Cross Sections and End Area Volumes

SUPPLEMENT TO INROADS SURVEY

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Supplemental Lab
Cross Sections and Volumes

Objectives

Upon completion:

- You will be able to create cross sections showing the multiple surfaces and to calculate end-area volumes between as-designed and as-constructed surfaces.

Getting Started

1 **Start InRoads**

- On the **MicroStation Manager** dialog,
  - Set the **Project** to ***KYTC Roadway***
  - Navigate to *c:\ztrain*
- Select the MicroStation design file *kytc_3D.dgn* and choose **OK**

MicroStation starts and opens the design file, then InRoads starts as normal.

2 **Open your project data files**

- Select **File** > **Open**
- Set the Files of type to *InRoads Files*
- **Open**
  - Civil_V8i.xin
  - WBMtnPrkway.alg (the geometry project)
  - Constructed Surface.dtm (the surveyed as-constructed surface)
  - Proposed Berm.dtm (the as-designed surface)
  - SurveyMound.dtm (the surveyed existing ground)

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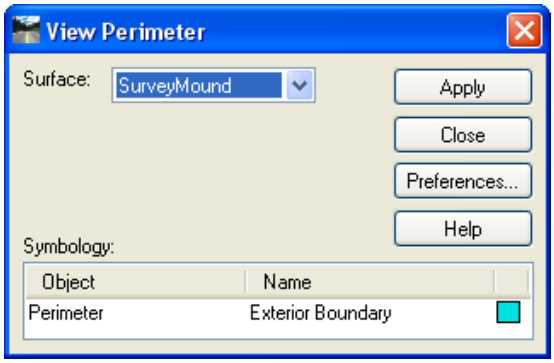
Review the data

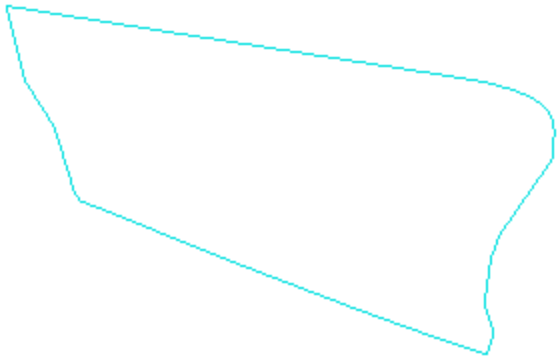
3 Display a perimeter

- Turn off **Style** lock

- Select **Surface > View Surface > Perimeter**
- Set the Surface to ***SurveyMound***
- Select **Apply**



The outer limit of the surface triangles is displayed in the design file



- **Close** the **Perimeter** dialog

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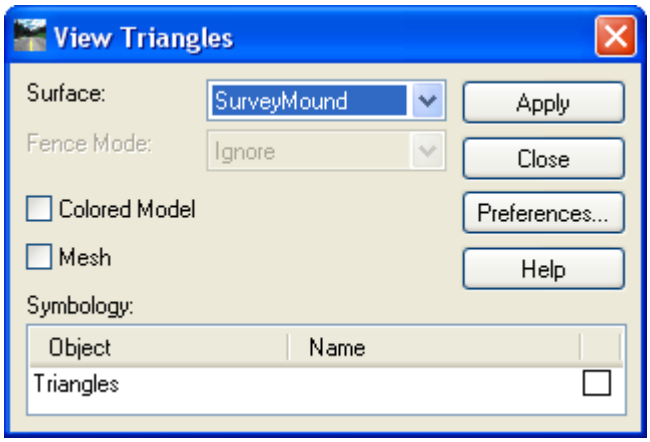
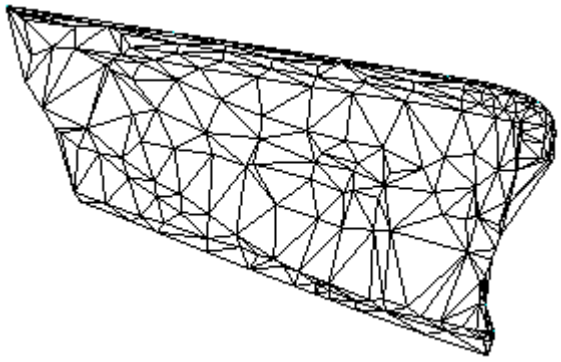
4 View triangles

- Select **Surface** > **View Surface** > **Triangles**
- Select **Apply**





- Review the triangles, then use MicroStation to **Delete** them

The display of the triangles is a graphic group. If Graphic Group lock is on, they are deleted as one.

