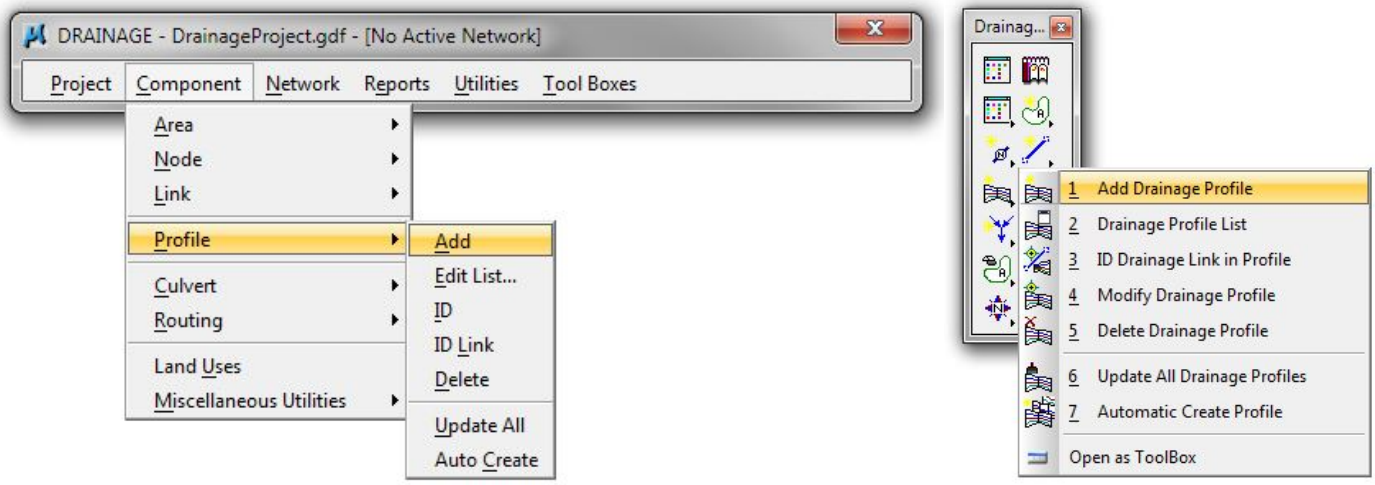
9. Profiles

This exercise shows the user how to perform profile computations and properly display the drainage profile.

Profiles can be constructed in a path running in either direction, upstream or downstream, in a drainage network. The Profiles dialog is used to display customized profiles including groundline, nodes, links, depth of cover, hydraulic grade line, etc.

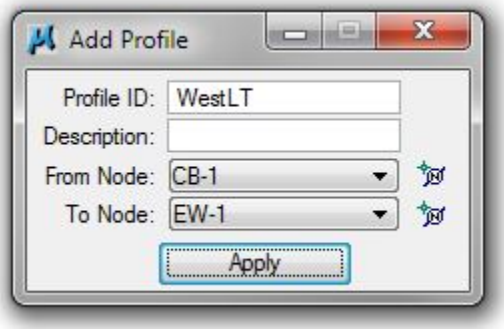
9.1 Storm Drainage Profile Design

a) Select from the Menu Bar: **Component > Profile > Add** or from the main toolbar: **Add Drainage Profile**



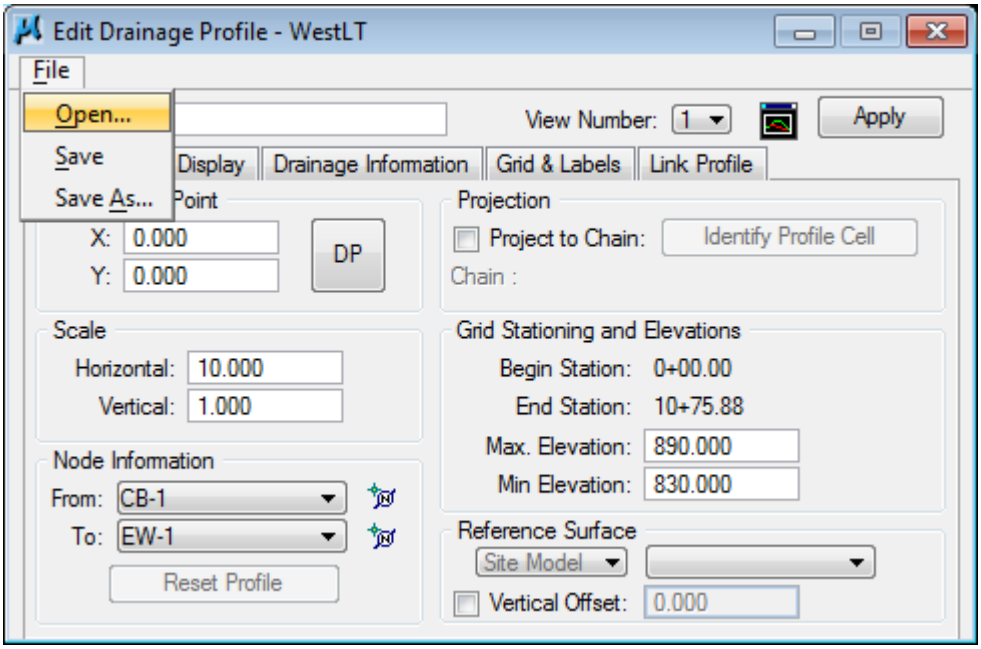
b) Complete the **Profile Configuration** dialog box information as follows for the left side of the roadway in the WEST drainage network. Click **Apply** when finished.

