LAB 3 - Geometry Annotation

This lab demonstrates how annotate horizontal geometry, set and display alignment stationing, and use horizontal alignment tracking tools.

Chapter Objectives:

- Display horizontal alignments.
- Annotate horizontal alignments and cogo points.
- Reset stationing on an alignment.
- Display stationing.
- Add a station equation.
- Use Tracking and Horizontal Alignments Tracking.

The following files are used in this lab:

- C:\Projects\12345\Design\Drawings\Reference_Files\12345DES_Model.dgn
- C:\Projects\12345\Design\InRoads\12345DES_Geometry.alg
- C:\Projects\12345\Design\InRoads\12345 existing ground.dtm

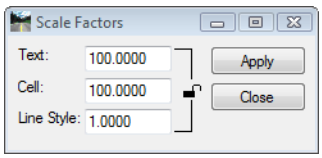
Lab 3.1 - Geometry Display

Section Objectives:

- Set the proper scale factors.
- Open a saved view in MicroStation.
- Display alignments using the View and Annotation commands.

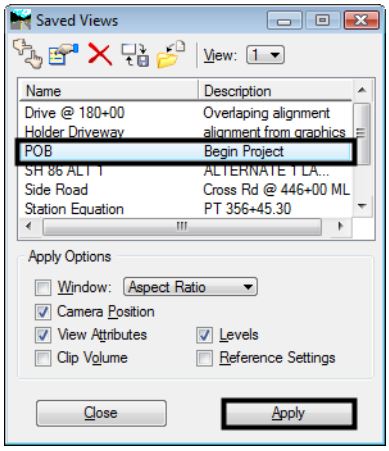
Options for displaying horizontal alignments are available when using the **Horizontal Annotation** dialog.

1. Select **Tools > Global Scale Factors** and set the scales to ***100*** for ***Text*** and ***Cell*** and ***1*** for ***Line Style*** .

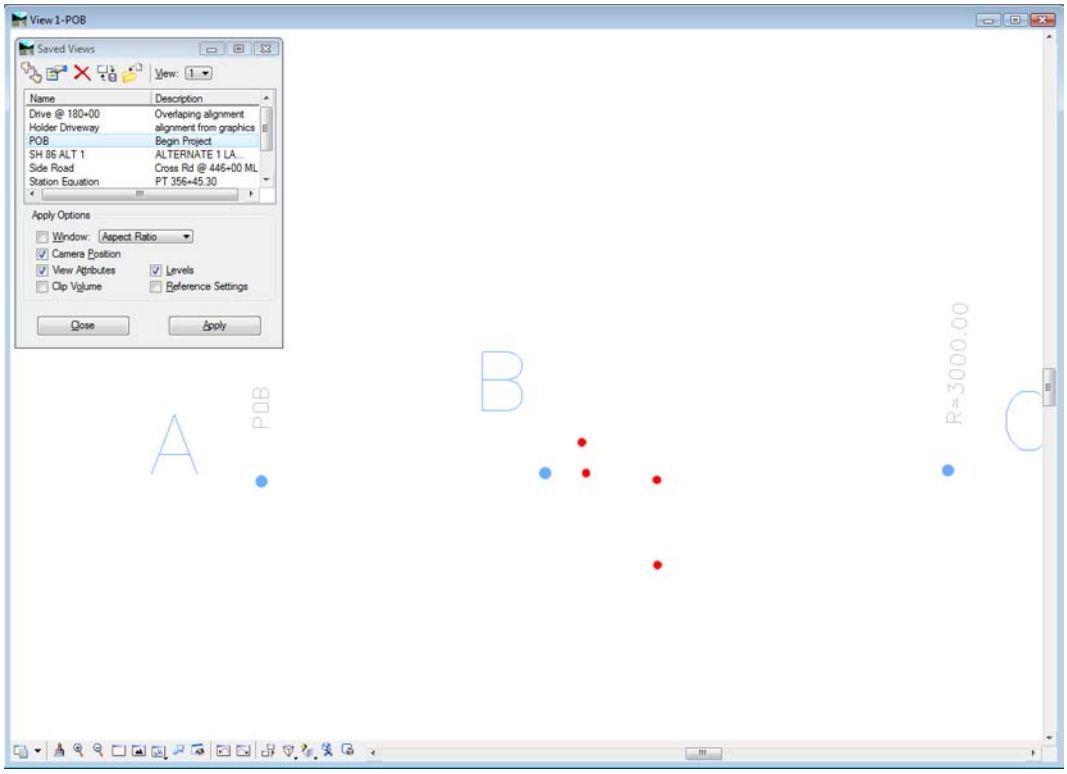


2. Using the ***MicroStation*** menus, select **Utilities > Saved Views** tools to open the saved views dialog.

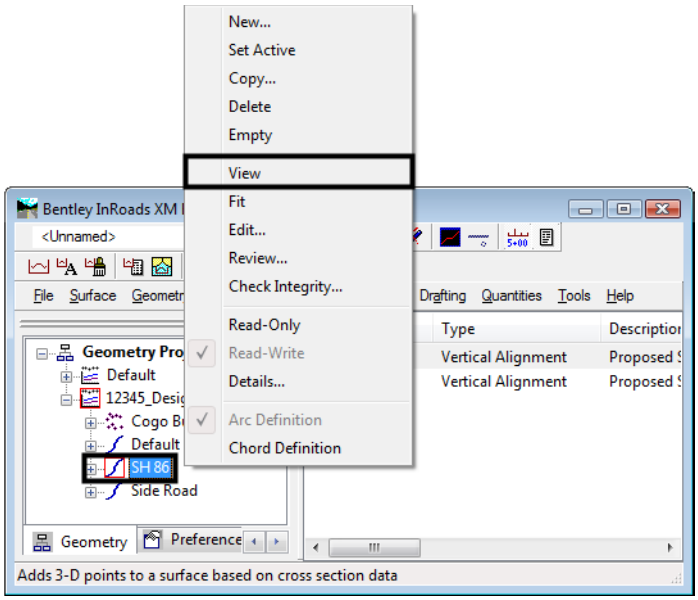
3. **<D>** on the name **POB**, **<D> Apply** for view **1**, and **<D> Close**.

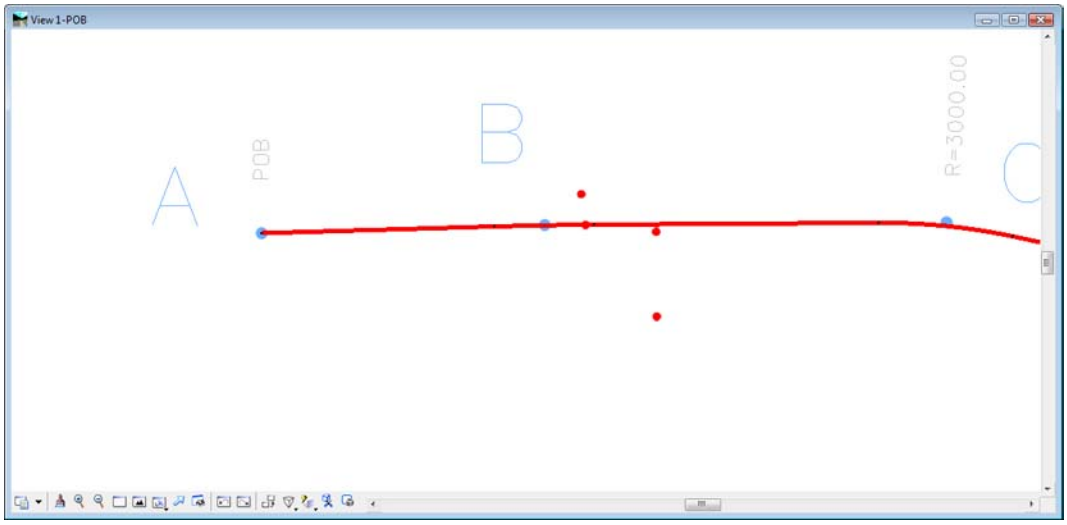


Below is an example of the saved view.



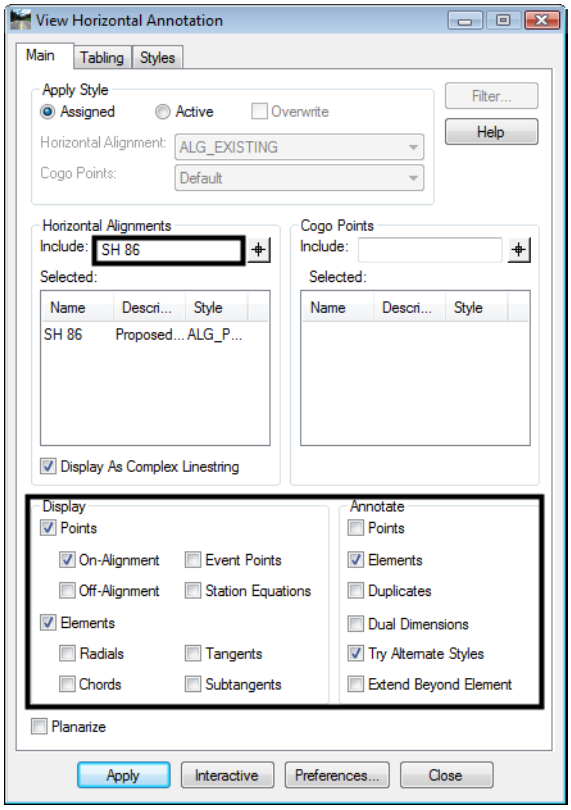
4. Display alignment **SH 86** from the Geometry Project ***12345_Design*** by right-clicking **<R>** on the alignment name and selecting **View** from the fly-out menu.





The alignment display is based on the geometry style assigned to the alignment. This display method is suitable but does not allow the user any options or allow annotation of the geometry. The next steps illustrate how to customize the graphics display for geometry elements.

