

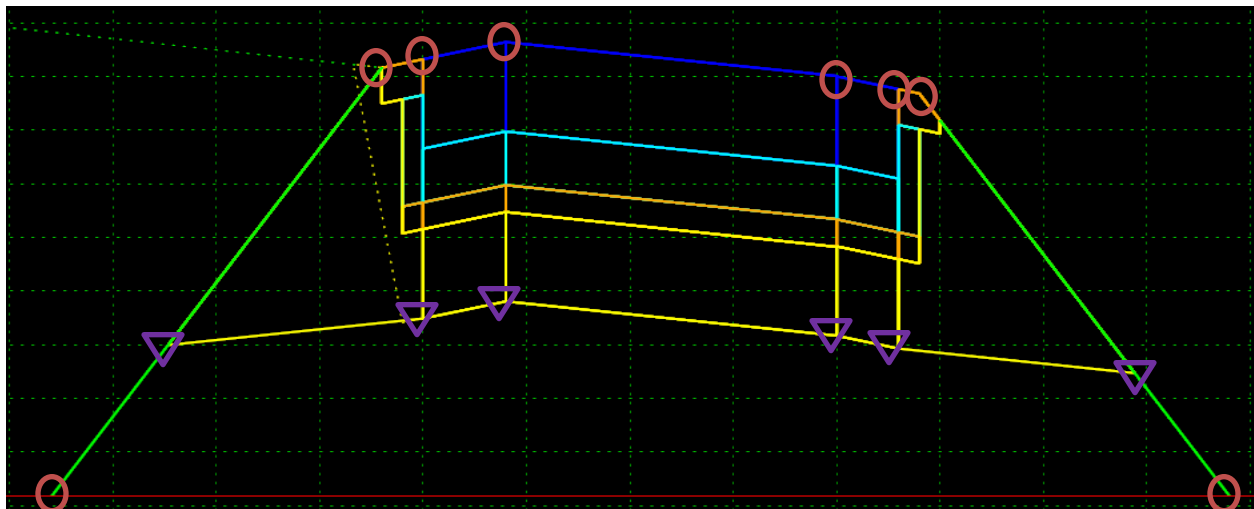
3D Model Submittal Preparation – Power GEOPAK SS2

General Information

This document is intended to provide guidance in preparing the proposed 3D model data from Roadway Designer for submittal and is only applicable to the MDOT_01 workspace. Specific template point names are not critical or mandated however, top surface and bottom surface feature styles must be delivered as indicated in the design submittal requirements [3D Model Surface Feature List SS2](#) and [Standard Naming Conventions](#). See below for an example of top and bottom surface point locations. A working knowledge of CADD, GEOPAK, template creation and Roadway Designer are necessary to complete this process.

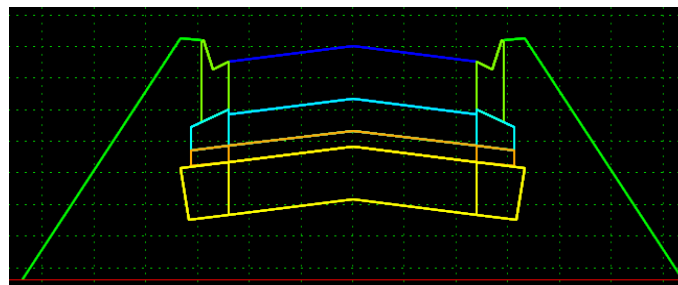
○ Typical Top Surface Points

▽ Typical Bottom Surface Points



In addition to top and bottom surface feature styles, the other layers of the template must be set to specific styles to simplify sorting of the 3D line strings for submittal.

Using the template below as an example in which the layers shown indicate concrete pavement, OGDC, aggregate base, and subbase the surface feature styles would need to be set as shown in the following figures.