Profile ID: WestLT **From Node:** CB-1 **To Node:** EW-1

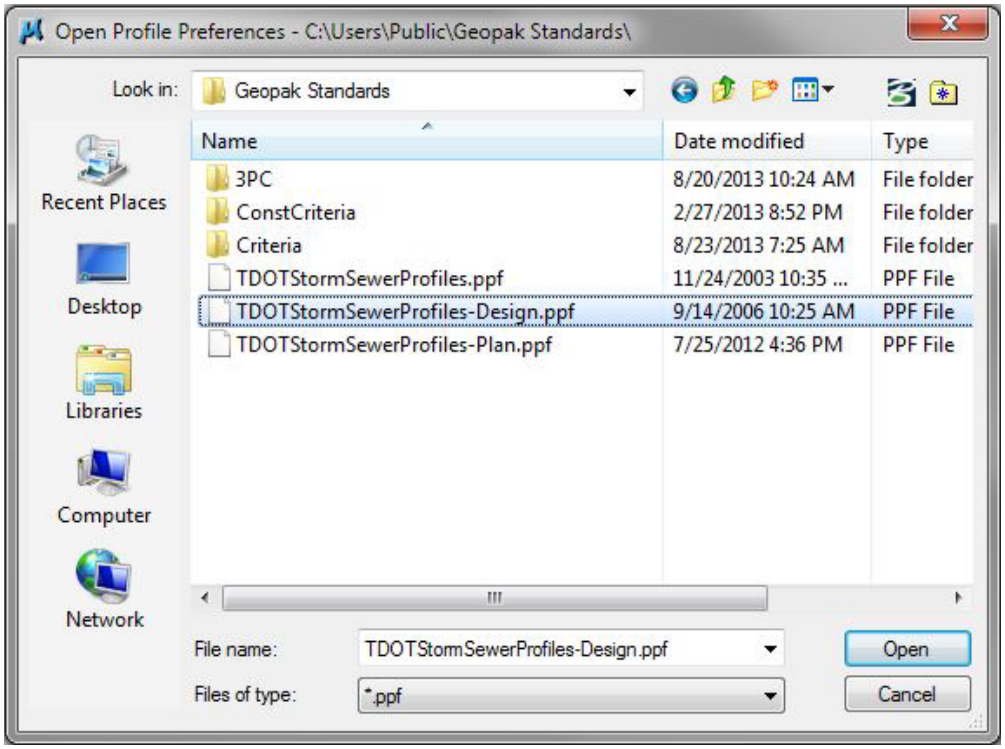


NOTE: To select the appropriate node; use the dropdown menu or use the **ID** node button and select the node from the plan view. **From Node and To Node *must* be in the same network.**

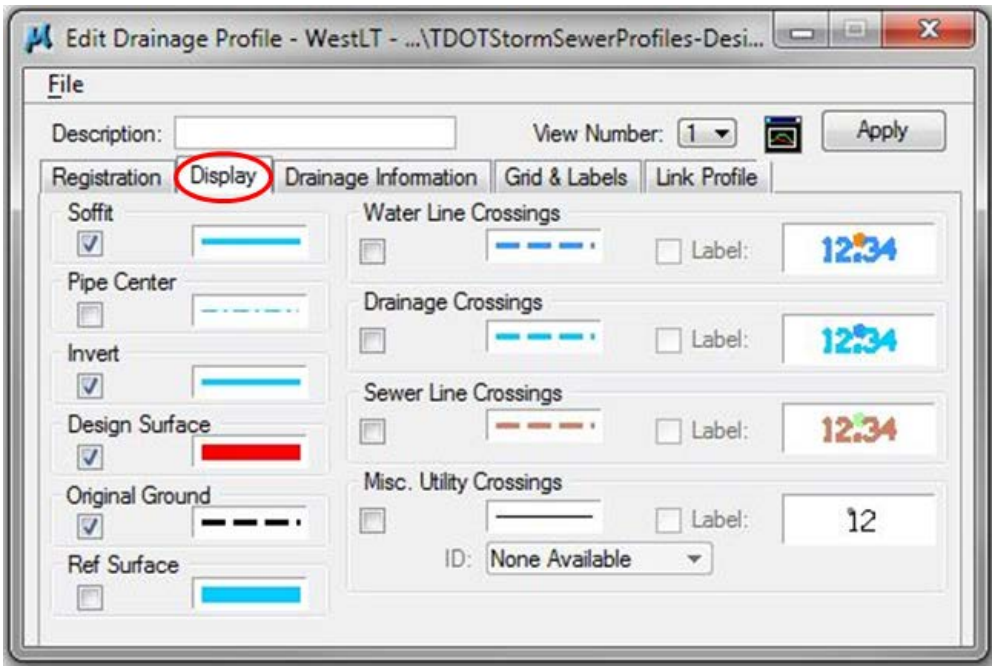
c) Load the **Profile Preferences** file. Inside the Edit Drainage Profile dialog, click **File > Open**.

