

Texturing modes

Once the modelling process is developed and the range of strategies applied, the surfaces may be textured – that is the application of photographic or graphic textures on a ‘blank’ 3D surface.

Tiling textures – textures can be tiled if all edges match on repeat. Some Photoshop work to site photographs can generate textures used in the 3D model. The tiled textures can be scaled to avoid distortion.

Baking textures – this involves ‘baking’ an image of some parts of the render ahead of time, for selected objects. For example, a light on a wall can be ‘baked’ and reapplied to the 3D model, thus saving render time with fewer lighting calculations.

Colour maps – colour maps define the surface colour of your texture material without any light or shade factors.

Airbrushing – this involves the use of 3D painting tools to apply photo or graphic textures to a 3D surface in software programs such as ZBrush (Publishing, 2016), Mudbox (Jeremy and Patel, 2012) or Blender (Thilakanathan, 2016).

Normals – normals designate the face in which the texture is applied. Thus, the texture needs to be applied to the front face of a surface. Normal maps are 2D flat-packs on which the user can paint detail without adding to the modelling count.

UVW texture maps – UV textures are 2D flat-packs of the 3D model with the textures applied to specific regions. PTEX is a newer method of modelling, applying textures to the specific mesh without the need for coordinates; it has no seams, unlike UVs.

Bump textures – bump textures are greyscale images. They are duplicates of a full-colour image, but in greyscale. Both colour and greyscale image are loaded together. The greyscale texture is read by the render and gives the impression in the render process that it ‘bumps’ or raises or recesses the surface, when it makes no such modifications.

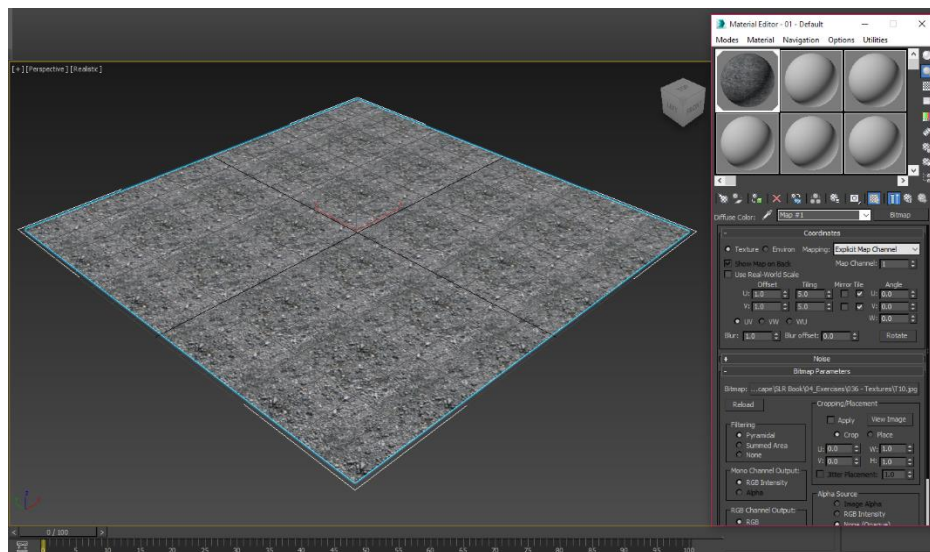
Displacement maps – displacement maps are like bump textures, though rather than simulating a raised surface, they affect the geometry and raise or depress the surface.

Transparency – some software programs cannot interpret transparency settings, others can take a texture with transparent surfaces and allow that surface to be seen through. This can also depend on file type. JPEGs do not have transparent capability, unlike TIFF or PNG file types.

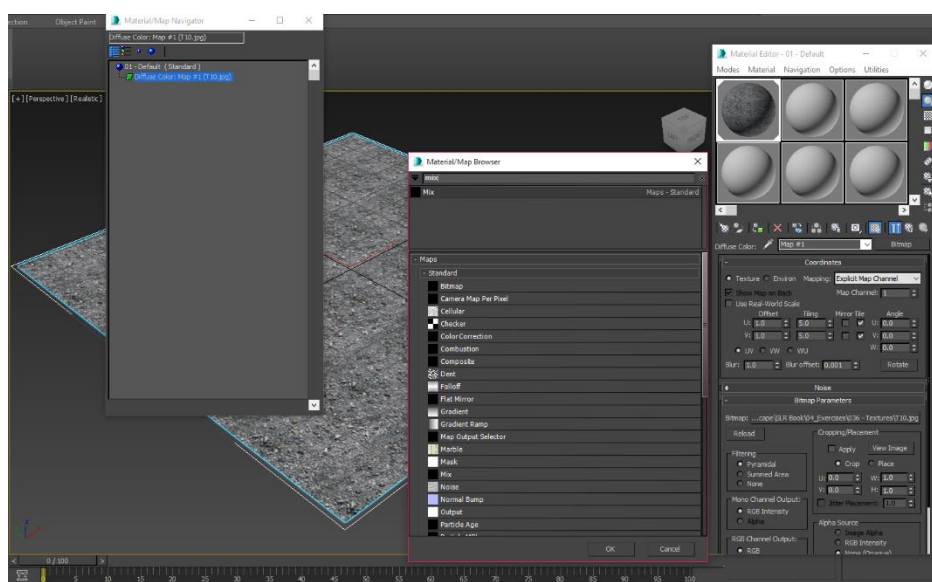
Mask maps – these allow two textures to be displayed on one surface.

Tiling and bump textures

Textures can be tiled and edited in Photoshop prior to texturing in 3DS Max – **Chapter 3**, Texturing.



1. Load 3DS Max and maximise the perspective window. Create a new plane and select the *Compact material editor* (M on the keyboard). Select an empty slot, select *Maps* and expand the stacked window. Select the diffuse map, and select the texture JPEG in the tutorial folder. In the map parameters, adjust the tiling to 5.0. Drag the material to the plane in the perspective window (ensure a realistic view with material maps is shown). You can offset the tiling (in this case 1.0) and blur the offset (in this case 0.001) to create a more seamless texture. The texture is still repeating so it can be 'mixed'.