Top Surface Feature Styles

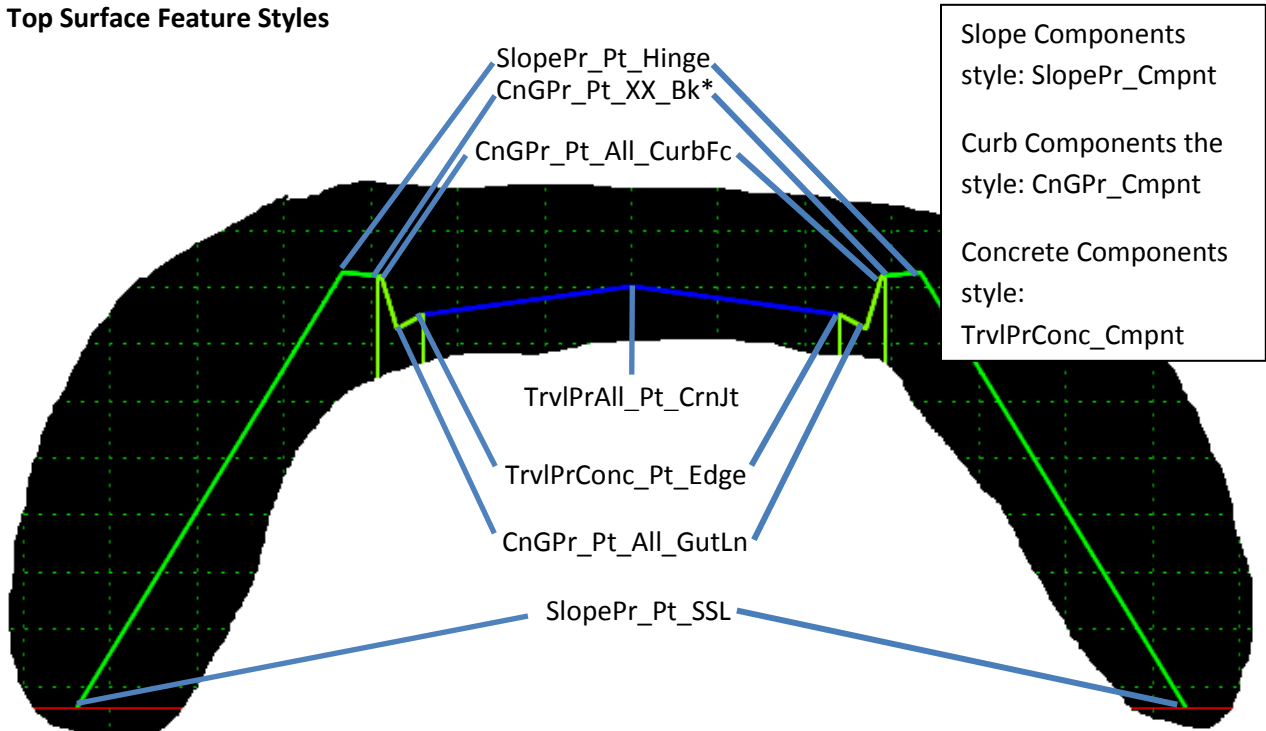


Figure 1

*If several different Curb and Gutter types are used on a project the feature name override on all back of curb points must be set to CnGPr_Pt_ALL_Bk_(R or L) for curb along the edge of the travel way.

NOTE: In the case of HMA pavement, all HMA points except the very top layer and very bottom layer should have the feature style TrvlPrHMA_Pt and the component style TrvlHMA_Cmpnt_(layer name). Additional top surface feature styles can be found in the document [3D Model Surface Feature List SS2](#).