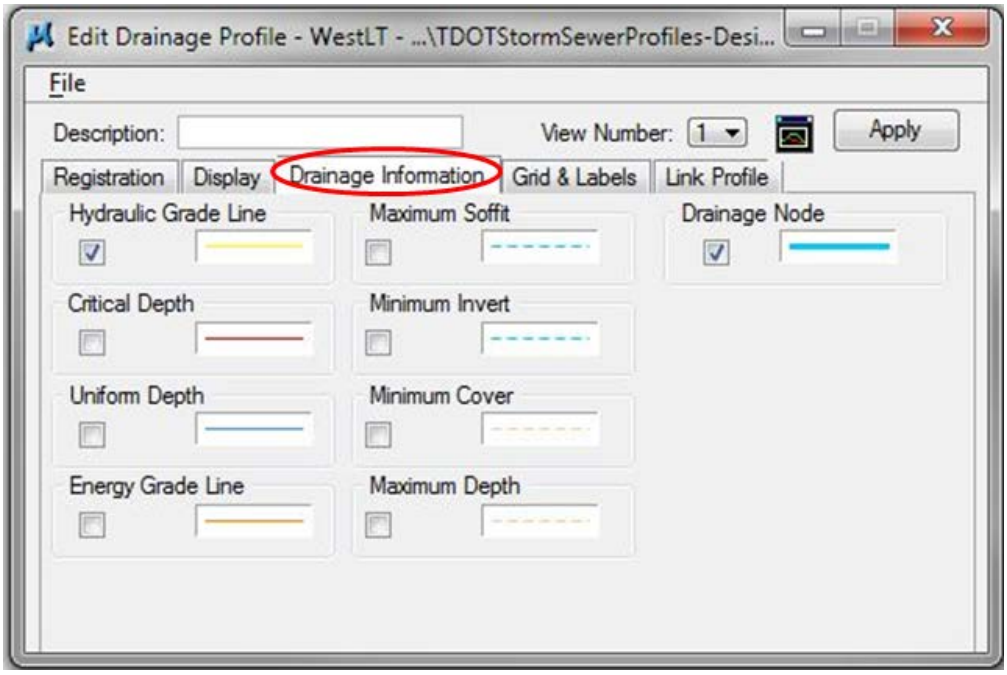


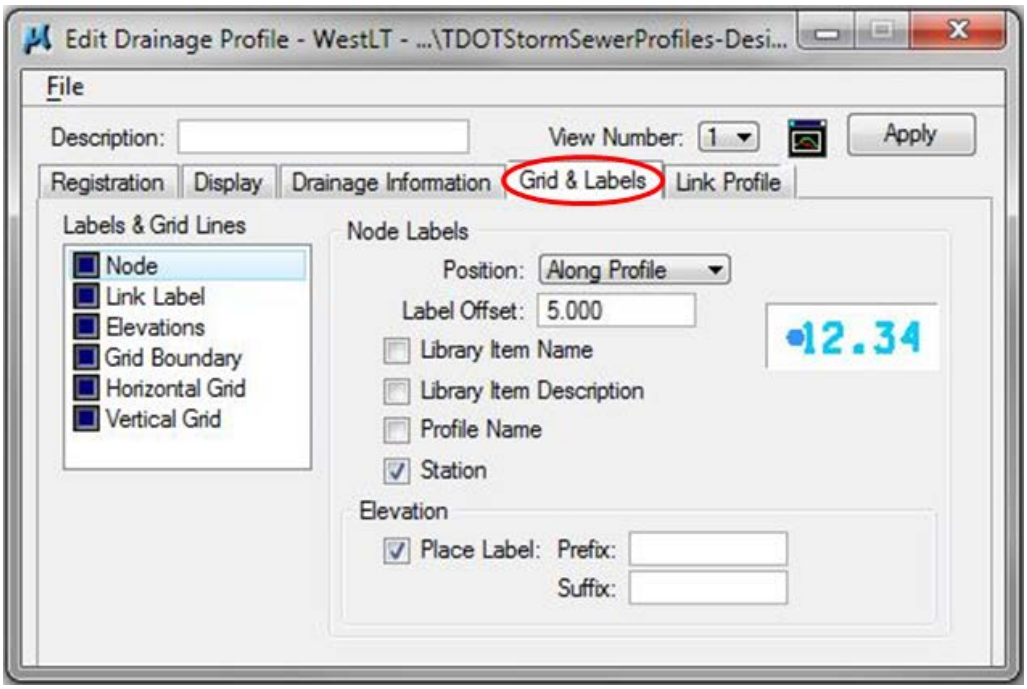
Navigate to **C:Users\Public\Geopak Standards** and select **TDOTStormSewerProfiles-Design.ppf**. Click **Open.**



All settings have been set for the profile. To view the settings, click on the **Display**, **Drainage Information** and **Grid & Labels** tabs. They should look as shown below.

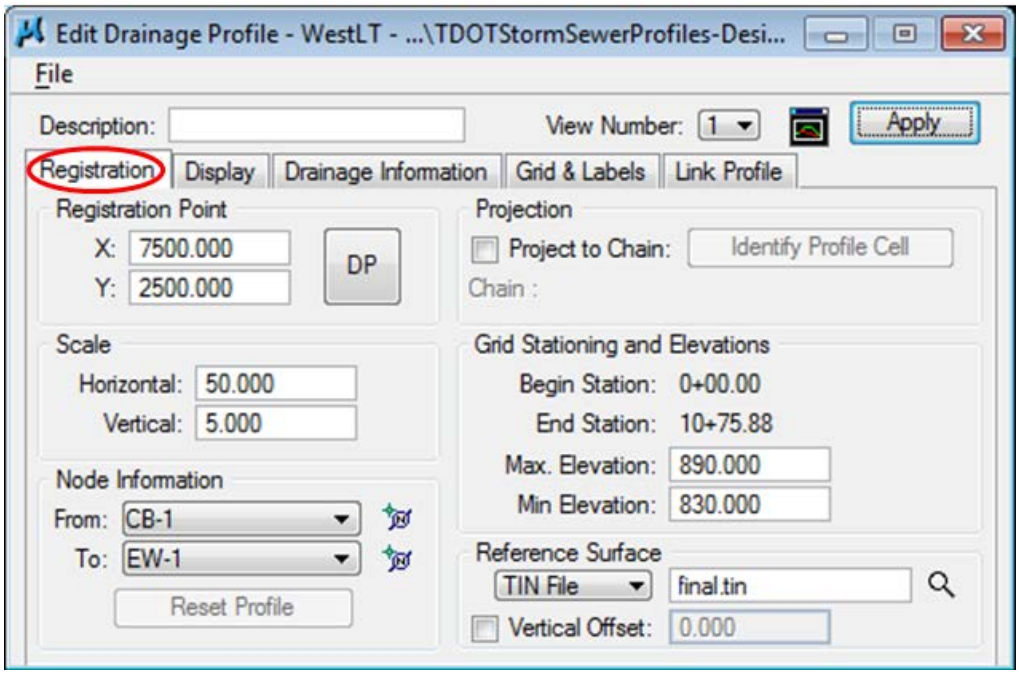

Edit Drainage Profile - WestLT - ...\TDOTStormSewerProfiles-Desi...
File
Description:
View Number: 1
Apply
Registration
Display
Drainage Information
Grid & Labels
Link Profile
Soffit
Pipe Center
Invert
Design Surface
Original Ground
Ref Surface
Water Line Crossings
Label:
Drainage Crossings
Label:
Sewer Line Crossings
Label:
Misc. Utility Crossings
Label:
12
ID: None Available