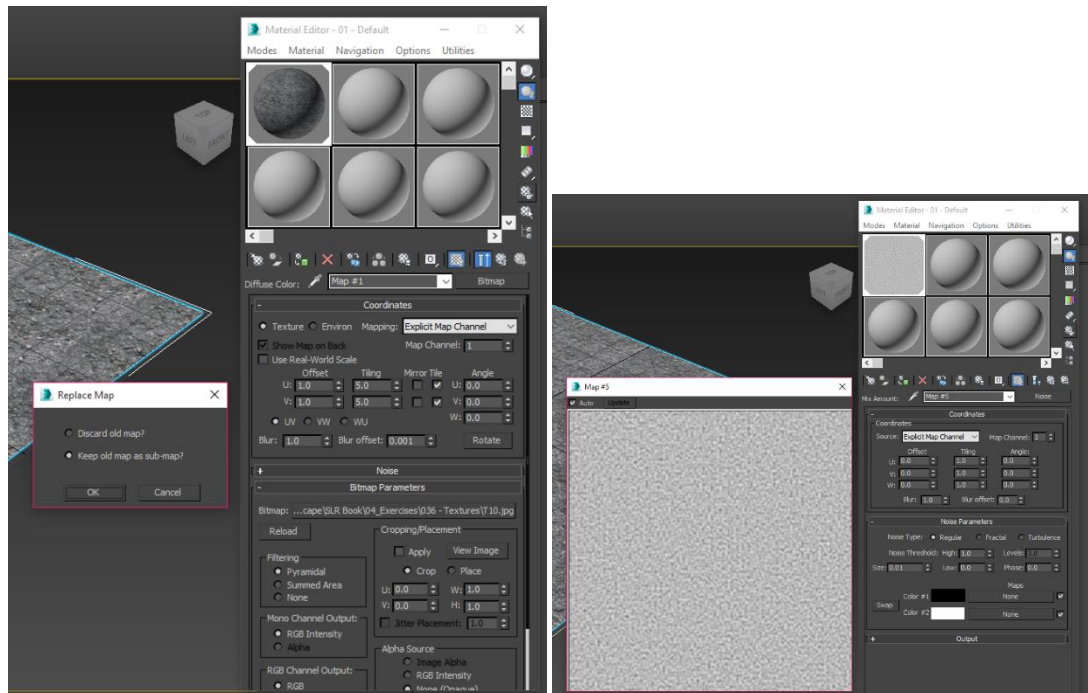


2. Click on the bitmap icon next to the *Map channel*. Enter 'mix' in the search bar of the *Material browser*. Select *Keep old map as a sub-map*. Right-click and copy the colour#1 map (the original texture), right-click and paste in the new sub-map colour#2. Click on the map

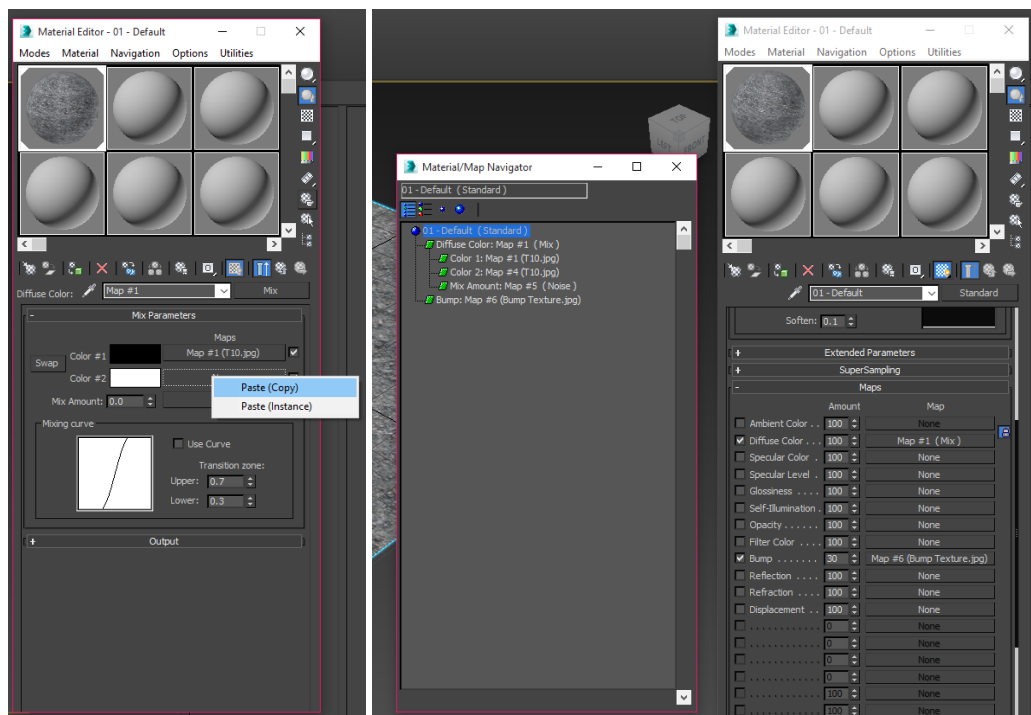
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Material to be used for educational purposes and with book companion.

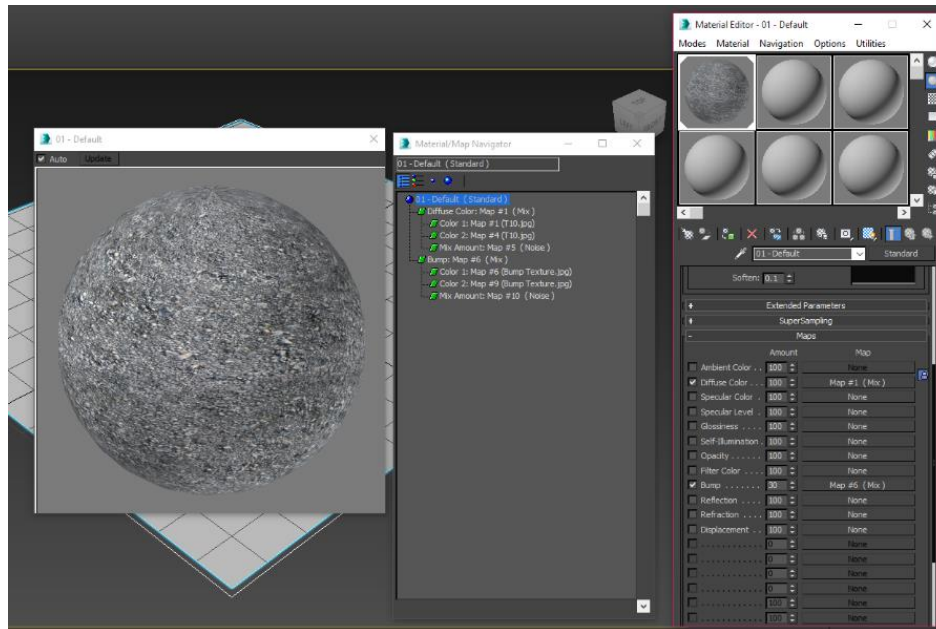
and change the tiling to 3.0. Change the mix amount to 50.0 (50 percent) to blend the two textures.



3. Select the icon next to *Mix*, and assign a noise map to the mix channel. Set the noise map to explicit map channel and reduce to 0.03. Change the high setting to 0.7. and low to 0.3 to enhance the noise.



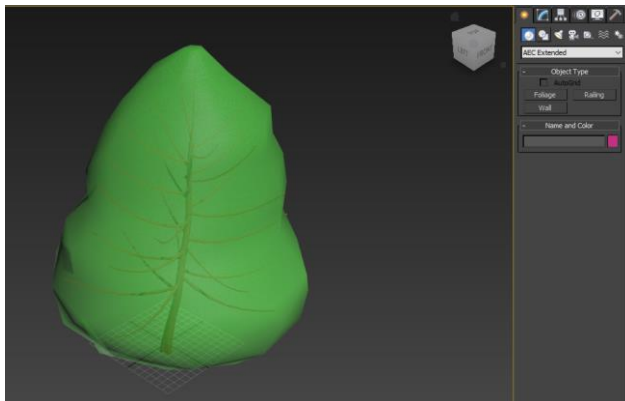
- Return to the default of the material and select *Maps > Bump* and assign the bump texture, changing the tile value to 5.0. You can repeat the previous steps and add a mix and noise if desired.



