you can maintain any parametric attributes to your geometry as well as any materials that need to be converted.

Now, identify any splines in your scene that you might not want to convert. You could use the Scene Explorer in 3ds Max to select only geometry, or you can use the selection filter on the main toolbar

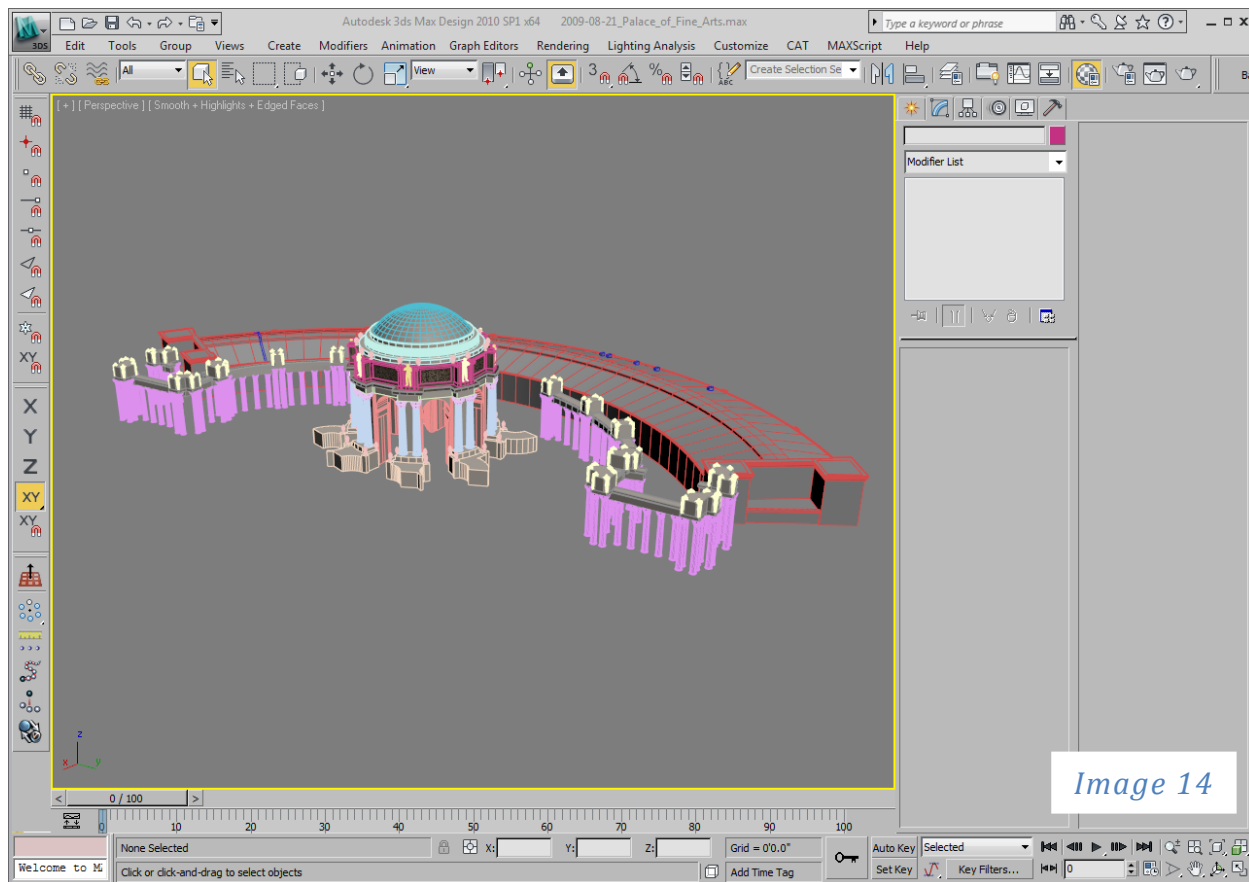
(Image 17)



2.3 Groups and objects

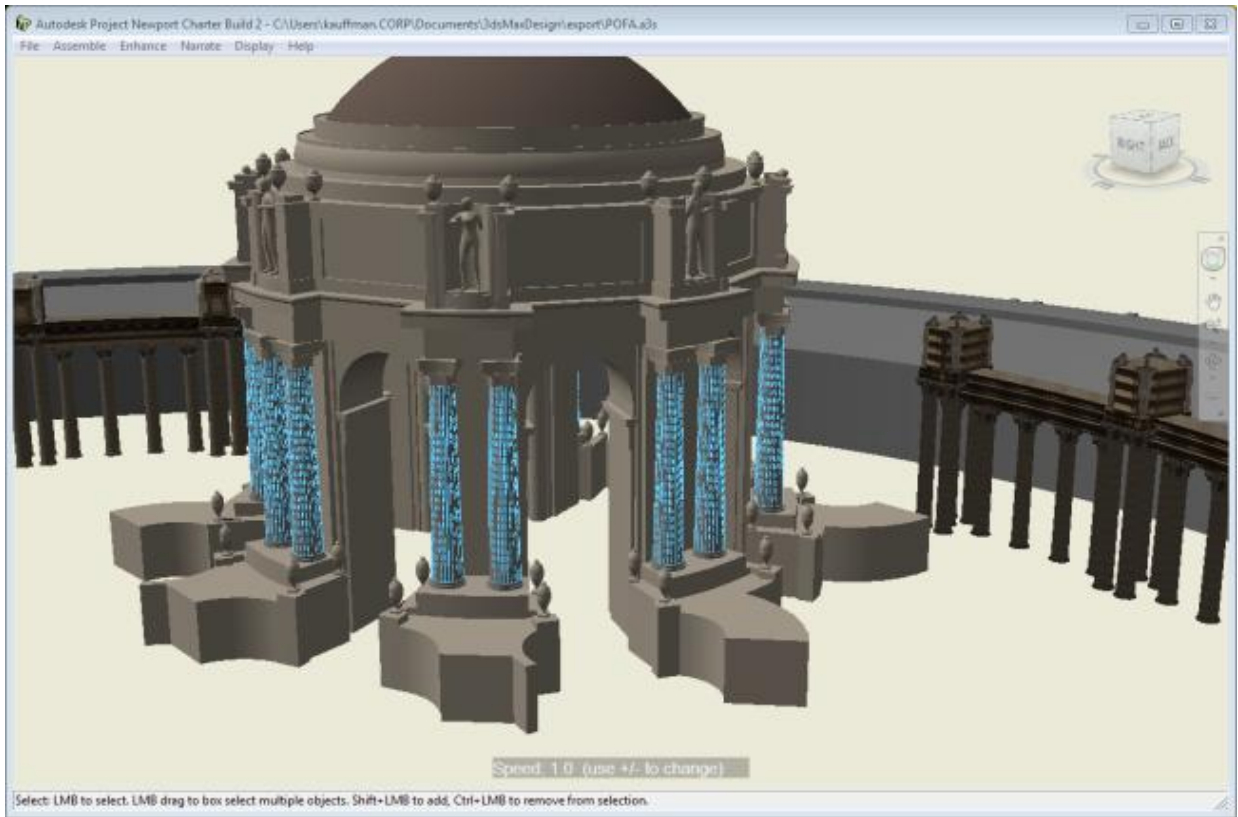
Showcase like 3ds Max is much more efficient with large amounts of geometry than it is will lots of separate objects. So, for example if you have a scene that totals 1 million polygons, but only contains 20 objects, it will behave much more efficiently than a 1 million polygon scene with 2000 objects. The best way to streamline your scene is to attach object together that do not need to be independent.

In this example, we have a model of the Palace of Fine Arts in San Francisco and most of the geometry is each its own separate piece. (*Image 14*). Once you attach all the objects together in 3ds Max a new material will be created, specifically a Multi Sub Object material (MSO). While Showcase cannot support an MSO material, it will break each MSO material into a single object.



So, in this example, all of the Dome Columns will become one object with one material when opened in Newport (*Image 15*).

Optimizing Your Autodesk® 3ds Max® Design Models for Autodesk® Showcase®



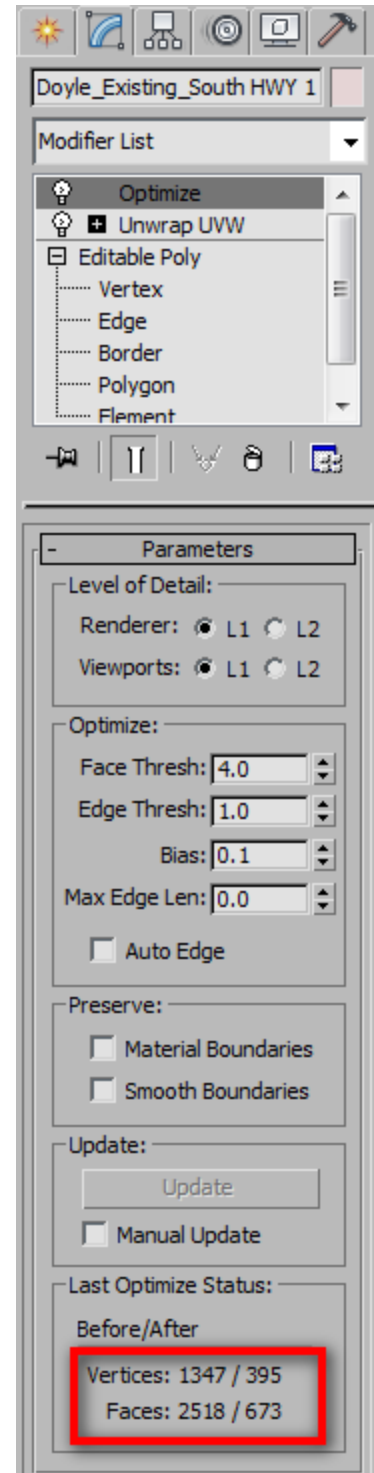
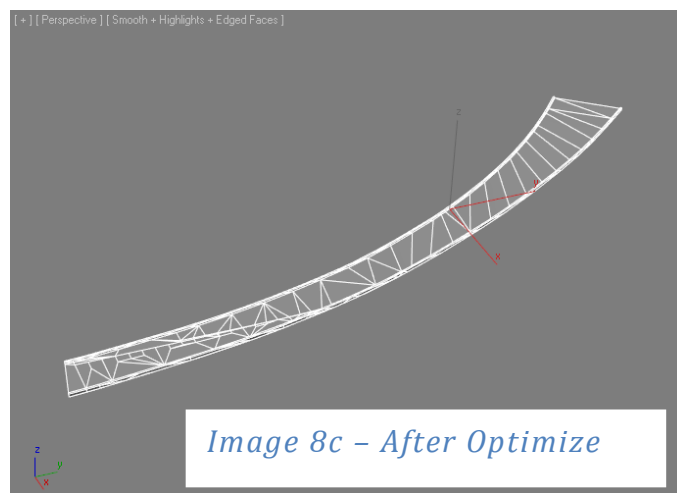
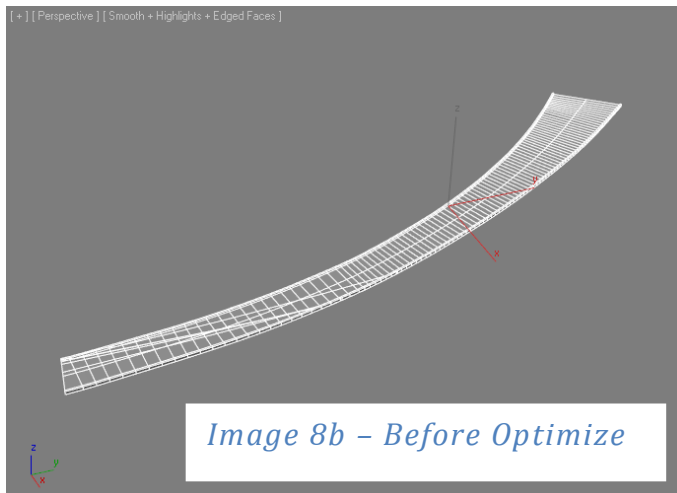
2.4 Reducing Poly counts

2.4.1 Optimize Modifier

Have a look at the scene statistics and use the xView to find out polygon issues. Please consult the Annexe for more information about these tools

This next tool has been in the 3ds Max stable for a very long time and while it is an oldie, it certainly is a goodie; the Optimize Modifier. Like any modifier, it allows you to assign a state to your geometry that is parametric and can easily be turned off or even removed without affecting the original geometry. In this case, Optimize can reduce the number of polygons in your geometry.

In the following example, you can see that I have applied Optimize to the Roadway section (*Image 8a,b,c*) and you can see the difference in both appearance and polygon reduction. In this case, the roadway section went from 2518 triangles (polygons) to 673.



It's important to know that while Optimize is a very nice tool, it does have its caveats. One is mapping coordinates. As you can see from the next example, Optimize does a fairly good job of jumbling the mapping coordinates on this particular object (Image 9a & b). A solution is to check both the Preserve Material/Smooth Boundaries option (Image 9c) but this will also affect the amount of polygonal reduction. In this example, instead of the reduction to 673 faces, we only get a reduction to 1966. That is still a 22% reduction in polygons.