5. Select **Geometry > View Geometry > Horizontal Annotation**.

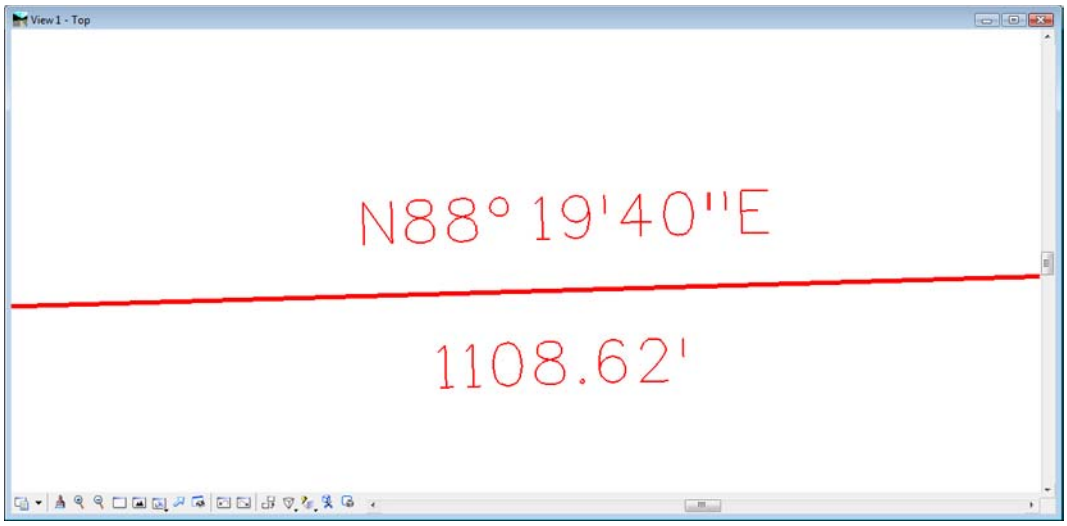


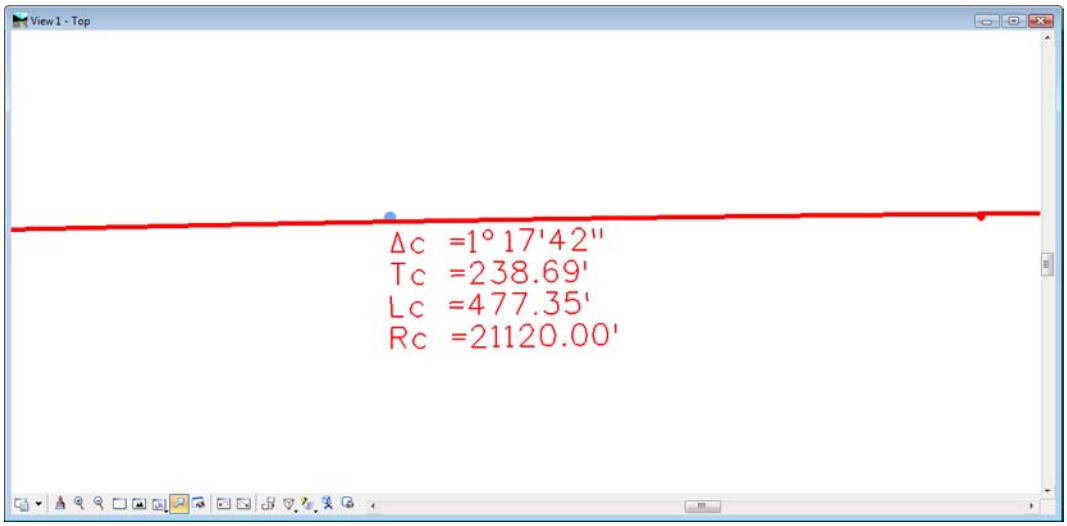
6. Key in ***SH 86*** in the ***Annotate*** field and ***Tab*** from the field.

7. Set options for the ***Display*** and ***Annotate*** sections of the dialog as shown in the above screen shot.

8. **<D>** the **Apply** button. This will write alignment ***SH 86*** to the MicroStation Screen and annotate the alignment.

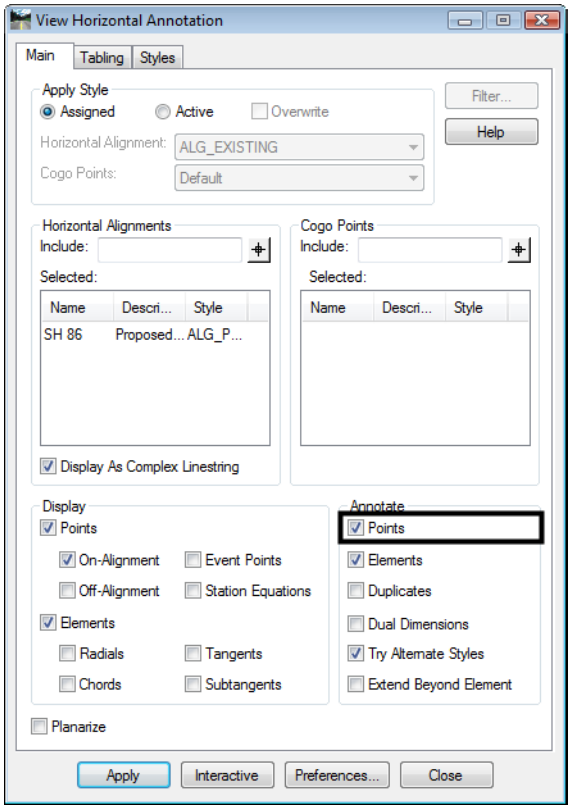
Note how ***Bearing*** and ***Distance*** annotation is displayed along the tangents. If the alignment contains horizontal curves, curve data will be displayed.



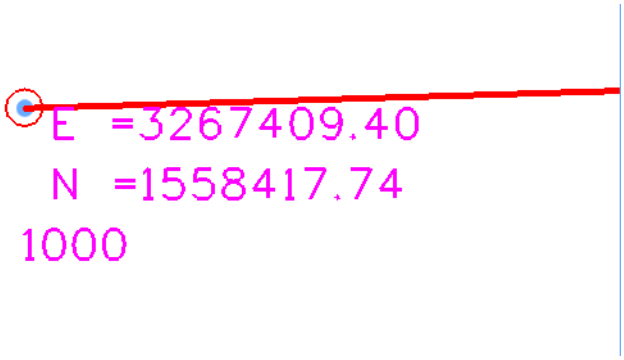


9. Return to the **View Horizontal Annotation** dialog.

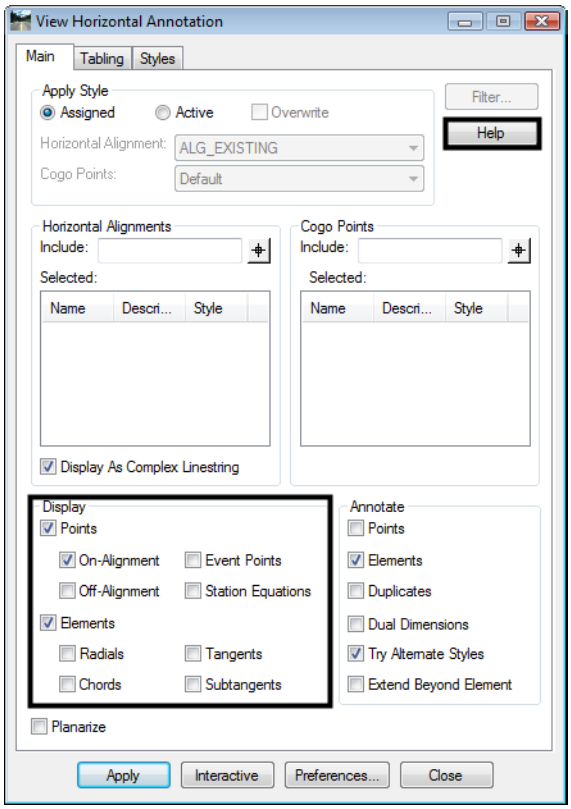
10. In the ***Annotate*** area of the ***Main*** tab, Toggle on ***Points***, **<D> Apply**



In addition to annotation for tangents and curves, notice that alignment vertices are also annotated.



11. On the Main tab, click the **Help** button and review the descriptions for the various components that can be displayed.



12. Experiment displaying an alignment with ***Points*** and ***Elements*** turned on or off on both the ***Display*** tab and the ***Annotate*** tab.

13. Experiment displaying the various components available in the display portion of the dialog.

Section Summary:

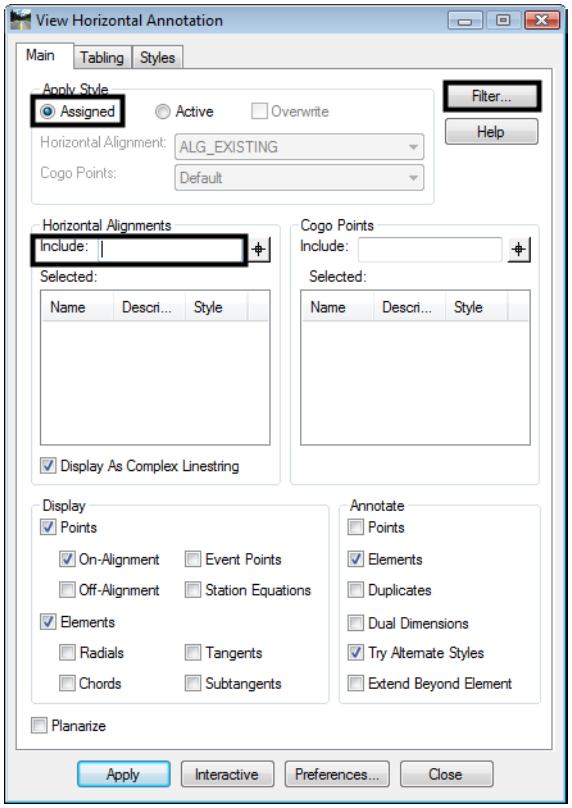
- InRoads displayed graphics are governed by the Global Scale Factor in InRoads. THe MicroStation Annotation Scale has no affect on these elements.
- The view alignment commands (from the right click menu of from Geometry > View Geometry > Active Horizontal) only display the lines and arcs that make of the alignments path.
- Horizontal Annotation also displays the alignment's path. It can display other geometry data as well.