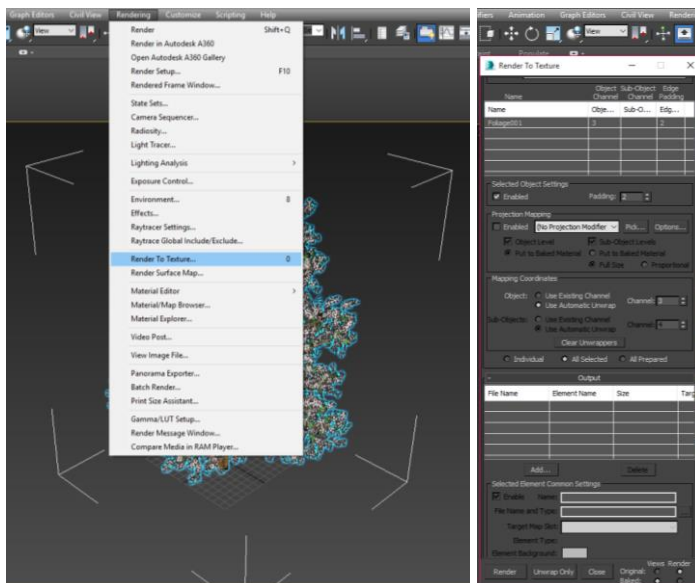
- Texture tiling involves careful aesthetic judgement on the visibility of seams. Multiple textures can be layered and assigned to different channels to mitigate joins and editing and revisiting Photoshop as at the start of this process will update the assigned texture map.

Baking textures

Baking textures renders lighting and shadows on an object and creates a UV tile. Thus, when no lighting is assigned, the object still appears lit.



1. Open 3DS Max and in the *Create* tab select *AEC Extended* select *Foliage* and *Japanese Cherry Tree*. Place the tree in a maximised viewport. To bake a scene you create texture maps based on an object's appearance in the perspective viewport.



2. Select the object and select the *Render* tab on the top toolbar and *Render to texture*. A new window appears providing render engine choice, diffuse settings and radiosity, among other things. Choose a folder in which to save the baked texture. These export as TARGA image files which are flat according to the object faces.

Additional links

Baking textures: <https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2016/ENU/3DSMax/files/GUID-37414F9F-5E33-4B1C-A77F-547D0B6F511A-htm.html>

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Colour maps

Colour maps allow the specification of specific colour values to objects (this applies to 3DS Max 2017 only).

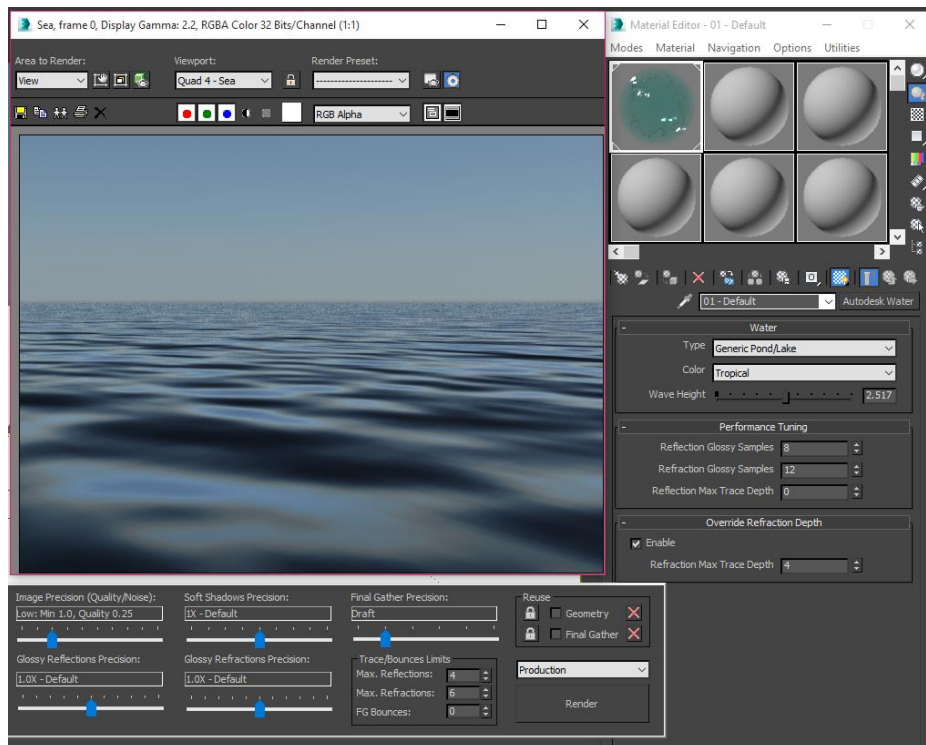
1. Open 3DS Max and the *Material editor*. Click the *Material map browser > Maps > General* and select ColorMap.
2. In the *Color map parameters* drop-down menu, select the map button labelled 'none'. The *Map browser* appears; select the colour. You can also use the *Slate material editor* and assign it to the colour map component.

Additional links

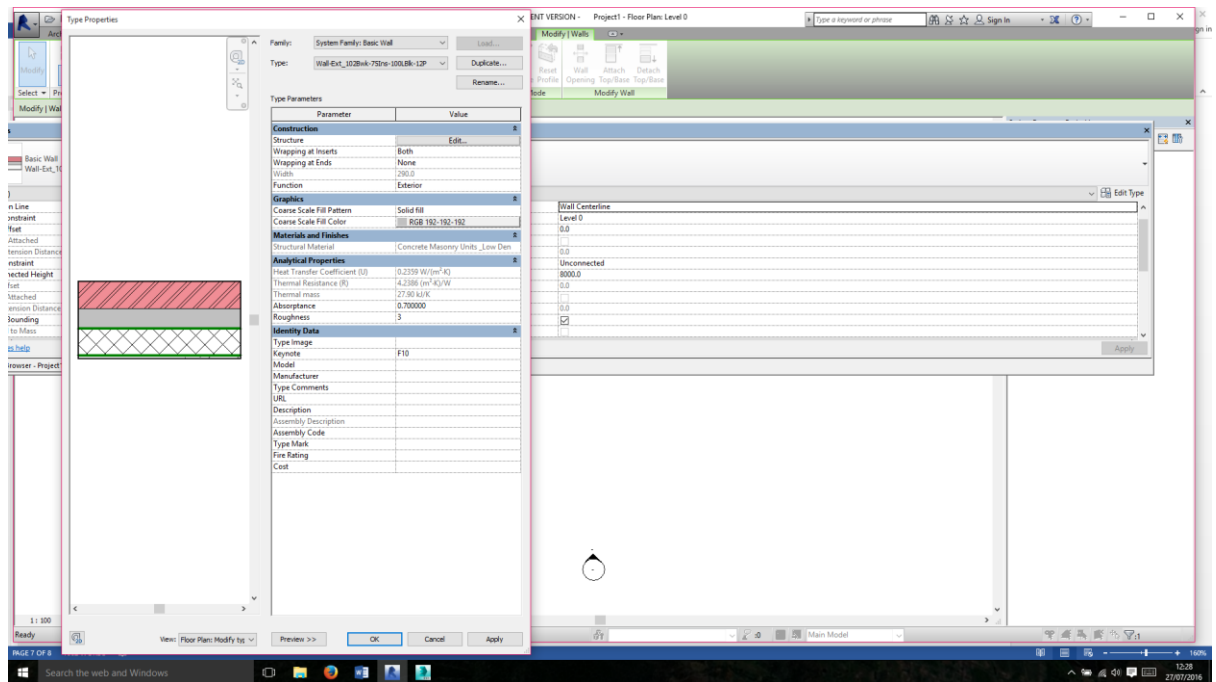
Colour maps: <https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2017/ENU/3DSMax/files/GUID-51AF0DA9-A591-41CB-BABE-B6105816E13F-htm.html>

Mental Ray Materials

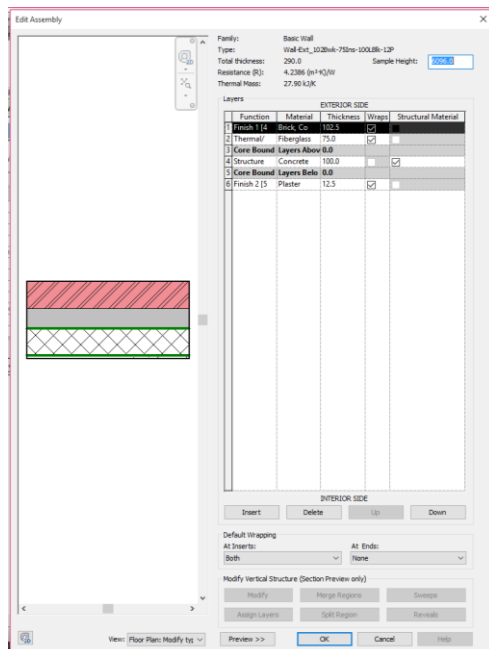
Mental Ray Materials can help with the texturing of complex surfaces such as wood, metal, glass and water in 3DS max. Other alternative rendering engines supply materials for effects, such as Vray (www.vray-materials.de/all_materials.php).

