



CONNECT DOCUMENTATION

[Connect Edition Introduction](#)

Proposed Terrain Models

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Creating Proposed Terrain Models

Introduction

Proposed terrain can be created from Elements using a graphic filter or by selecting the elements desired. On long slopes this method can result in some slope waffling as the triangles try to connect to the nearest points of each feature rather than going from the top of slope straight to the bottom. It is for this reason the preferred method is to build Proposed Terrain Models from the corridor meshes.

The process is to reference all the meshes into the dgn, review them and copy any that need to be edited into the dgn. They can be moved into different levels so they can be displayed independently and edited easily using the Edit Mesh tools. Large meshes can be split into smaller pieces. These referenced and edited meshes are then used to create a Terrain from Elements.

If the referenced corridors or drives are updated in the future the terrain model can be updated by selecting it and updating from source. Previously copied mesh elements can be removed from the terrain model, the updated ones copied back into the drawing, edited and then added back into the Terrain.

A third method is to reference the design files and use the **Create Terrain Model from Design Meshes**. The meshes don't need to be displayed as part of the corridor feature definition, it will find and create the Top or Bottom Terrain from all the design mesh elements in the dgn's that are referenced. The drawback is that the Terrain may need to be edited which is harder than editing copied meshes.

Creating Proposed Terrain Models from Mesh Elements

Copy and Edit the Meshes

The Corridor's feature definitions on your project need be set to either Concept 5X w/ Meshes or Final w/ Meshes so that the P-Mesh-Top and -Bottom meshes are created. This can be done on a Corridor-by-Corridor basis or the Explorer - OpenRoads Model tab can be used. For linear Templates set them to Final w/ Meshes. Surface templates have components for Top and Bottom Mesh elements.

Open the *P-Terrain.dgn*. Attach all files that are to be included in creating the Terrain such as the corridor and drive files as well as any other special plan files needed.

Open the *Default-3D* model. In level display select all the reference files and turn off all levels and then turn on the *P-Mesh-Top*. Create a new level called **1-mesh**, set the color, and then make active. Review the mesh elements, copy any that need to be edited into the dgn. Change their Level and color so they can be identified separately from others.



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Shut off the display of all the referenced files in the *Default_3D* display. Create a new level called **2-mesh**, set the color, set Active. Use *Change Element Attributes* to modify the display of alternating Mesh pieces. Continue until no adjoining meshes are the same.

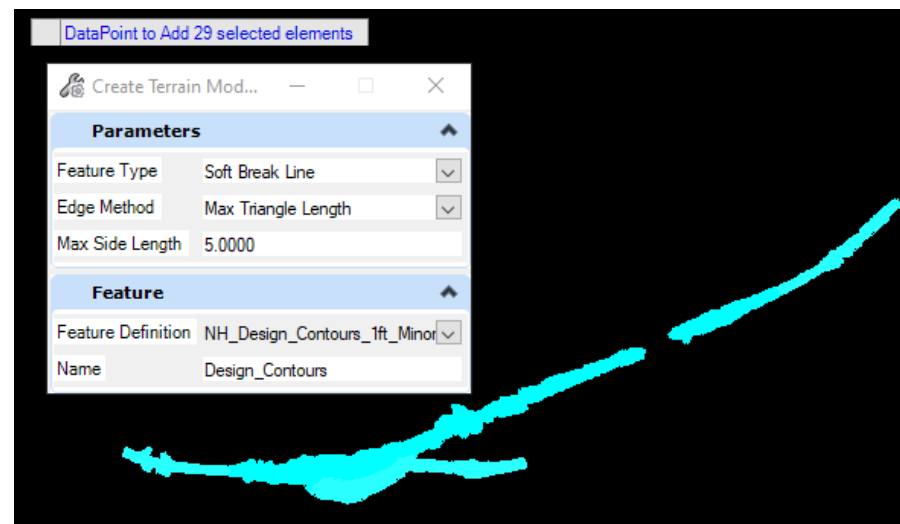
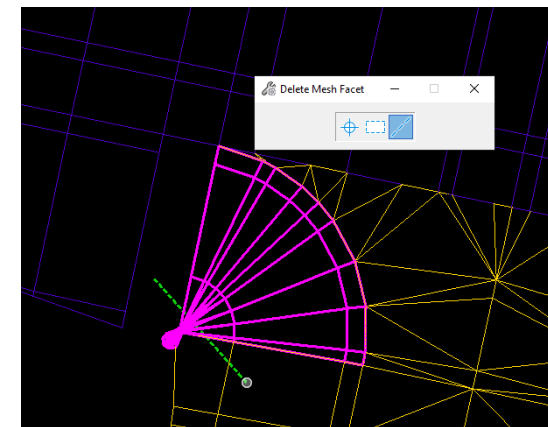
Drawing workflow > *Mesh Tab* > *Modify Meshes* pane. Select the *Delete Mesh Facet* tool. Set the *Type* on the tool to **Line**. Select the mesh to edit such as a drive radii mesh and draw a line across the overlapping slopes at the toe. **Accept!** This will remove the overlapping mesh elements.