Lab 3.2 - Selection of Geometry for display and/or Annotation

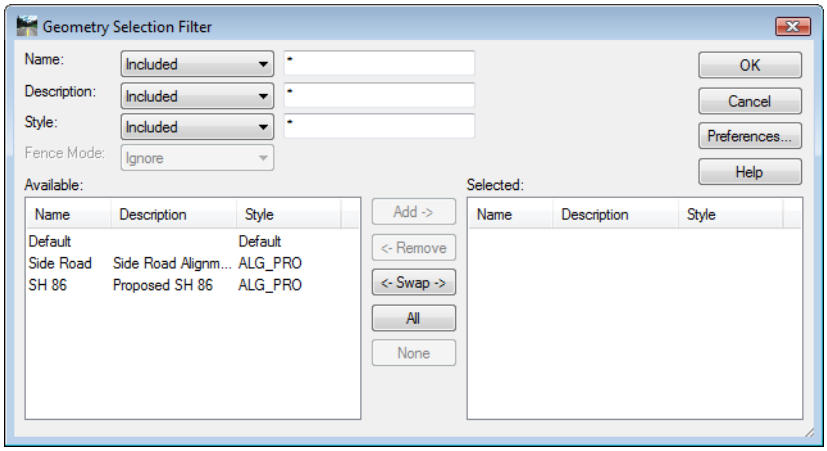
Section Objectives:

- Illustrate methods for defining horizontal alignment elements for display and/or annotation.

1. Select **Geometry > View Geometry > Horizontal Annotation**.
2. **<D>** the ***Main*** tab.
3. Set the ***Apply Style*** to **Assigned**.
4. **<D>** in the ***Include*** field in the ***Horizontal Alignments*** area. The ***Filter*** button becomes active.



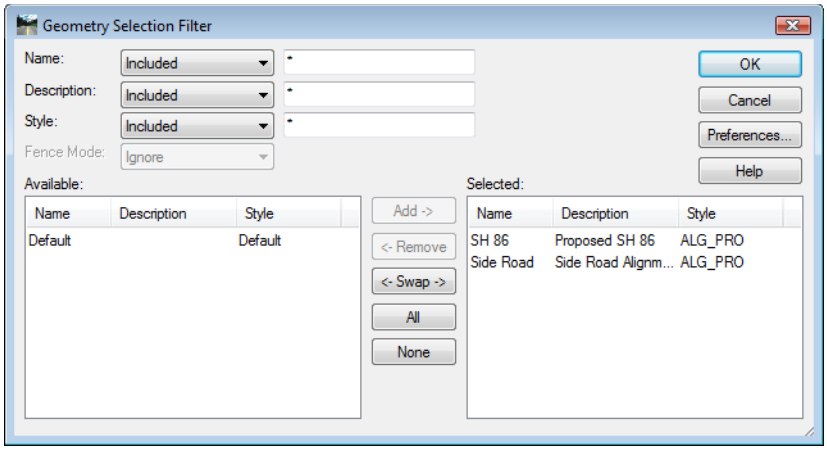
5. **<D>** the **Filter** button. The ***Geometry Selection Filter*** dialog will appear.



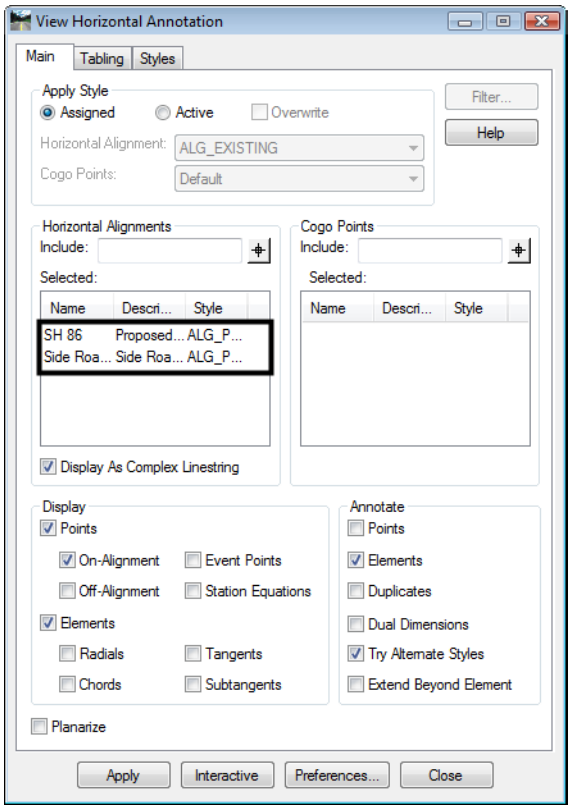
Note: ***Available*** alignments are shown on the left, ***Selected*** (for display or annotation) alignments are shown on the right. This makes it possible to select multiple alignments for display or annotation.

6. Move the alignments **SH 86** and **Side Road** from the ***Available*** list to the ***Selected*** list by **<D>** the names in the ***Available*** list and then **<D>** the **ADD** button (or **<D><D>** on the names).

Note: The data in this dialog can be sorted by clicking **<D>** on the column headers. Multiple selections of alignments can be made through the use of the <CTRL> or <Shift> keys.

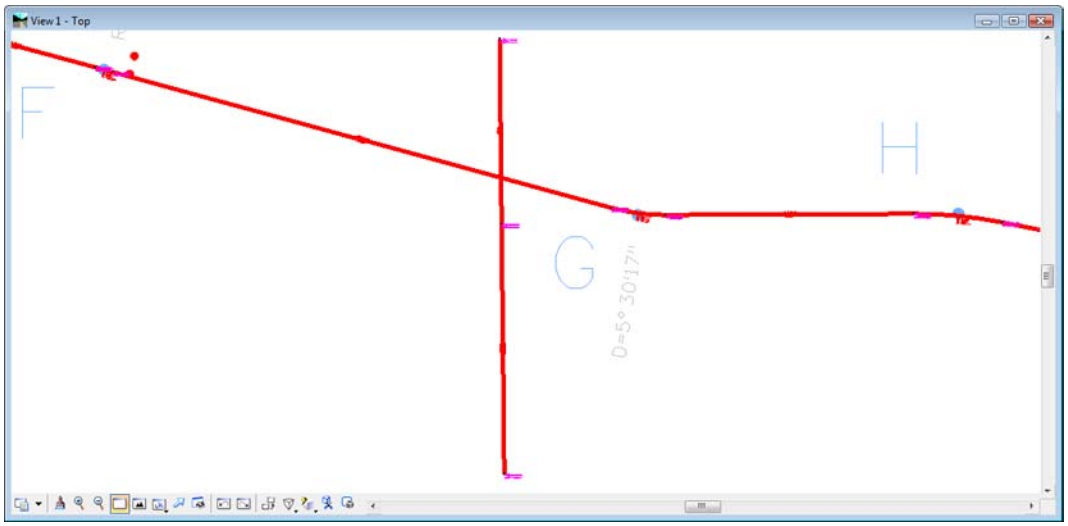


7. When done identifying the desired alignments in the Filter dialog, **<D> OK** – the Selected geometry is populated in the ***Selected*** field



8. **<D> Apply** and the selected alignments will display in MicroStation.

9. Review the results in MicroStation.



Section Summary:

- Alignments can be selected for annotation by key in, graphic selection using the button, or by using the Filter options.
- The Display area is used to turn on or off the display of the geometry elements.
- The Annotate area is used to turn on and off the text data associated with the geometry elements.

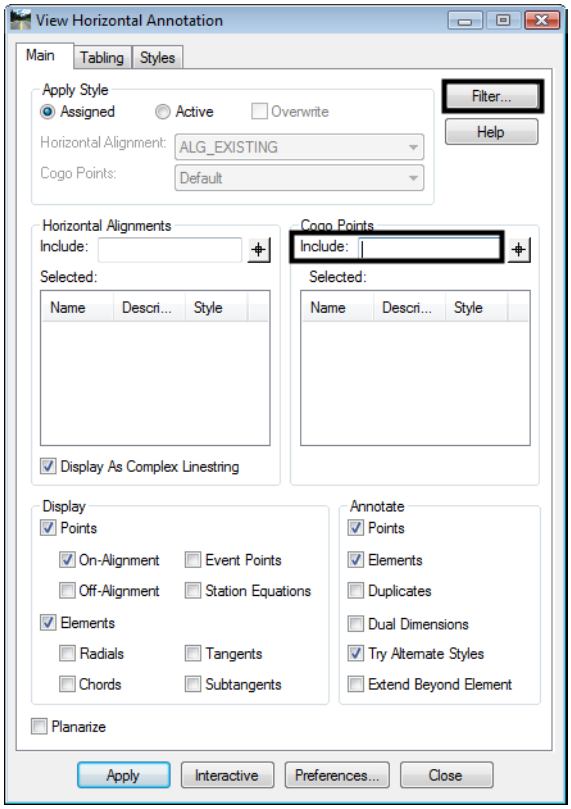
Lab 3.3 - Display or Annotation of Cogo Points

Section Objectives:

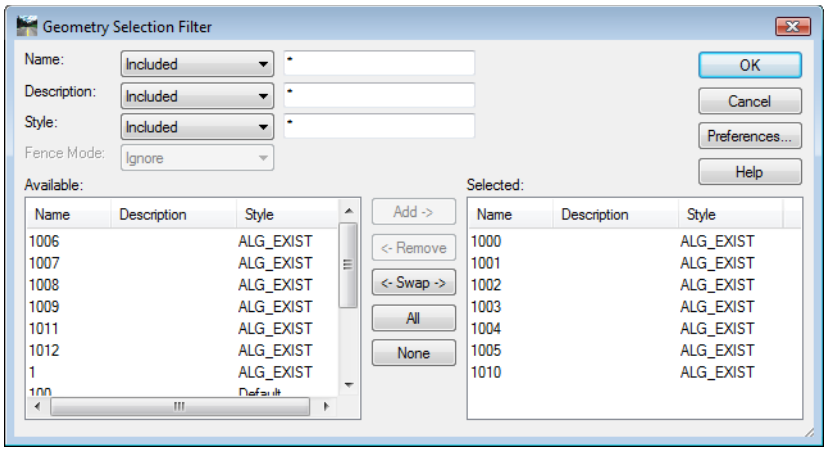
- Illustrate methods for defining cogo points for display and/or annotation.