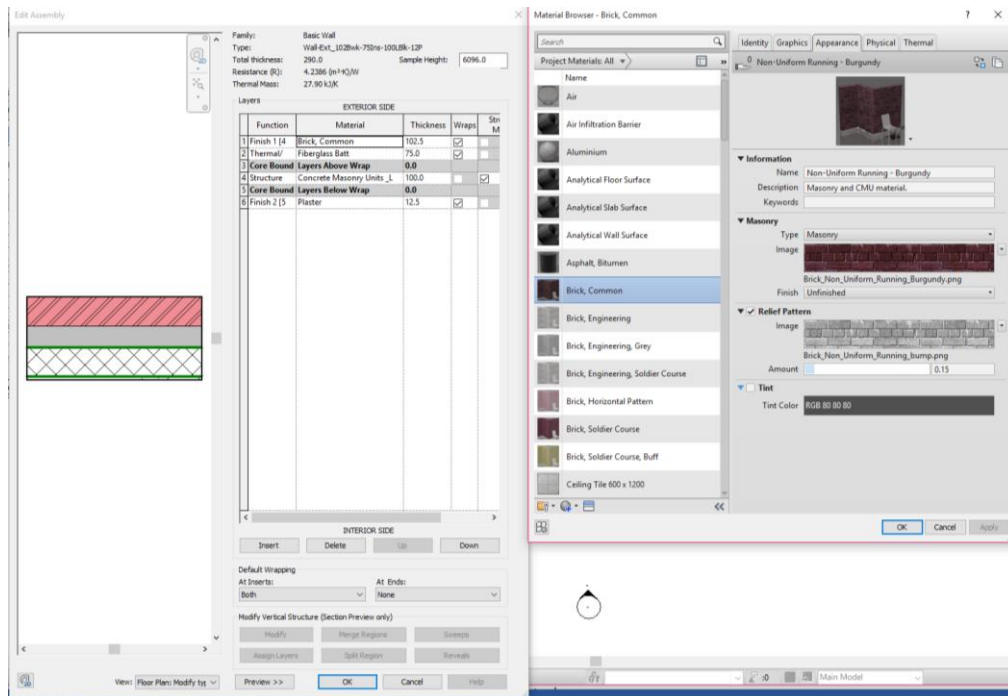


1. Load 3DS Max, Mental Ray Materials to view a simple sea scene. Ensure material packs are installed in your copy of 3DS Max. Autodesk materials translate to other software programs in their range.

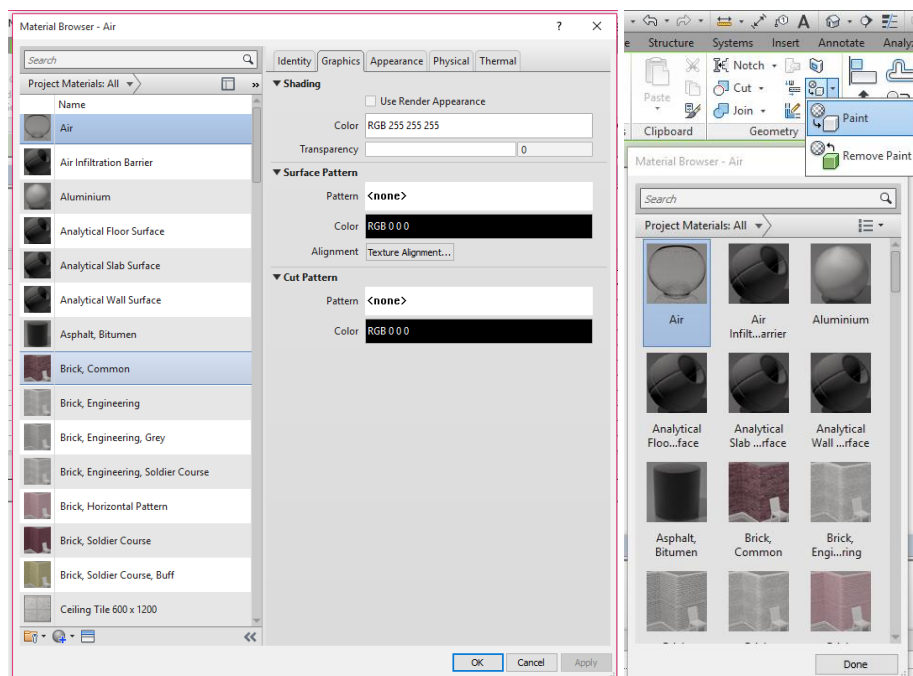


- Materials can also be assigned in Autodesk Revit. The model can then be exported into 3DS Max, Stingray or other related programs. Load Revit and select the *Architectural* template. Select *Wall* and draw a simple wall in plan view. Select the properties and select the *Edit type* icon. Press the preview button to view the structure of the wall. These parameters can be changed, as can the rendering texture.





3. Click the *Edit structure* icon. In the material column a small grey icon will appear. Select the *Finish* row, material and brick common. The *Materials browser* will appear and you can select the finish material, colour and render appearance at this level, and add your own textures or bump maps.



4. You can also access the material browser by clicking the *Manage* tab, materials icon and then the *Materials browser* appears. To paint your object with a material (it does not change the structure of the element), select the element and the *Modify* tab appears. Go to geometry and select the paint icon. The *Material editor* appears and you can assign a material.

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Additional links

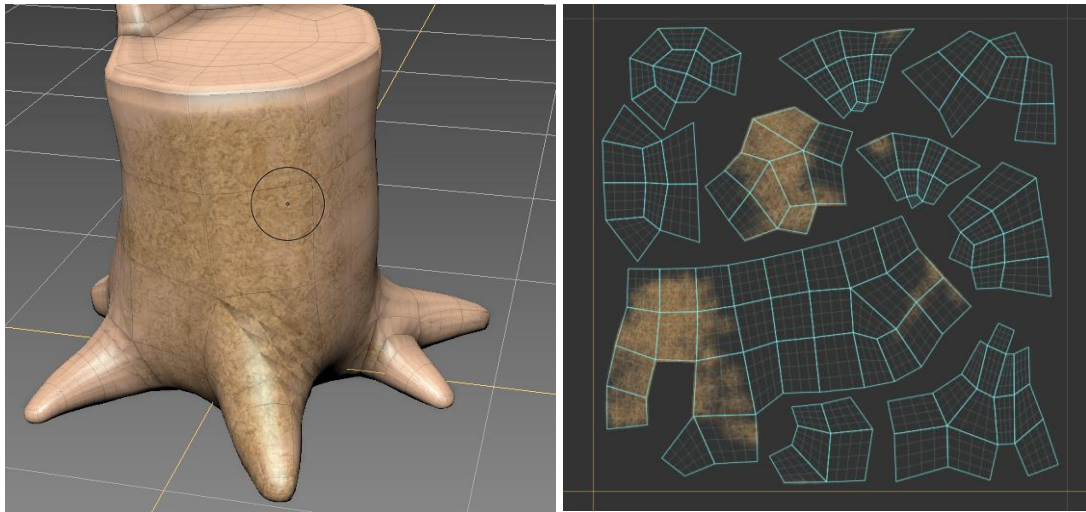
Mental Ray Materials: <https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2016/ENU/3DSMax/files/GUID-5032AECC-D496-4588-9ADC-279FB65D71B5-htm.html>