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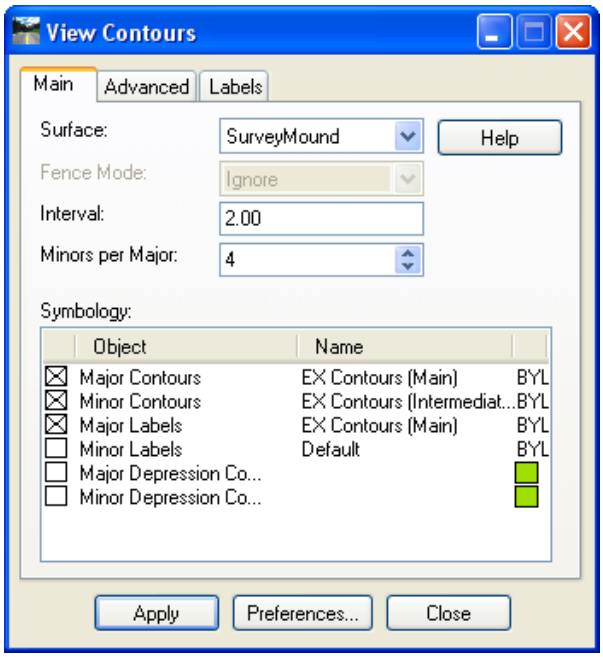
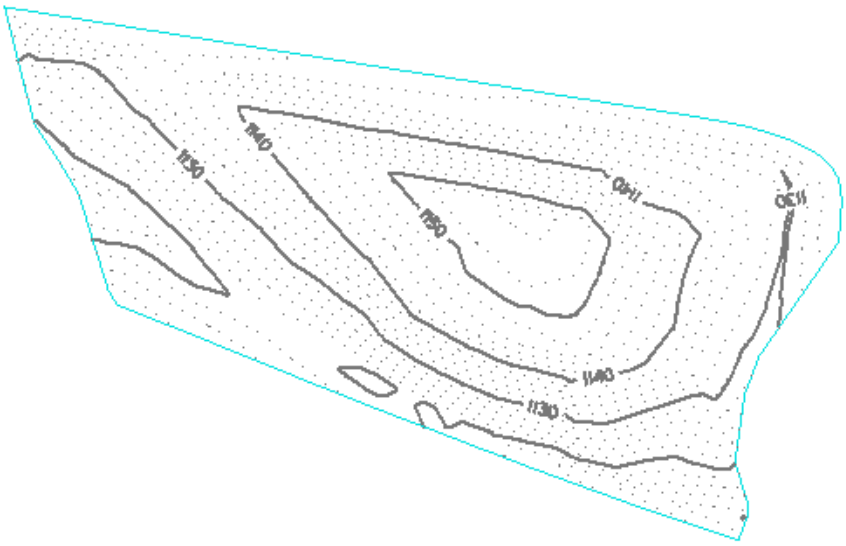
5 View contours

- Select **Surface > View Surface > Contours**
- Choose **Preferences** and Load ***EX Contours***
- Select **Apply**





- Review the contours
- **Close** the **Contours** dialog
- Use MicroStation to **Delete** the contours

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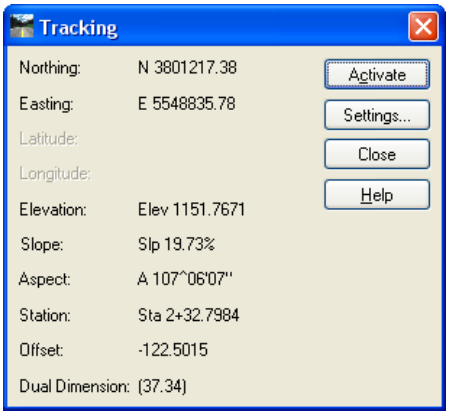
Displaying surface coordinates

There are several ways to plot the coordinates and elevations of the surface points. This is one way to label coordinates in your design file.