Note: Whether you are annotating Points or Alignments, keep in mind that the element selection button can be used to graphically identify the geometry of interest. This is universally true in InRoads whenever the selection button is displayed.

10. **<D>** the ***Include*** field in the ***Cogo Points*** area to activate the Filter button
11. **<D>** the **Filter** button. The ***Geometry Selection Filter*** dialog will appear.

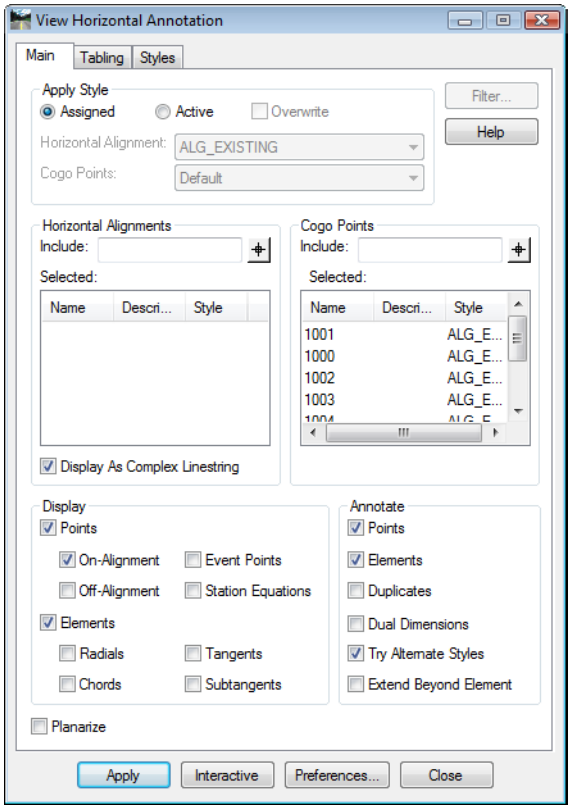


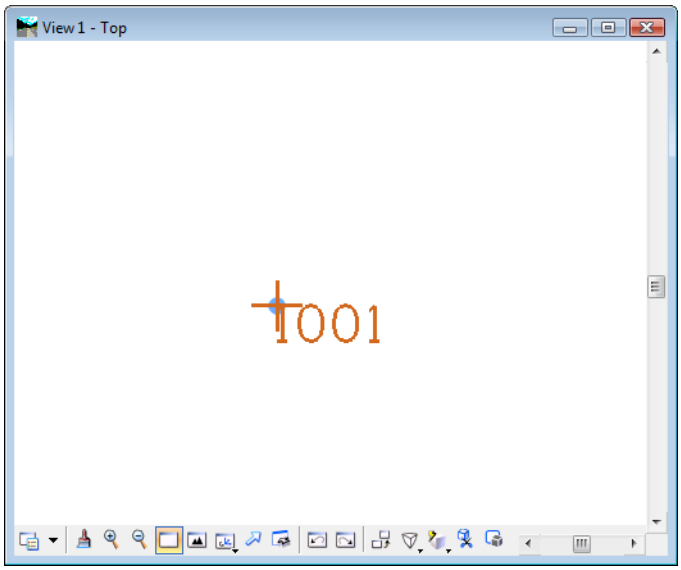
12. Select points **1001-1005 & 1010** from the ***Available*** field and add them to the ***Selected*** field.



13. **<D>** the **OK** button. The points populate the ***Selected*** field.

14. **<D>** the **Apply** button in the ***View Horizontal Annotation*** dialog.





15. Experiment displaying various ***Alignments*** and ***Points*** with the assorted settings.

Note: Remember to toggle on ***Points*** in the ***Annotation*** tab if you need to see Cogo Point numbers, Northing, and Easting. Keep in mind annotation settings are derived from the Geometry Style Manager Type: Points for the assigned Geometry Style.

Section Summary:

- Cogo Points can be selected for annotation by key in, graphic selection using the button, or by using the Filter options.
- In the Display area, the Points toggle is used to turn on or off the display of the geometry elements.
- The Annotate area is used to turn on and off the text data associated with the geometry elements.

Lab 3.4 - Review Alignment Stationing

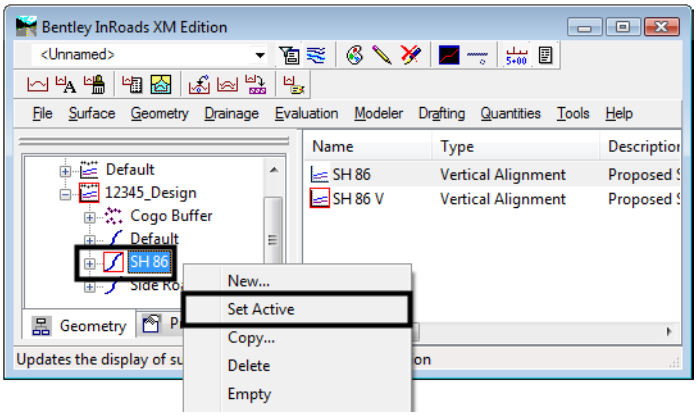
Section Objectives:

- Review the alignmet to determine its current stationing.

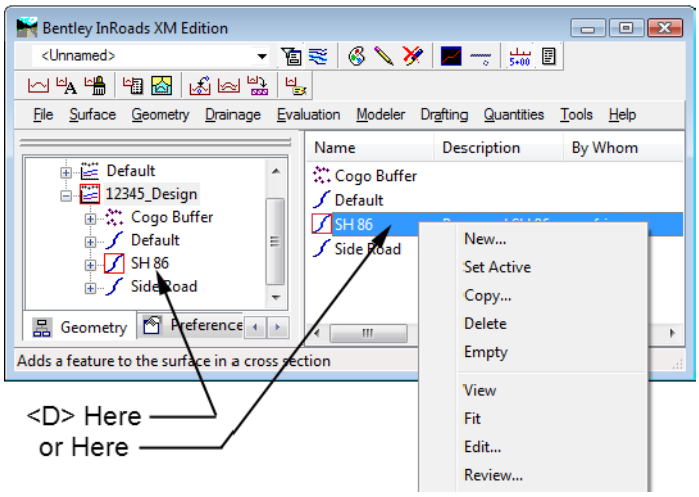
The default station at the beginning of a newly created horizontal or vertical alignment is 0+00. This value can be changed as shown later in this lab.

One of the easiest methods for determining assigned stationing values is through the alignment review commands.

1. Make **12345_Design** the active geometry project by **right-clicking** on this geometry name and selecting **Set Active** from the fly-out menu.



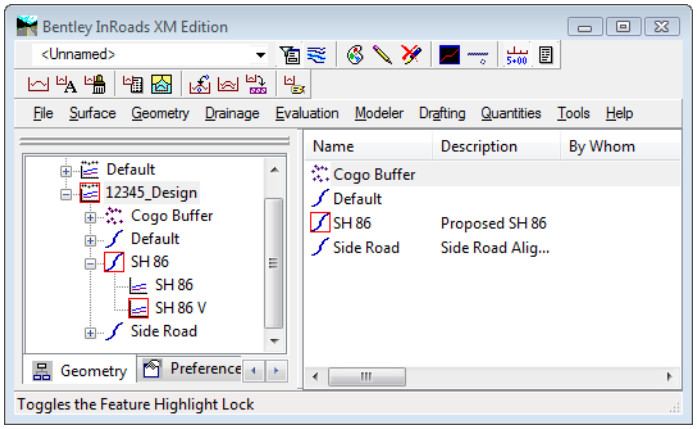
2. **Right-click** on the alignment **SH 86** and select ***Review*** from the Fly-out menu. The ***Review Horizontal Alignment*** dialog will appear.



Note: Fly-out menus can be access from either the workspace or feedback panes. Also note that selecting an alignment for review switches it to being the ***active*** alignment.

3. Investigate the stationing assigned to horizontal Alignment **SH 86**.

   Initial station value is: _____.



4. Review the ***Vertical*** alignment **SH 86 V** associated with horizontal alignment SH 86.

   ♦ Is the stationing for the horizontal and vertical alignments synchronized?

Section Summary:

- Use the Review command to find out information about the alignment, like stationing, without having to display it graphically.