OGDC Layer Feature Style

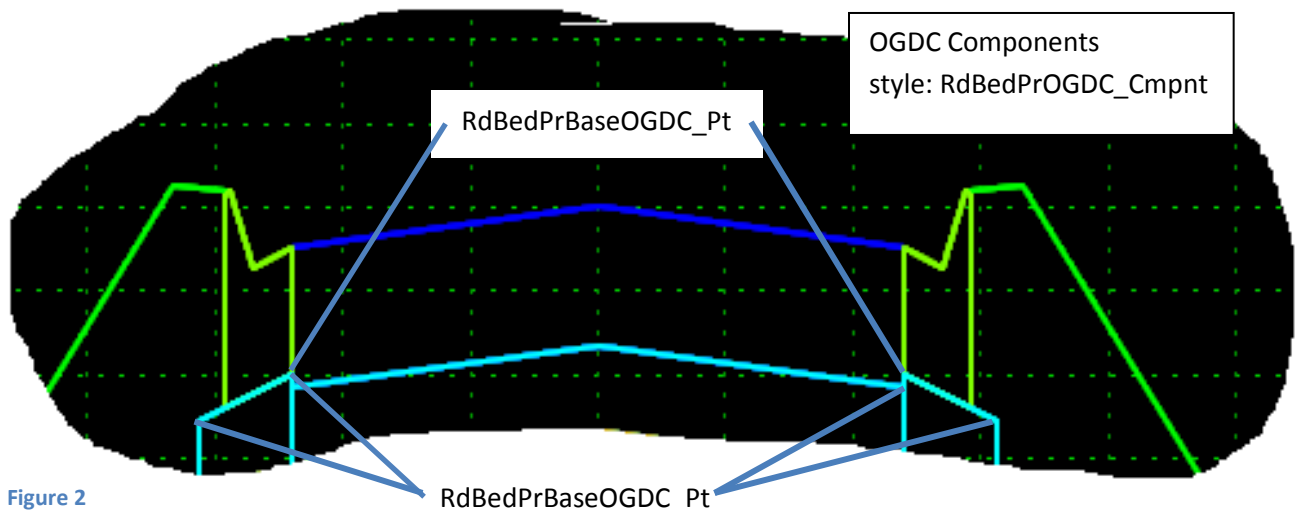


Figure 2



Aggregate Base Layer Feature Style

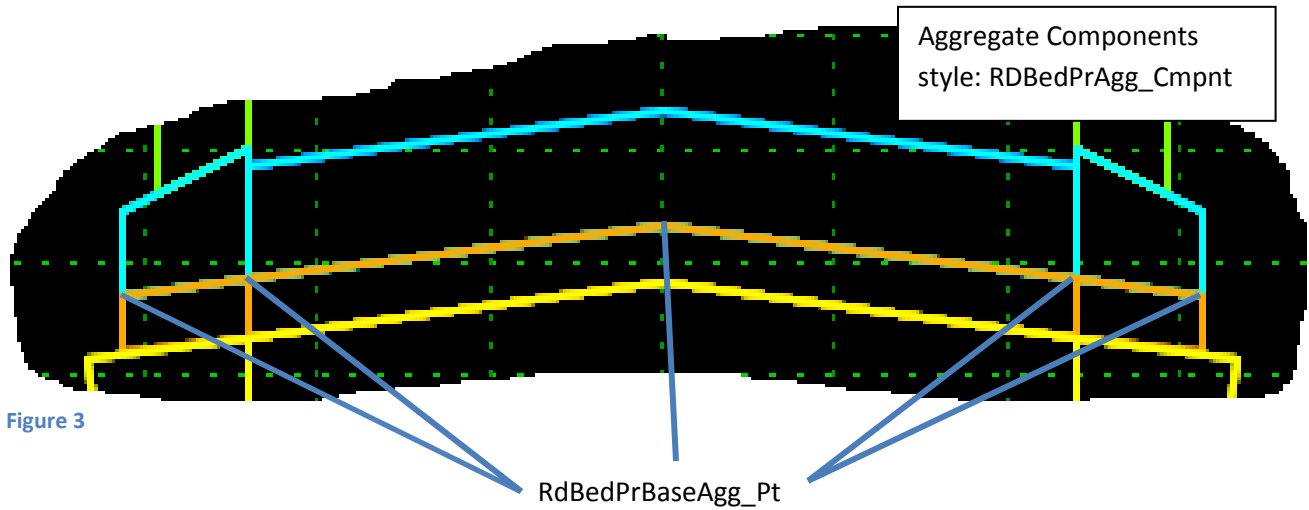


Figure 3

Subbase Layer Feature Style

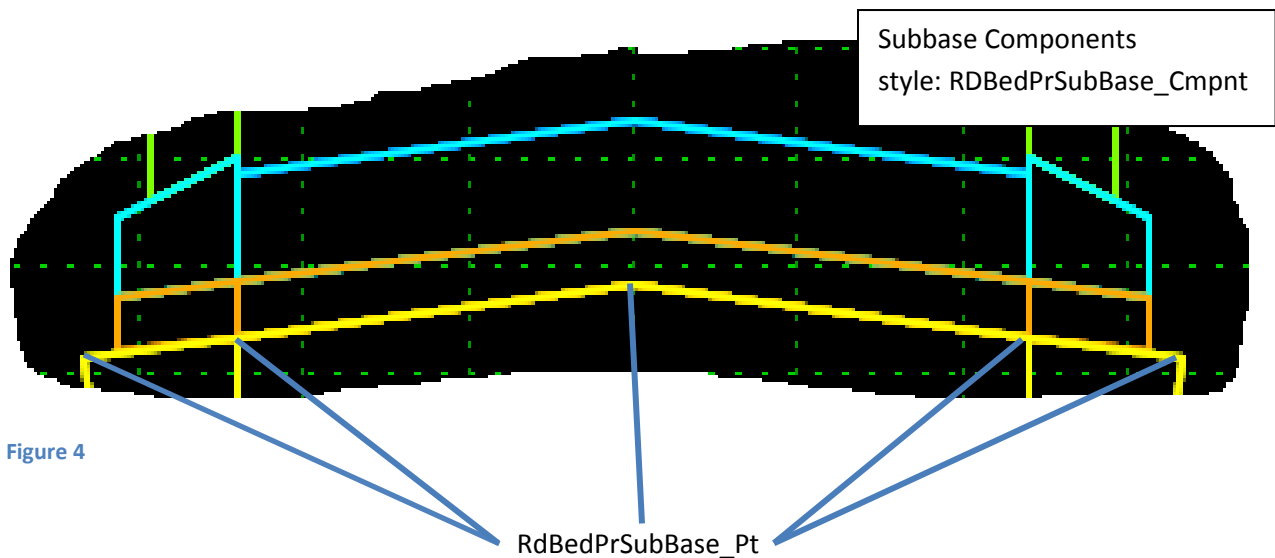


Figure 4

NOTE: Each of the bottom feature styles indicated in Figure 2 through Figure 4 must be manually changed. The default