6 **Write surface coordinate information into the design file using the Tracking command.**

- Select **Tools** > **Tracking** > **Tracking**
- Choose **Activate**
- Move the cursor around inside the perimeter



Notice that the information in the Tracking dialog box updates as the cursor moves across the screen.

- Close the **Tracking** dialog
- Review any of the other surfaces as desired

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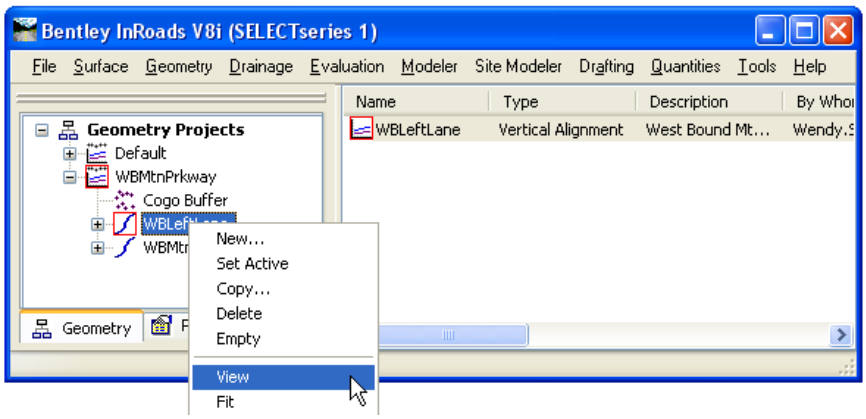
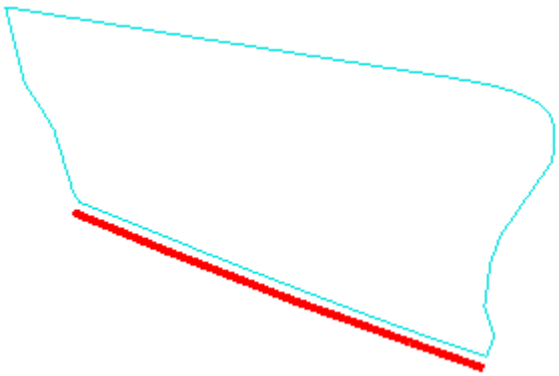
Creating Cross Sections

7 **Create cross sections showing the existing surface, designed surface and as constructed surface**

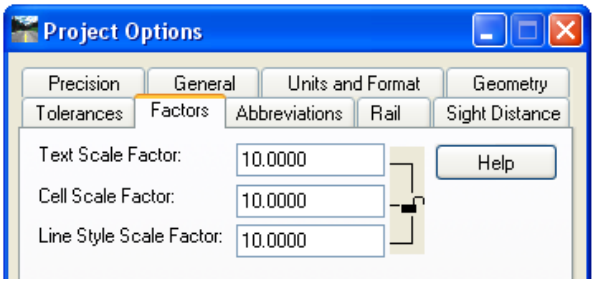
- Right-click on the WBLeftLane alignment in the Explorer as shown and choose View





This is the alignment you are about to use for cutting sections.