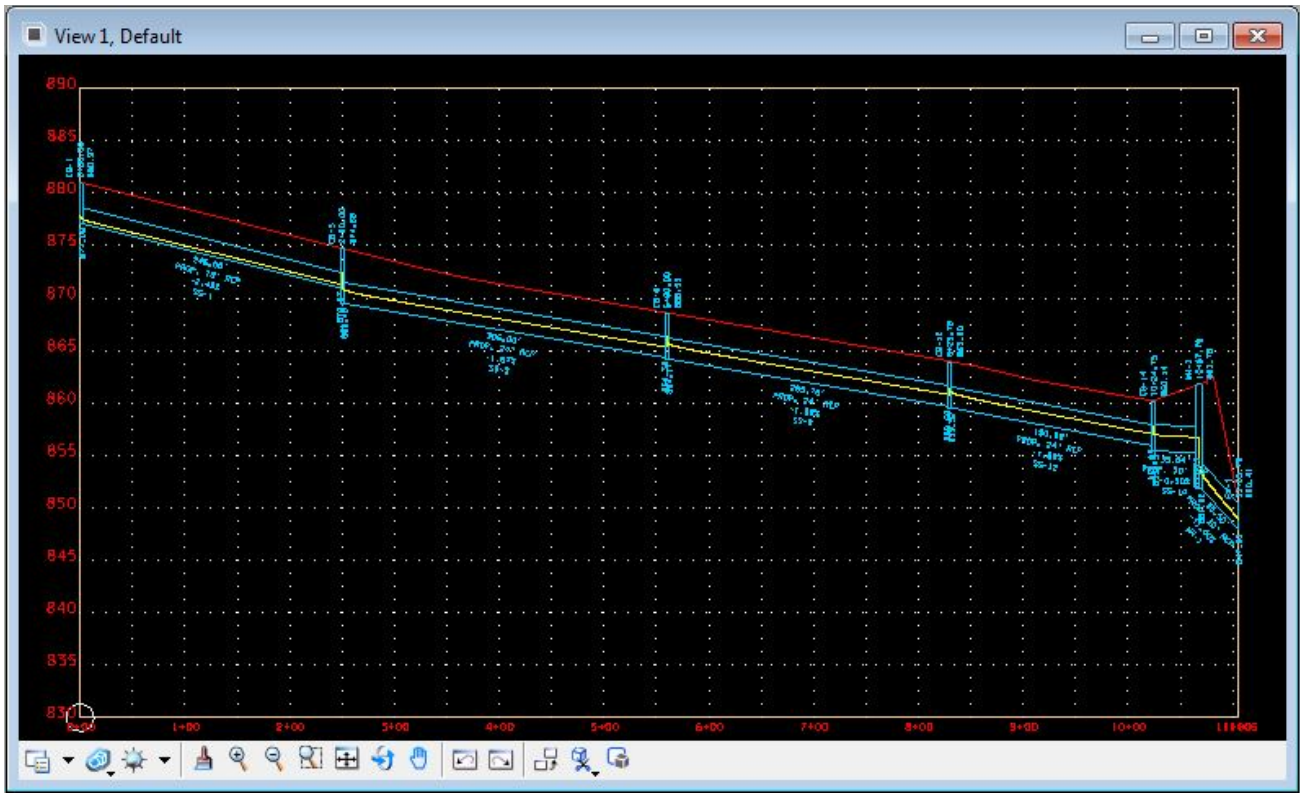

Edit Drainage Profile - WestLT - ...\TDOTStormSewerProfiles-Desi...
File
Description:
View Number: 1
Apply
Registration
Display
Drainage Information
Grid & Labels
Link Profile
Hydraulic Grade Line
Critical Depth
Uniform Depth
Energy Grade Line
Maximum Soffit
Minimum Invert
Minimum Cover
Maximum Depth
Drainage Node



NOTE: During the design process these preferences can be modified to display needed information. However, when projecting to a profile (see Exercise 9.2) the settings should match those defined in profile preference file **TDOTStormSewerProfiles-Plan.ppf**.

d) Click the **Registration** tab and make the settings as below in the *Registration Point*, *Scale* and *Reference Surface* portions (ignore the *Projection* portion for now). The Registration Point will correspond to the lower left corner of the profile and can be wherever an open space is available. Click **Apply**.





e) Review the profile for anything that needs to be corrected.

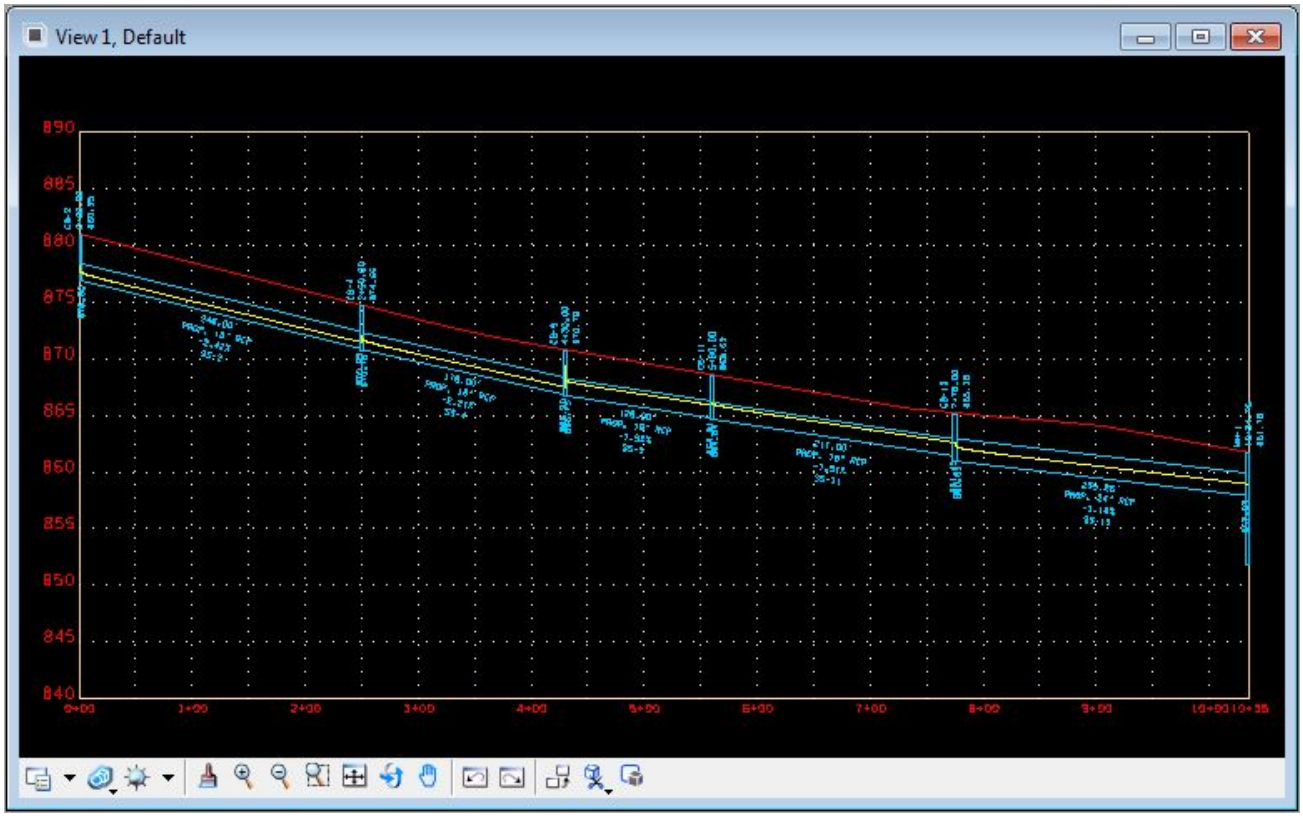
f) Repeat steps a-d to create the following profiles:

Profile ID	From Node - To Node	Registration Point	
WestRT	CB-2 - EW-1	X = 7500	Y = 1000
CB5	CB-5 - CB-2	X = 9000	Y = 1000
CB7	CB-7 - CB-3	X = 9000	Y = 2500
CB8	CB-8 - CB-6	X = 9500	Y = 2500
CB10	CB-10 - CB-9	X = 9500	Y = 1000

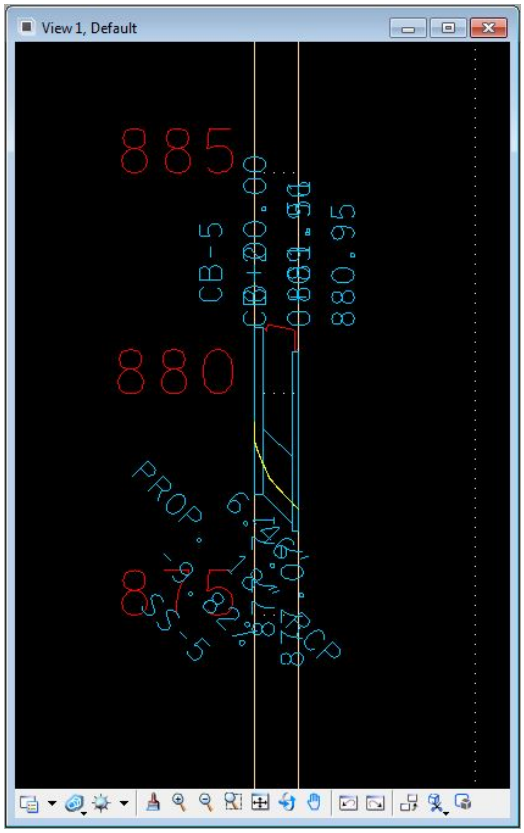
NOTE: All Profiles should go forward with the alignment so they can be projected to the roadway alignment profile at a later time.