feature style of two points merged during placement will retain the original feature style of the first component placed. So it is necessary to change the feature style of each bottom layer point to the features styles indicted in the figures above.



Bottom Surface Layer Feature Style

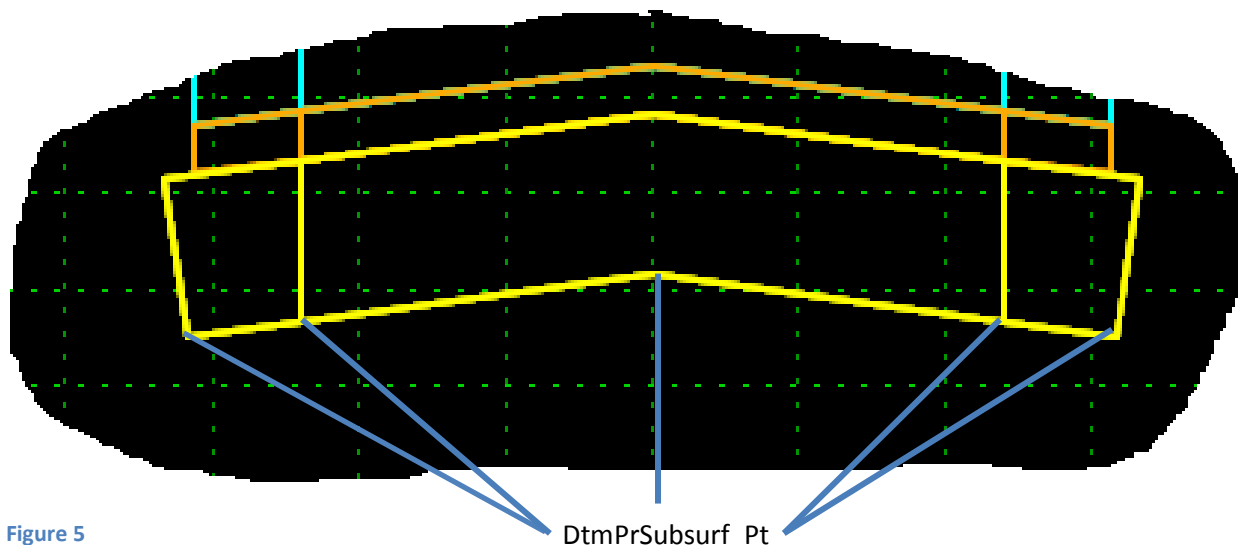
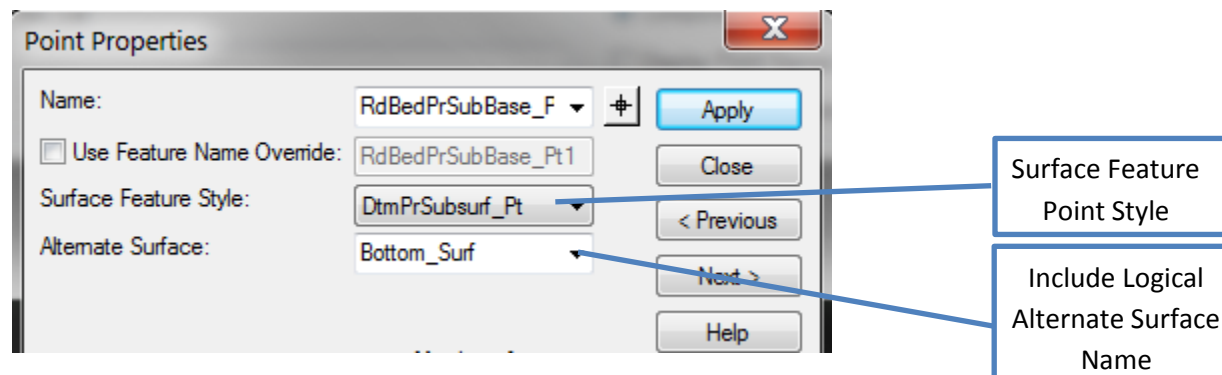


