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## Chapter 5

# Surfaces, Cross Sections & Labeling

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## 5.1 Objectives

The purpose of this chapter is to show the user how to cut Geopak cross sections including any necessary labeling using the model or models created in Roadway Designer.

## 5.2 Draw Cross Sections from Surfaces

Once the corridor design is finished and surfaces have been created, the user is ready to cut traditional GEOPAK cross sections to calculate end area method earthwork quantities and/or plot sheets.

When Roadway Designer creates surfaces, they are created in two formats: Geopak TIN and InRoads DTM. The DTM's contain all component layers including their symbology. Consequently, the process of cutting existing and proposed cross sections in Geopak can be combined in one run using the “Draw Cross Sections” from the Corridor Modeler dialog.

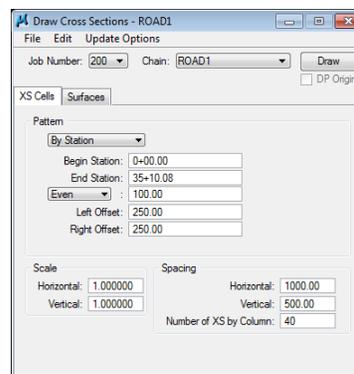
When the “Draw Cross Sections” tool is selected from Corridor Modeler, it brings up the Geopak Project Manager Run.

### 5.2.1 Cutting Existing Ground Cross Sections

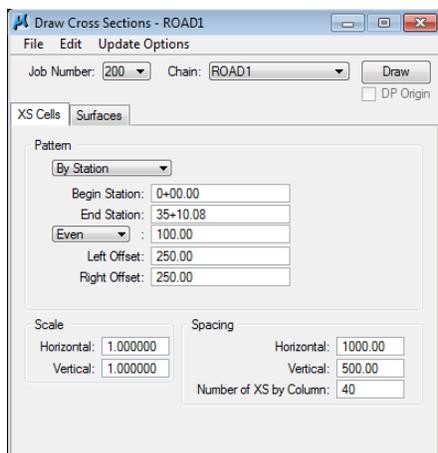
Cutting existing ground cross section follows the same process as the traditional Geopak workflow. The only difference is that the user can choose to draw existing ground cross sections by stations instead of by pattern lines, avoiding the need to create pattern lines in a the pattern-shape drawing.

### 5.2.2 Cutting Proposed Cross Sections

Cutting proposed cross sections from Corridor Modeler uses the same Geopak tool for creating existing ground cross sections.



\*\*See note about setting the primary attributes at the end of this section.



#### Setting the XS cells tab -

If not using pattern lines for existing ground cross sections, then select the XS Cells tab and switch the Pattern Section to “By Station”. Enter the begin/end station (must be a greater multiple of your corridor interval). Select “even or increment” and set your left/right offsets.

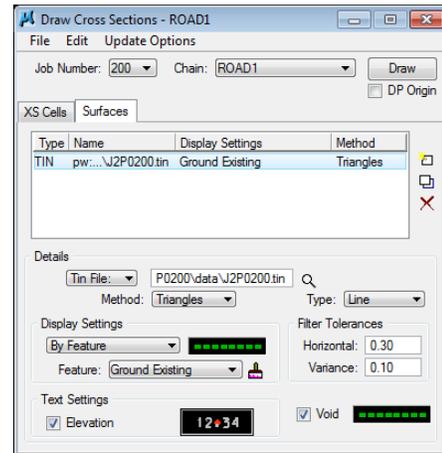
Both horizontal and vertical scales should be set to 1. Use the default spacing. However, the user has the option to adjust the number of cross sections by column.