- Choose **File > Project Options** and Load the **10 Scale** preference



- **Apply** and **Close**

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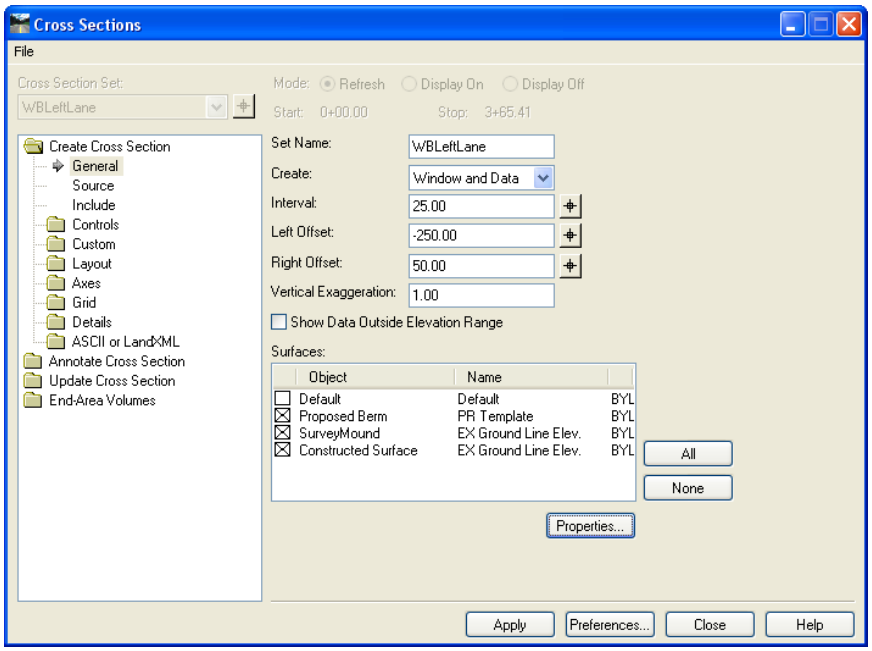
- Choose **Evaluation > Cross Section > Create Cross Section**
- Choose **Preferences** and load 10 Scale SXS
- Set the **Interval** to **25**
- Set the **Left offset** to **-250**
- Set the **Right offset** to **50**
- Toggle on all three surfaces as shown



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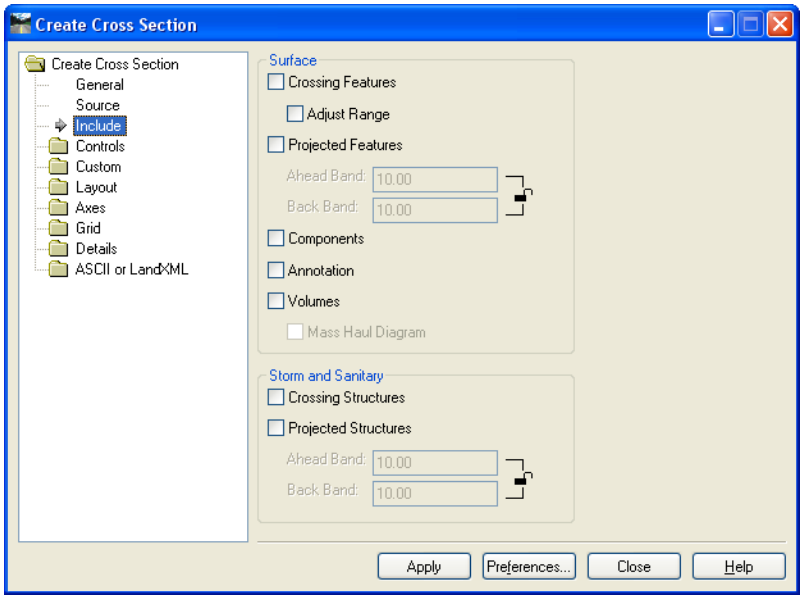
- In the **Tree** structure, choose *Include*



Notice options that you can include.

Crossing Features *displays feature that actually cross the line 'cut' by the cross section. Their display is controlled by the feature style associated with the individual features. You can use* ***Update Cross Sections*** *to display feature individually.*

Projected Features *allows you to show features on a cross section that fall within a band-width of the cross section, rather than only those that the section actually crosses. This is useful for projecting both breaklines and random points to the sections, such as trees or structures.*

Components *allow you to display the components from the template in the cross section, in addition to the ground surface. Remember, the only proposed ground surface you have is the finished grade, so you will need components to show the subgrades and for computing volumes. There will be duplicate lines, since the ground surface is also made up of components that will be displayed. If you do not want to show all components, you can leave this option off and turn on individual components with the Update Cross Sections command or make sure the components you do not want to show on the sections use feature styles that do not have the cross section option toggled on.*

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Notice the other include options. ***Annotation*** *will annotate the ground surfaces (not the features), and* ***Volumes*** *will compute and annotate end areas. Both of these can also be accomplished later with the* ***Cross Section Annotation*** *and* ***End Area Volume*** *commands respectively.*

