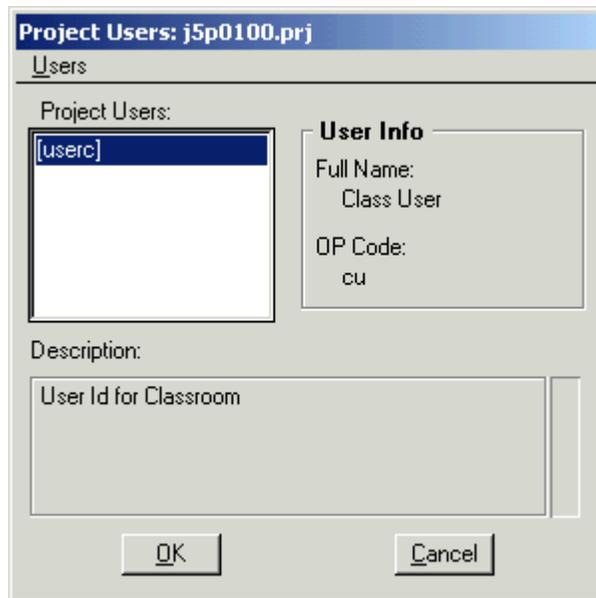
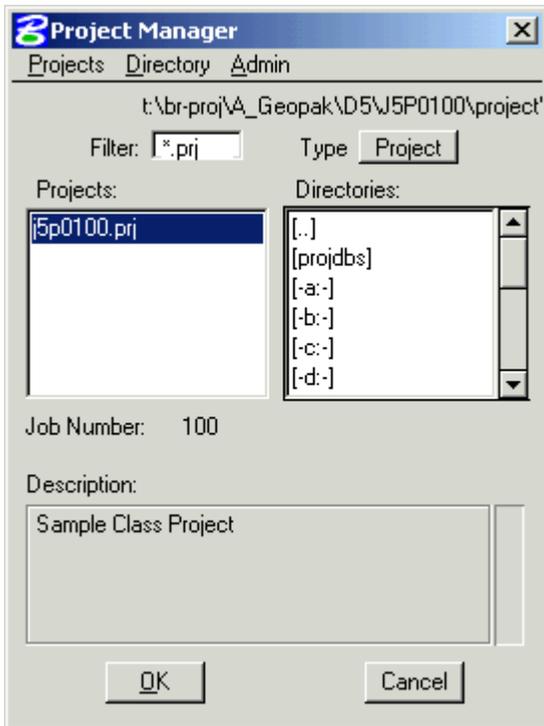


Exercise 14-1

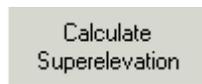
1. Open the MicroStation file
t:\br-proj\A_geopak\d5\j5p0100\data\pattern_shape_j5p0100.dgn.

2. Open the project **t:\br-proj\A_geopak\d5\j5p0100\project\j5p0100.prj** as user **userc** and enter **Road**.



3. Select the **Route50** working alignment.

4. Choose **Calculate Superelevation** from the **Road Project** dialog to calculate the pavement cross slopes.



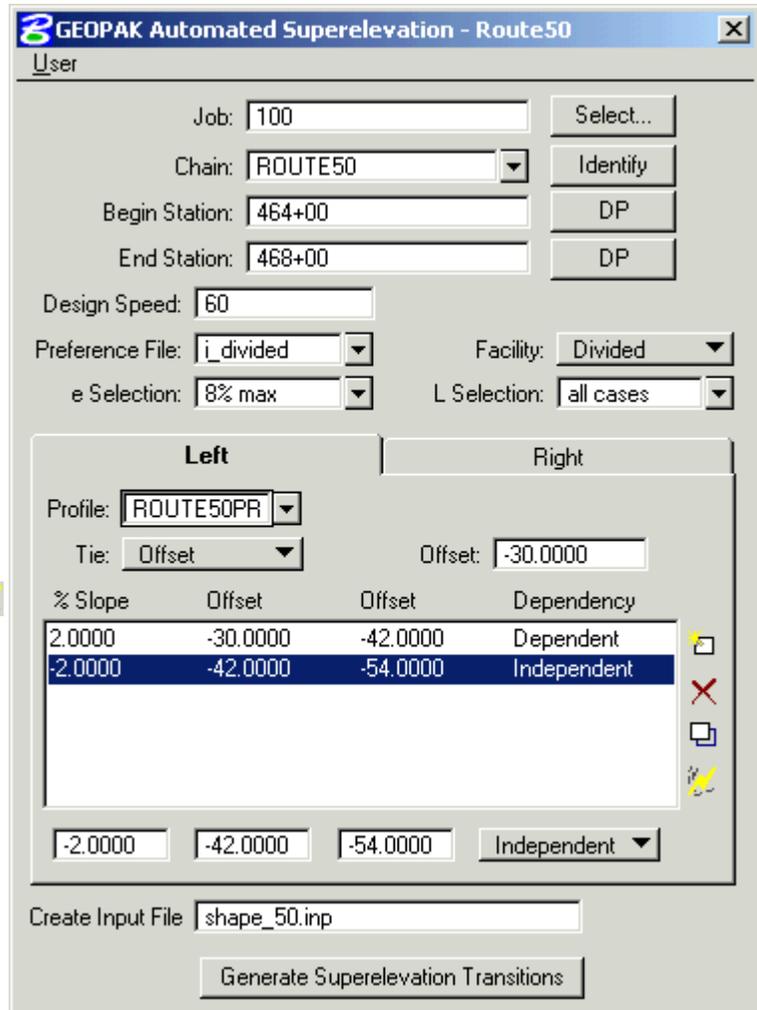
Copy the **MoDOT** run to **Route50** and enter the run.