Continue Zooming and rotating your view, identifying all areas of overlapping mesh elements and deleting the overlaps from the appropriate mesh. Use any other mesh editing tools needed to update the models. The *Split Mesh* tools can be used to separate mesh elements that cross a bridge area so that terrain for each side can be edited\created independently. The *Mesh Utilities* tab has the *Cleanup Mesh* tool that removes many facets of a terrain simplifying it.

To view the results of your manipulations you can create a terrain model from elements and turn on the contours or flow arrows to view an area. Delete the terrain when done and keep moving to other areas that need attention.

When finished editing the meshes, turn on the display of any Reference files that contain mesh elements that did not need to be edited. Fit view. Select all the meshes needed for the terrain. Use *WF* > *OpenRoads Modeling* > *Terrain Tab* > *Create from Elements* tool. Feature type - **Soft Break Lines**, max triangles **20'** Feature **NH_Design_Contours_1'_Minor**, Accept.

Shut off the all the mesh levels. Review the terrain. If any meshes were missed add them in. The referenced Design files linear features can be displayed to help review the terrain. Right click and open 3 Views. Use the *Default* view to select the main corridor and Display Dynamic sections. Move through the sections comparing the surfaces.





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Editing Terrain Created from Meshes

When Corridors or drives are updated the associated meshes are updated but the copied and edited meshes and the terrains created from them are not. In some cases, it may be beneficial to just recreate from scratch depending on the number of changes that have occurred since the Terrain was created. If there are specific areas that need to be updated that can be easily accomplished.

Open the DGN's Default 3D model. Select the terrain model and **Update from Source** to refresh the referenced mesh elements. Turn on the display of the reference files and compare the numbered mesh levels that it was created from. Delete any outdated mesh elements. Select the updated mesh elements from the referenced files. Copy them into the view. Edit the copied terrains if needed. Use the *Add Features* tool to add them to the Terrain model.



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Creating Proposed Terrain from Graphic Filter

Design and Subgrade terrain model surfaces need to be created for the cross sections. These will also be exported in LandXML format for turnover to construction. The Design terrain model and the existing terrain will also be combined to create a Composite terrain model for use with Drainage & Utility tools to design Proposed Drainage.

When included with cross sections, the design and subgrade will be displayed with line weight **4** that the proposed sections should be drawn with.

When a design is created by using one of the corridor templates, feature definitions are assigned to the elements being created (edge of pavement, top of slope, toe of slope, etc). The process which is described here is dependent on the drawing containing those features. Graphical filters select the features that would be used for a specific surface definition. For example, the NHDOT *Subgrade By Features* filter selects features defining the bottom of the subgrade and toe of slope.