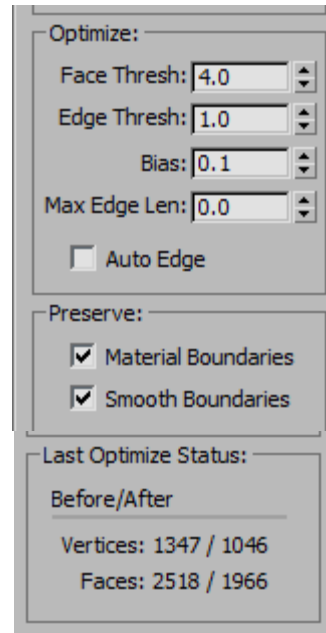


Image 9c – Reduction

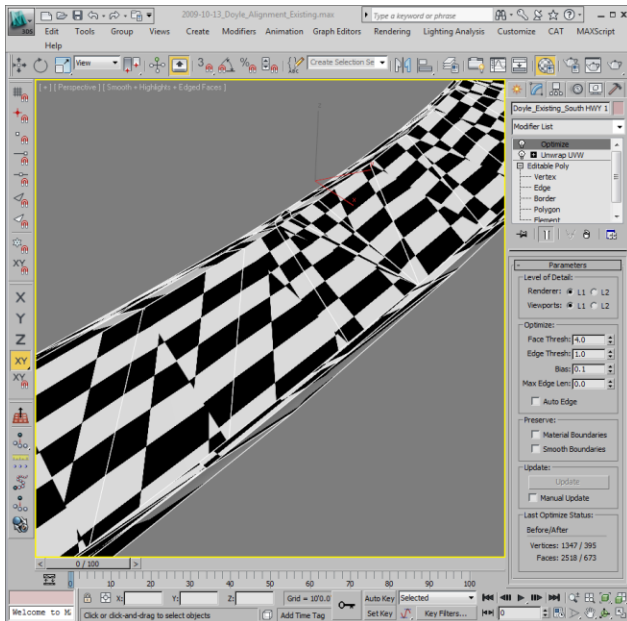


Image 9a – Preserve Off

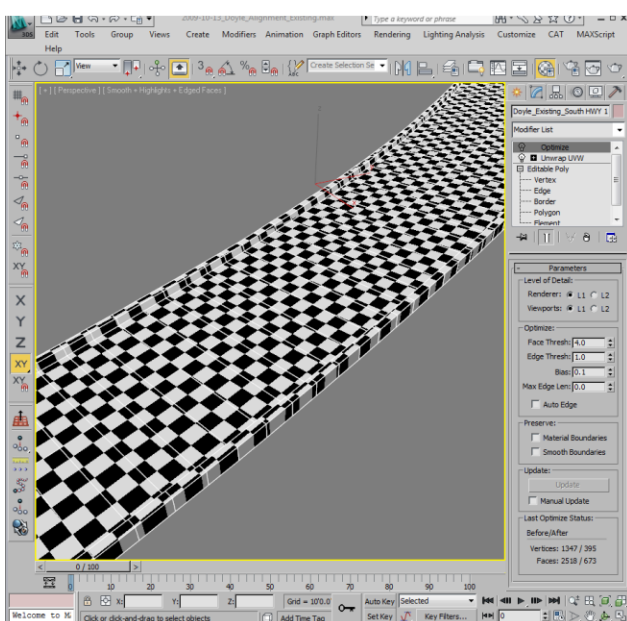


Image 9b – Preserve On

Another point to consider with Optimize is how it might change the aspect of the polygons it is reducing. What I am referring to here is this, how does the reduced geometry look in comparison to the original. This comes down to a judgment call on your behalf, but here are a few items to consider. First, is the geometry in question major or minor to your presentation? Will it be viewed close up or will it always be a fair distance from the viewer's perspective? Does it need to be animated?

Optimize is not always the best solution. Frequently, it does not always preserve the materials very well and can in some cases increase the number of polygons on an object. That is why we have other options.

2.4.2 ProOptimizer

ProOptimizer was released in 3ds Max 2009 and is a much needed improvement over both the Optimize modifier and the old Multires modifier (for this document, I have decided to not include Multires since ProOptimize was ultimately designed to replace it). Compared to plain old Optimize, ProOptimizer is significantly more robust and solves many of the shortcomings of Optimize, specifically the mapping coordinate issue. In this example, you can see that ProOptimizer significantly reduced the number of polygons, but was also able to maintain the mapping on the roadway object (*Image 10*).

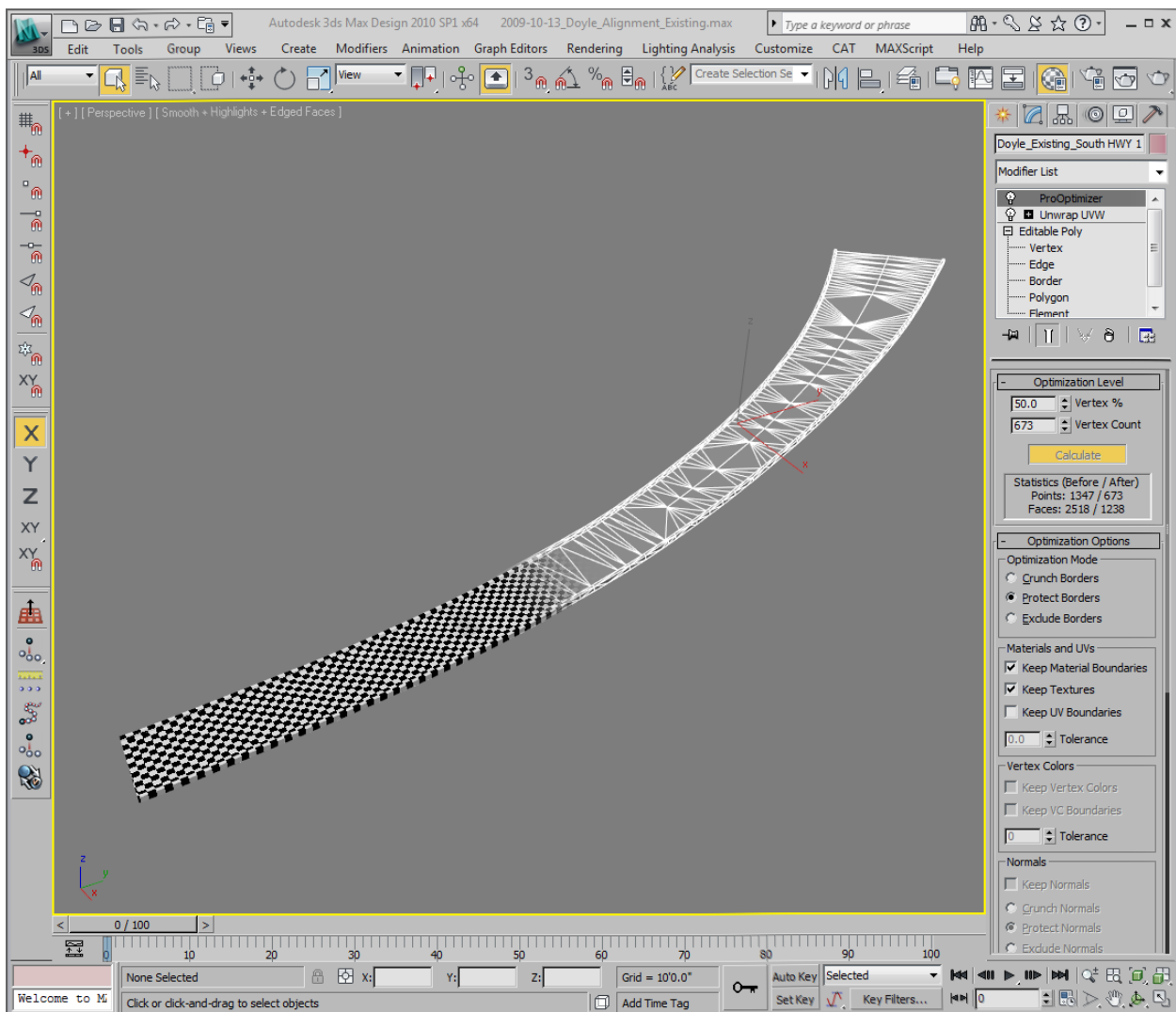


Image 10

So, how do you choose which one? As a rule, I will use ProOptimizer when I need to reduce polygons, maintain the mapping coordinates and I am not concerned with triangulation. Optimize on the other hand is really good for cleaning up excess edges in the interest of keeping your polygons clean for paint work with the UVW Unwrapping modifier. In this example, you can see a context building that was created in 3ds Max using the tools available (*Images 11a&b*). Unfortunately, in order to create windows and doors, the modeler ended up creating an excess of extra edges. Using the EAuto edge function in Optimize was able to clean up the edges while maintaining the mapping (note that the Preserve Options are on for materials and smoothing).

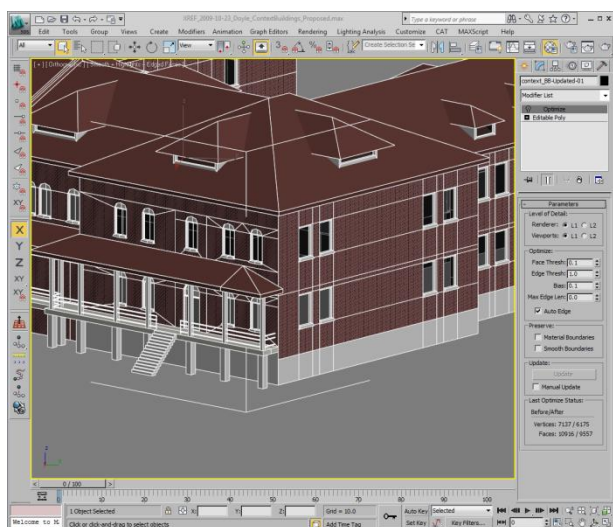


Image 11a

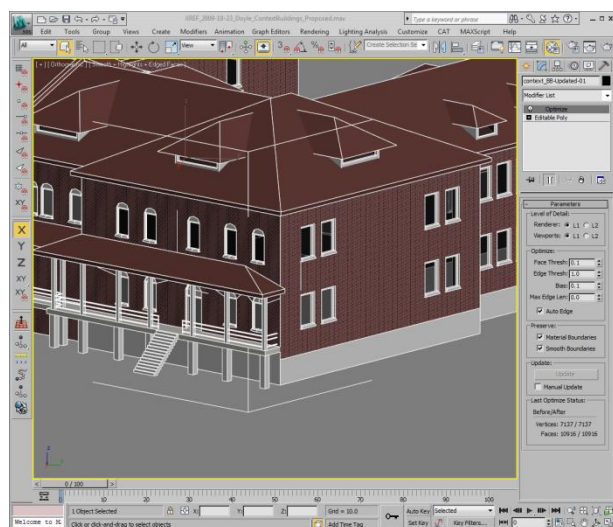


Image 11b

ProOptimizer is not as efficient on flat angular surfaces such as walls on a building. It was designed to handle more organic surfaces such as topography, characters, trees, etc. In the example, you can see that while geometry is a bit cluttered the number of polygons was

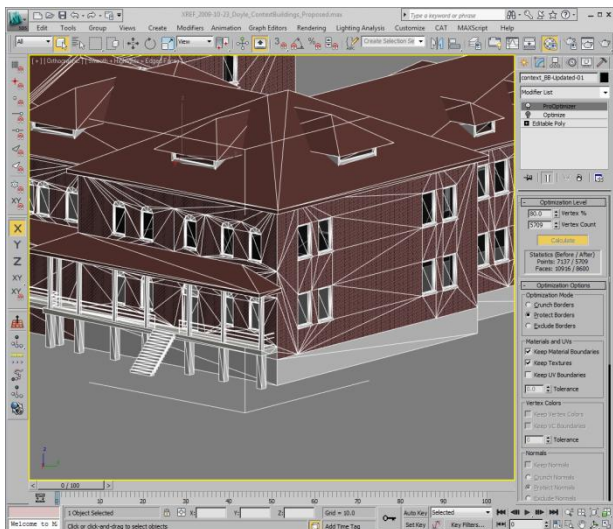


Image 12

decreased by 20% (*Image 12*). This was the maximum that I could maintain without seriously compromising the geometric integrity. Again, not ideal for work in 3ds Max, i.e. UVW Unwrap, but it is ideal for decimating polygons for Showcase.

In the case of topography as mentioned earlier, ProOptimizer is a champ, reducing the number of polygons while maintaining the mapping and the aesthetic fidelity. In this example, a section of topography in this scene was reduced from 679963 polygons down to 67408, a difference of 90 percent while maintaining good quality (*Image 13a&b*).