5. Create the Route50 shapes as follows and as depicted in the dialog to the right:

Job: **100**
 Chain: **Route50**
 Begin Station: **464+00**
 Ending Station: **468+00**
 Design Speed: **60**
 Reference File: **i_divided**
 Facility: **Divided**
 e Selection: **8% max**
 L Selection: **all cases**
 Profile: **ROUTE50PR**
 Tie: **Offset**

Click on the **Quick Entry** icon  circled in red in the dialog box to the right. This will bring up the dialog shown below. Fill it in as shown with the following:

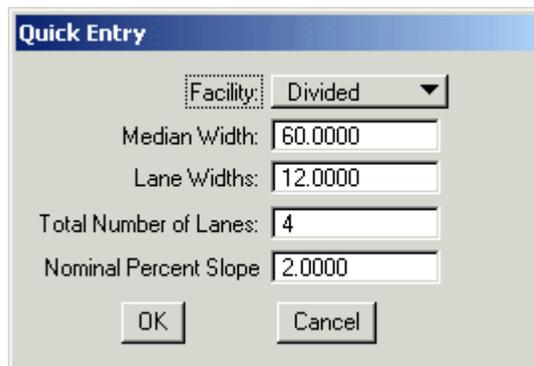
Facility: **Divided**
 Median Width: **60.00**
 Lane Widths: **12.00**
 Total Lanes: **4**
 Normal % Slope: **2.00**



Job: 100
 Chain: ROUTE50
 Begin Station: 464+00
 End Station: 468+00
 Design Speed: 60
 Preference File: i_divided
 Facility: Divided
 e Selection: 8% max
 L Selection: all cases

% Slope	Offset	Offset	Dependency
2.0000	-30.0000	-42.0000	Dependent
-2.0000	-42.0000	-54.0000	Independent

Create Input File: shape_50.inp
 Generate Superelevation Transitions



Facility: Divided
 Median Width: 60.0000
 Lane Widths: 12.0000
 Total Number of Lanes: 4
 Nominal Percent Slope: 2.0000