See the following pages for images of the profiles.

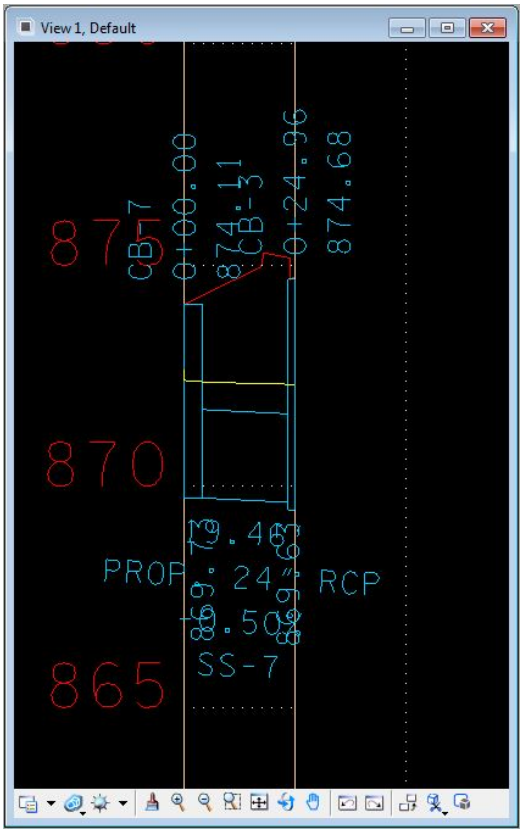
WestRT



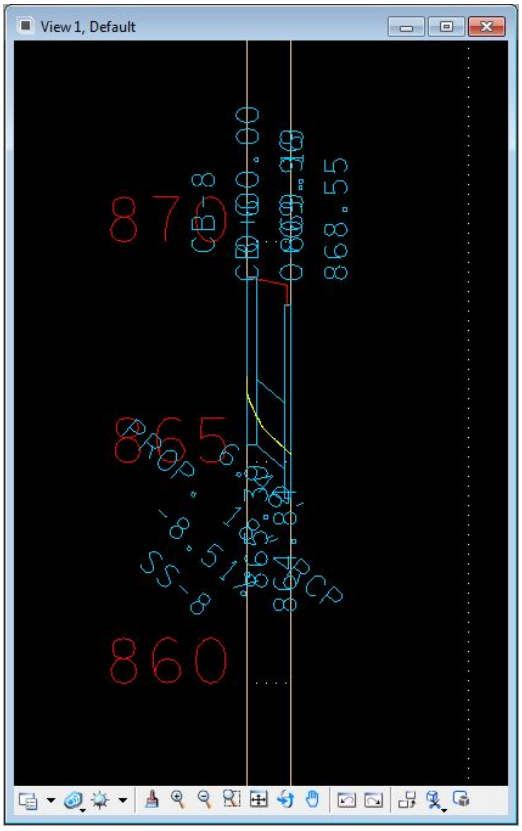
CB5



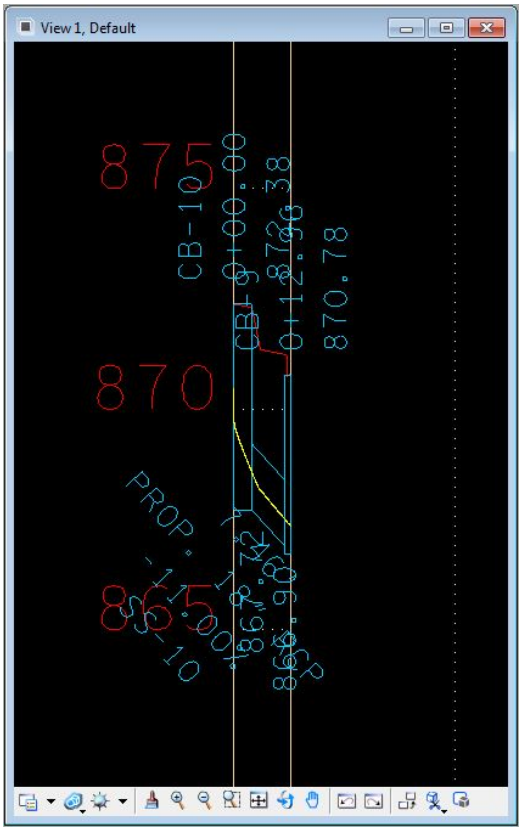
CB7



CB8

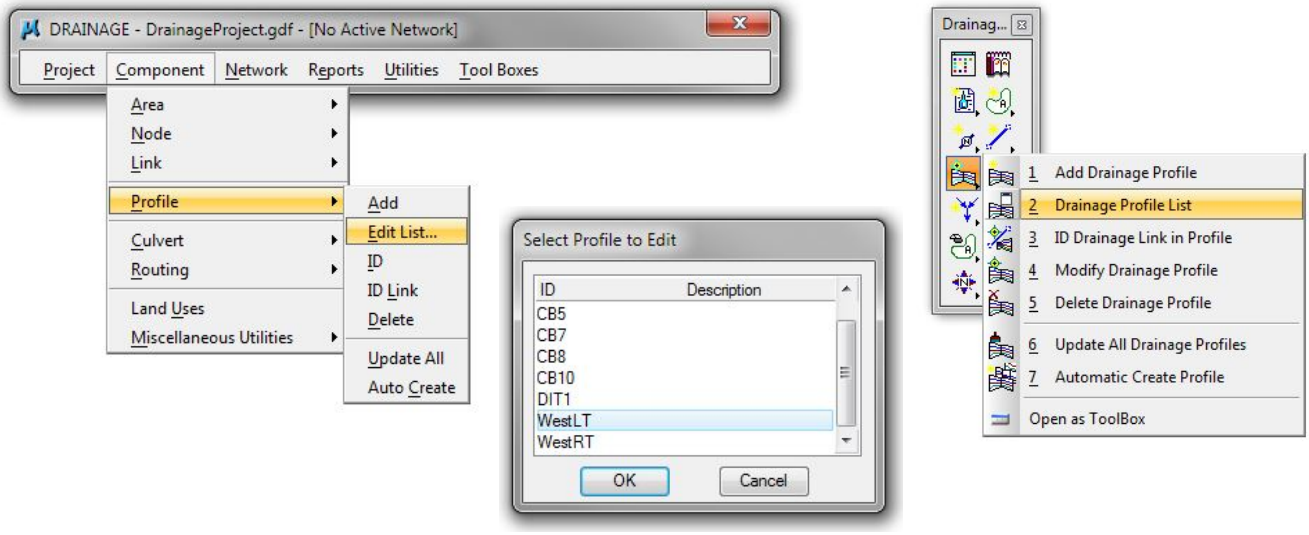

View 1, Default
870
865
860
CB 8
868.55
PROP. -8.51%
SS-8

CB10


View 1, Default
875
870
865
CB-10
870.78
PROP. -11.00%
SS-10

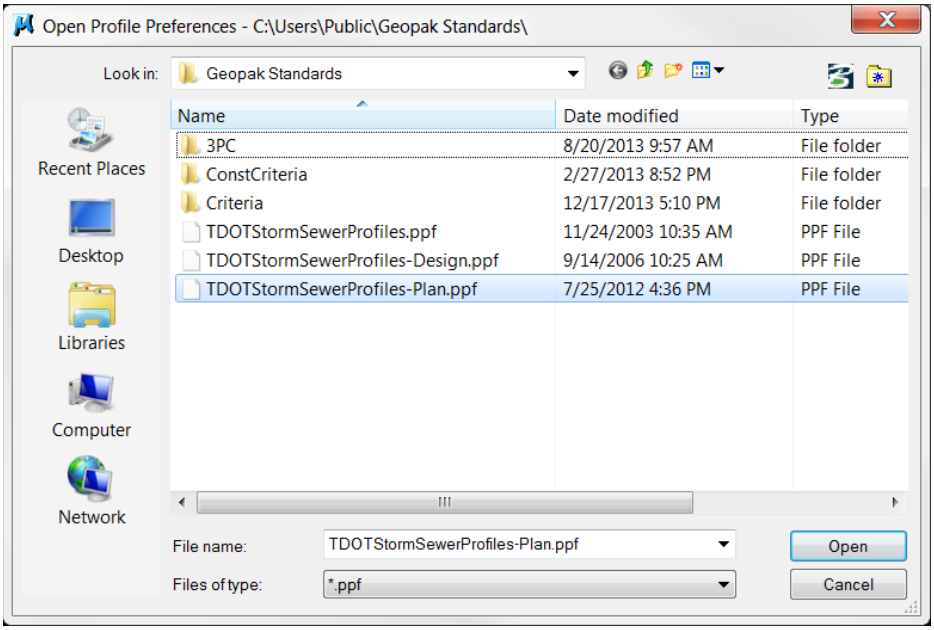
9.2 Projecting Profiles to a Chain