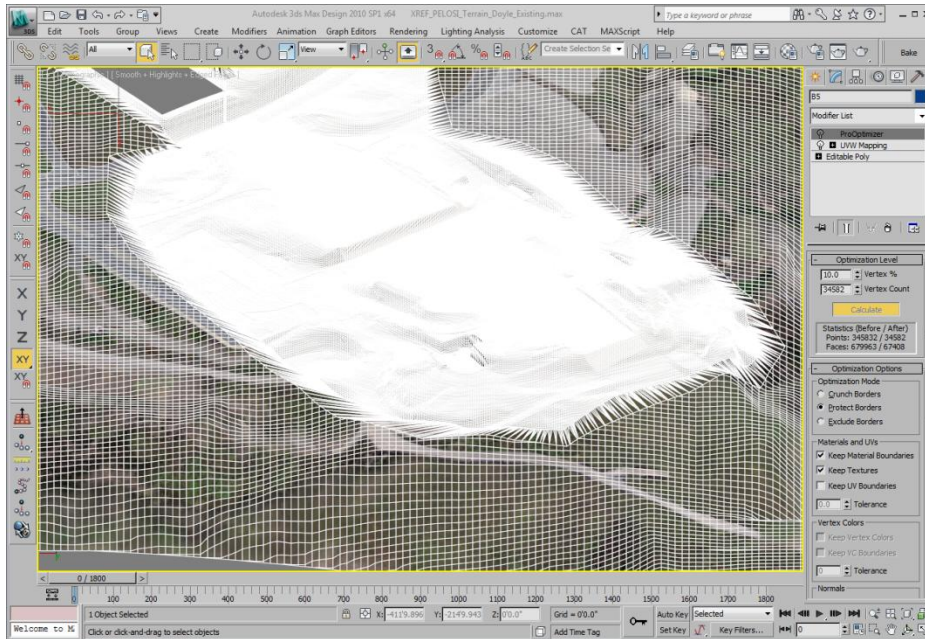


Image 13a – 100% 679,000+ Polygons

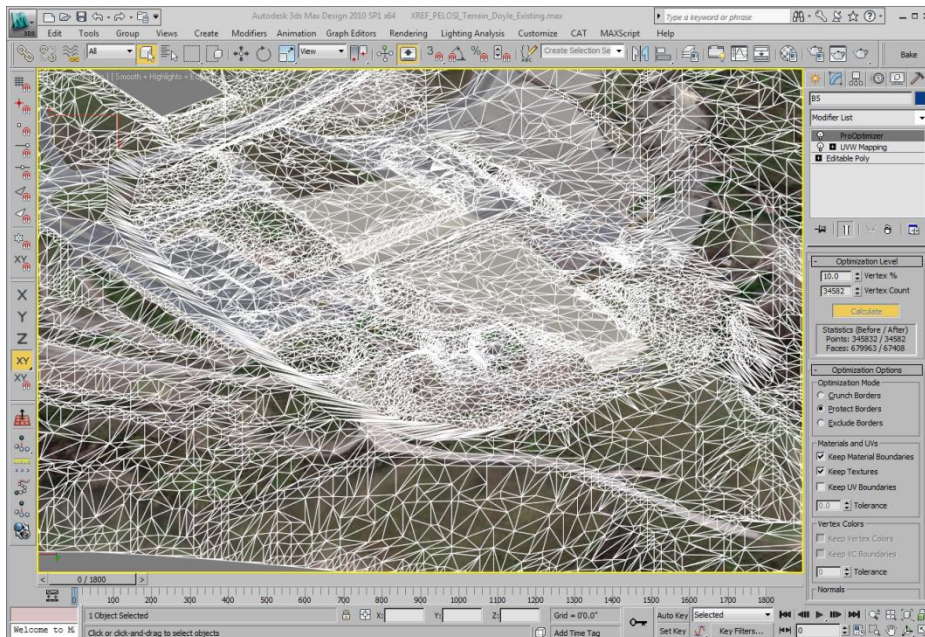


Image 13b – 10 percent 67,000+ Polygons

2.5 Geometry based interop chart

		3DS MAX	.FBX	SHOWCASE
OBJECTS	Geometry	Editable Mesh	√	√
		Editable Poly	√	C
		Patch	C	C
		NURBS	C	X
		Primitive	C	C
		Instances	√	C
		References	C	C
	Helpers	Standard (Dummy Objects)	X	X
		Containers	X	X
		Atmospheric Apparatuses	X	X
Manipulators		X	X	
Reactor Objects		X	X	
MODIFIERS	Morpher	Editable Mesh	√	X
		Editable Poly	√	X
		NURBS	√	X
		Patch	X	X
	Physique	All Geometry Types	X	X
	(.PC2) Point Cache 2 (OSM/WSM)	Editable Mesh	√	X
		Editable Poly	√	X
		NURBS	X	X
		Patch Object	X	X
		Primitive	√	X
	(.MC) Autodesk Cache (OSM/WSM)	Editable Mesh	√	X
		Editable Poly	√	X
		NURBS	X	X
		Patch Object	X	X
		Primitive	√	X

	Skin	Editable Mesh	√	x
		Editable Poly	√	x
		NURBS	x	x
		Patch Object	x	x
		Primitive	√	x
	Turbosmooth	All Geometry Types	√	x
	Meshsmooth	All Geometry Types	C	C

3 Material Optimization

Babylon Assets use Autodesk Common Materials for consistent hardware and software rendering with supported Autodesk software. Materials in Babylon are restricted to what is available in the Autodesk Material Library.

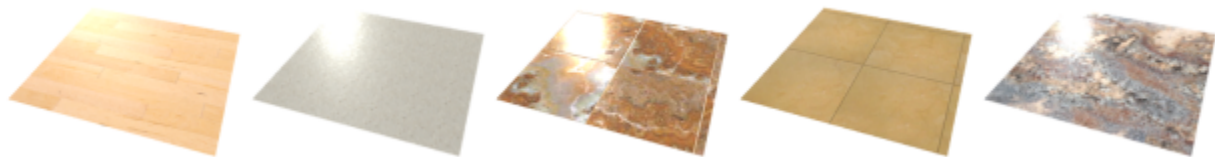


Fig. 4 - Example of surfaces: Hardwood floor, synthetic countertop, marble tiles, ceramic tiles, natural stone.

The 2012 releases will install a common Autodesk Materials Library, a shared resource for all Autodesk software that includes the following material categories.

- Metal
- Wood
- Plastic
- Masonry
- Concrete
- Ceramic
- Stone
- Glazing
- Glass Solid
- Mirror
- Wall Paint
- Metallic Paint
- Liquid
- Terrain
- Textile
- Color
- Non-photorealistic
- Light Emitting

Autodesk Common Materials properties are represented in the material domain. For example, paint has parameters for eggshell, emulsion and gloss. The user is not required to know anything about the complexities of rendering.

3.1 Autodesk Generic Material and Compound Material

The Autodesk Generic Material is the building block upon which Autodesk Common Materials are based. By using the Autodesk Generic Material, content vendors gain the flexibility of defining materials that meet their specific needs, with all the interoperability benefits implied by Autodesk Common Materials.

The Autodesk Compound Material allows any Autodesk Common Material to be blended with another.

Autodesk Generic Material includes the following capabilities:

- Color
- Glossiness
- Direct Reflectivity
- Oblique Reflectivity
- Transparency
- Translucency
- Index of Refraction
- Cutouts
- Luminance
- Color Temperature
- Filter Color
- Bump Pattern
- Bump Amount

3.2 General Guidelines

Surfaces can be submitted as scenes or as material libraries. In both cases, surfaces materials are identified by the IDs in their names.

The ability to submit surfaces as scenes allow you to submit the same scene used to create and test the materials.

You can create a scene file with one or more objects with the surface materials applied to them. The objects themselves won't be used by Showcase, only their materials.

The surface materials can be assigned to meshes as simple as a plane, or as complex as a full table with chairs, giving you the ability to see and tweak the material in a realistic context.

As for any materials used in Babylon, surfaces materials need to be optimized for quality and rendering times.

3.3 Using Real-World UV coordinates

To guarantee a perfect scaling of the textures used in product materials or surface materials, you have to use **Real-World Scale** and set the texture size in current units. This way, 3ds Max will automatically tile the textures and guarantee, for example, that a 12x12 inches tile will be 12x12 inches no matter what surface it's applied to.

You can also find more information in the following 3ds Max Help topics:

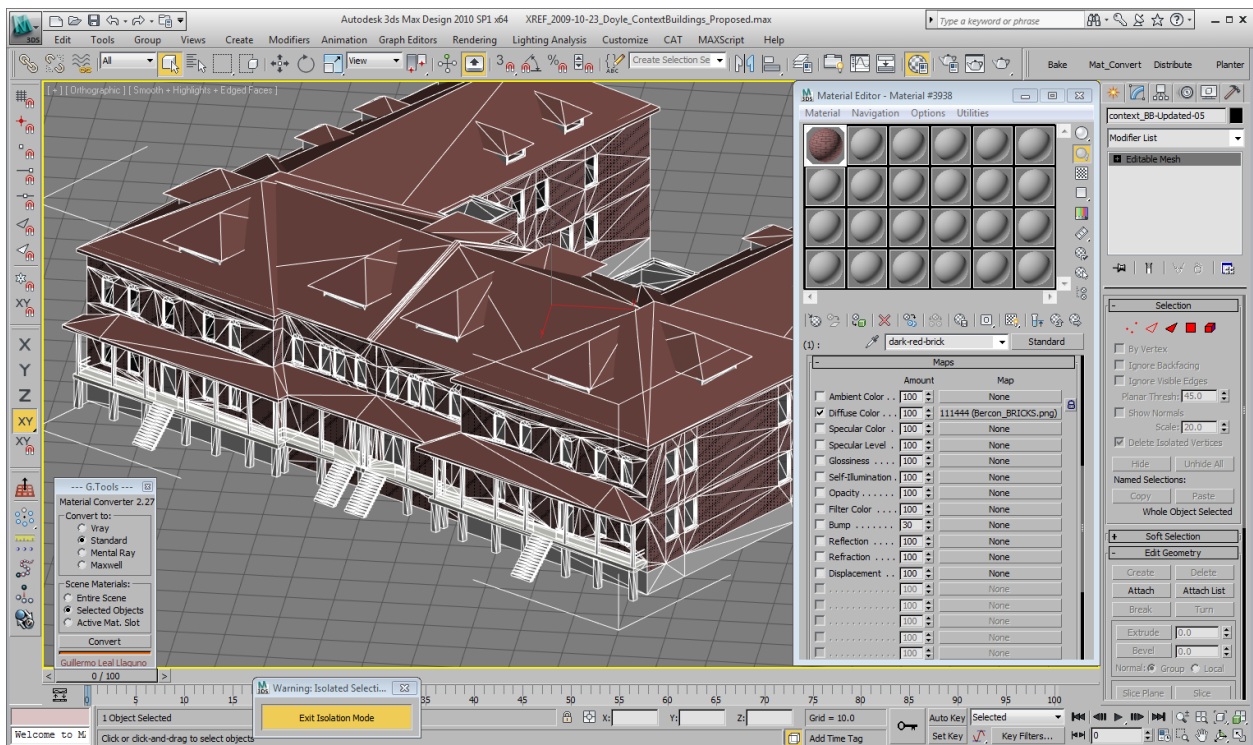
- Real-World Mapping
- UVW Map Modifier (Real-World mapping section)

- Coordinates Rollout 2D (Use Real-World Scale parameter)
- Material Editor Options (Auto-Select Texture Map Size and Use Real-World Map Size For Geometry Samples options)
- General Preferences (Texture Coordinates group)

3.4 Material Conversion

If you have a model that has Standard Materials you will have to do a little more work than if it had been made with Autodesk Consistent Materials. Luckily, the stock-red material in Showcase is very similar to the Standard Material in 3ds Max and thus most of the channels are interchangeable.

For many of you, Standard Materials are not on the menu when using 3ds Max. Mental Ray is the new de-facto standard in 3ds Max, while many others such as the group I work with utilize the V-Ray render engine, or Brazil or FinalRender. Converting an entire scene from V-Ray materials to Standard Materials can take an age which is why we have scripts. In this next example, I will use a material converter script by Guillermo Leal Laguno (<http://www.evisual.com/maxscript.htm>) to convert all the V-Ray materials into Standard Materials. Another good conversion script is VrayMaterialConverter which you can find here (<http://www.scriptspot.com/3ds-max/vraymtlconverter-v2-5>).