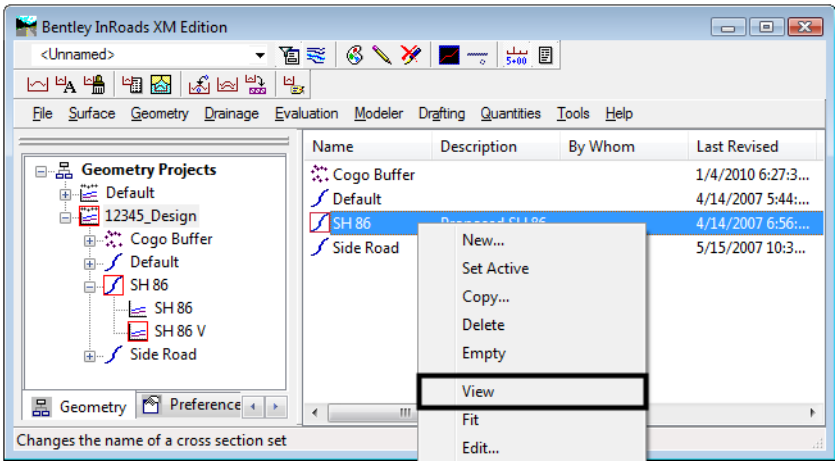
Lab 3.5 - Displaying Stationing

Section Objectives:

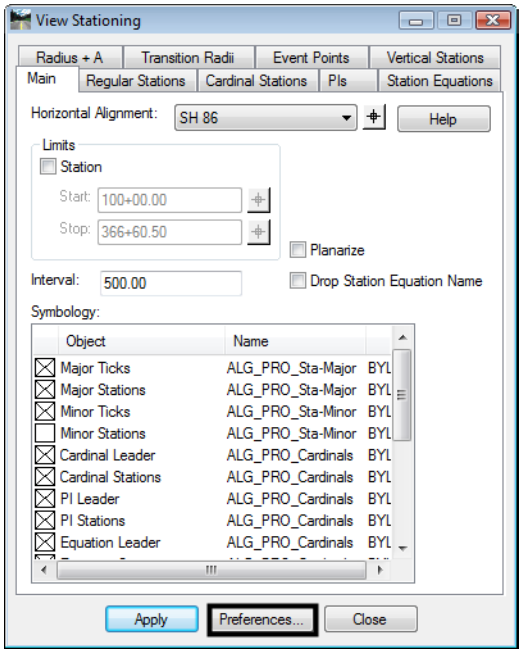
- Display stationing and alignment keypoints.
- Use the Symbology toggles to turn on and off various items.

1. Prior to displaying the stationing, display the lifework for the horizontal alignment **SH 86.**

   Right-click on the alignment name in the InRoads explorer window and select ***View*** from the fly-out menu.



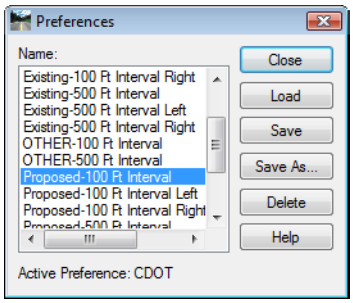
2. Select **Geometry > View Geometry > Stationing.** The ***View Stationing*** dialog will appear.



3. **<D>** the ***Preferences*** button.

Note: The Preferences dialog is used to load preset settings for a particular tool. In the View Stationing dialog the preference is setting the interval and symbology of the display graphics.

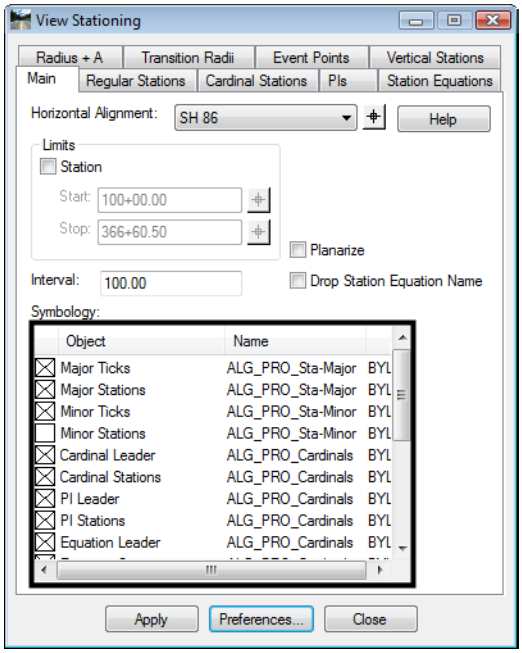
The following steps load the Preference Proposed–100 Ft Interval as the active symbology.



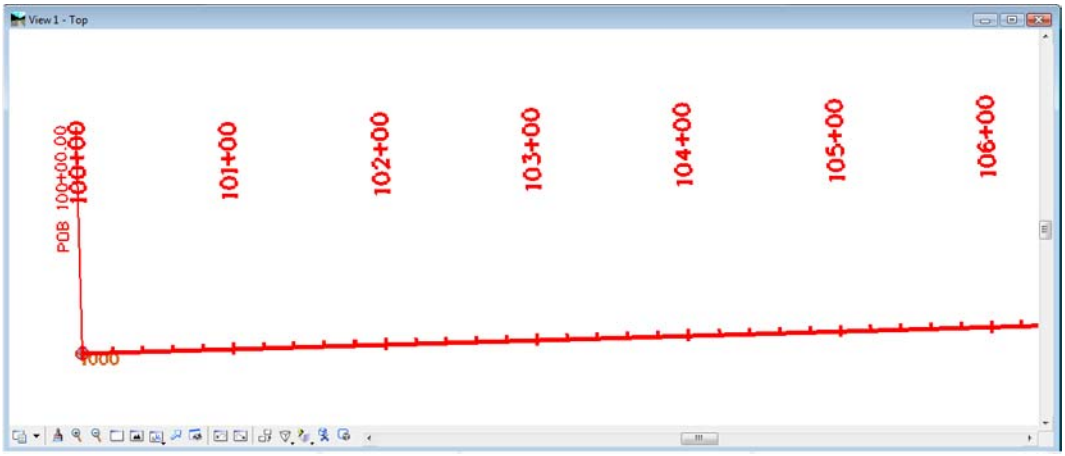
4. **<D> Proposed-100 Ft Interval**.

5. **<D> Load** then **Close** button.

6. In the ***Symbology*** portion of the dialog, select or de-select the alignment components for display. Loading the preference sets the default interval for major stations.



7. **<D> Apply** to display the stationing.



The ***View Stationing*** dialog is populated with the predefined settings from the stored preferences. Notice the ***interval*** field and settings under the ***symbology*** section. The display toggles define what will display; the name column reflects the InRoads named symbology defining graphical attributes for displayed items.

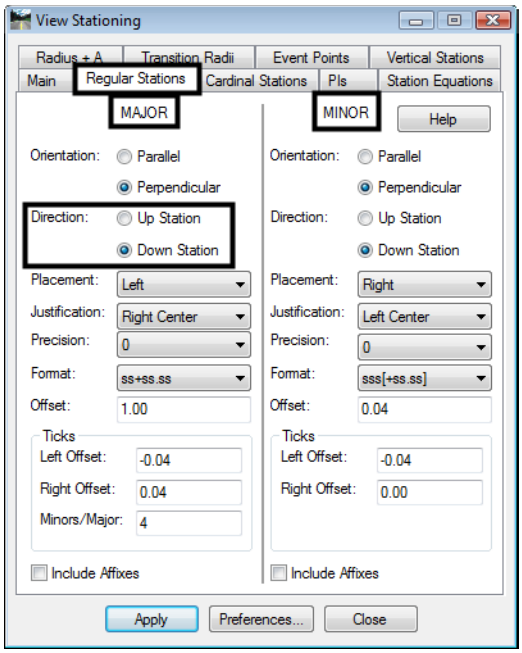
There are several standard CDOT preferences to choose from, depending upon the type of alignment stationed and station interval. Choose the appropriate **Preference** and **<D> Apply** to see the stationing.

Keep in mind that text size is dependent on the active ***Global Scale Factor*** at time of display. If necessary, select **Tools > Options [Factors**] to change the value of the Global Scale factors.

8. **Change** the ***Global Scale Factor*** and redisplay stationing.

9. **Experiment** displaying stationing using various CDOT preferences until presets becomes familiar.

10. **Experiment** with the various tabs and settings in the ***View Stationing*** dialog and investigate what changes are made when stationing is redisplayed.



Section Summary:

- The stationing Preferences are set to CDOT standards and should be used in most cases.
- Using the Pencil mode automatically deletes old stationing when new stationing is displayed.

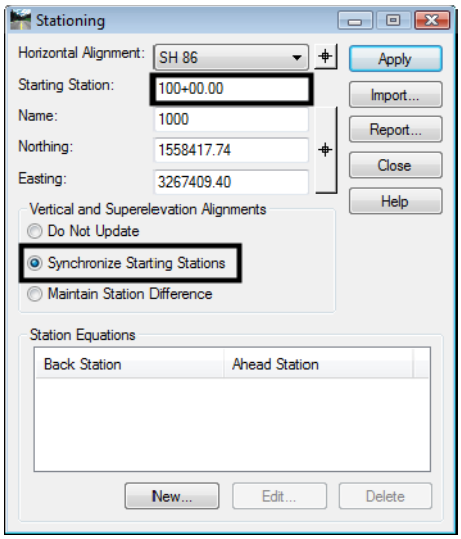
Lab 3.6 - Defining Stationing

Section Objectives:

- Change the biginning station of an alignment.

Upon creation, alignments are defined with a beginning stationing of 0+00. Stationing can be redefined from any location along the alignment. Additionally, station equations can be incorporated.