**Setting the surfaces tab -**

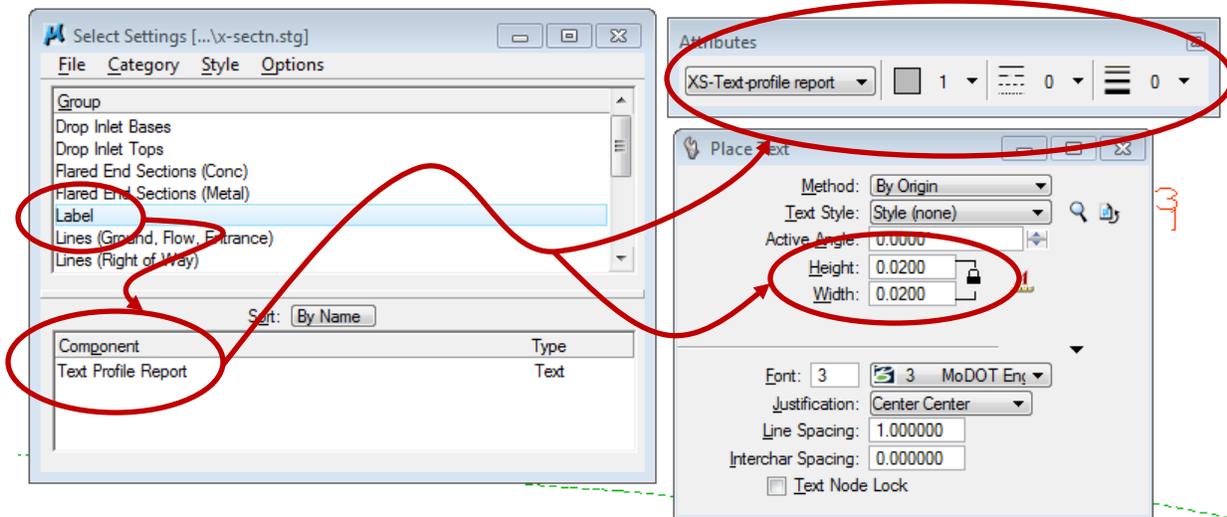
For existing ground cross sections, the process is no different than before. Select your TIN, add it to the list box and select Draw.

For proposed cross sections however, instead of selecting a TIN, select a DTM file. The Display Settings DO NOT need to be reset, the level symbology for each component in the template is drawn based on the template library styles.

All other settings are set by default in the MoDOT run.

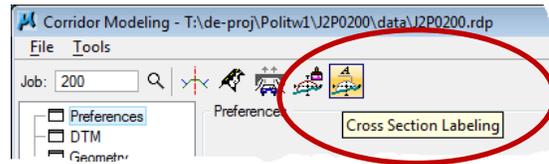


**NOTE:** Point names are part of the DTM therefore, plotting on your proposed cross sections. Unfortunately, they plot using the Microstation active attributes in the file. So, **before** running your proposed cross section using the Roadway Designer created DTM, set your active level in Microstation by using the Settings Manager. The component named Text Profile Report is located in the X-Sections/Culverts Sheets settings manager under the Group named Label. Selecting this component will set up all the primary attributes along with the text attributes, keep in mind that the Category Scale option in the settings manager will affect your text size.

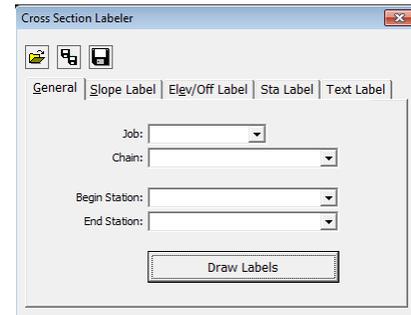


### 5.3 Cross Section Labeling

Proposed cross sections have always been labeled through criteria. Consequently, with Roadway Designer 3D model proposed cross sections, another tool must be utilized to set all the labels in the cross sections for sheet purposes.

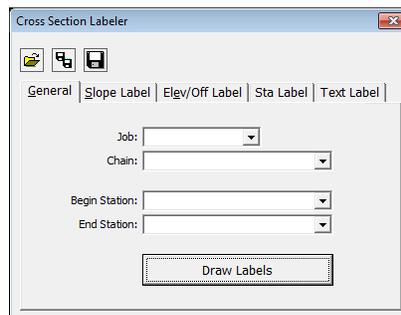


The tool to label cross sections can only be accessed thru the Corridor Modeler tools, and it is called “Cross Section Labeler”, which is not the same as the Geopak Cross Section Labeler from the Cross Section Tools.