Architecture & Design Material: <http://help.autodesk.com/view/3DSMAX/2016/ENU/?guid=GUID-6F13FC90-80A4-4092-BB5F-662546685C2B>

Revit Material: <https://knowledge.autodesk.com/support/revit-products/learn-explore/caas/CloudHelp/cloudhelp/2014/ENU/Revit/files/GUID-8BAA7C07-D174-4F02-AA81-239FD33BE363-htm.html>

Airbrush

You may airbrush work using Mudbox, Blender (open source) or ZBrush, which applies textures to a UV map. For those accustomed to Photoshop work, knowledge of paint layers, cloning, pencils and adjustment layers all apply in a 3D context.



1. Load Autodesk Mudbox and select the Stump model pre-set. Select the *Airbrush* in the paint tools in the lower panel. Select a pre-set bark texture, adjust the spacing and paint the stump. Click the *UV* tab at the top of the viewport to view the painted areas. Experiment, then go to *File > Export* and export to a 3DS scene or PSD (Photoshop).

Additional links

Mudbox overview: www.autodesk.com/products/mudbox/overview

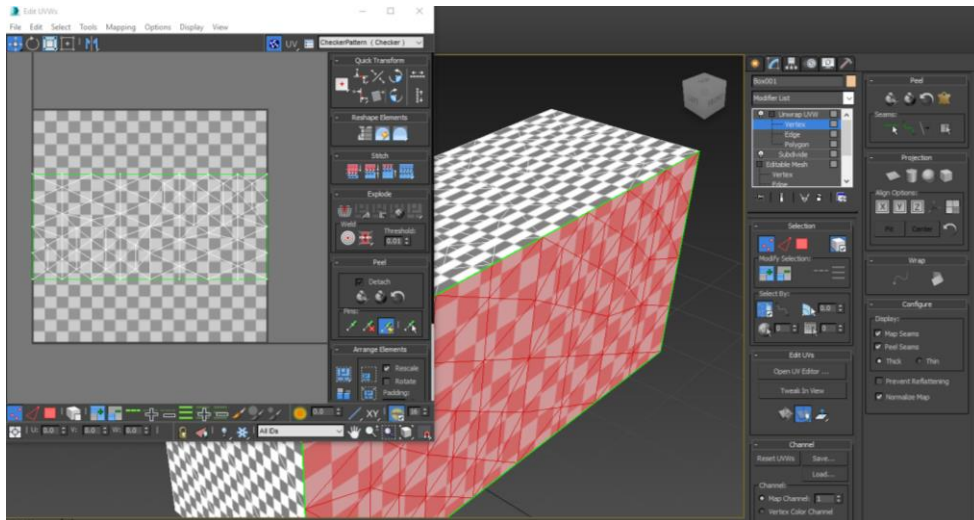
Blender guide: www.blender.org/support/tutorials

ZBrush: <http://pixologic.com/zbrush/getting-started>

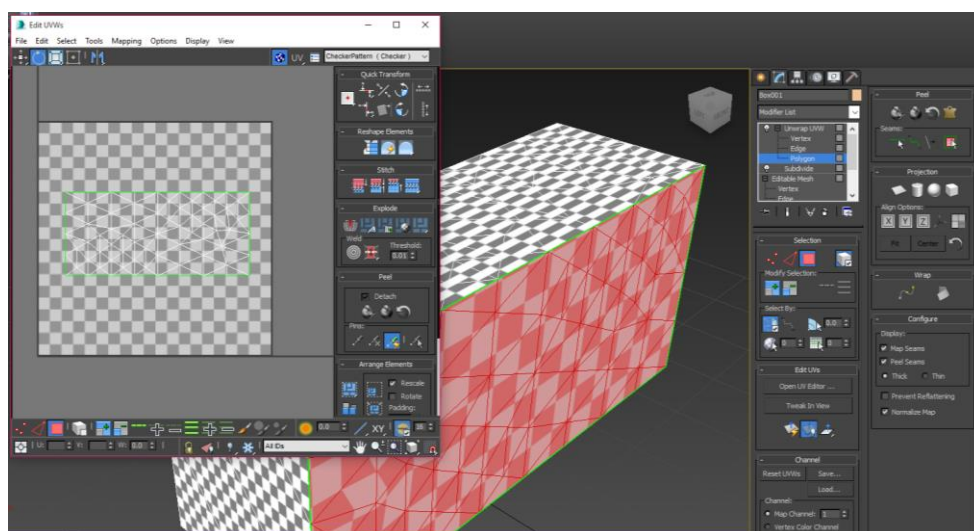
UVW texture maps

UVW maps are different from UV maps. UVW maps have a third dimension which warps to complex surfaces and meshes. A point on the map corresponds to a point on the surface.

1. Load 3DS Max and create a new file and maximise the perspective window. Navigate to the *Create* tab and create a box primitive with ten segments on each side.



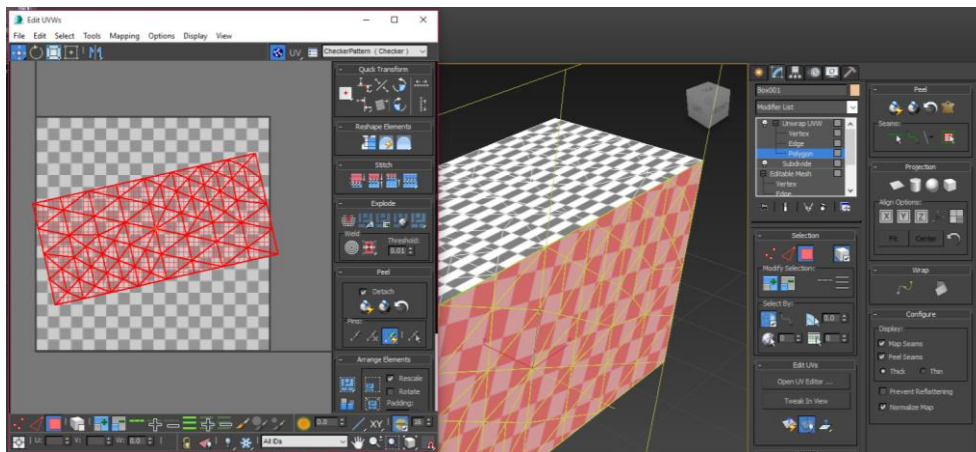
2. If you have a complex object you may wish to smooth the mesh using a mesh smooth modifier. Add a UVW unwrap modifier. New tabs appear. Select *Open UV editor*. Select *Checker pattern* in the top right of the UV editor window (this is the optimum display for the unwrap).