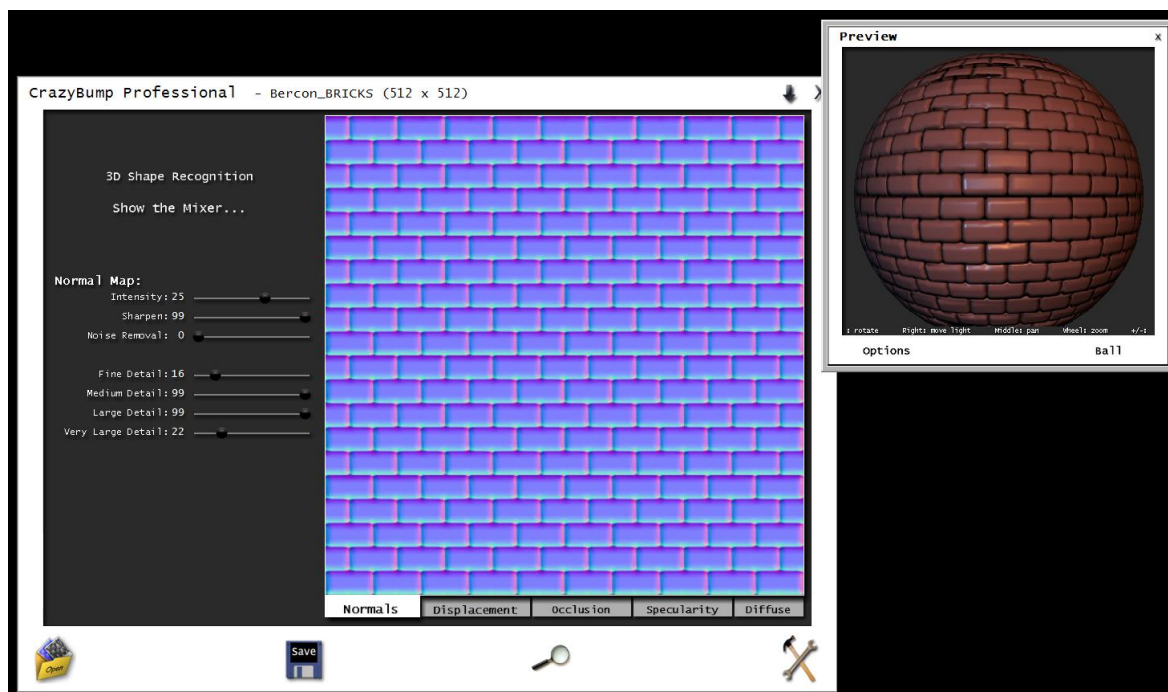
Within about 5 seconds, this simple scene was converted to all Standard Materials. The current conversion matrix for Standard Materials to Showcase Materials is as follows:

3ds Max	Showcase
<i>Diffuse Texture</i>	Color
<i>Specular Color</i>	Highlight
<i>Opacity</i>	Opacity
<i>Bump</i>	Bump

3.5 Texture maps

3.5.1 BUMP

Here is a segment on Bump maps and how they transfer between 3ds Max and Showcase. While the map will transfer from one to the other, Showcase uses normal maps for bumpiness and does not display correctly if a grayscale image is used. Therefore, you will need to get a hold of a program such as Crazy Bump (<http://www.crazybump.com>) to convert your grayscale bump files into normal maps. Crazy Bump is a great little application and is well worth the \$299 for the Professional version (\$99 for the personal). It creates the cleanest and best looking normal maps that I have ever seen from just about anything you can throw at it. In fact, I highly recommend converting your standard production workflow to include normal maps in 3ds Max. The bump from a normal map is so much better than a standard 2D grayscale bump, especially when rendering using GI.



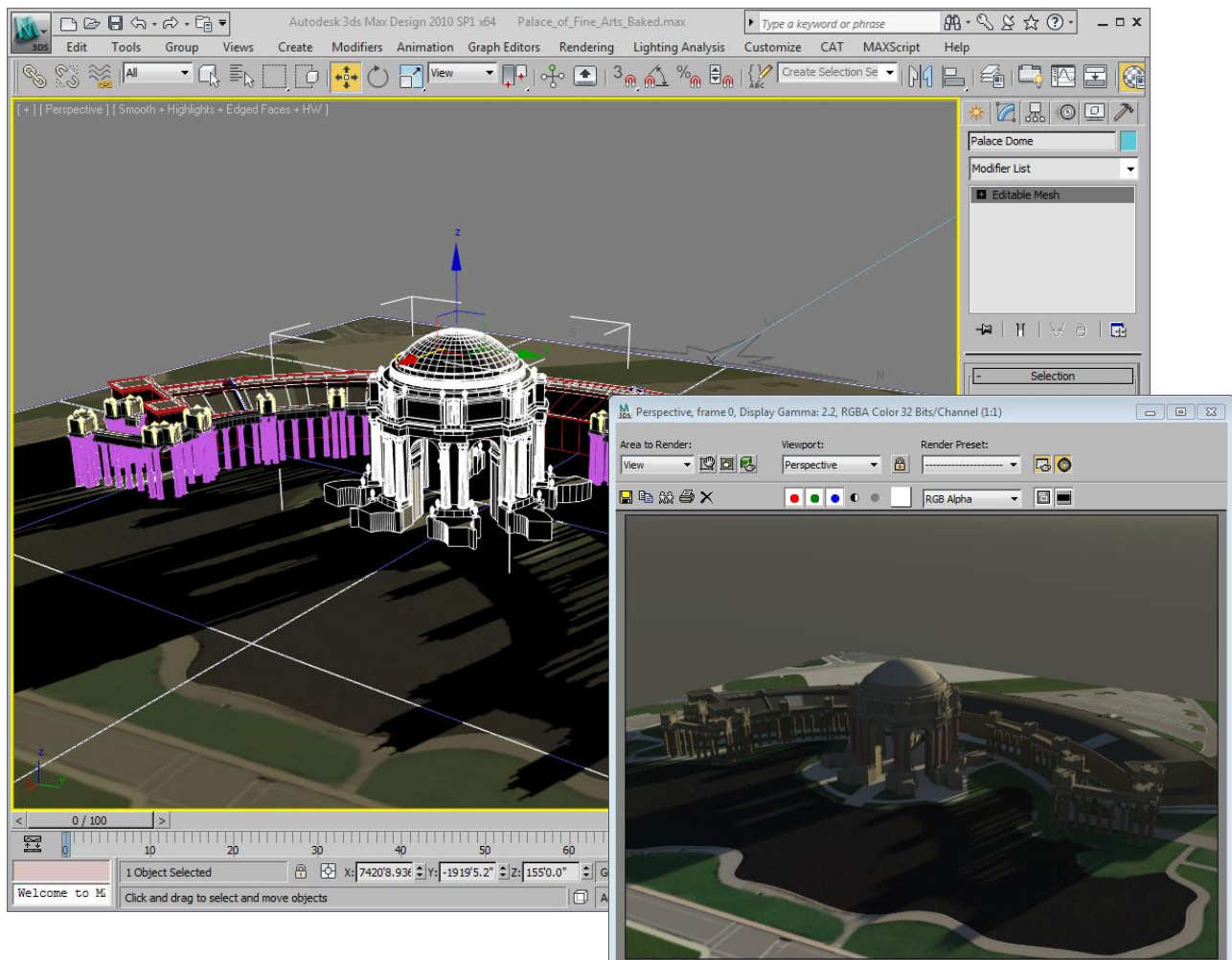
3.5.2 Texture Baking

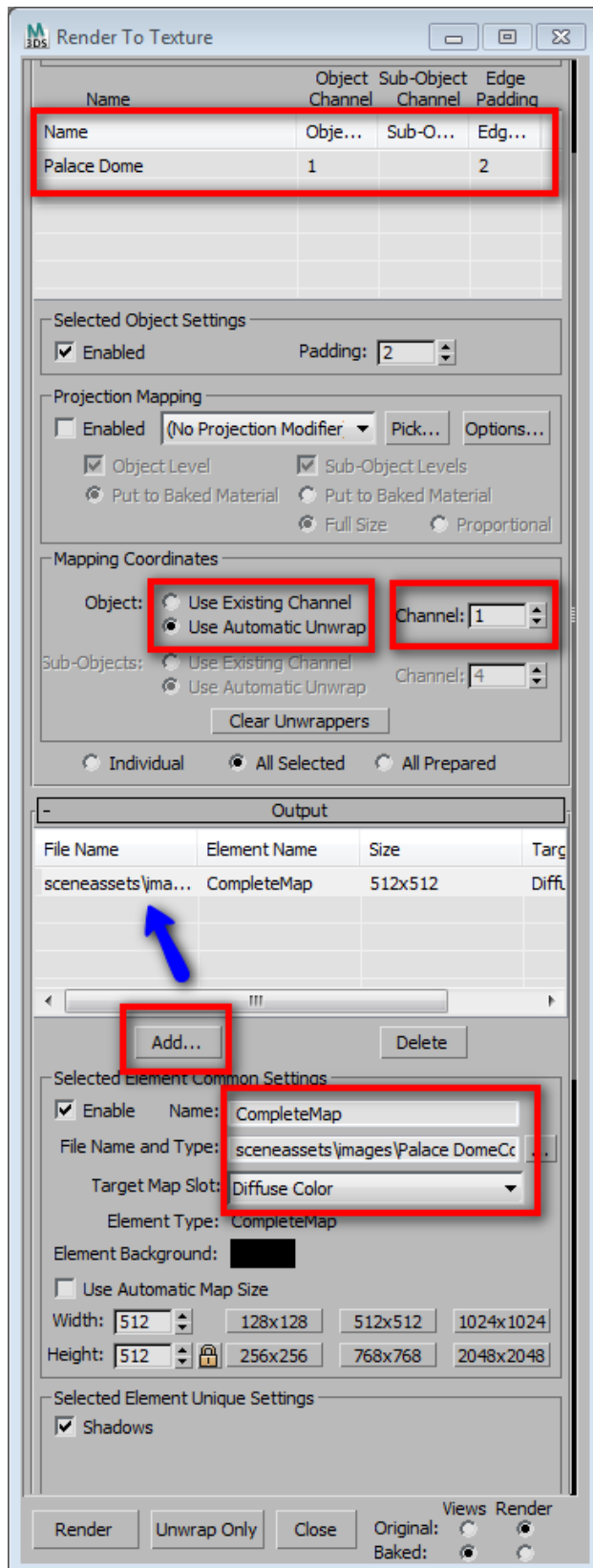
Showcase has a great tool for “baking” ambient lighting into geometry to create realistic real-time lighting for your scenes. While this is a great tool, it can lack some of the additional photorealism that you require or the dramatic effect of sunset, sunrise or nighttime lighting indicative of a software based GI render. It is also process intensive for Showcase to have real-time lighting and shadows in your scene resulting in decrease frame rates or responsiveness depending on the quality and extent of your lighting. To address these issues we can utilize the texture baking capabilities of 3ds Max.

Texture baking is a process by which we take the lighting solution generated in 3ds Max using your GI (or other) engine and baking it into a texture map which is then assigned to each object. It is somewhat of a black art and there are many methods to use to get the most efficient and sexiest bake, but I will cover the basics here.

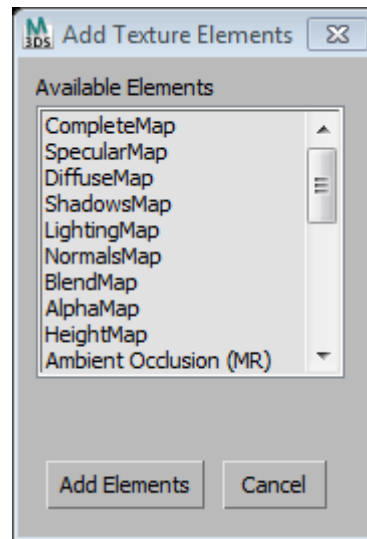
3.5.2.1 Example: Palace of Fine Arts Dome

In this example, I will take the Palace of Fine Arts Dome section (highlighted in white edges on the screen) and bake sunset lighting onto it.