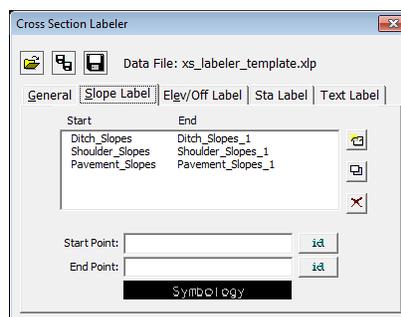


#### 5.3.1 The Cross Section Labeler

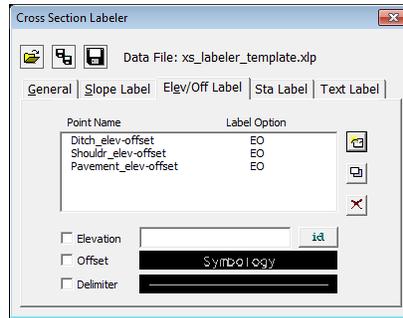
**The General Tab** - contains the GPK information: Job Number, Chain, and Begin/End Stations. This information is read and populated from the Geopak Cross Section Cell. The user can label different begin/end station ranges.



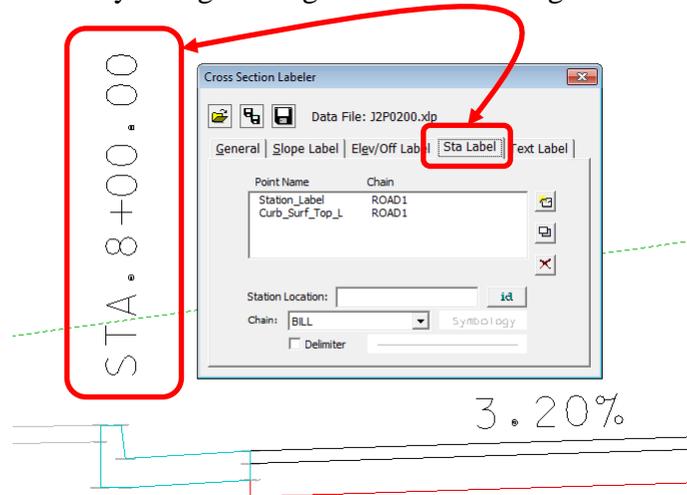
**The Slope Label Tab** - Contains all the labels to be used for slope readouts. The labels are defined by the point names in the project template. The slope label then is determined from the slope between the two selected points. Each label is added to the list box. The symbology is determined by what is set up in the symbology dialog for each line in the tab. Each line can have different symbology if necessary.



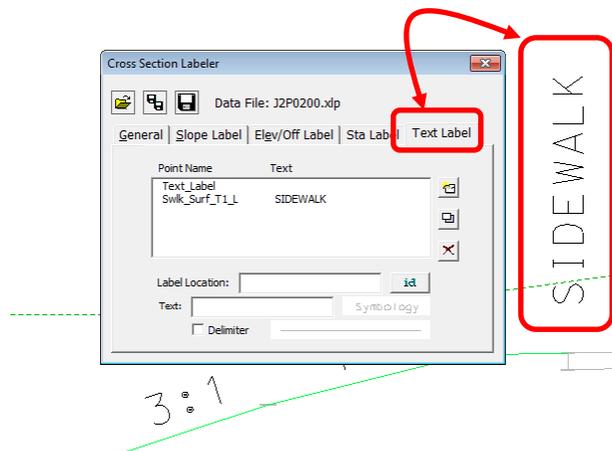
**The Elev/Offset Label Tab** - Contains all the lines to be used for all the labels for elevations and offsets from the centerline. Each label has three options: Elevation, Offset, and Delimiter. The elevation and offset are placed as a Microstation text node and share the same symbology.



**The Sta Label Tab** - Contains a line to be used for labeling the stations pertaining to a specific chain. The value automatically changes along with the stationing from station to station.