a) Click **Component > Profile > Edit List** from the GEOPAK Drainage Menu or by **Drainage Profile List** from the Drainage Toolbar and select the Profile **WestLT**. Click **OK**.

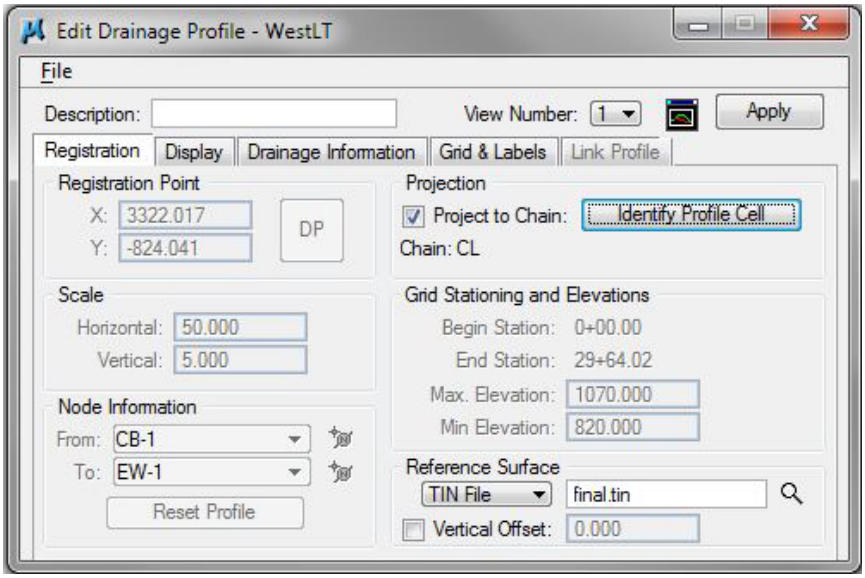


b) Load the **Profile Preferences** file. Inside the Edit Drainage Profile dialog, click **File > Open**.

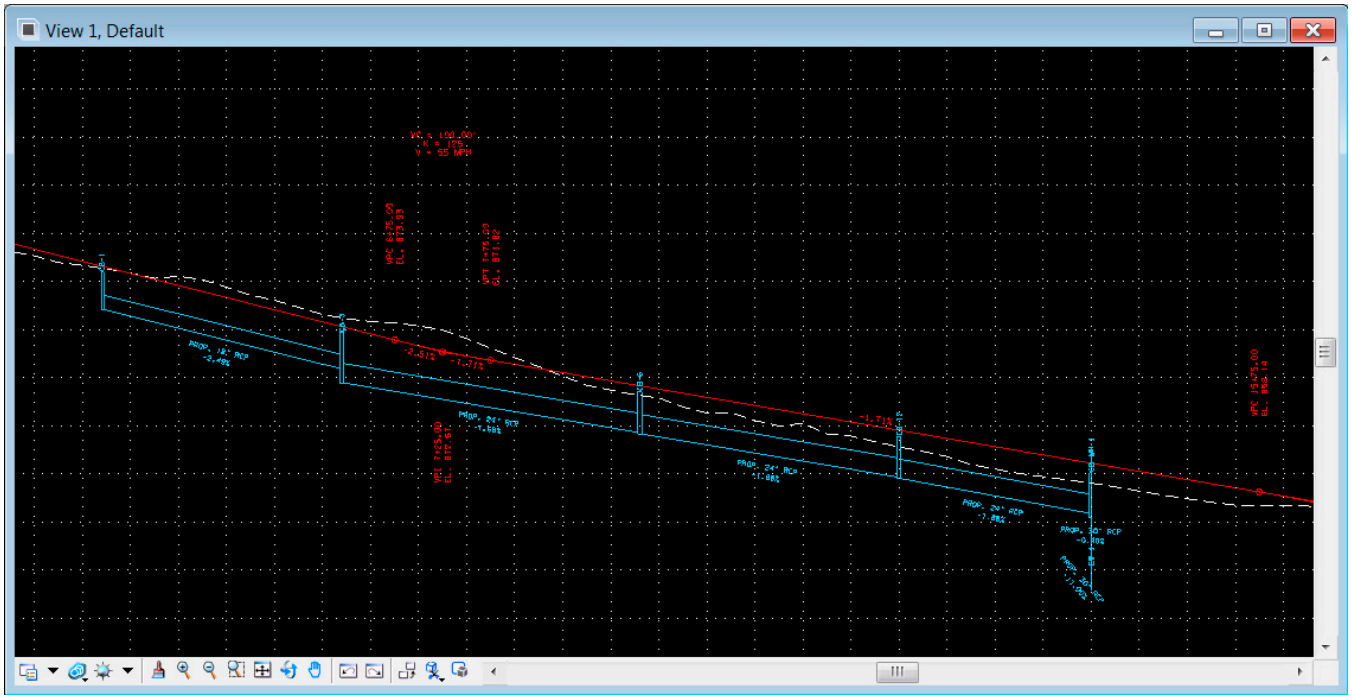
Navigate to **C:Users\Public\Geopak Standards** and select **TDOTStormSewerProfiles-Plan.ppf**. Click **Open.**