Figure 5

NOTE: The bottom surface layer feature style should be applied to any point on the template that would need to be included in the clay grade or bottom of the proposed pavement section layer. This would include any day lighting points (locations as shown on [Page 1](#)). This can also be applied to a wedging layer or a milling surface on rehab projects.

In addition to the surface feature style, an alternate surface name needs to be included in the point properties for each bottom surface layer as shown below. The bottom surface name should be logical and easily identifiable.



General Overview

The proposed surfaces and 3D line string files required for the RID submittal are generated in the Create Surface dialog in Roadway Designer. It will be necessary to process every road corridor over 200' in length twice to produce the necessary output files. Any road corridor under 200' in length can be processed once along with the associated main line roadway.



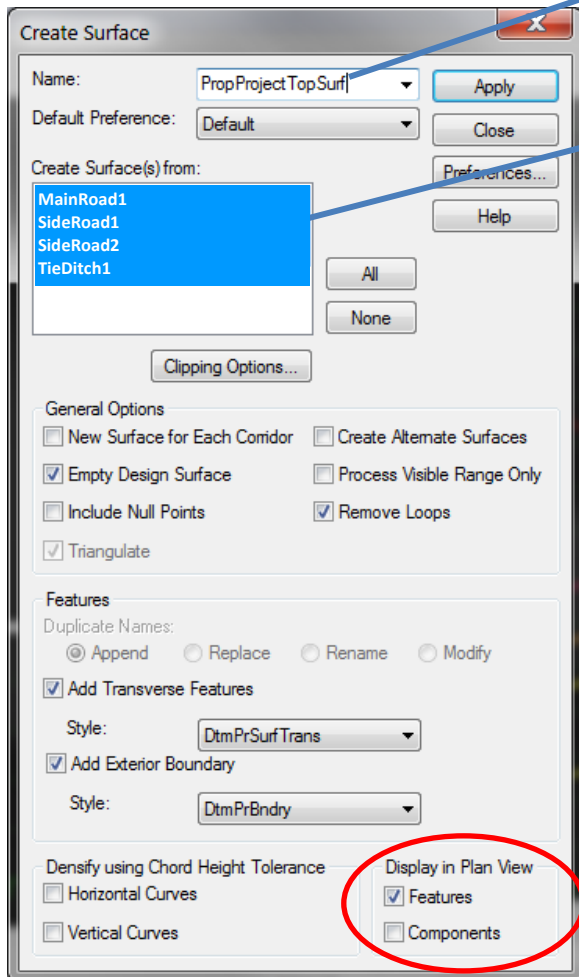
RID Creation

Step 1: Create the 3D DGN Data Required for the Overall Project

NOTE: This step is required for every RID submittal. Prior to completing this step, create the following 3D DGN files named per the [Standard Naming Conventions](#):

- one for the 3D Components (Not required for the Final RID Submittal)
- one for the top surface 3D line strings
- one for the top surface 3D triangles
- one for the bottom surface 3D line strings

Step 1.1: Verify all corridor template drop intervals are set at 5' or less and open the top surface 3D line strings DGN file and set the surface creation dialog in Roadway Designer as follows:



NOTE: The overall proposed surface name is not mandated, but should be specific enough to easily identify the project.

Step 1.2: Select all the corridors that comprise the complete top surface of the project. This would include any roadways, independent ditches, retaining walls or any other corridors which are needed to produce a complete top surface of the project.

Step 1.3: Set the remaining dialog toggles as shown and click “APPLY” to process the model and write the 3D line strings (features) to the file.