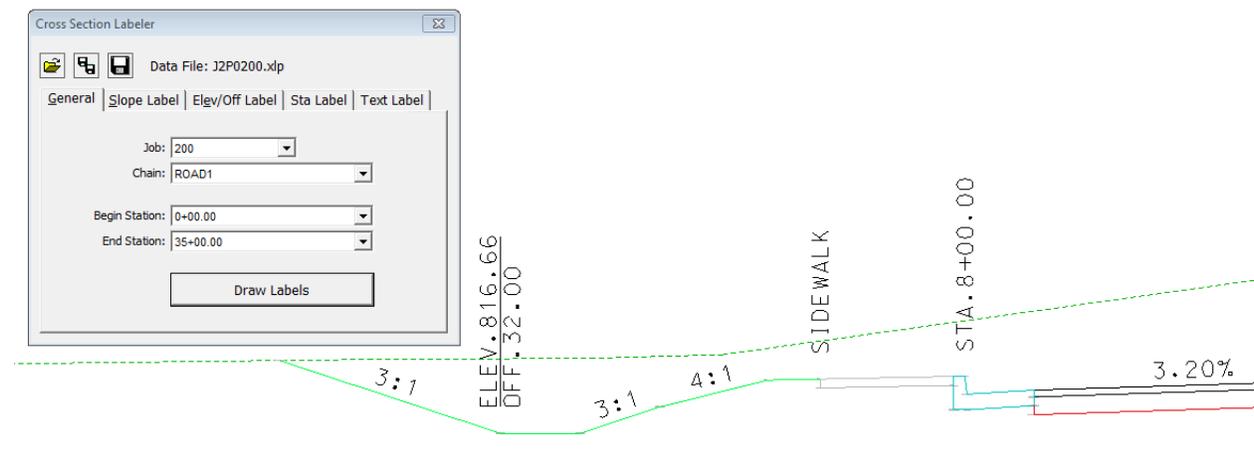


**The Text Label Tab** - Contains a line to be used for placing label text using the point names as an anchor point. This option contains an input field to enter desired information.



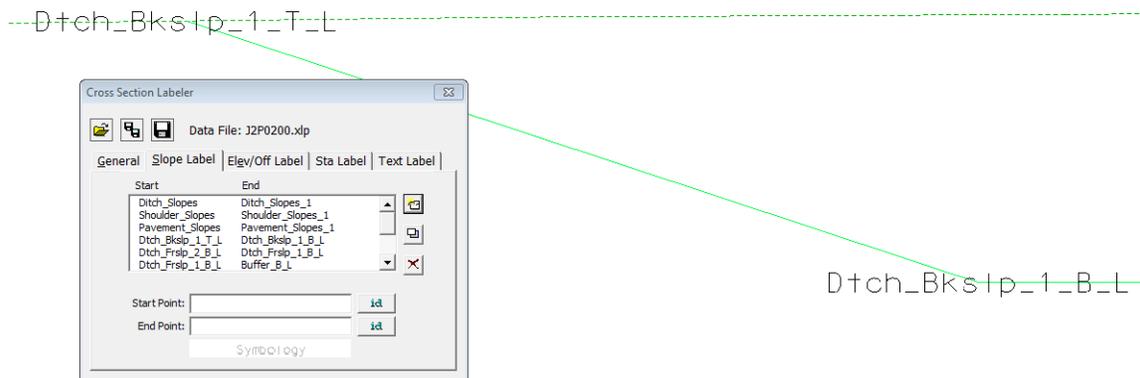
### 5.3.2 Loading and Plotting Cross Section Labels (Workflow)

1. Open the Cross Section Labeler from Corridor Modeler while in the cross section design file.
2. Browse for desired preference file.
3. Populate the General tab.
4. Review tabs, and modify as necessary using the add/modify/delete icons.
5. Go to the General Tab and select “Draw Labels”.
6. Review the labels plotted in the cross section file.



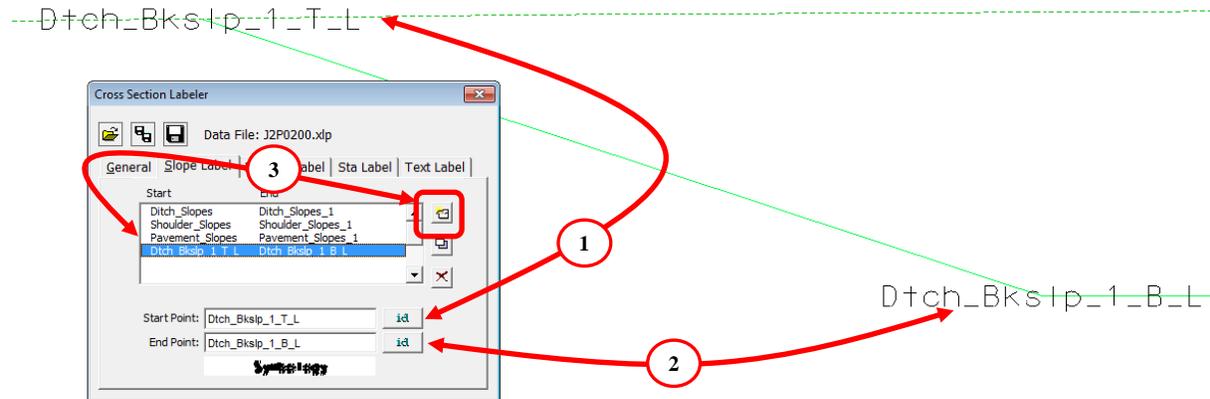
### 5.3.3 Adding Slope Labels (Workflow)