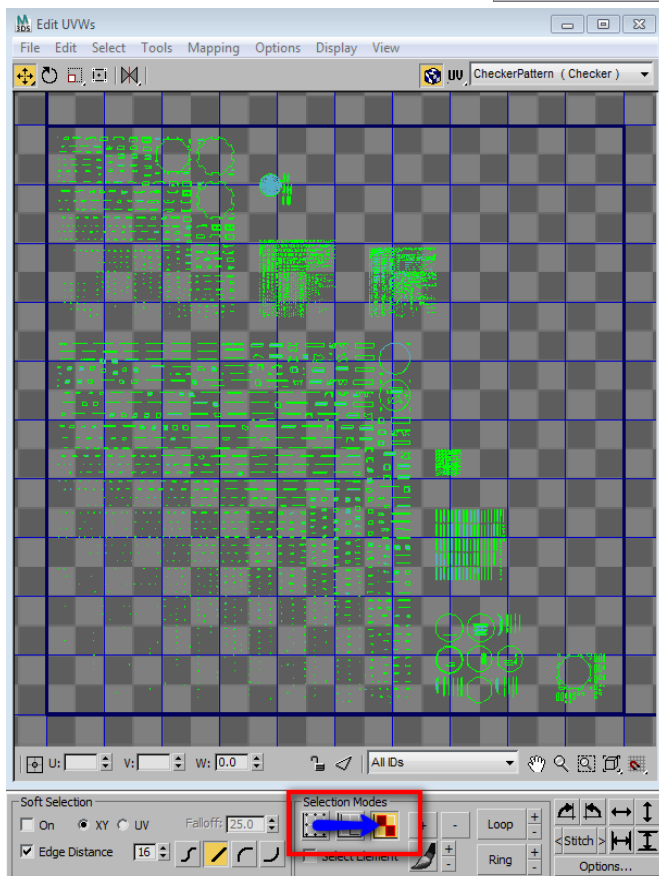
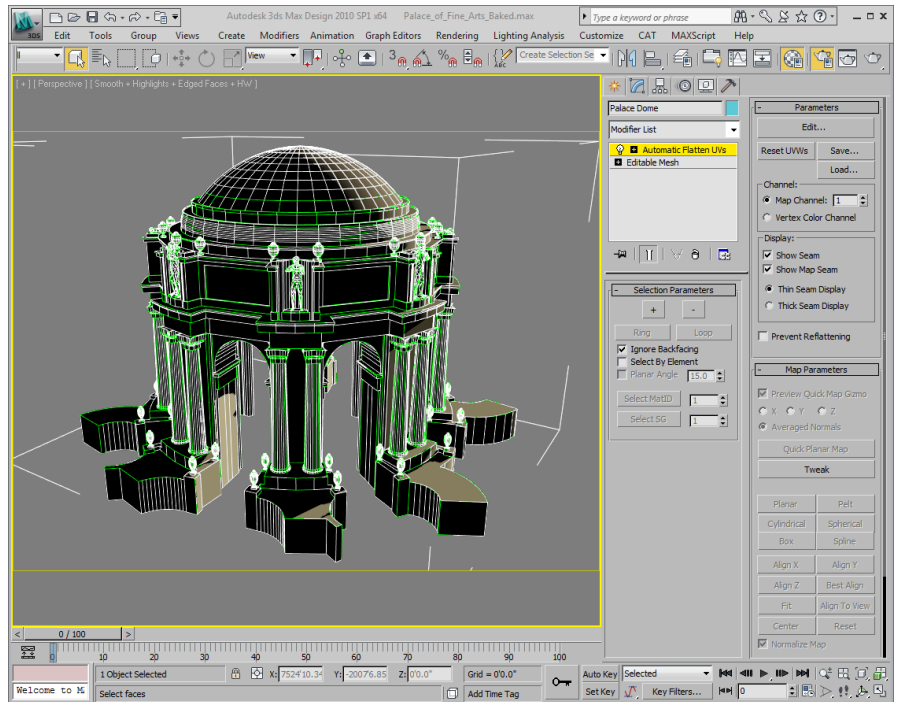
First, we will need to bring up the Render to Texture dialog window (hit the “0” key). Make sure that the object you plan to work with is selected; you will see it listed at the top of the dialog. Next, we need to set the mapping coordinates from existing to Automatic Unwrap on channel 1. If we used the existing map channel, the bake would not work properly since this is a Multi Sub-Object material so we will get 3ds Max to create new mapping using an Unwrap UVW modifier. Now, we need to add an output map type by clicking on the Add button. Select Complete Map from the list and click Add Elements.



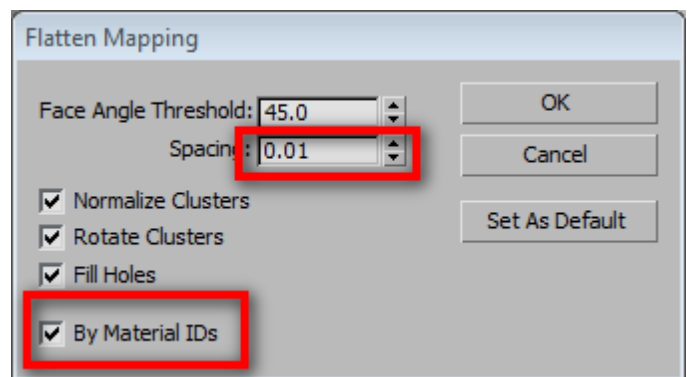
Next, we need to set the Target Map slot to Diffuse Color and point the resulting texture map to an appropriate location on your drive. You can also set the resolution of the map to one of the presets listed. You can go higher (or smaller), but make sure that you maintain your binary multiples, i.e. 4096x4096, 64x64, etc. The remaining options should be fine for now though we will need to make a few more adjustments to the Unwrap mapping channel to ensure maximum quality. Click the Unwrap Only button to proceed.

3.6 UVS/Unwrapping

Let's look at the resulting Unwrap. Open the Modifier tab and you will see the Automatic Flatten UVs modifier has been applied to the Dome mesh. From here, click on the Edit button so that we can see the results of the unwrap process. As you can see below, the unwrap was successful, however, there is too much open space between the polygons resulting in a ton of unused space and a lower resolution map in the long run. Don't worry though, we have a few options that will allow us to fix this. Click on the Face Sub-Object mode button highlighted in the image and select all the flattened polygons.



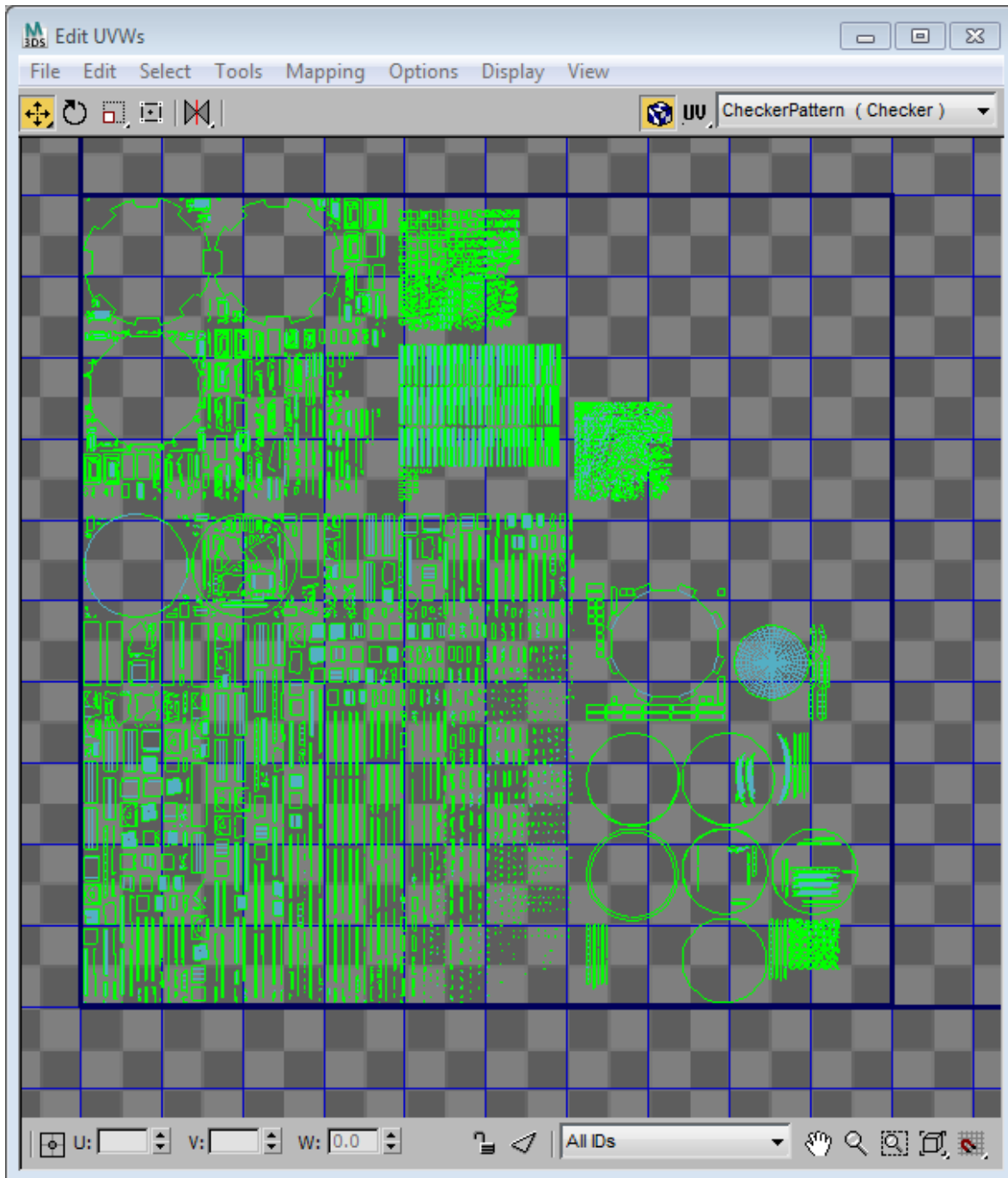
Click the Mapping Menu and select the Flatten Mapping item; up will appear this



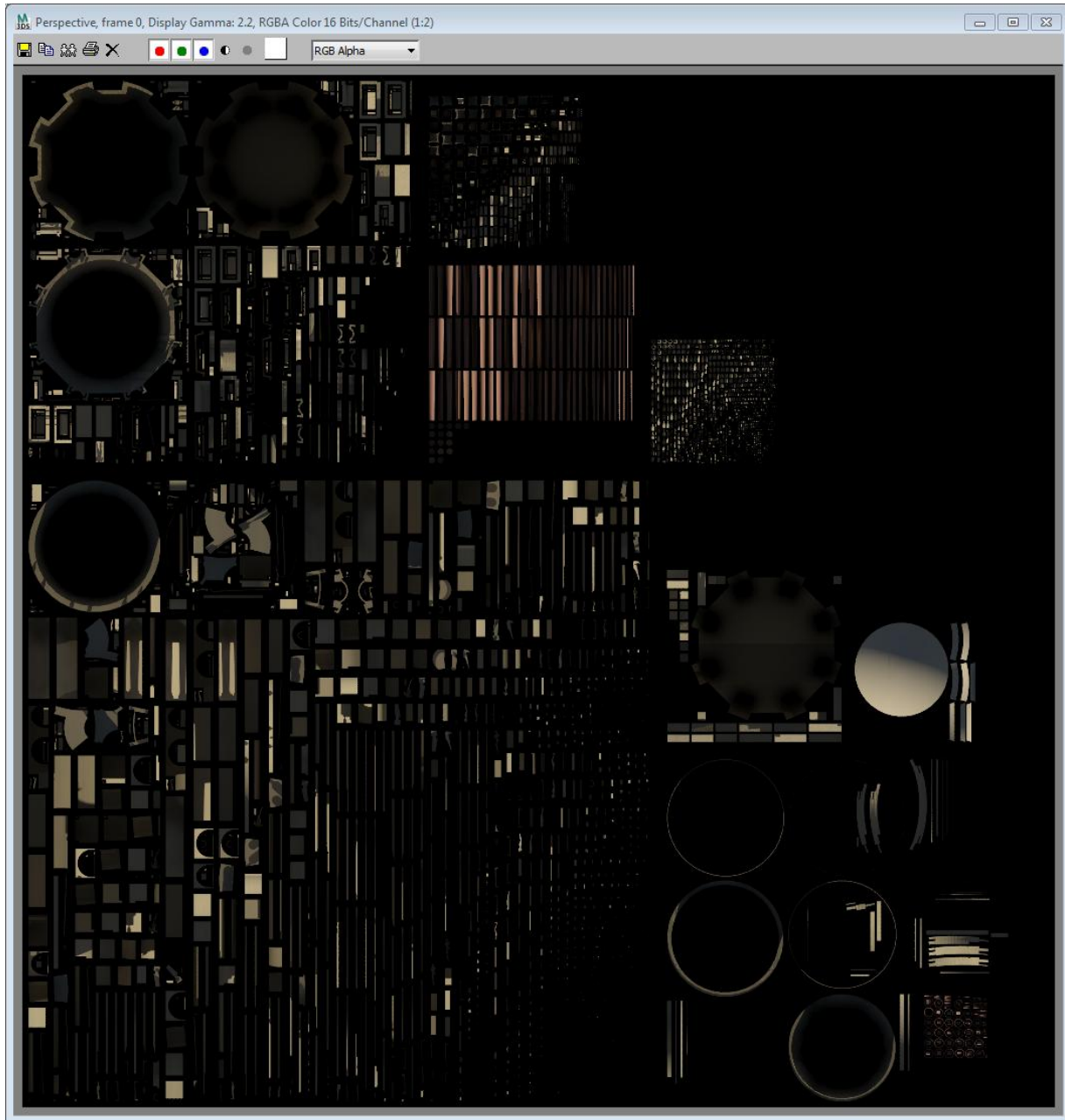
dialog window.

Enter in .01 for the spacing and check the "By Material IDs" button. This will both close the gap space between the polygons to ensure maximum render exposure and flatten the polygons relative to Material ID.