- Open the **12345-P-Terrain.dgn**, Open the **Default-3D** model. Turn on the display of all proposed corridors created during the design process including drives.
- Set the active level to **Terrain_Coutour_Imported**, color=**9**, linestyle **0** and line weight **3**.
- From the *Terrain Model* Task menu, select *Create Terrain by Graphical Filter*. See the sample form below while following the next few steps.
- Select the ... button next to *Graphical Filter Group* and pick the filter group to use, **NHDOT Design by Features**. Hit *Preview* to view selected features. Under *Triangulation Options*, set the *Edge Method* to **None** or Max Triangle Length = **15**. The *Edge Method* can be modified through element properties after the process is complete if the desired result isn't achieved on the first try. More details below.
- Select feature definition - **NH_Design_Triangles** under the *Terrain Display* category. Accept through the prompts.

Other Proposed Graphic Filters

Repeat the above steps using the settings shown in the table below to create the Subgrade terrain model. Filters have also been created for creating surfaces representing the bottom of pavement and toe of slope boundary.

Filter	Feature	Edge Method
NHDOT Design by Features	NH_Design_Triangles	Max triangle Length = 15
NHDOT Subgrade By Features	NH_Subgrade_Traingles	Max Triangle Length = 15



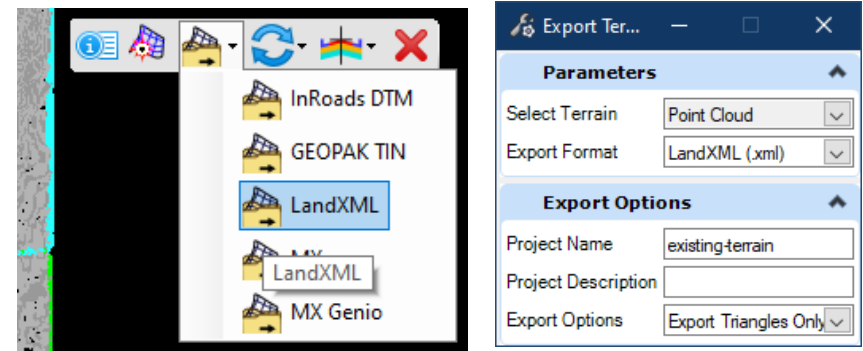
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NHDOT Bottom Pavement	NH_SubPavement_Triangles	Max triangle Length = 15
NHDOT Toe Boundary	NH_SubPavement_Triangles	None

The *Maximum Triangle Length* should be changed until the you have all triangles displayed... but so you do not have large slivers. The *Maximum Triangle Length* can be changed from the *Edge Method* section of the Element Information panel.

The *NHDOT Toe Boundary* filter creates a terrain that only follows the *Toe* features. Use the *Extract Boundary* tool to Extract Graphic which creates a Line String boundary from the terrain model. It will put it in the active level and element attributes. Use the Add Feature task to add the line string to design and subgrade terrains as a Boundary to more effectively clip out unwanted triangles.

When the project is finalized and going to Construction, select the Design terrain model and right-click to display the Context Sensitive menu. Choose the *Export to LandXML* option. Fill in the prompts. Repeat the *Export* for the *Subgrade Terrain* model.





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Terrain Tasks – Create Terrain Model from Design Meshes

Reference the design files and use the **Create Terrain Model from Design Meshes** tool.

The meshes don't need to be displayed as part of the corridor feature definition, it will find and create the Top or Bottom Terrain from all the design mesh elements in the DGN's that are referenced. The drawback is that the Terrain includes all mesh elements even from components that are set to not be part of the top and bottom mesh line like the roundings. Editing a terrain is much harder than editing copied meshes. To edit the terrain you need to drop the rules. This still does not really allow you to use the *Edit Mesh* tools with any dependency. The resultant Terrain can be dropped. This will reduce it to a mesh element which can be edited with the mesh editing tools making it much easier to trim down but deleting the roundings can take time along the whole project. Prior to creating the terrain, all roundings could be set to 0 in the corridors so they are not part of the terrain but that would take a lot of time.

The resultant terrain cannot be updated from source if the design is changed, they would need to be deleted and recreated. This is a fast way to create the Terrain's but may not be the best.