Navigate or pan close enough to a slope line to be labeled. Now zoom in close enough to read the text from the points that the **Draw Cross Sections from Surfaces** tool has placed. (The text shown here has been scaled up for clarification, you will have to zoom in closer than this example)



Select a default entry item to copy the attributes from. In this example we will choose the Ditch\_Slopes entry since we want to label a ditch back slope.

1 With the Ditch\_Slopes entry selected, left click the Start Point “id” button and simply left click either point to define the label start point and accept the point by left clicking in a blank area of your screen. The Start Point input field will now show the selected point name.

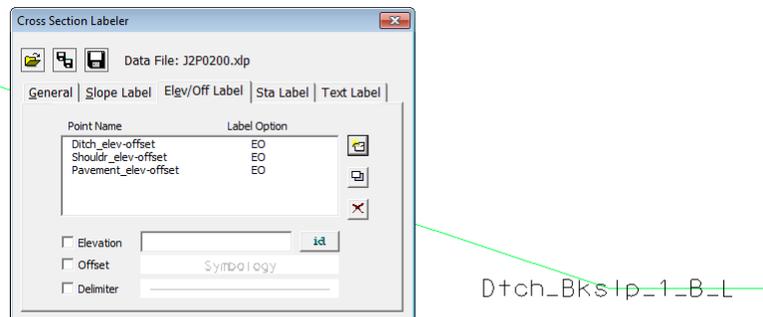


2 Now we need to input the End Point field with the correct point name. Left click the “id” button and select the desired point for the End Point. Again, left click in a blank area on the screen to accept the chosen point and the input field will be defined.

3 The next step is to add the entry to the collection field by left clicking the Add button as shown above in step 3. The collection field will continue to grow by adding whatever slopes you desire by selecting the type of slope you prefer from the 3 available default entries.

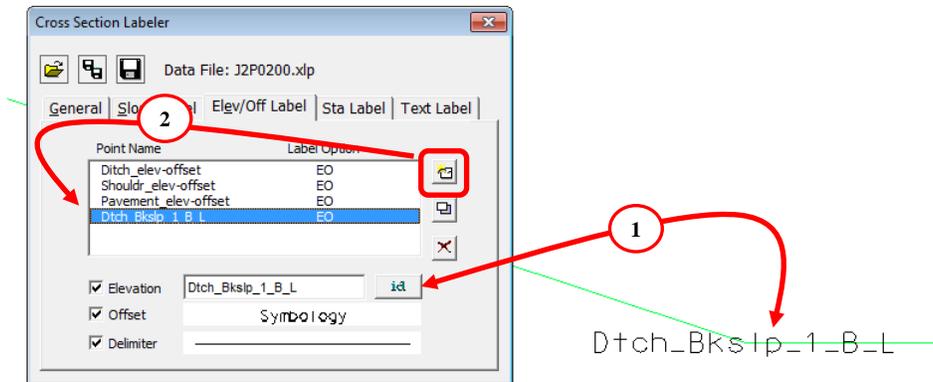
### 5.3.4 Adding Elevation/Offset Labels (Workflow)

Navigate or pan close enough to a slope line to be labeled. Now zoom in close enough to read the text from the points that the **Draw Cross Sections from Surfaces** tool has placed. (The text shown here has been scaled up for clarification, you will have to zoom in closer than this example)



Select a default entry item to copy the attributes from. In this example we will choose the Ditch\_Slopes entry since we want to label a ditch back slope.