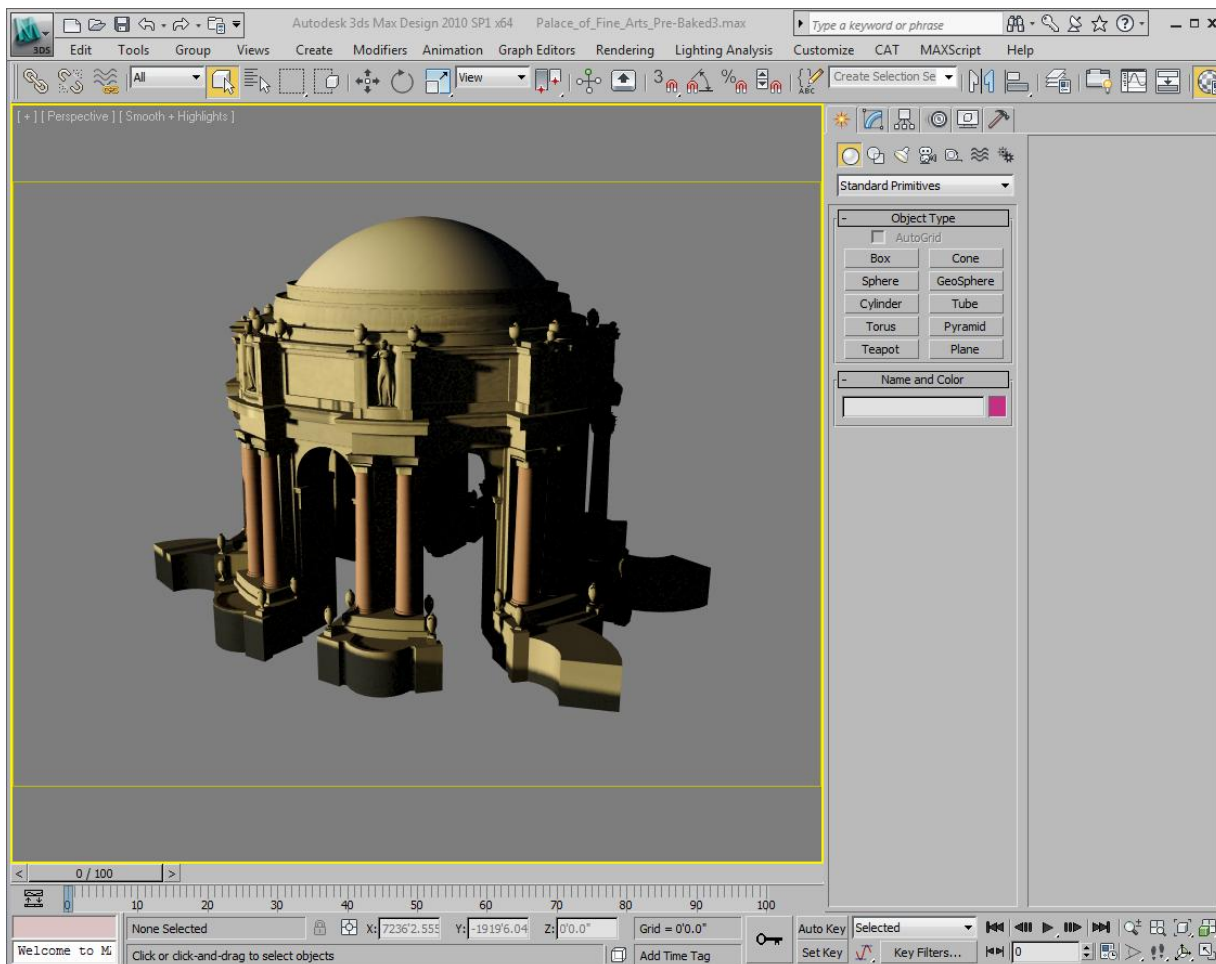
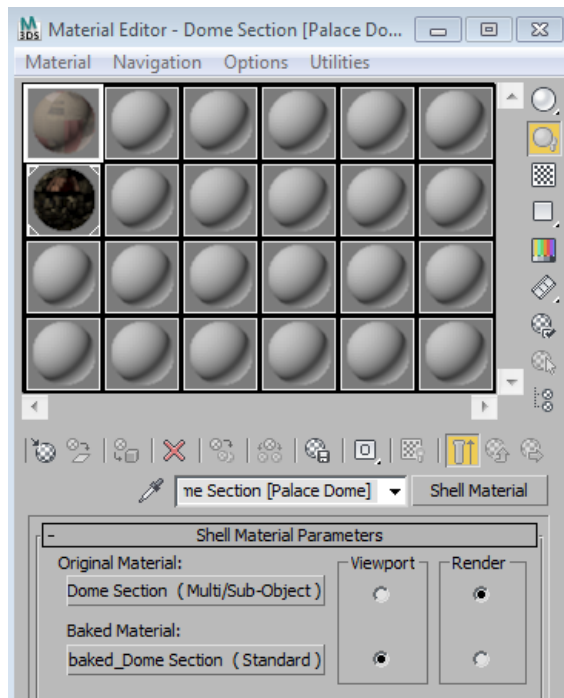
The new unwrap map looks much better and will maximize the quality of the baked map.



It's now time to render the lighting to a map. Click on the render button at the bottom of the Render to Texture Window. The resulting render will look like this.



The material that is generated is a Shell material, which in affect contains both the original MSO and a new material based on the rendered bake. One is designed exclusively for rendering whereas the other is for viewport display. We will need to create a new Standard Material with the rendered image in the diffuse channel and assign it to the unwrapped geometry. This will then be exported to Showcase via FBX.



3.7 Material based interop Chart

		3DS MAX	.FBX	SHOWCASE
MODIFIERS	UVW Mapping	Editable Mesh	√	√
		Editable Poly	√	√
		NURBS	x	x
		Patch Object	√	√
		Primitive	√	√
	Unwrap UVW	Editable Mesh/Patch/Poly/Prim	√	√
MATERIALS	Types	Standard Materials: Standard	√	C
		Standard Materials: Composite	√	x
		Standard Materials: DirectX (HLSL)	√	x
		Standard materials: Multi/Sub	C	C
		mental ray Materials: All	√	x
		Autodesk Material Library: All	√	x
	Basic / Extended Parameters	Anisotropic Shader	C	C
		Blinn Shader	C	C
		Metal Shader	C	x
		Multi-Layer Shader	C	C
		Oren-Nayer Blinn Shader	C	C
		Phong Shader	√	C
		Strauss Shader	C	C
	Translucent Shader	C	C	
	Map Channels (Map Coordinates)	Values	C	x
		Ambient Color	√	x
		Diffuse Color	√	√
		Specular Color	√	√
Specular Level		√	x	
Glossiness		√	x	

	Self-Illumination	√	x
	Opacity	√	C
	Filter Color	x	x
	Bump / Normal Bump	√	√
	Reflection	√	x
	Refraction	x	x
	Displacement	x	x

4 Cameras

4.1 What cameras are supported?

		3DS MAX	.FBX	SHOWCASE
OBJECTS	Camera Types	Target	√	C
		Free	√	C

5 Animations

5.1 What type of animation is supported?

5.2 Animation based interop Chart

		3DS MAX	.FBX	SHOWCASE
ANIMATION	Constraints	Attachment	B	B
		Link	B	B
		LookAt	B	B

Position Controllers	Orientation	B	B
	Path	B	B
	Position	B	B
	Surface	B	B
	Audio	B	B
	Bezier	B	B
	Expression	B	B
	Linear	B	B
	Motion Capture	B	B
	Noise	B	B
	Quaternion (TCB)	B	B
	Reaction	B	B
	Spring	B	B
Script	B	B	
X Y Z	√	C	
Rotation Controllers	Audio	B	B
	Euler X Y Z	√	C
	Linear	C	C
	Motion Capture	B	B
	Noise	B	B
	Quaternion (TCB)	C	C
	Reaction	B	B
	Script	B	B
	Smooth	C	C
Scale Controllers	Audio	B	B
	Bezier	√	C
	Expression	B	B
	Linear	B	B
	Motion Capture	B	B
	Noise	B	B
	Quaternion (TCB)	C	C
	Reaction	B	B
	Script	B	B
	X Y Z	C	C
Bezier Tangent Types (PRS)	Smooth	√	C
	Linear	√	C
	Step	√	C
	Slow	C	C
	Fast	C	C

		Custom (broken or flat)	√	C	
		Flat Tangent	C	C	
	IK Solvers		HD	B	B
			HI	C	C
			IK Limb	B	B
			SplineIK	B	B
	Special Key Types		Parameter Curve Out-Of-Range	C	x
Miscellaneous		Reaction Manager	B	B	

6 Exporting

6.1 FBX exporting suggestions

6.2 Other tested methods to export

7 Conclusion

8 Annexes

8.1 Scene Statistics

This is an integral tool to any optimization workflow as it gives the user details on the number of vertices, edges and polygons both in the scene and what is currently selected (*Image 1*). You can use the “7” keyboard command to bring the scene stats up, but you can also customize what is being shown on screen. To adjust the settings for scene statistics, simply click on the “+” symbol indicated on image 1 and select “Configure” to bring up the Viewport Configuration window (*Image 2*).

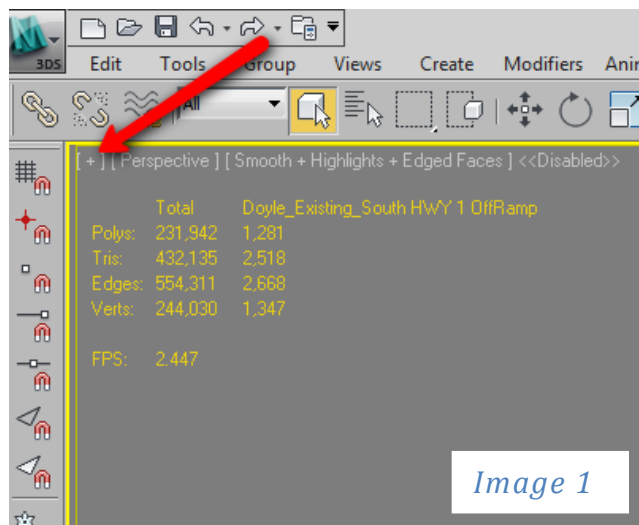


Image 1

Here you can set preferences for how the statistical information is displayed. For example, you can show the total number of polygons for the entire scene, or just the selected object or both. I will usually activate all the options as this gives me the ability to see all the stats all the time. For work with Showcase, selecting **Triangle Count**, **Frames Per Second** and **Total + Selection** should be ideal. Polygon Count is counting polygons with 3 faces or more and since Showcase works with triangle based polygons, it is best to use the Triangle Count to get an accurate indication.

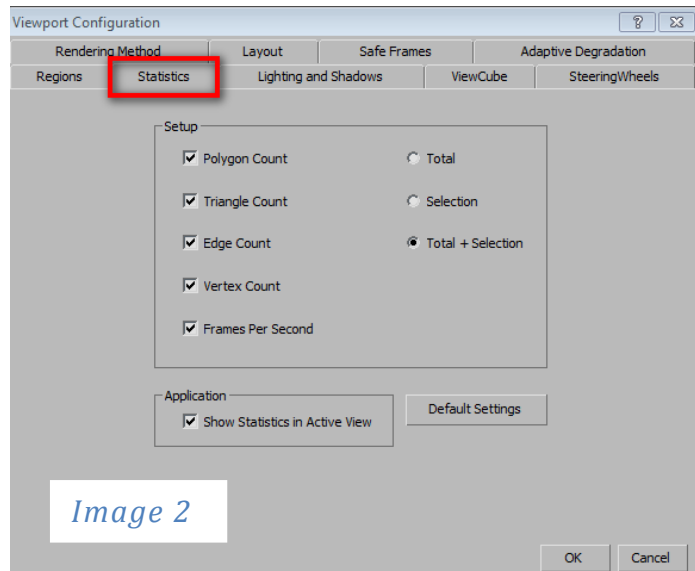


Image 2

As you can see from this example, I have just a section of the roadway selected and 3ds Max is giving me both the total number of triangles in the screen as well as the number of triangles (2518) for the selected roadway. (Image 3)