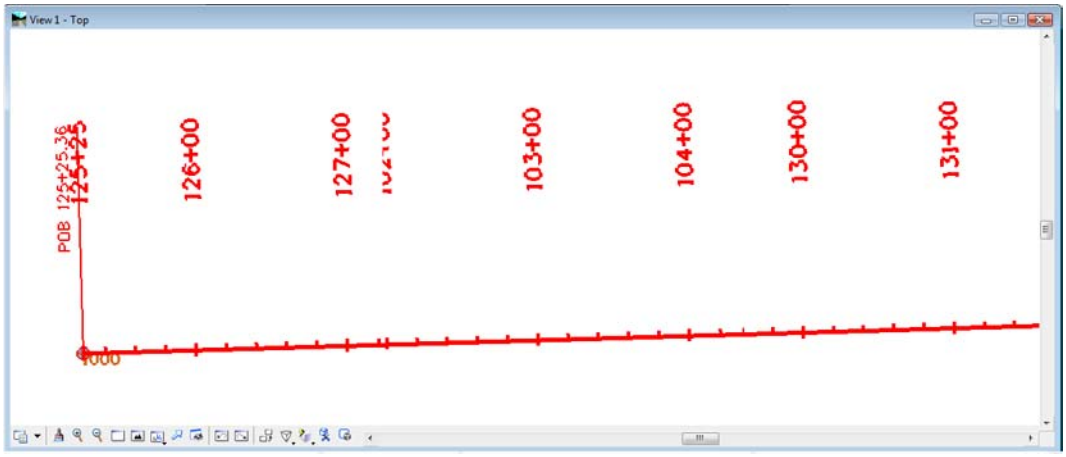
1. Select **Geometry > Horizontal Curve Set > Stationing**. By default, this dialog displays the beginning station value of the active alignment.



2. Select **Synchronize Starting Stations** in the ***Vertical and Superelevation Alignments*** section.

3. Set the beginning station of alignment ***SH 86*** by keying in ***125+25.36*** and choosing **Apply**.

4. **Verify** the change has been applied by redisplaying the stationing using **Geometry > View Geometry > Stationing** and clicking **Apply**. Also, check the beginning station value of any associated vertical alignments by using the review command.

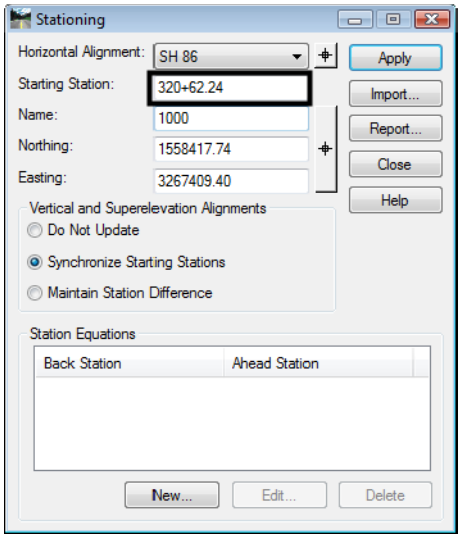


Note: The options for ***Vertical Alignments*** should be considered carefully. **Do Not Update** will leave the stationing of vertical application stations as is, **Synchronize Starting Stations** will update their stationing to match that of the horizontal and **Maintain Station Difference** will keep any difference (delta) in the current starting stations.

- InRoads does not require a '+' when keying in a station. The plus sign will be added automatically.

- Any point along the alignment can be specified as the location for the input stationing value. The alignment location defined by either ***name*** or the ***northing*** and ***easting*** fields is the location the input stationing will propagate from.

5. Set the beginning station of alignment ***SH 86*** by keying in ***32062.24*** and choosing **Apply**.



6. **Verify** the change has been applied by redisplaying the stationing. Select **Geometry > View Geometry > Stationing** then click **Apply**.

Section Summary:

- When stationing is set for a particular point, the stationing for the remainder of the alignment (forwards and backwards).
- The reference to Superelevation in the Vertical and Superelevation Alignments area refers to geometry created in the 2004 edition of InRoads. It does not affect the superelevation contained in the Roadway Designer.

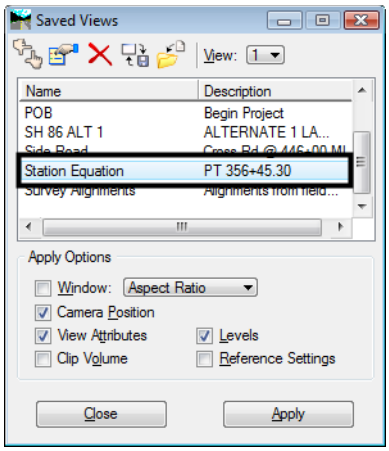
Lab 3.7 - Station Equations

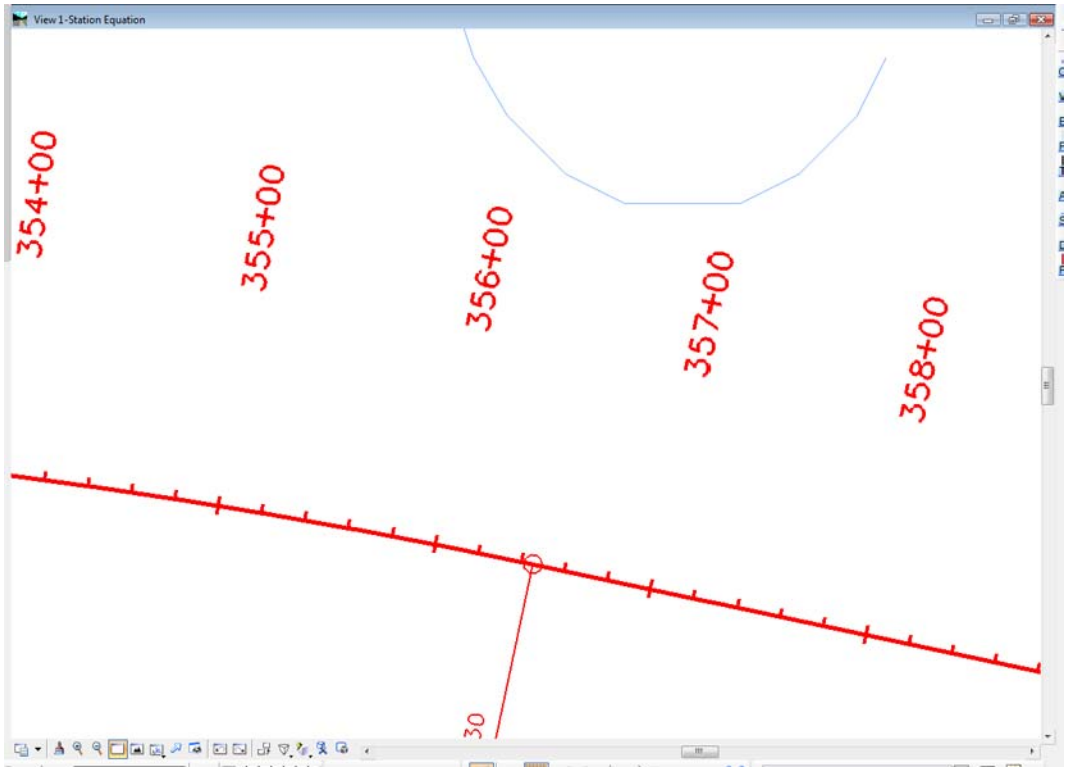
If there are inequalities in the alignment, station equations may be required. These equations can be either gap or overlap equations.

Section Objectives:

- Add a station equation to an existing alignment.
- Redisplay stationing to show the station equation.

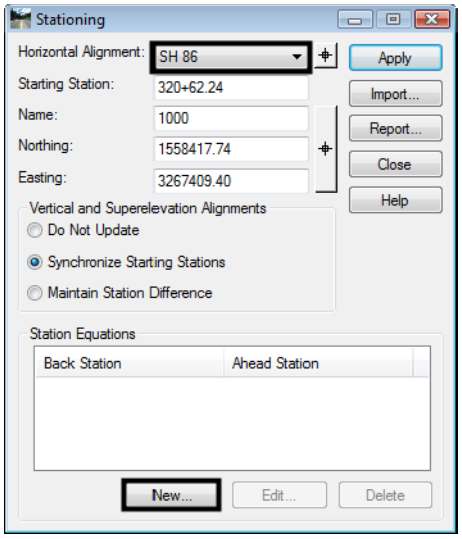
1. From MicroStation, select **Utilities > Saved Views. Apply** saved view **Station Equation.** Once applied, **Close** the ***Saved View*** dialog.



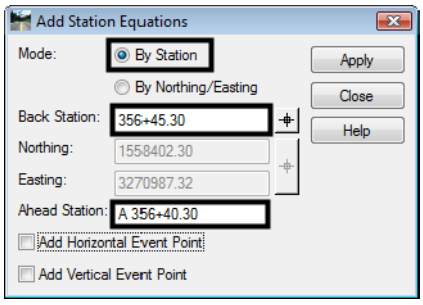


At the PT of the curve a station equation is necessary to tie to previous work. The values are:
Back = 356+45.30
Ahead = 356+40.30

2. Select **Geometry > Horizontal Curve Sets > Stationing.** The ***Stationing*** dialog will appear.
3. Verify **SH 86** is the horizontal alignment.
4. At the bottom of the dialog, choose **New**.

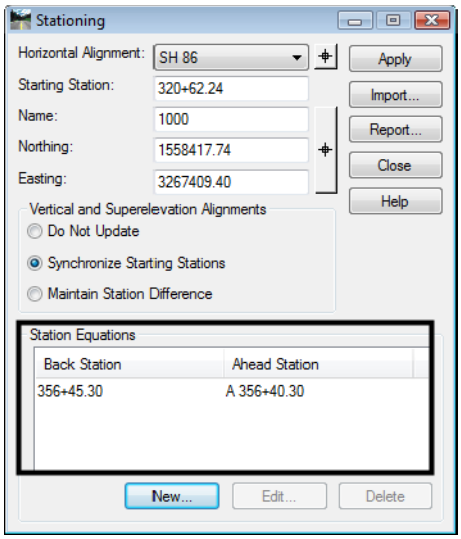


5. In the resulting box, set the ***Mode*** to **By Station**.
6. Enter the ***Back Station*** and the ***Ahead Station*** as shown below.