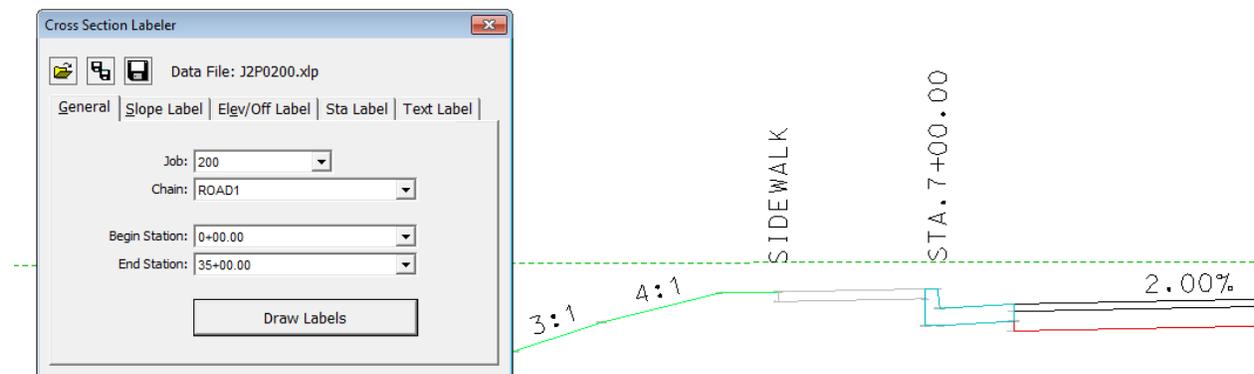
1 With the Ditch\_elev-offset entry selected, left click the Start Point “id” button and simply left click to define the elevation label point and accept the point by left clicking in a blank area of your screen. The input field will now show the selected point name.



2 The next step is to add the entry to the collection field by left clicking the Add button as shown above in step 2. The collection field will continue to grow by adding whatever slopes you desire by selecting the type of slope you prefer from the 3 available default entries.

### 5.3.5 Plotting the Labels

After the tabs have been modified to include the slopes and elevations or any other pertinent information then you can go back to the General tab and click the Draw Labels button



Use the Cross Section Navigator to go through your sections and verify that all labels have been accounted for.

**5.4 Group Exercise: Cutting GeoPak Cross Sections & Labeling**

1. Open the following MicroStation file:

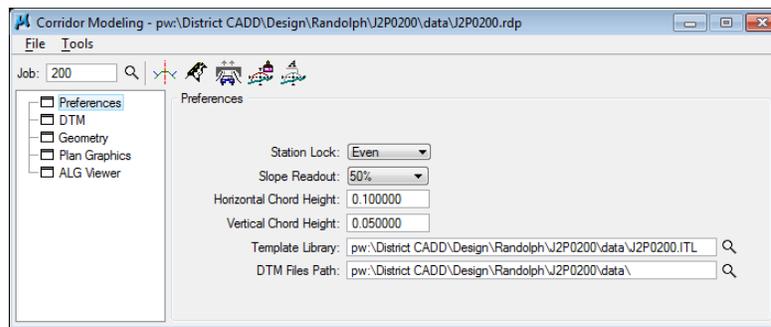
pw://MoDOT/Documents/District CADD/Design/Randolph/J2P0200/data/XS.dgn

Save-as the file to: **XS\_Road1.dgn**

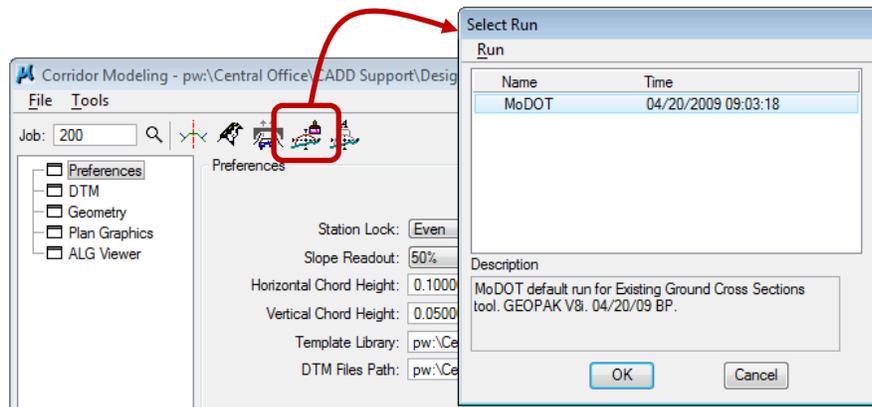
2. Access the Geopak Corridor Modeler Tool. **Geopak Road>>3D Tools>>Corridor Modeler**