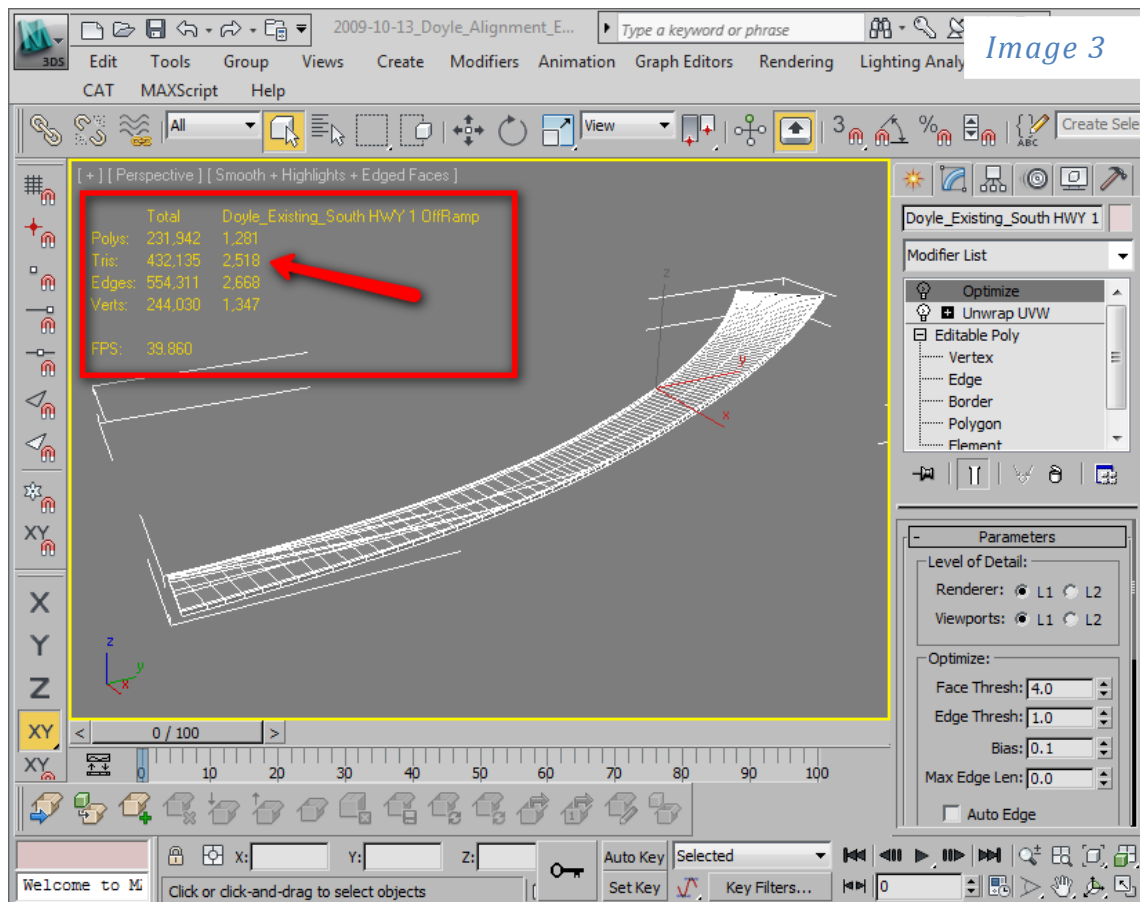
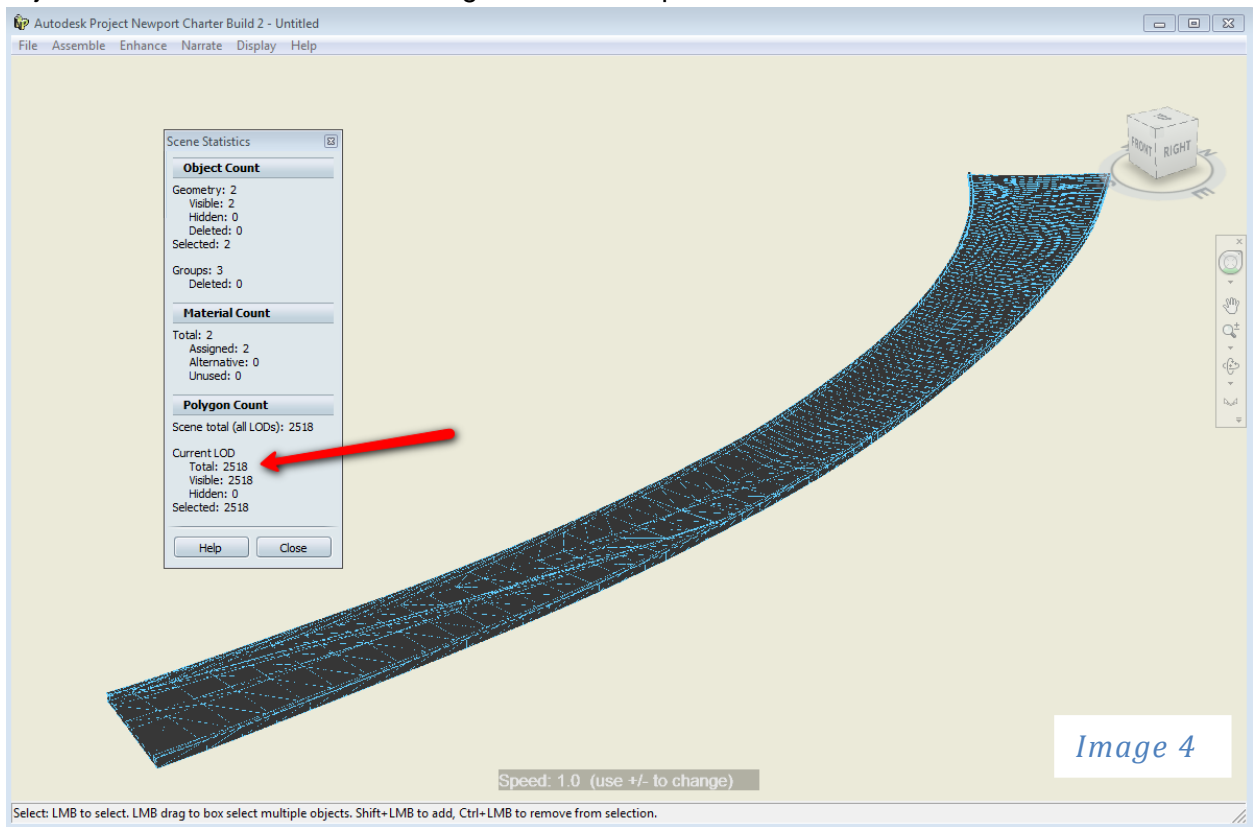


Image 3

In Showcase, you will see that the object looks a little different, but the numbers of triangles are the same between the 2 applications. (Image 4). The reason for the difference between the polygon display in 3ds Max and Showcase is that Showcase is showing all the triangles for the object whereas 3ds Max hides triangles in the viewport.



8.2 Using X-View

Now that we have a guide to help us identify polygon/triangle/vertex/edge counts, let's look at a new tool in 3ds Max that helps identify problem geometry. As quoted from the 3ds Max help file, "xView analyzes mesh models, flags various potential problems and errors, and displays the results in the viewports both graphically and as text. Tests include isolated and overlapping vertices, open edges, various UVW statistics, and more."

Finding these issues in previous versions of 3ds Max as a bit of a chore and many of the results can be flickering faces in rendering, black faced polygons and general all around mayhem. In Showcase, this can cause problems when generating ambient lighting and similar problems indicative of rendering. To access the vXiew mode, right-click on the 3 tier of the shading viewport labels (*Image 5*).

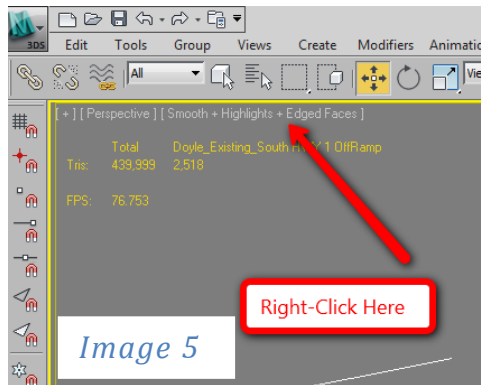


Image 5

In the proceeding window, select xView then an option such as Face Orientation. You will now see “Face Orientation” listed at the bottom of the viewport in green (default color in 3ds Max). To change the display selection, simply click on the green text and select another option. In the provided example, you will see that I selected “Overlapping Faces” and the result is a selection of green highlighted faces on the roadway geometry (*Image 6*). From here I can make selection based on the highlighted geometry and fix/change it

appropriately. In this case, I have several un-welded vertices and a few polygons that were duplicated resulting in overlapping faces.

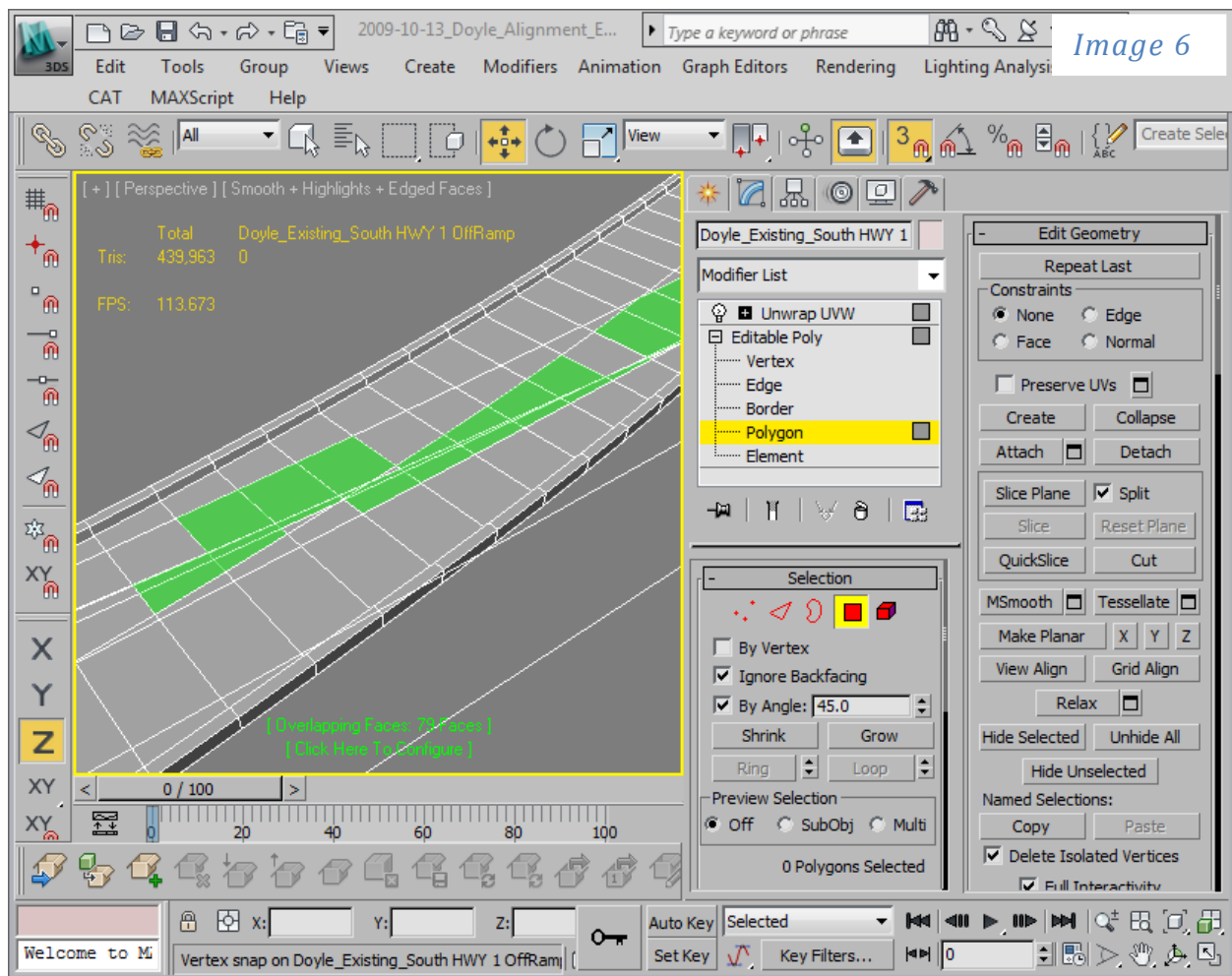


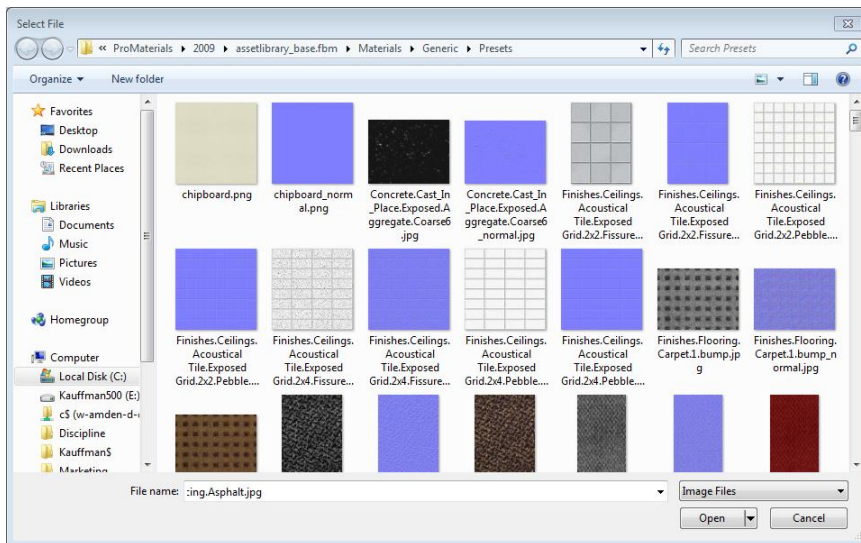
Image 6

8.3 Bitmaps

8.3.1 Bitmap Types

Many people have asked me over the years what bitmap format is the best to use in 3D and to this I always answer the following, “Anything but JPEGs!” Like in photography a raw or uncompressed format is always desirable over a compressed format. With compression comes artifacts and with artifacts comes well, artifacting. Unlike a simple jpeg picture, which is displayed at around 100%, a texture is constantly being enlarged and shrunk depending on where the texture is in relation to the camera. This is the same in rendering and even more of an issue in real-time since you do not always have all the anti-aliasing horsepower at your disposal.