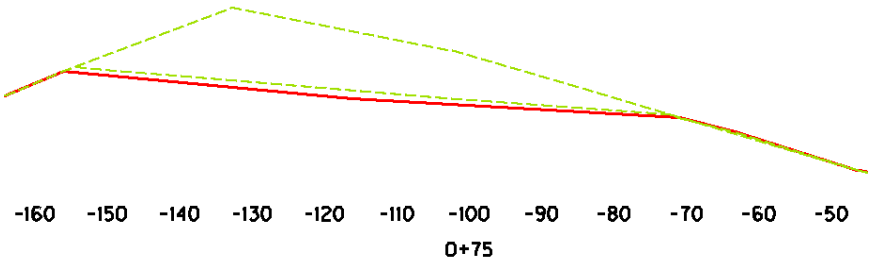
- Leave all of the options toggled **off** for now
- Using the tree structure, look at the other options in the **Cross Section** dialog
- **Apply** and identify **(<D>)** a clear area in your design file.

When you select a location with the <D>, you are giving it the lower left corner of the first section.

- **Close** the **Create Cross Sections** dialog

8 **Review the cross sections**

- Use **Evaluation > Cross Section > Cross Section Viewer** to review the sections



Notice on the sections that two of the surfaces appear with the same symbology. You'll change the assigned symbology and update the sections to reflect the change.

(Here the grid lines have been turned off to better see the surfaces.)

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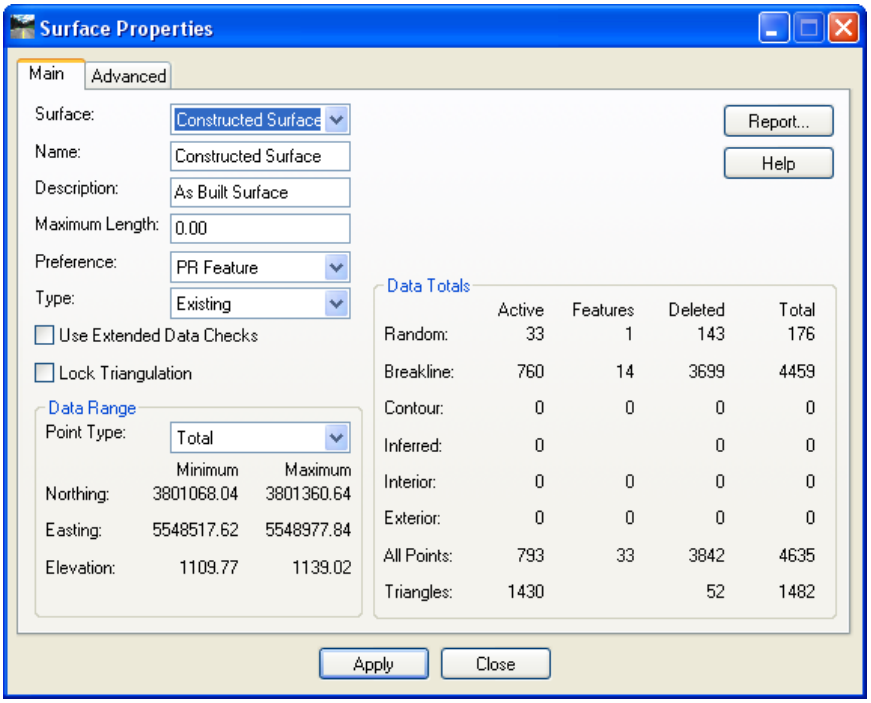
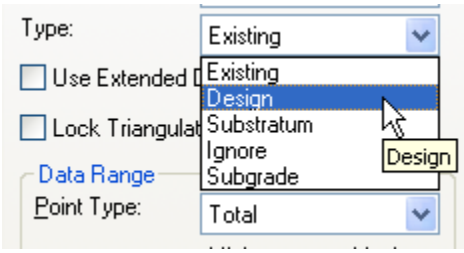
9 Assign a symbology and update the sections

The Update option allows you to re-display surfaces or features without re-creating the sections. Here, you'll use it to re-display a surface with different symbology.

- Choose **Surface > Surface Properties** and set **Surface** to ***Constructed Surface***



- Set the **Type** to ***Design***



In order to later calculate volumes between two surfaces, one must be set to Existing and another to Design.