Verify the J2P0200 preference file is loaded:

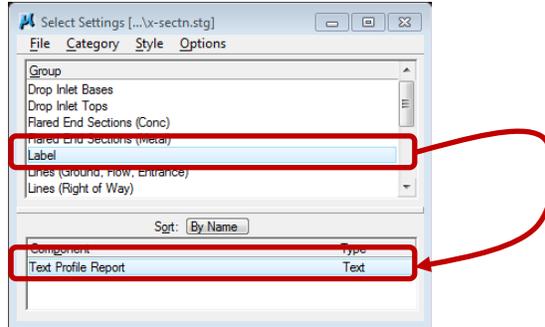
pw:\District CADD\Design\Randolph\J2P0200\data\ J2P0200.rdp



3. Select the Draw Cross Sections Tool. Copy the MoDOT run and name it ROAD1.



4. **Do not skip this step!** Set your active attributes in Microstation by using the **Settings Manager**. Verify that the Category Scale is set to **1”=1’**. Click the component named **Text Profile Report** which is located in the **X-Sections/Culverts Sheets** settings manager under the Group named **Label**.



5. Populate the **XS Cells** tab and the **Surfaces** tab for **EXISTING GROUND**:

**Pattern:**

**By Station**

**Begin Station:** 0+00.00

**End Station:** 35+10.08

**Even:** 100.00

**Left Offset:** 250

**Right Offset:** 250

**Scale:**

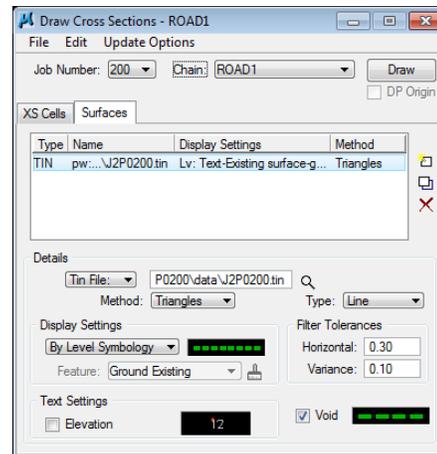
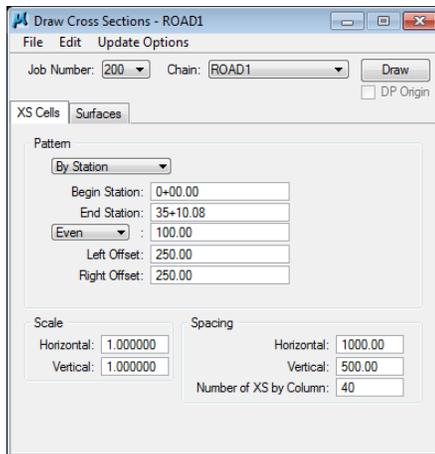
**Horizontal:** 1

**Vertical:** 1

**Spacing:** Leave to Default

Set up the **Surfaces** tab as follow for existing:

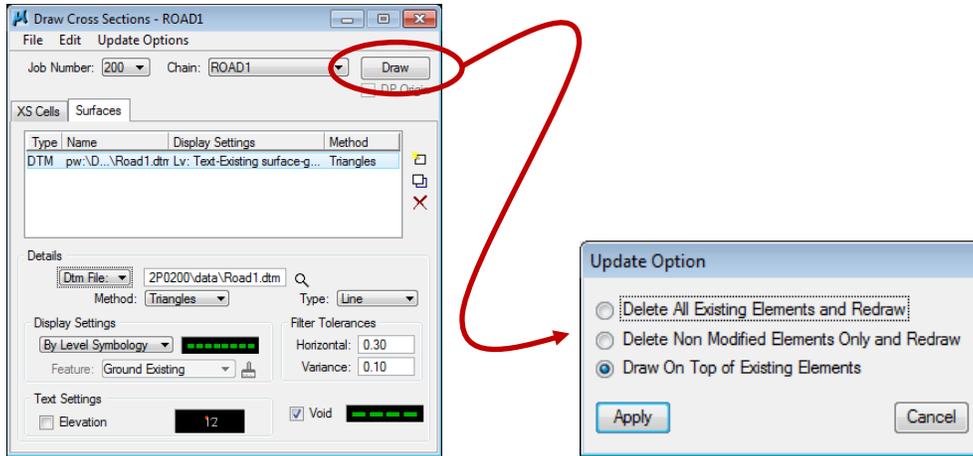
**TIN File:** J2P0200.tin (Make sure the symbology is all set to existing ground symbology)