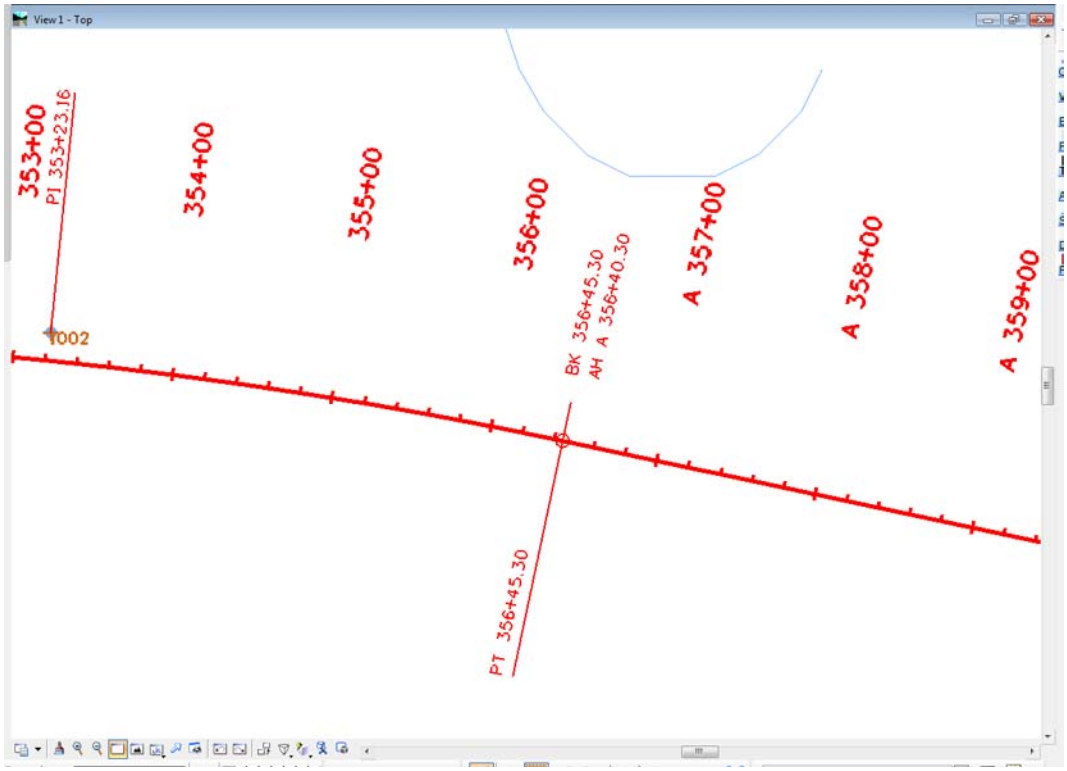
7. **<D> Apply**.

8. **<D> Cancel** to close the ***Add Station Equation*** dialog. The station equation will be shown in the parent dialog.



9. **<D> Close** in the ***Stationing*** dialog.

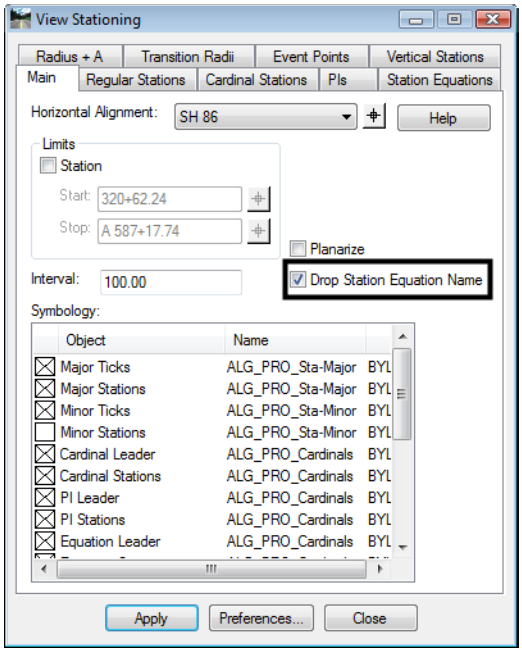
10. Redisplay the stationing for alignment **SH 86**.

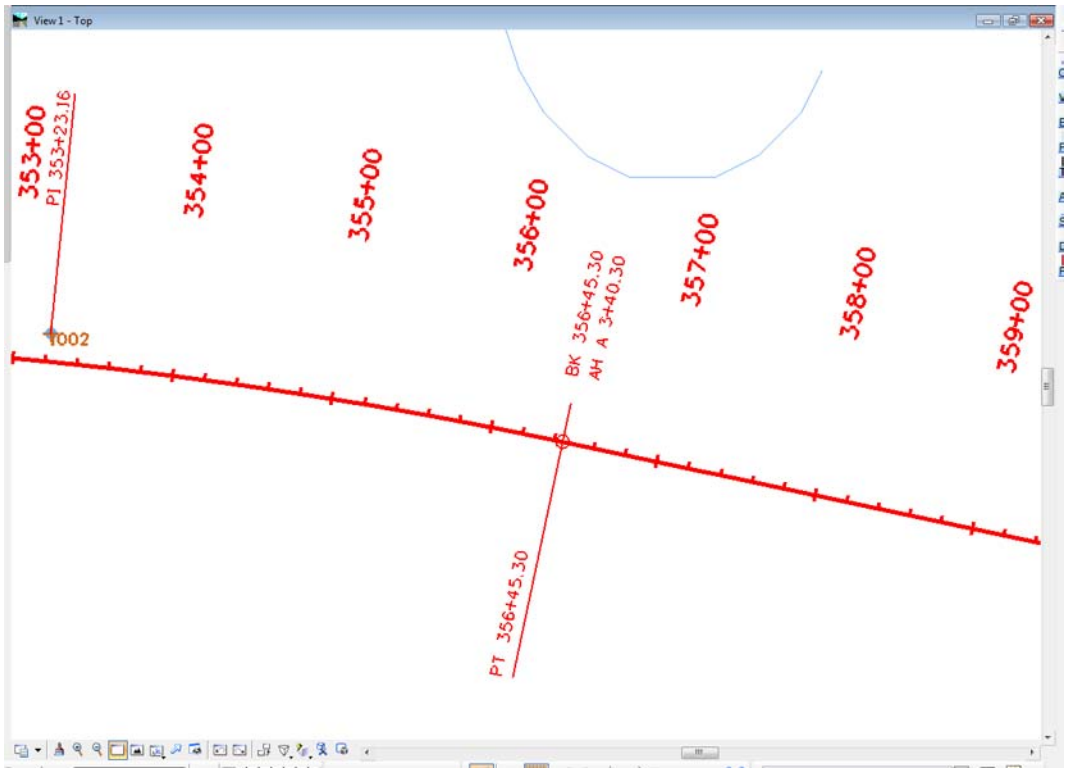


Note: The ahead station must be prefixed with an equation name. The name must consist of at least one alpha character.

- An alignment can contain multiple station equations.

- Annotation of stationing lying within the range of a station equation will be prefixed with the equation name. If the prefix is undesirable, toggle on ***Drop Station Equation Name*** in the ***View Stationing*** dialog and redisplay the stationing.





Section Summary:

- Station equations are used to change the stationing from a given spot forward, along the alignment. Stationing prior to the equation retains its original stationing.
- The ahead station must have a prefix, containing atleast 1 letter, followed by the new station number.

Lab 3.8 - Horizontal Alignment Tracking

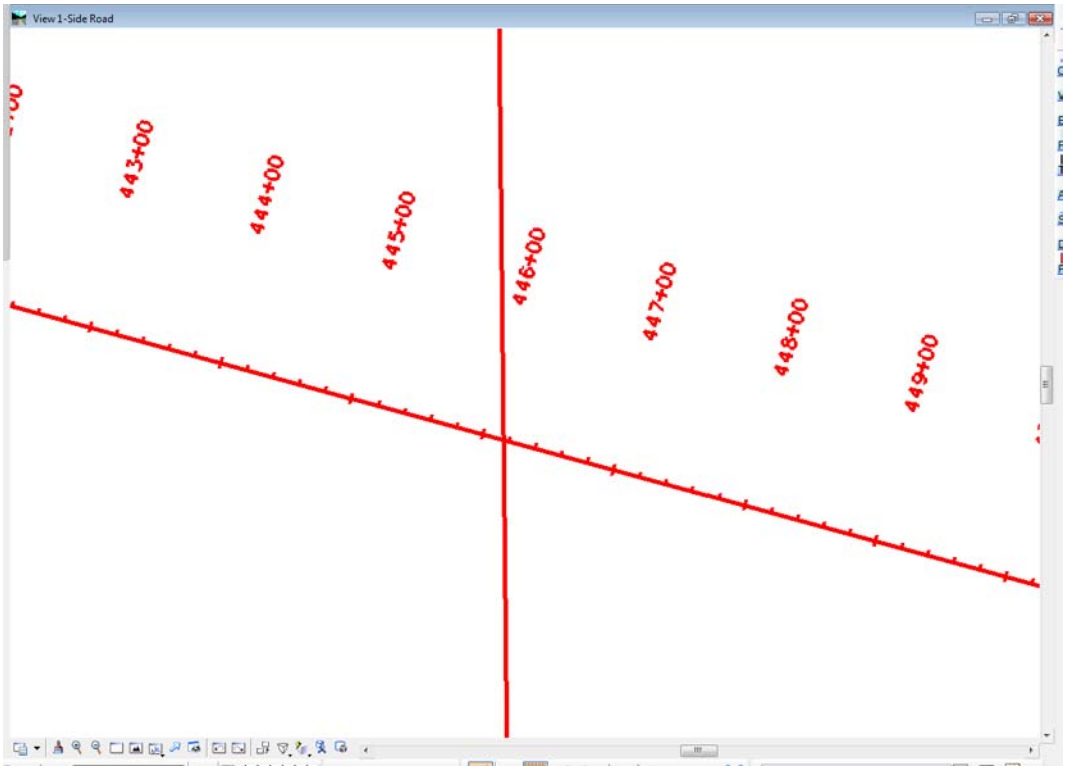
Two methods exist for receiving interactive information relative to a horizontal alignment. Both methods report on stationing, offset, elevation, etc. One method reports the elevation of the active surface, the other reports the elevation of the active vertical alignment.