c) Toggle ON **Project to Chain** in the *Projection* portion of the dialog. Click **Identify Profile Cell** and select the Profile Cell for the *Roadway* Profile and Data Point to accept. Click **Apply**.



d) View the Projected Drainage Profile along the Roadway Profile.



NOTE: Caution must be used when Projecting Drainage Profiles since the profile will be skewed to fit the station and elevation data of the roadway profile.

9.3 Ditch Profile

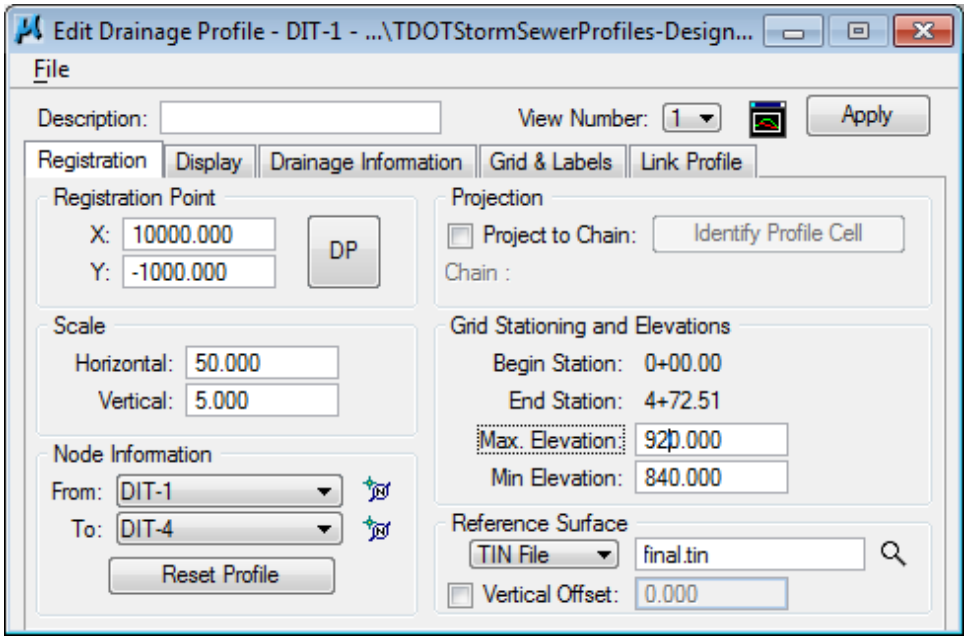
a) Select from the Menu Bar: **Component > Profile > Add** or from the main toolbar: **Add Drainage Profile**

b) Complete the **Profile Configuration** dialog box information as follows for the special ditch drainage network. Click **Apply** when finished.

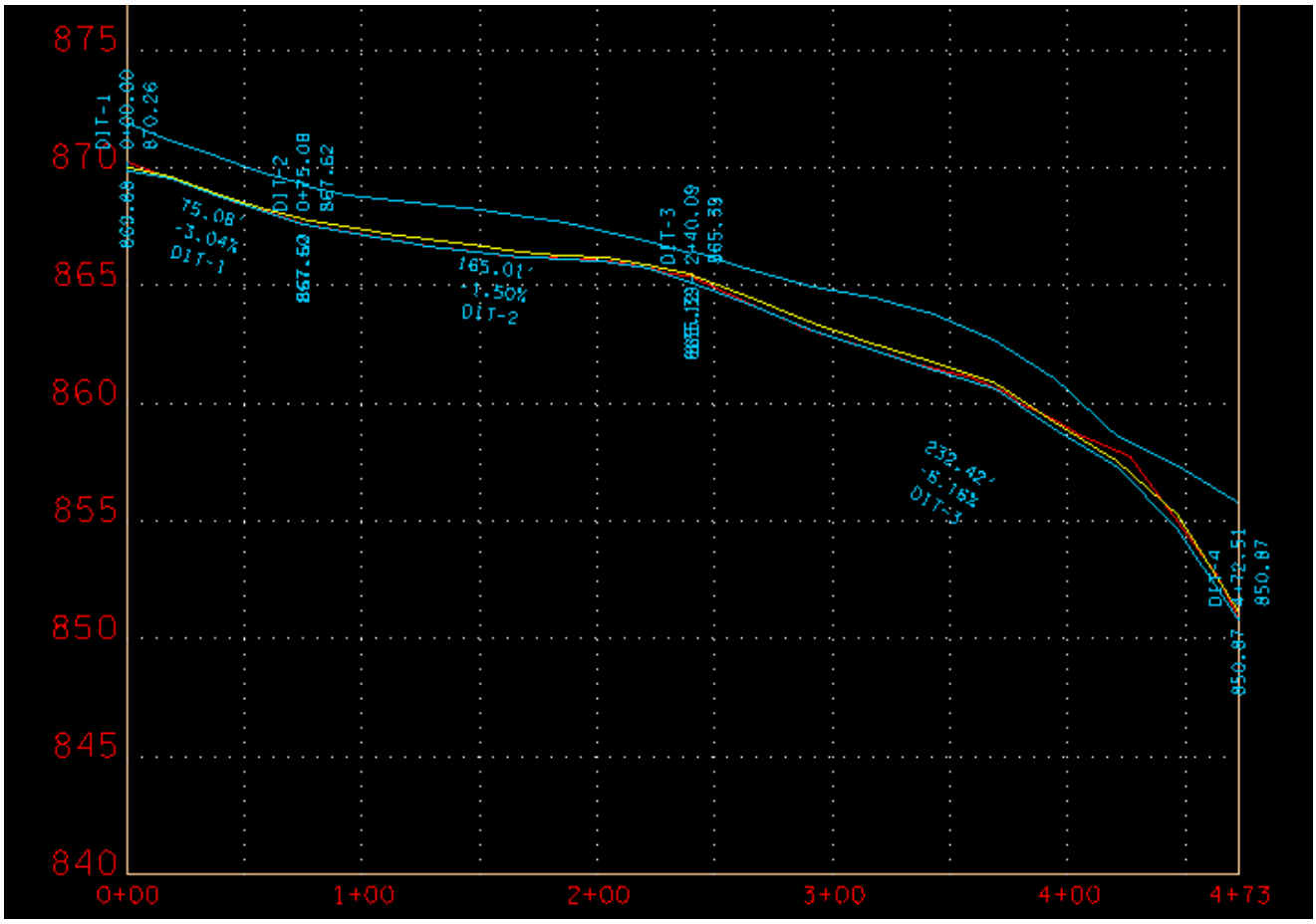
Profile ID: DIT1 **From Node:** DIT-1 **To Node:** DIT-4