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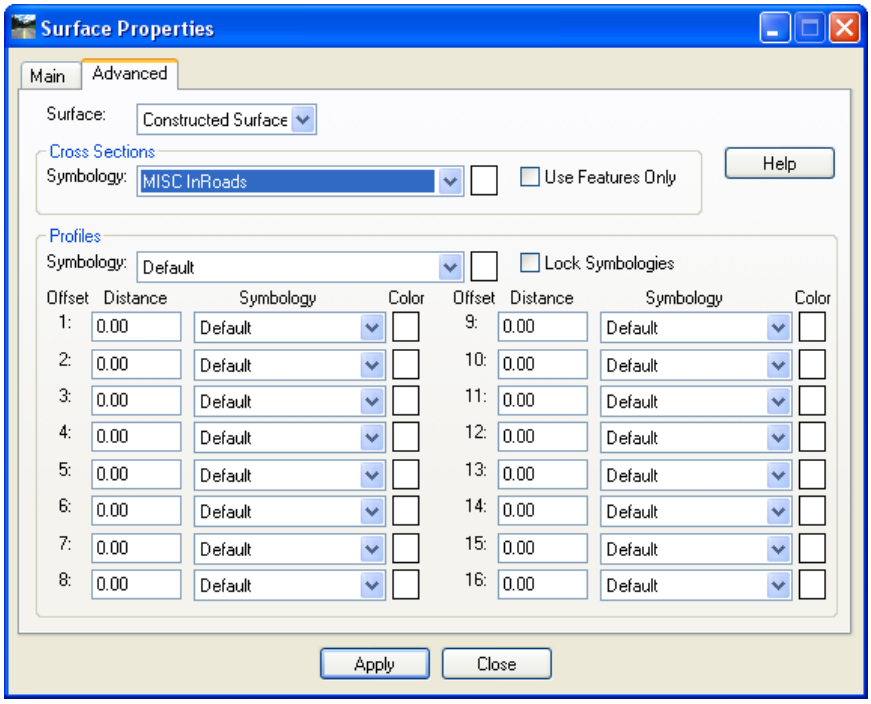
- On the **Advanced** tab under the **Profiles** section, set the symbology to ***MISC InRoads***



- **Apply**, then **Close** the **Surface Properties** box

The Constructed Surface ground line will now display on the Cross Sections using this Named Symbology.

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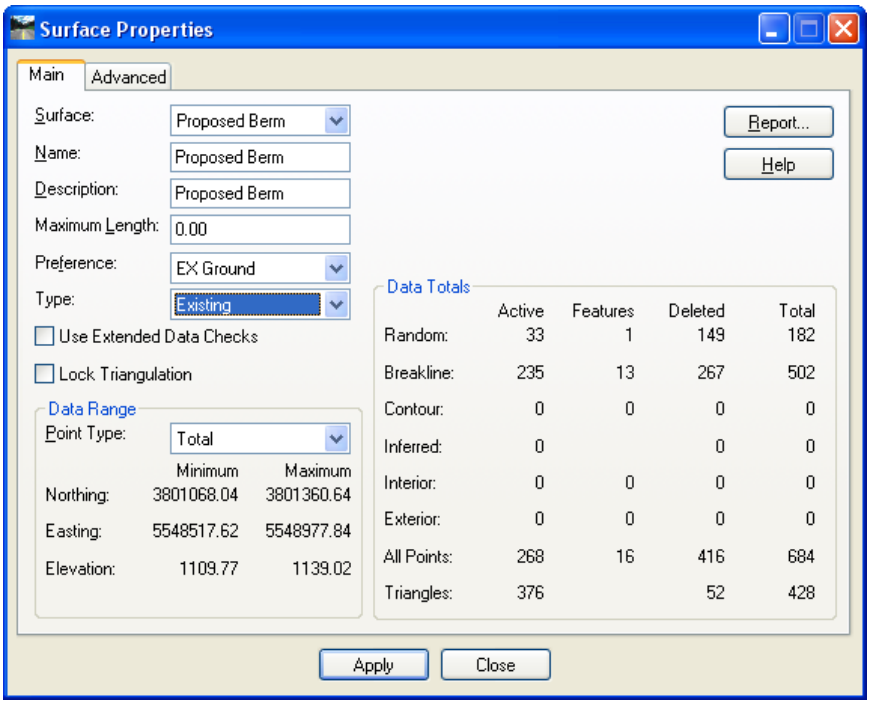
- Set the **Surface** to ***Proposed Berm***
- On the **Main** tab, set the **Type** to ***Existing***