Section Objectives:

- Demonstrate the Tracking command.
- Demonstrate the Tracking Horizontal Alignments command

Horizontal Alignment & Surface Elevation Tracking

1. **Recall** Saved View **Side Road**.

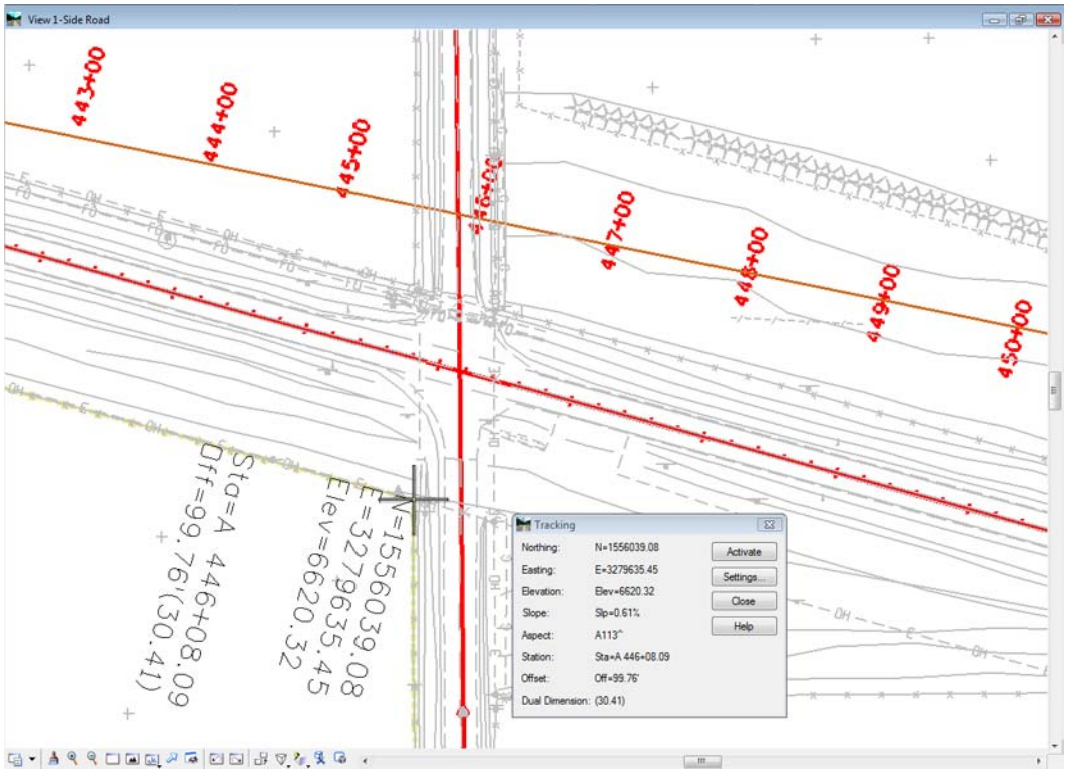


In addition to reporting on station and offset information relative to the active alignment, the following method will report on information relative to the active surface.

2. Select **File > Open** and load the surface **12345SURV_Surface_Existing.dtm** from the **C:\Projects\12345\ROW_Survey\InRoads\DTM** folder.

3. Select **Tools > Tracking > Tracking** to track both the active horizontal alignment and information relative to the active surface.

4. Select **Activate** to initialize the command. Slide the cursor along the alignment to interactively update the display in the ***Tracking*** dialog. If a **<D>** (data point) is entered in the design file the information toggled on is displayed graphically.

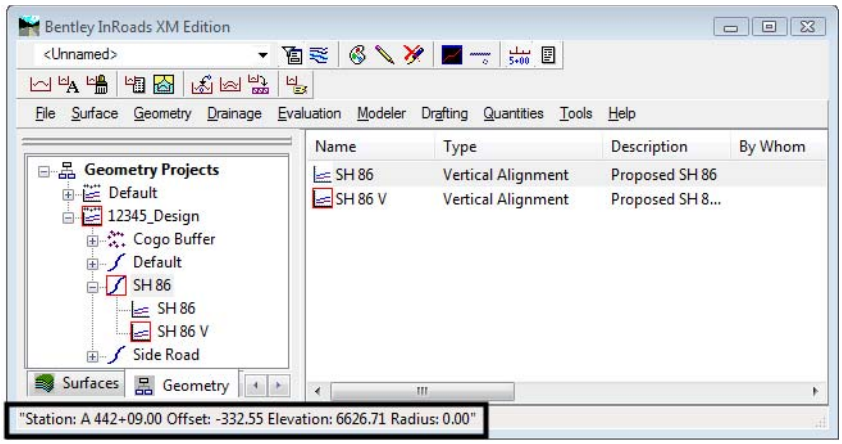


Note: Select the **Settings** button in the ***Tracking*** dialog to examine the attributes assigned to annotation placed in the MicroStation design file.

Horizontal & Vertical Alignment Tracking

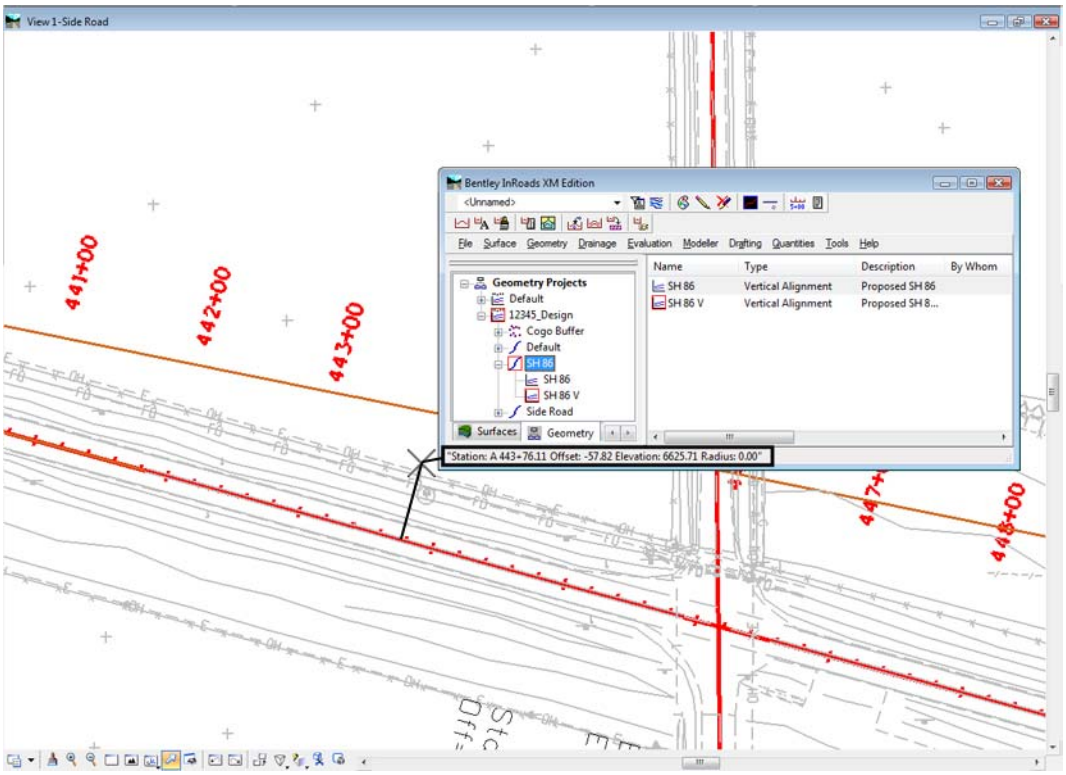
The second method tracks the station and offset relative to the active horizontal alignment along with the elevation of the active vertical alignment. Station, Offset, and Elevation information is displayed in the message field of the InRoads interface.

1. Select **Tools > Tracking > Horizontal Alignment** to track the active horizontal alignment.



2. The results display in the status bar of the InRoads interface.

Note: The readout interactively reflects the location of the cursor relative to the active alignment. If a second horizontal alignment is selected with a data point, **<D>** the offset displayed will be relative to the two alignments perpendicular to the active alignment.



Section Summary:

- Use the Tracking command to get surface information in relation the the horizontal alignment.

- The Tracking command can be used to display the information in its dialog box as MicroStation graphics.
- The tracking Settings options are used to disable the graphic display of items in the Tracking dialog box.
- Use the Horizontal Alignments tracking to get vertical alignment information in relation the the horizontal alignment.
- Horizontal Alignments tracking can not be displayed graphically.

Chapter Summary:

- Alignments can be displayed using the View and View All Horizontals from the right click menu or from the main tool bar, or by using the horizontal alignment annotation command.
- Use the preferences to set up the Stationing dialog. Items in the Stationing dialog box should only be changes for special circumstances.
- Use the Stationing options under the Horizontal Curve Set commands to change the stationing for the entire alignment.
- Use station Equations to change the stationing from a point on the alignment to the end.
- Tracking is used to gain station and offset information at the cursors location.
- Tracking also collects sufrace data, while Horizontal Alignment tracking gets vertical alignment data.