c) Load the **Profile Preferences** file. Inside the Edit Drainage Profile dialog, click **File > Open**. Navigate to **C:Users\Public\Geopak Standards** and select **TDOTStormSewerProfiles-Design.ppf**. Click **Open.**

d) Click the **Registration** tab and make the settings as below in the *Registration Point*, *Scale* and *Reference Surface* portions (make sure **Project to Chain** is toggled OFF). Click **Apply**.



NOTE: For ditch profiles defined with Fixed Geometry, this dialog can be used to help identify and correct errors produced in the drainage calculations and ensure the drainage flows as it should. Our current ditch network set up is Cross Section Based on the existing terrain so that functionality is not applicable.



NOTES:
For Cross Section Based links the invert generally follows the existing surface terrain.

The yellow hydraulic grade line indicates locations where the existing ditch cross section geometry and water volume cause a rise or fall in the water surface elevation. Rises indicate points where greater capacity may be required. This information along with computation information provided with the links can be used to determine any possible special ditch needs.

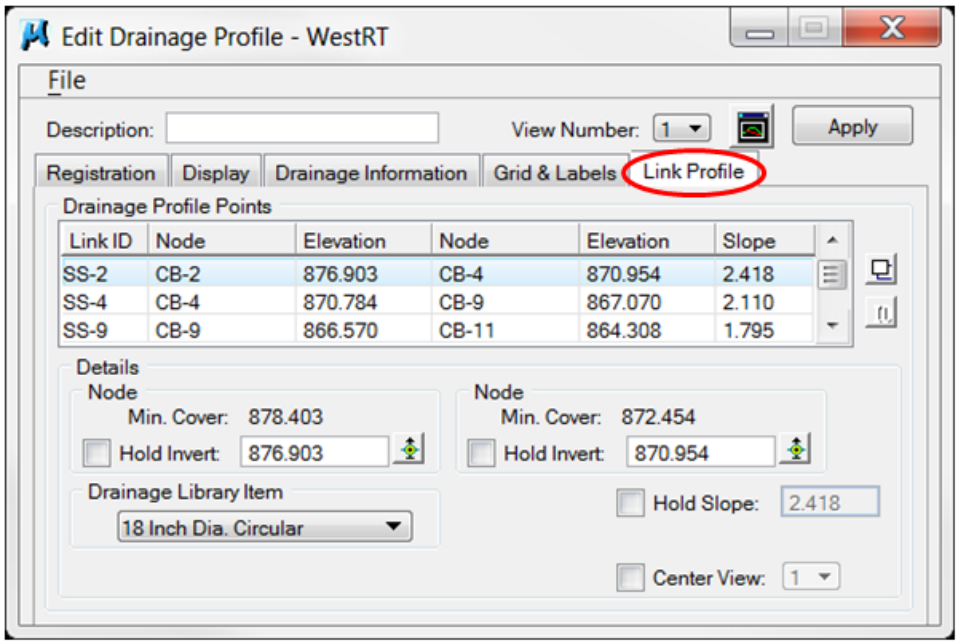
In Exercise 11, the system modification chapter, we will relocate these nodes and set the links as fixed geometry to define a special ditch set up to handle the drainage in this area.

9.4 Editing Links via Profiles

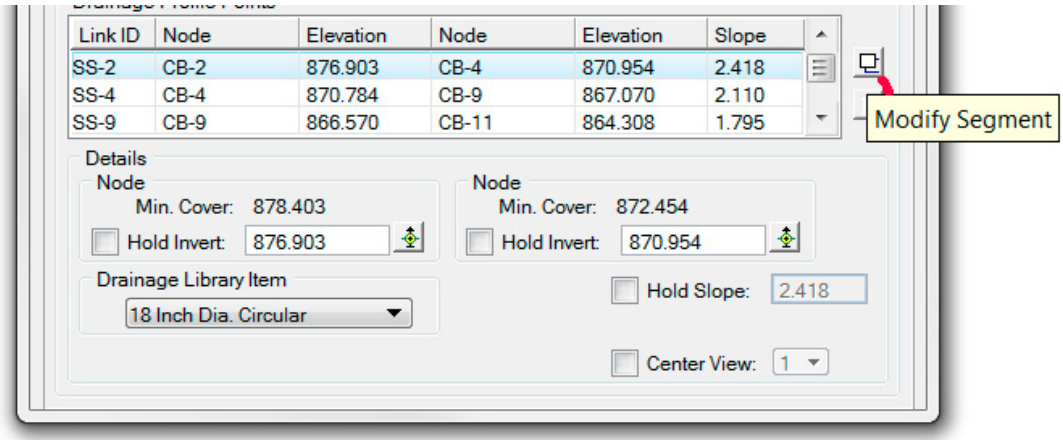
The Edit Profiles dialog allows you to edit a Link's design. This being the case the **Link Configuration** dialog must be closed in order to open the **Edit Drainage Profile** dialog.

a) Open profile **WestRT** by selecting **Component > Profile > Edit List** or by selecting **Drainage Profile List** from the GEOPAK Drainage Main Toolbar**.**

b) Click the **Link Profile** tab. Highlight the **SS-2** Link ID.



The SS-2 link's control data is populated in the **Details** section at the bottom.



From here you can set and hold the invert elevations, set the slope to hold or change the pipe size.

Once any desired changes are made, click the **Modify Segment** icon on the right. An alert will appear. Click **Yes**, review and dismiss the warnings.

c) Do not make any changes at this time. Click the red X to dismiss the dialog.