- **Apply**, then **Close** the **Surface Properties** box

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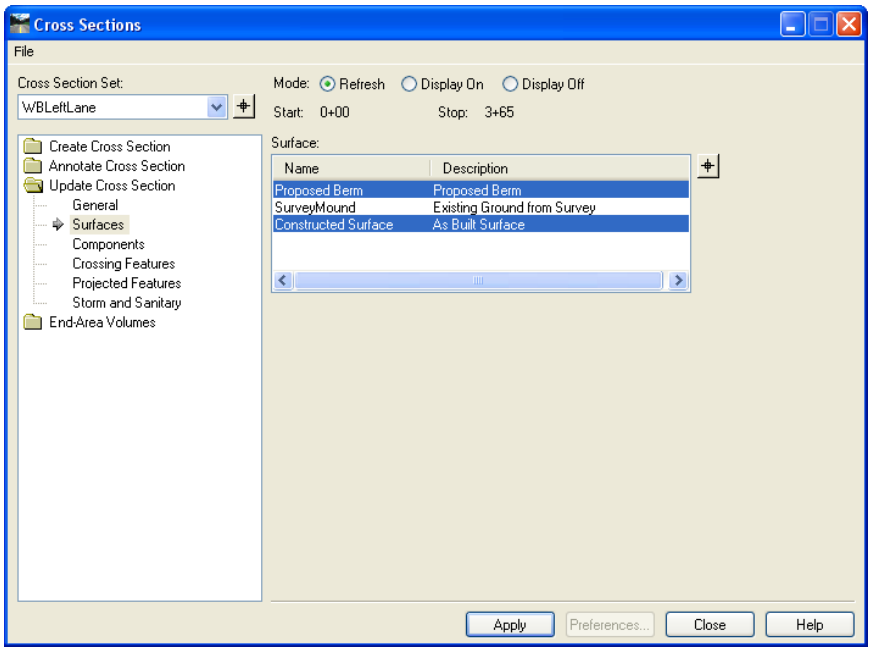
- Choose **Evaluation > Cross Section > Update Cross Sections**
- Toggle the **Cross Section Set** to the last one you created



- In the Tree structure at left, highlight **Surfaces** under *Update Cross Section*
- Set the **Mode** to Refresh
- In the **Surface** area, highlight *Proposed Berm and Constructed Surface*
- Choose **Apply**
- **Close** the **Update Cross Sections** dialog

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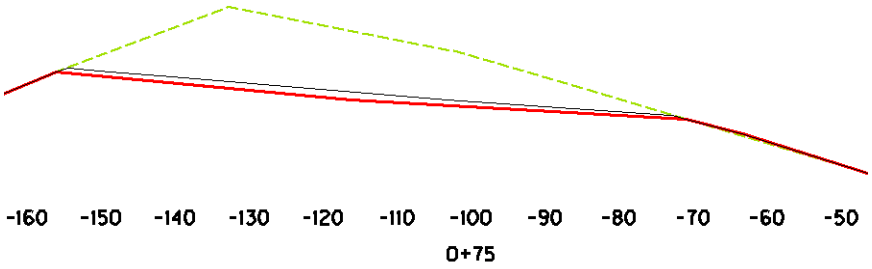
10 **Review the updated cross sections**

- Use **Evaluation > Cross Section > Cross Section Viewer** to review the sections



The sections now show the surfaces in different symbologies and one is known as the Design and one the Existing.