So, what is an ideal format? I usually suggest PNG, TIF or TGA, all three of which include lossless compression and support for alpha channels. Personally, I prefer either the TIF format since they are natively supported within Windows at both the icon level and preview level. Plus, 3ds Max can exhibit some quirkiness with Gamma on PNG files. So, when looking at TIF maps you can use Windows’ native ability to preview the files in a dialog window as in this example (*Image 14*).

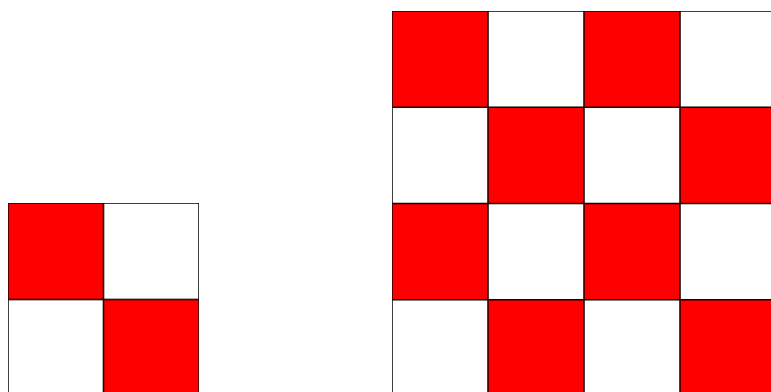


8.3.2 Bitmap Sizes

So, what is a binary multiple? In binary terms, everything is based on two numbers, 0 and 1. If you take 2 and multi it by itself 7 times or 2^8 you will end up with 256. In fact, all the numbers associated with computers fall within this structure. Ever wonder why Photoshop shows the RGB color sliders in values from 0 to 255? Well, binary is why. Each color value in a true color image is 8bits of information or 24bits of color (32bits if you include an alpha channel).

As such, in a real-time environment since it is binary based, an ideal pixel size for an image would be a binary multiple, i.e. 128x128 or 1024x1024. Not all textures are perfect thought. While you can use non-binary scaled images such as 356x788 the graphics engine will scale these images up to the next closest binary multiple, in this case 1024x1024. An optimized scene should minimize the amount of texture RAM being used. If your production workflow permits and you need to optimize your scene to squeeze as much performance out of Showcase, you might consider using an application such as Photoshop to manually scale all your imagery to appropriately scaled binary multiples.

Another example is pixel scale. One 1024x1024 image is equal in size to four 512x512 images, or even sixteen 256x256 images. That can really add up.



512x512

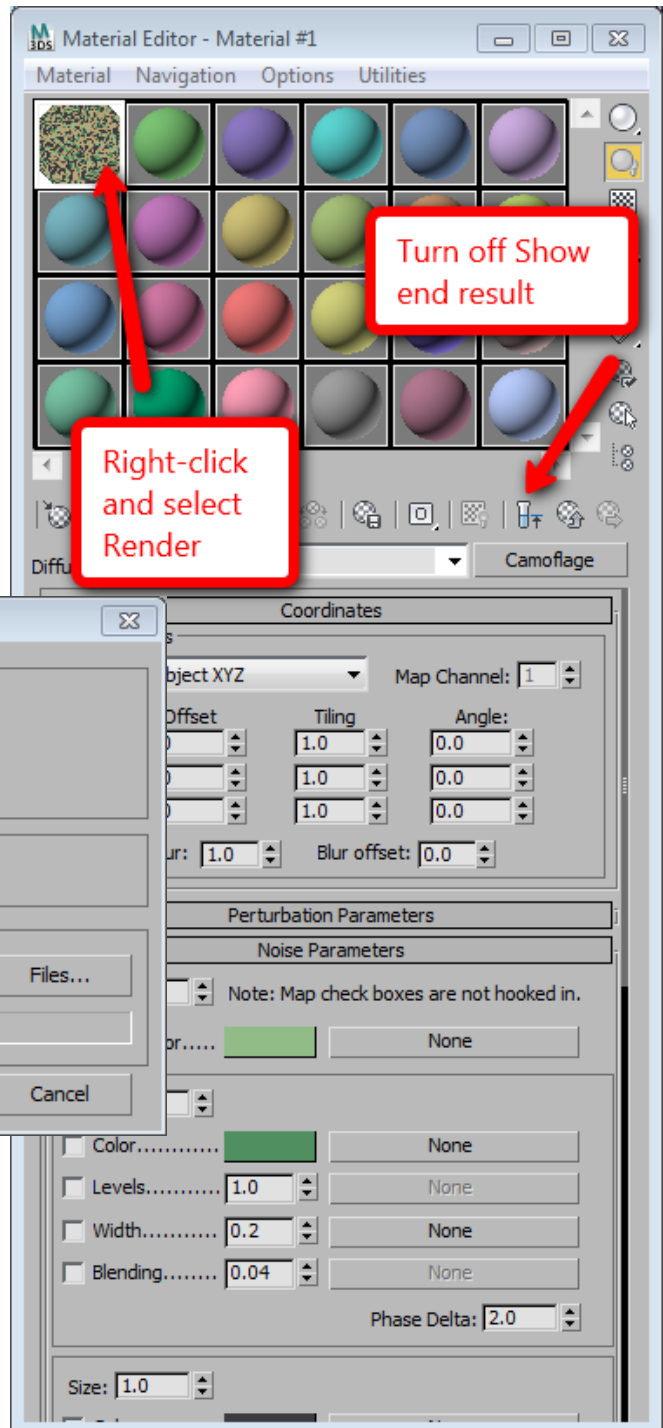
1024x1024

8.3.3 Texture Types

Currently, there is no support for procedural texture exchange between 3ds Max and Showcase, though I have my eye on MetaSL from Mental Images. With the release of 3ds Max 2010, MetaSL shader support was opened to the masses with the inclusion of Mental Mill Artist Edition, a schematic material editing application for creating MetaSL shader networks. These MetaSL shaders can then be used in 3ds Max as materials via the Direct X material type. My hope is that this shader language will be supported by all the third-party developers in the near future as I would imagine that Showcase will support it as well. This is how we would be able to transfer procedural information between the two applications. In the meantime, all textures must be rendered in order to be loaded into Showcase. This is not always an easy process, as each procedural must be rendered to a specific size in order to match the intended size in the render engine. In addition, most procedural textures such as the noise texture does not repeat itself

when mapped to geometry due to their unique procedural nature. Rendering a texture swatch of noise would appear tiled in the viewport.

If you choose to render out a procedural texture for later use in Showcase, you can do so in the following manner. Navigate to the texture channel you need to render, turn off show end result to display only the texture and right-click on the texture swatch to select Render Map. Select a resolution, frame range if necessary and file type and click render. 3ds Max will then render your procedural out to a bitmap format of your choice (TIF).



8.4 3ds Max → Showcase FBX Interop support chart

		3DS MAX	.FBX	SHOWCASE
GENERAL	Environment and Effects	Background Color / Map	x	x
		Ambient Global Lighting	√	x
		Exposure Control	x	x
		Atmosphere	x	x
		Effects	x	x
	Export Options	Audio Embedding	x	x
		Texture Embedding	√	√
		Export Selected	√	√
	Names	Named Selection Sets	√	x
		Object Names / Name Clash	√	C
	Time Configuration	Frames Per Second (FPS) Rate	x	x
		Start / End Times	C	x
	Render Setup	Pixel Aspect	√	x
		Output Size (Width/Height)	√	x
	Miscellaneous	Groups / Assemblies	C	C
		Display Layers	√	x
		Animation Layers	x	x
		Level of Detail (Utility)	C	x
		File Link	C	C
		X-REF Objects	C	C
X-REF Scene		x	x	
Transforms	Position/Rotation/Scale	√	√	
OBJECTS	Camera Types	Target	√	C
		Free	√	C
Geometry	Editable Mesh	√	√	
	Editable Poly	√	C	
	Patch	C	C	

		NURBS	C	x	
		Primitive	C	C	
		Instances	√	C	
		References	C	C	
	Helpers	Standard (Dummy Objects)	x	x	
		Containers	x	x	
		Atmospheric Apparatuses	x	x	
		Manipulators	x	x	
		Reactor Objects	x	x	
	Standard Lights	Target Spot	√	x	
		Free Spot	√	x	
		Target Direct	√	x	
		Free Direct	√	x	
		Omni	√	x	
		Skylight	C	x	
		mental ray Area Omni	C	x	
		mental ray Area Spot	C	x	
	Photometric Lights	Target Light	C	x	
		Free Light	C	x	
		mental ray Sky Portal	C	x	
	Shape Objects	NURBS Curves	√	x	
		Splines / Editable Splines	C	x	
	Systems	Biped	C	x	
		Bones	C	x	
		Particle Systems	x	x	
		Daylight	C	x	
		Sunlight	C	x	
	MODIFIERS	Morpher	Editable Mesh	√	x
			Editable Poly	√	x
			NURBS	√	x
Patch			x	x	
Physique		All Geometry Types	x	x	
(.PC2) Point Cache 2 (OSM/WSM)		Editable Mesh	√	x	
		Editable Poly	√	x	
		NURBS	x	x	
		Patch Object	x	x	
		Primitive	√	x	
(.MC) Autodesk Cache (OSM/WSM)		Editable Mesh	√	x	
		Editable Poly	√	x	

		NURBS	x	x
		Patch Object	x	x
		Primitive	√	x
	Skin	Editable Mesh	√	x
		Editable Poly	√	x
		NURBS	x	x
		Patch Object	x	x
		Primitive	√	x
	Turbosmooth	All Geometry Types	√	x
	Meshsmooth	All Geometry Types	C	C
	UVW Mapping	Editable Mesh	√	√
		Editable Poly	√	√
		NURBS	x	x
		Patch Object	√	√
		Primitive	√	√
Unwrap UVW	Editable Mesh/Patch/Poly/Prim	√	√	
MATERIALS	Types	Standard Materials: Standard	√	C
		Standard Materials: Composite	√	x
		Standard Materials: DirectX (HLSL)	√	x
		Standard materials: Multi/Sub	C	C
		mental ray Materials: All	√	x
		Autodesk Material Library: All	√	x
	Basic / Extended Parameters	Anisotropic Shader	C	C
		Blinn Shader	C	C
		Metal Shader	C	x
		Multi-Layer Shader	C	C
		Oren-Nayer Blinn Shader	C	C
		Phong Shader	√	C
		Strauss Shader	C	C
		Translucent Shader	C	C
	Map Channels (Map Coordinates)	Values	C	x
		Ambient Color	√	x
		Diffuse Color	√	√
		Specular Color	√	√
		Specular Level	√	x
		Glossiness	√	x
		Self-Illumination	√	x

ANIMATION		Opacity	√	C
		Filter Color	x	x
		Bump / Normal Bump	√	√
		Reflection	√	x
		Refraction	x	x
		Displacement	x	x
		Constraints		
		Attachment	B	B
		Link	B	B
		LookAt	B	B
		Orientation	B	B
		Path	B	B
		Position	B	B
		Surface	B	B
		Position Controllers		
		Audio	B	B
		Bezier	B	B
		Expression	B	B
		Linear	B	B
		Motion Capture	B	B
		Noise	B	B
		Quaternion (TCB)	B	B
		Reaction	B	B
		Spring	B	B
		Script	B	B
		X Y Z	√	C
		Rotation Controllers		
	Audio	B	B	
	Euler X Y Z	√	C	
	Linear	C	C	
	Motion Capture	B	B	
	Noise	B	B	
	Quaternion (TCB)	C	C	
	Reaction	B	B	
	Script	B	B	
	Smooth	C	C	
	Scale Controllers			
	Audio	B	B	
	Bezier	√	C	
	Expression	B	B	
	Linear	B	B	
	Motion Capture	B	B	
	Noise	B	B	

		Quaternion (TCB)	C	C	
		Reaction	B	B	
		Script	B	B	
		X Y Z	C	C	
	Bezier Tangent Types (PRS)		Smooth	√	C
			Linear	√	C
			Step	√	C
			Slow	C	C
			Fast	C	C
			Custom (broken or flat)	√	C
			Flat Tangent	C	C
	IK Solvers		HD	B	B
			HI	C	C
			IK Limb	B	B
			SplineIK	B	B
		Special Key Types	Parameter Curve Out-Of-Range	C	X
	Miscellaneous	Reaction Manager	B	B	
MISC.	Custom Attributes	Angle	√	X	
		Array	√	X	
		Boolean	√	X	
		RGB	C	X	
		Float	√	X	
		fRGBA	C	X	
		Integer	√	X	
		Material	X	X	
		Node	X	X	
		Percent	√	X	
		String	√	X	
		Texture	X	X	
		World Units	√	X	
		User Defined Properties	All Object Types	√	X

8.5 References

DV118-1 Optimizing Your Autodesk® 3ds Max® Design Models for Project Newport, a AU 2009 talk by Mark Kauffman – Parsons Brinckerhoff, Inc.

QA work by Adam Adryan

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