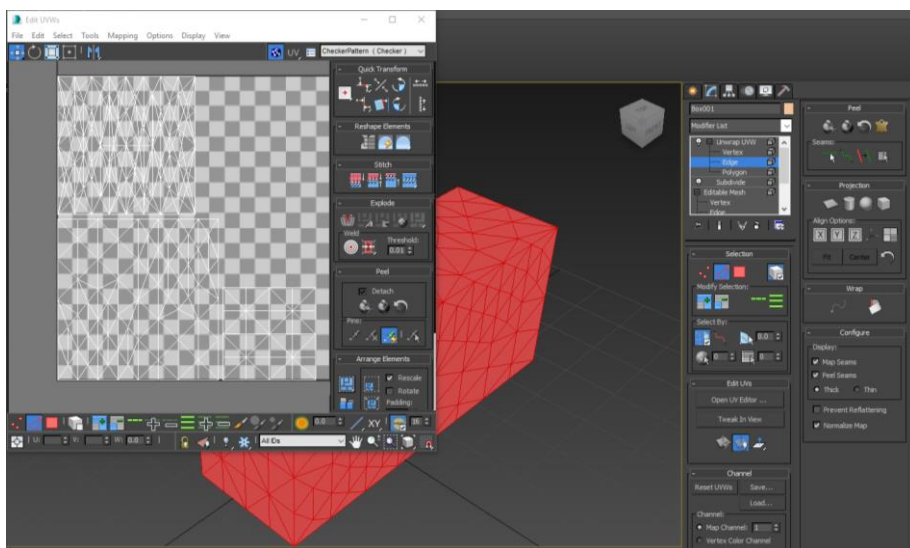
3. Select the edges of the element, then *Peel > Point to point*. Draw around the box segment points to create your unwrap disconnected part. This divides the element into various coordinates in which a texture is mapped.

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4. Select the *Polygon selection* tool and click on a side of your mapped rectangle element. Select *Peel* and select *Planar projection*. This unwraps the area. In the UV editor you may resize by pressing R on your keyboard. You can rotate or press the *Custom: pack* button to place the elements within the template checker box. You can stitch elements, alter normals and adjust individual edges and faces. Change the checker to a sample texture to see how the unwrapped elements map, adjusting accordingly.



5. Go to *Tools* and select *Render*. Choose the template line colours and select *Render*. A new window appears. Save the image as a TARGA image file. The template can be used to colour parts of the elements and separated or painted in a single material and re-applied to the 3D model.

Additional links

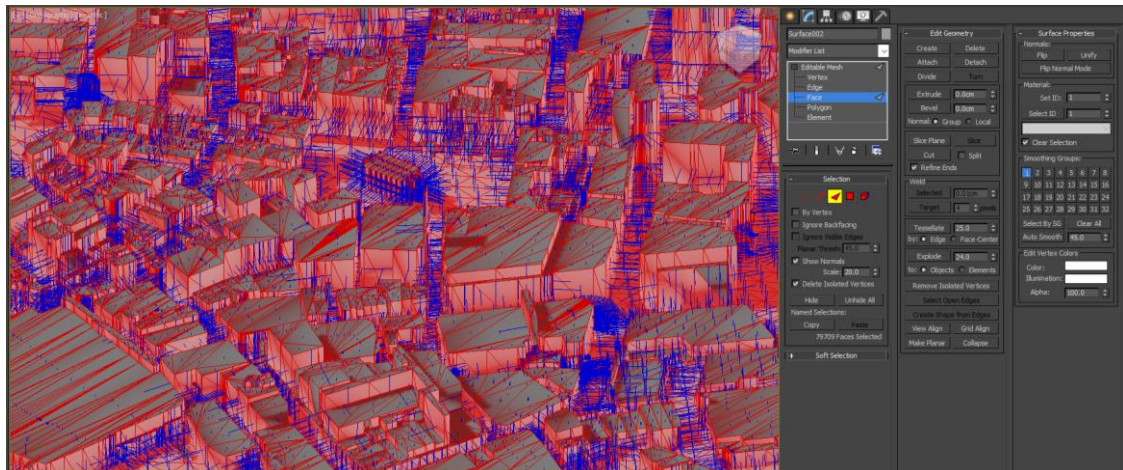
UVW Mapper: <https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2016/ENU/3DSMax/files/GUID-EA10E59F-DE7F-497E-B399-6CF213A02C8D-htm.html>

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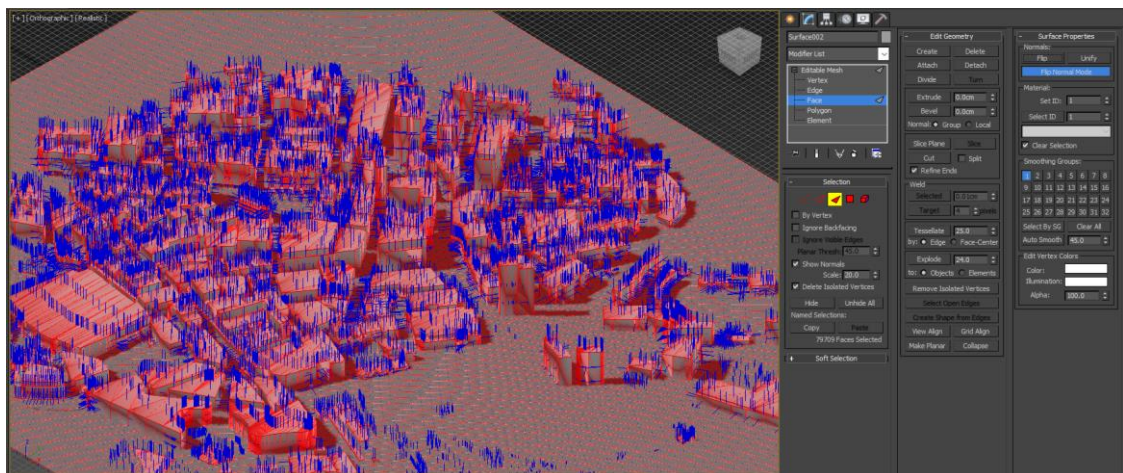
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Normals

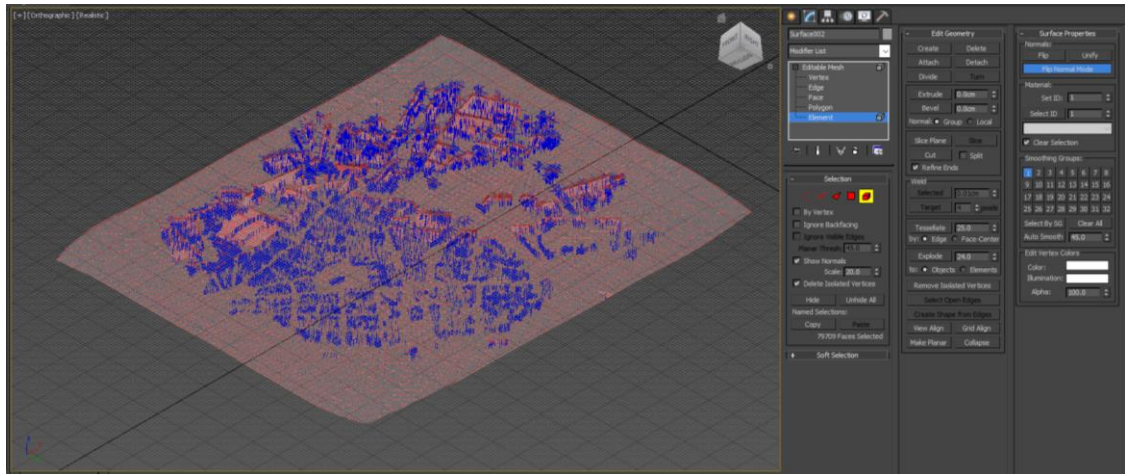
A normal indicates the direction or front of a vertex or face. Normals that face in the wrong direction will not render unless a two-sided texture is applied.