NOTE: be sure to include the Transverse and Exterior Boundary styles as indicated.

Step 1.4: Open the 3D line strings DGN file for the bottom surface of the project and reference the 3D DGN file of the top surface.

Step 1.5: Turn off all levels in the referenced top surface file except the level DTM_CorMod_Pr_Subsurf and merge the level DTM_CorMod_Pr_Subsurf into the 3D bottom surface DGN file.

NOTE: Repeat the **Step 1.1** through **Step 1.3** in the 3D Component file except uncheck the display “Features” box and check the “Components” box to create the 3D Components for the Milestone Submittals.



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Step 1.6: Open the triangle 3D DGN file for the project and display the 3D triangles for the proposed surface in the file.

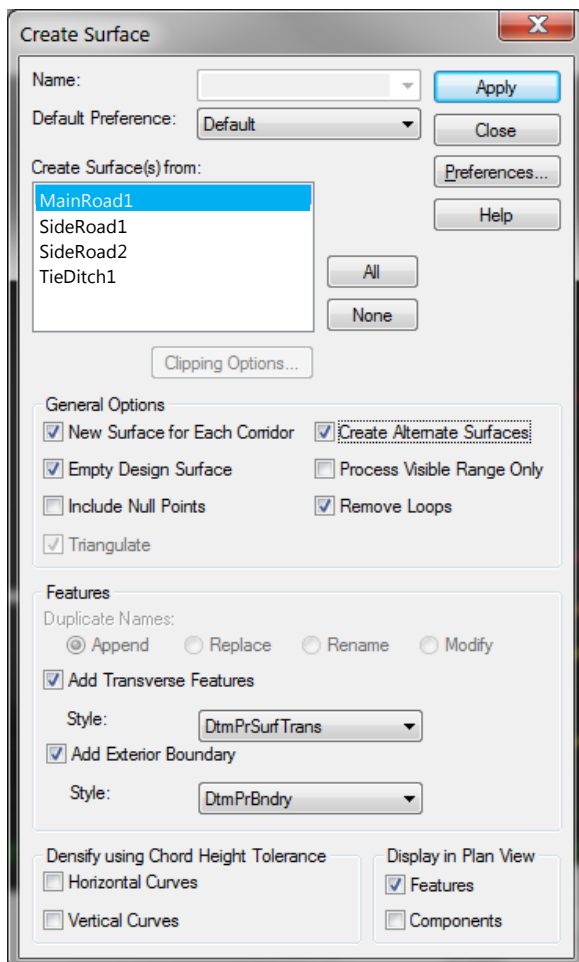
NOTE: See the section, **Displaying the Proposed Triangles**, for more information on how to display the proposed triangles.

Step 1g: Open the top surface 3D line strings DGN file and delete any line strings on levels that have _XS in the level name and are on the DTM_CorMod_Pr_Subsurf level. The only remaining features should be on levels as per the [3D Model Surface Feature List SS2](#) and the [Standard Naming Conventions](#).

Step 2: Create the 3D DGN Data Required Per Roadway

NOTE: This step is only required for the [Final RID Submittal](#). Prior to completing this step create a separate 3D DGN file for of the following for every roadway over 200' in length per the [Standard Naming Conventions](#).

- top surface
- bottom surface



Repeat the following process to create the proposed 3D line string files for each roadway.

Step 2.1: Open the corresponding road top surface 3D DGN file.

Step 2.2: Using Roadway Designer, process corresponding corridor and write the 3D line strings to the file by selecting the corridor and clicking “APPLY” with the dialog as shown.

The 3D features should be displayed for roadway in the 3D DGN file.

Step 2.3: Open the 3D line strings DGN file for the bottom surface of the roadway and reference the 3D DGN file of the top surface.

Step 2.4: Turn off all levels in the referenced top surface file except the level DTM_CorMod_Pr_Subsurf and merge the level DTM_CorMod_Pr_Subsurf into the 3D bottom surface DGN file.

Step 2.5: Open the top surface 3D line strings DGN file and delete any line strings on levels that have _XS in the level name and are on the DTM_CorMod_Pr_Subsurf level.



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Repeat **Step 2** for each roadway over 200' in length. Side roads of less than 200' in length, independent ditches or walls should have the 3D line string features included with the associated mainline roadway.