**CLICK ON DRAW to run the existing!!!!**

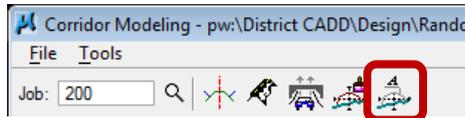
6. Set up the **Surfaces** tab as follow for **PROPOSED**:

**DTM File = Road1.dtm** (Don't worry about any of the display settings)

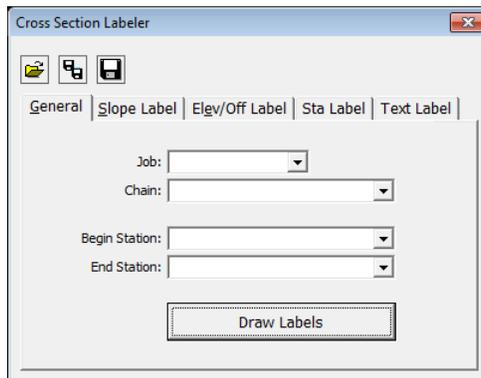


**CLICK ON DRAW to run the proposed!!!!**

7. Select the **Cross Section Labeling** tool from Corridor Modeler.



8. Open the xlp file in the data folder and rename to ROAD1. Review the **General** tab. Edit the job, chain and begin/end stations as needed.



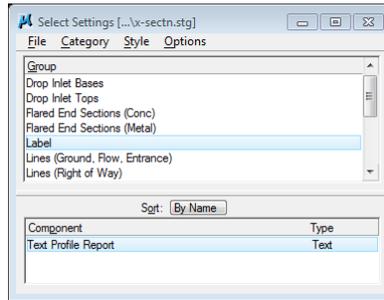
Load the preference file, run the tool and make necessary additions if needed.

**5.5 Individual Exercise 5-1: Cutting GeoPak XS & Labeling**

1. Save the **XS.dgn** as **XS\_ROUTE63.dgn**

2. Using the Draw Cross Sections Tool located in the Corridor Modeler create a run named **ROUTE63**.

3. Set the Text Profile Report settings by using the Settings Manager



4. Populate the **XS Cells** tab and the Surfaces tab for **EXISTING GROUND**:

<b><u>Pattern:</u></b>	<b><u>Scale:</u></b>
<b>By Station</b>	<b>Horizontal: 1</b>
<b>Begin Station: 10+00.00</b>	<b>Vertical: 1</b>
<b>End Station: 70+00.00</b>	<b><u>Spacing:</u></b>
<b>Even: 100.00</b>	Horizontal: 1500
<b>Left Offset: 500</b>	Vertical: 500
<b>Right Offset: 500</b>	

Set up the **Surfaces** tab as follow for existing:

**TIN File:** J2P0200.tin (Make sure the symbology is all set to existing ground symbology)

5. Using the DTM file for **ROUTE 63** create the proposed cross sections.

6. Open, Save as and modify the XLP file in order to label the **Route 63** cross sections.

## 5.6 Review Quiz

1. In the Corridor Modeling workflow, what application is used to cut proposed cross sections?
2. What new option has been added to the Draw Cross Sections dialog?
  - a. TIN file
  - b. Triangles File
  - c. DTM file
3. **True or False.** The symbology of the proposed cross sections comes from the template library components.
4. When the component point names are placed on the proposed cross sections, where the text symbology come from? \_\_\_\_\_
5. What element is used by the XS Labeling tool to label the cross section components?
  - a. MicroStation lines
  - b. Cross Section Cell
  - c. Cross Section point labels
  - d. Existing ground DTM
6. The cross section labeling preference file uses what extension?
  - a. .ird
  - b. .xlp
  - c. .xld
7. If I used an interval of 10 ft in Roadway Designer when dropping my templates, which of the following would be an INCORRECT interval for my proposed cross sections?
  - a. 5
  - b. 20
  - c. 50