1. Load 3DS Max. Open the *Normals* model and select *Modify*, choose *Face* in the selection panel and navigate to *Surface properties*. Ensure *Show normal* is selected (blue lines). Flip the normal.



2. You will notice in this model that the abstract buildings normals are correct but the terrain is not. You may also create a normal modifier to give greater control of normals.



3. Rotate the view cube to the bottom of the model. Select by polygon and select *Normal mode*, clicking on the terrain. This should correct the normal to the model for both parts of the terrain.

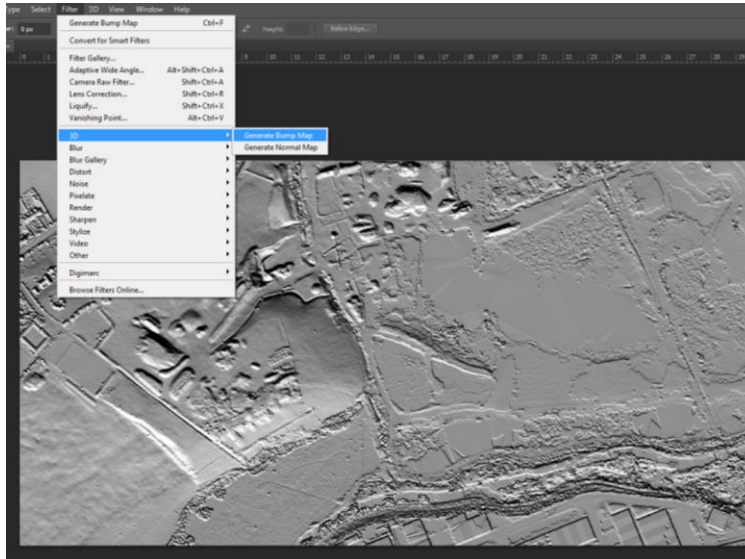
Interoperability note: a common workflow involves exporting a Sketchup model to 3DS Max, setting textures and lighting and rendering. Ensure Sketchup normals are all facing the desired direction before export.

Additional links

Normals: <https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2016/ENU/3DSMax/files/GUID-C420859B-D44E-469F-9A20-AFD731216EA1-htm.html>

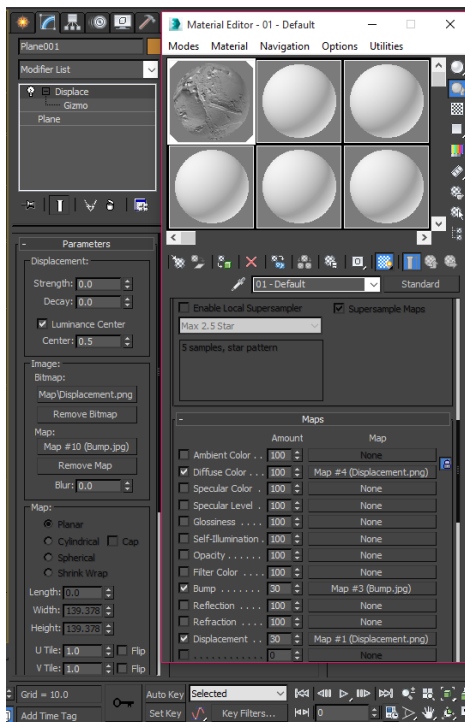
Displacement maps

Displacement maps create height values based on greyscale colour ramps. In other words, displacement changes the actual geometry, whereas bump maps provide illusionary height. Displacement maps create the height to the plane object; however, the detail should always be supported with a separate bump map.

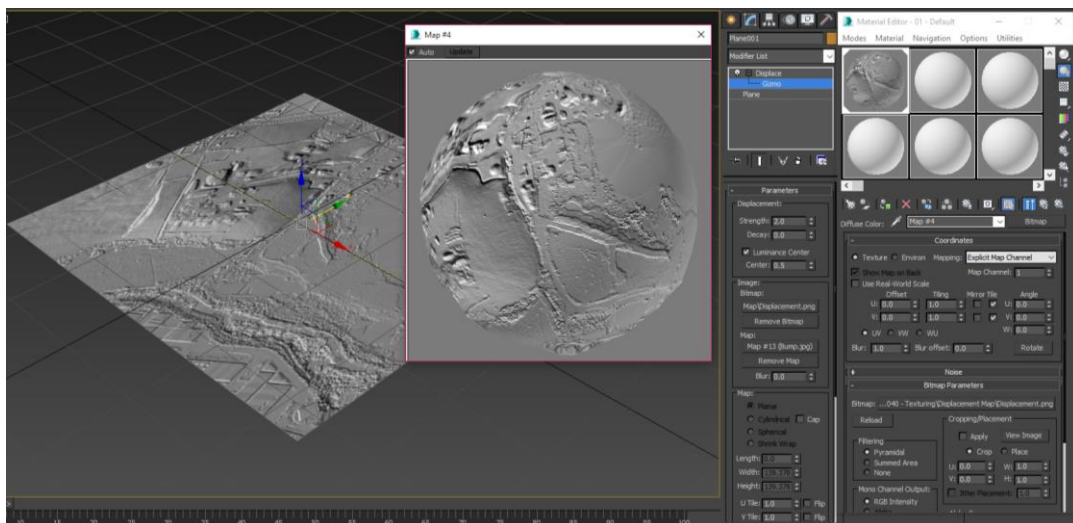


1. Displacements can be created like bump maps in Adobe Photoshop. One quick option is to load Photoshop, go to the *Filter* tab on the top toolbar and select *3D > Generate bump map*. Use desaturate or a B&W filter plus level adjustments for colour imagery.