Step 3: Create the Proposed Surface LandXML files

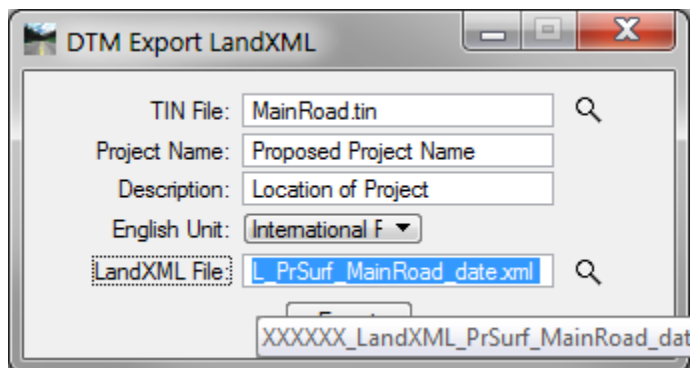
NOTE: This step is only required for the [Final RID Submittal](#) and should only be completed after all the 3D line string and triangle files have been created.

Step 3.1: Open the DTM Tools menu and select the Export XML option on the tool bar.



For help locating the DTM menu please see [Displaying the Proposed Triangles](#).

Step 3.2: Create the LandXML file for the surface as per the [Standard Naming Conventions](#).



NOTE: surface names shown do not reflect actual file name requirements but are intended to indicate the general type of information and naming convention required. All surface names should be specific enough to identify the location and roadway in the project.

Repeat the **Step 3** for each TIN file created with the **Steps 1** and **2** for the project.

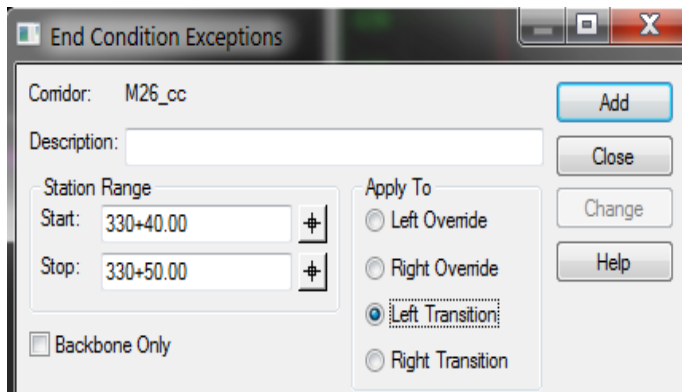
NOTE: Do not create standalone LandXML files for independent ditches, walls or roadways less than 200' in length.



Additional Information

Any template points included in various display rules or hidden features will need to the same feature style as the mainline material layer as well as a consistent feature and component name override name, throughout the template, to build connected 3D line strings for a project. 3D triangles and cross sections when displayed often look fine and the continuity issues are not apparent until the line strings are displayed.

At times the plotted cross sections will not draw components; this is also a symptom of gaps in the line strings or sections where the model has not processed more than once at a driveway or tapered section. The model must create a rectangular component where the cross section will be cut to display in cross section.



Point names and override names are especially import when transitioning between templates. The program will not know how to connect the points across the transition unless the override names match or an end condition exception with a transition is set for the template transition and the points are connected together appropriately.

For more information on template transitions see the [MDOT Power GEOPAK Training Video – Roadway Designer Series: Part 5 – Template Transitions](#).

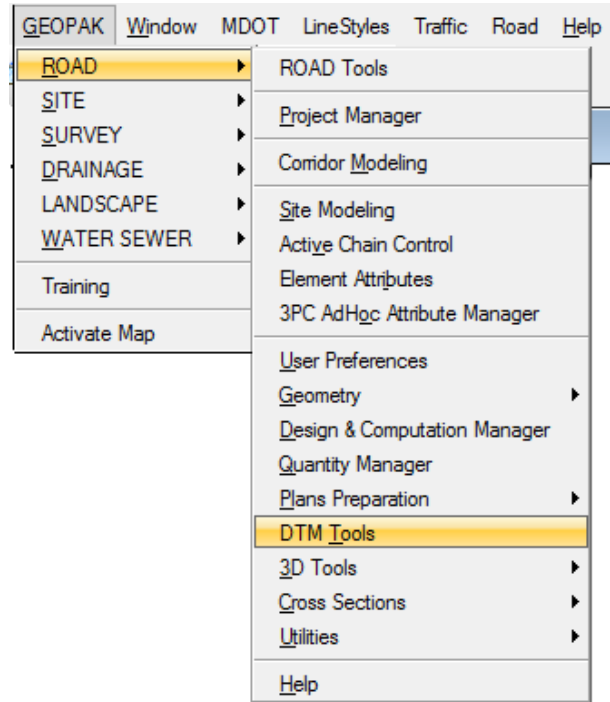
Alternate surface names can be added to any layer of the template if any additional surfaces are requested. It is important that any template point to be included in an alternate surface have the same alternate surface name defined.