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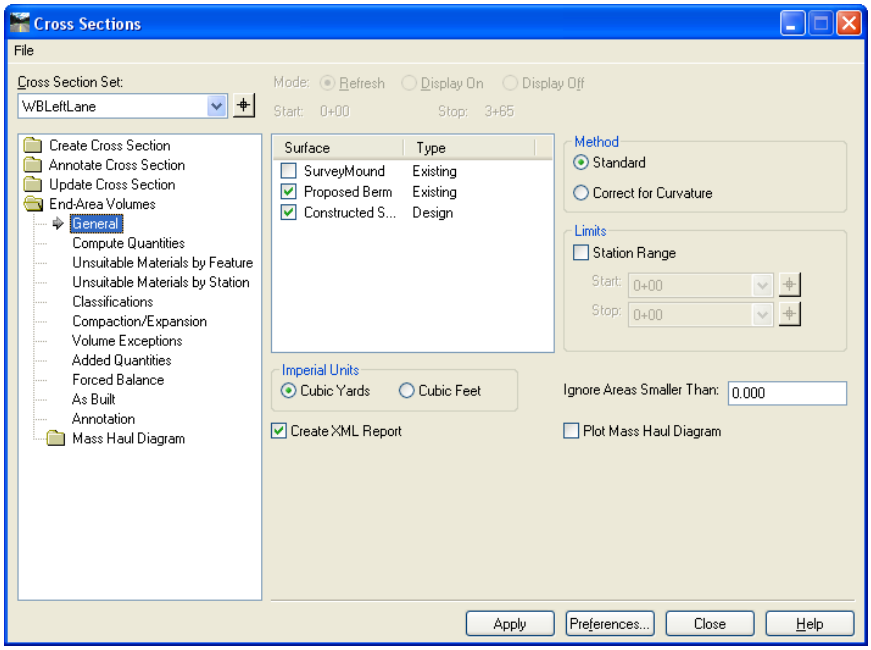
End Area Volumes

11 **Calculate end area volumes for the new set of cross section**

- Choose **Evaluation > Volume > End Area Volume**
- Set the **Cross Section Set** to the complete set of sections where you displayed the components
- Select the *General* branch of the tree structure
- Toggle on both the Proposed Berm and the Constructed Surface surfaces
- Toggle on Create XML Report



- Choose **Apply**

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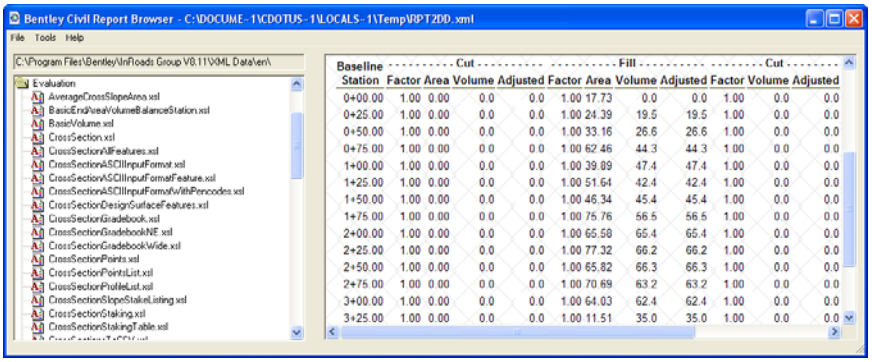
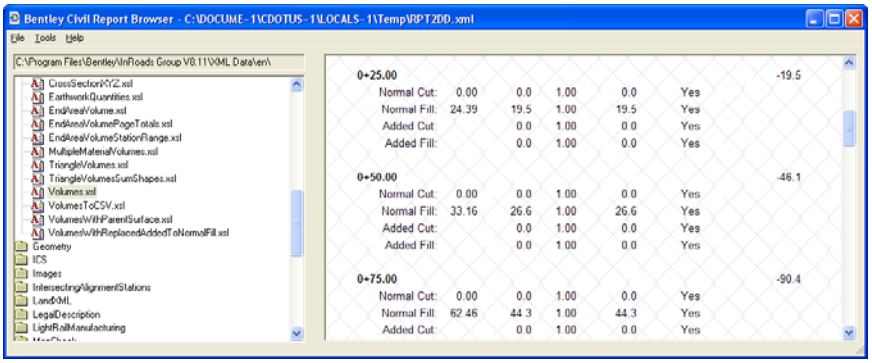
*The volumes are calculated, the cross sections annotated and the **Report Browser** appears with the default report format (style sheet).*

Note: If this is the first time a report is created on your machine, you may be asked to select a style sheet first.



- Choose the style sheet *Volumes.xsl*



Notice the station by station volumes listed in either report.

- Experiment with any other formats you would like.
- **Close** the **Report Browser**
- **Close** the **Volumes** dialog

You do not need to save the parameters file.

12 Exit MicroStation and InRoads or move on to the Challenge

Challenge

13 Annotate the Cross Sections as shown in class.

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