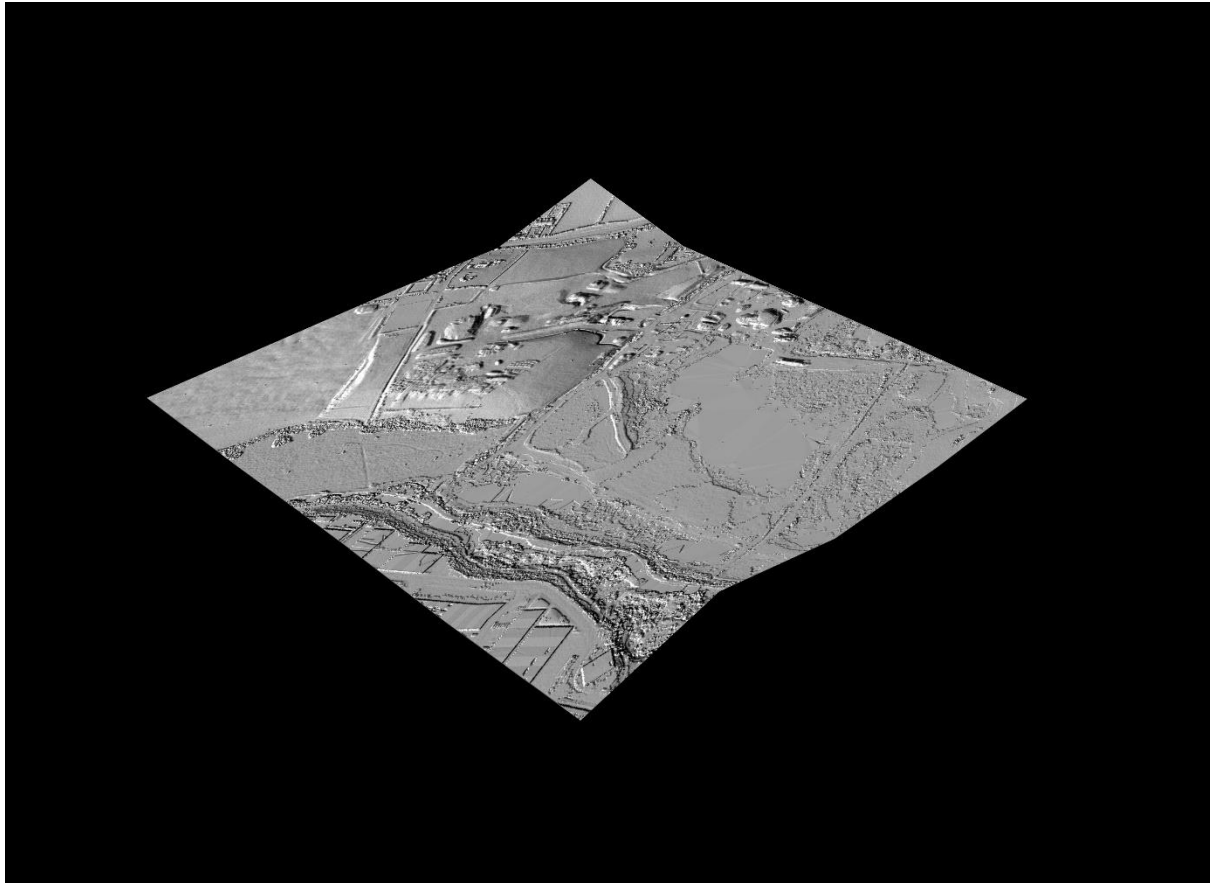
Interoperability note: exporting a global DEM and processing in Esri ArcMap will provide base DEMs for displacement. You may also create and add displacements in Mudbox to sculpted layers.



2. To create a displacement, load 3DS Max and open a new file. Maximise the perspective viewport, go to the *Create* tab and draw a plane. Load the *Material editor*, choose an empty slot in the *Compact editor* and maximise the maps (you can apply a displace modifier to displace the map in the *Modify* tab, or displace wholly in the *Material editor*). Expand the *Maps* tab and select *Displacement* and the 'none' empty slot. Assign the displacement the value of 40. The blur value should be around 0.1 to sharpen the displacement and bump. Return to the material and select the bump, 'none' icon and assign the bump texture to the material we are creating.



3. Apply the texture to the plane (ensure realistic view with assigned material is selected in the viewport). Again reduce the blur of this setting to ensure sharpness. Always inspect the material in the viewer to see the effects of each transformation. You may wish to bake textures and paint various levels or apply a mix to change the surface texture.



Additional links

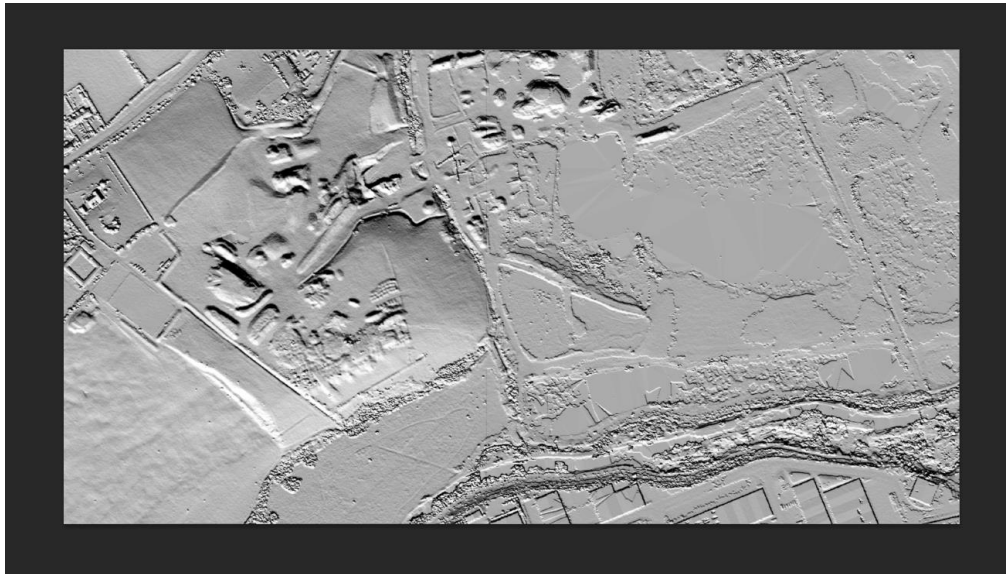
Displacement maps: <https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2017/ENU/3DSMax/files/GUID-14B36287-F9FB-4D92-98D3-A95D100DA296-htm.html>

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Mask maps

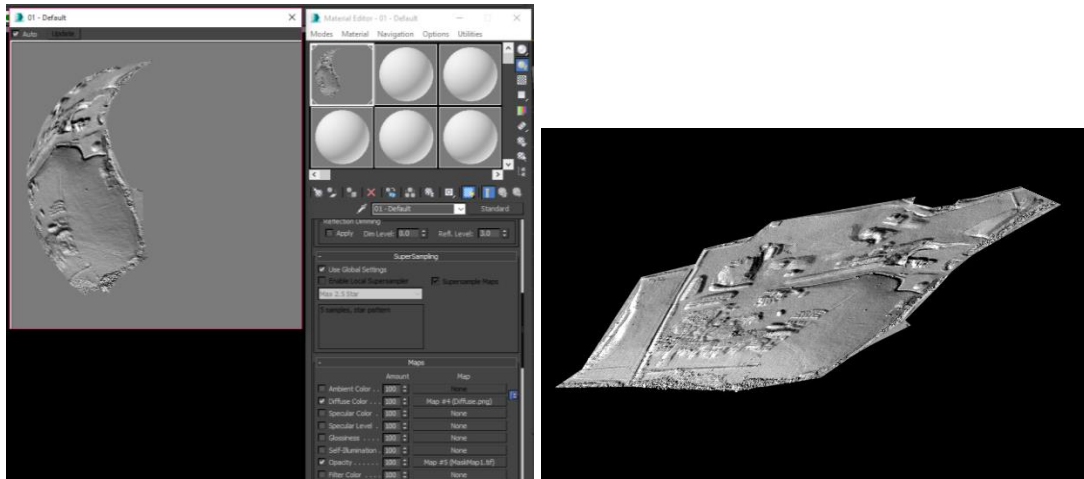
To apply a mask map, create a mask default black and white area for the cut-out to be composited. Understanding mask maps can assist in texture compositing, as well as cut-out maps.



1. Load 3DS Max and create a new file, maximising the perspective viewport. Create a plane surface and assign a diffuse, bump and displacement as per displacement map exercises.



2. A mask map has been created in Photoshop using the diffuse texture and adjusting levels. White areas signify the cut. In this case, a site boundary has been defined.



3. Load the *Compact material editor* and the map channels. Assign the mask map to opacity. The opacity value of 100 is a full cut. The material will update and render the scene to view the masked area.

Additional links

Mask maps: <https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2016/ENU/3DSMax/files/GUID-11F039BF-8A3D-4728-B7DC-B535DF85F155-htm.html>

Cut-out: <https://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2016/ENU/3DSMax/files/GUID-911073ED-9A73-482A-A274-6DED542F6DA3-htm.html>

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