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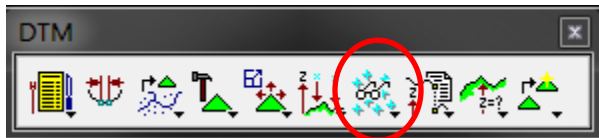


Displaying the Proposed Triangles

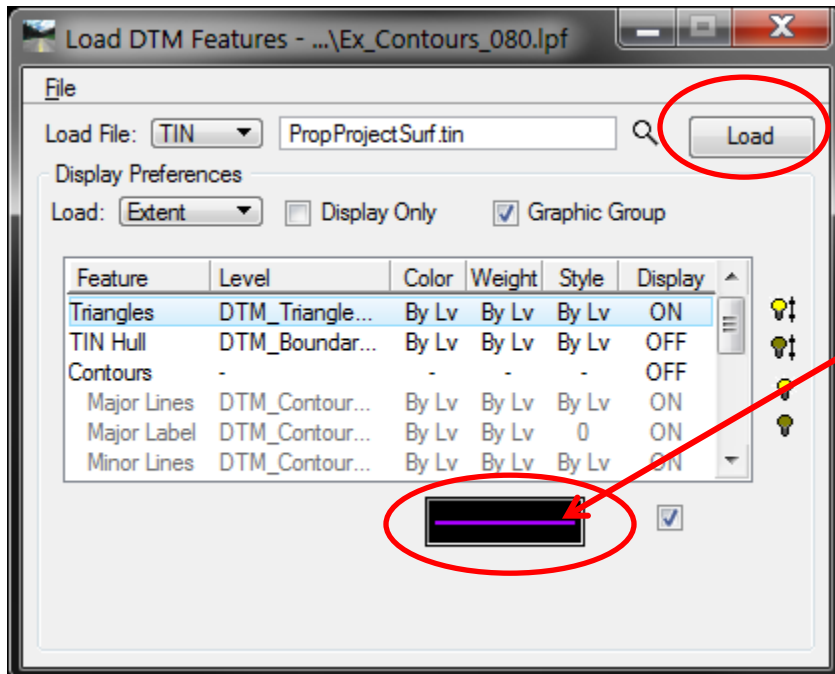
Step A: Open the 3D DGN file named according to the [Standard Naming Conventions](#), and then open the DTM Tools Menu and create and open a run called Prop or something similar. Do not use the “Untitled” run.



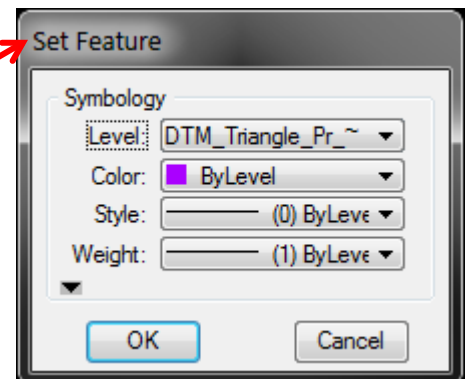
Step B: Select the Load DTM Feature option.



Step C: Select the TIN of the proposed surface and set the toggles on the dialog as shown below. Be sure to set the feature symbology as shown.



Step D: Display the 3D triangles in a 3D DGN file named according to the [Standard Naming Conventions](#) by “Clicking” the Load button.



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Trouble Shooting the 3D line Strings

If the line strings are broken lines meaning they have unnecessary gaps or breaks in the line strings, it will be necessary to use the “Feature Name Override” in the point properties dialog and the “Use Name Override” in the component properties dialog as shown below for components at points that need to be connected in the complete model.

These toggles should be set for like points and components when using multiple templates or display rules. See the MDOT Power GEOPAK Training Webinar: [The Proposed Template Series: Part 6 - Parametric Constraints](#) for more information.

Technical Support

Please email any questions, issues or problems associated with this document to:

MDOT-PowerGEOPAKSupport@michigan.gov

This is also accessible through Microstation or Power GEOPAK while in the MDOT_01 workspace through the “Help\MDOT Support” menu.