OK Cancel

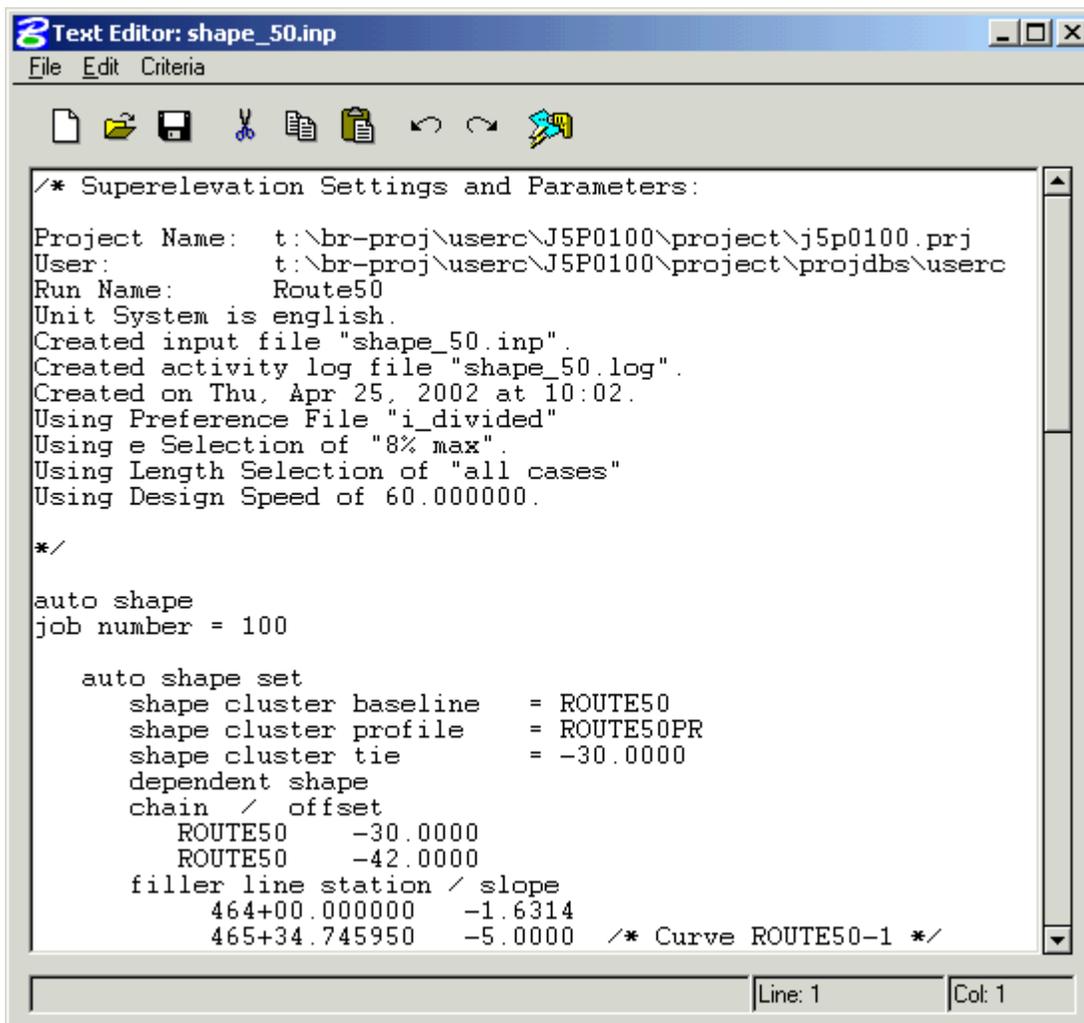
Click **OK**.

Modify the % Slope to -2.0000 for offsets 42-54 on the Left (negative) and Right (positive) sides.

Change the Input File to: **shape_50.inp**

Click on **Generate Superelevation Transitions**.

6. Clicking on the **Generate Superelevation Transitions** button will generate the INP file, which is displayed in the following dialog box.



```

/* Superelevation Settings and Parameters:

Project Name:  t:\br-proj\userc\J5P0100\project\j5p0100.prj
User:          t:\br-proj\userc\J5P0100\project\projdbs\userc
Run Name:      Route50
Unit System is english.
Created input file "shape_50.inp".
Created activity log file "shape_50.log".
Created on Thu, Apr 25, 2002 at 10:02.
Using Preference File "i_divided"
Using e Selection of "8% max".
Using Length Selection of "all cases"
Using Design Speed of 60.000000.

*/

auto shape
job number = 100

  auto shape set
    shape cluster baseline   = ROUTE50
    shape cluster profile    = ROUTE50PR
    shape cluster tie        = -30.0000
    dependent shape
    chain / offset
      ROUTE50  -30.0000
      ROUTE50  -42.0000
    filler line station / slope
      464+00.000000  -1.6314
      465+34.745950  -5.0000 /* Curve ROUTE50-1 */

```

7. Use UltraEdit or another text editor to view the log file:
t:\br-proj\a_geopak\d5\j5p0100\data\j5p0100\data\shape_50.log.

8. Run the input file shape_50.inp by clicking on the **Create Superelevation Shapes** icon  in the **GEOPAK Text Editor: shape_50.inp**. It is the icon shown to the right and it the last icon in the tool bar at the top of the dialog. Save the MicroStation drawing after creating the shapes and close the **GEOPAK Automated Superelevation** dialog. Click on **Yes** to **Save Superelevation Settings?** in the Alert dialog.

9. Select the **BigHorn** working alignment.

10. Click on the **Define** button to review the **BigHorn** working alignment definitions. Under the **Shapes** section, change the following symbology settings:

Levels: **62**
 Colors: **2,7**

Using different symbology lets the user distinguish between the shapes for the two alignments.

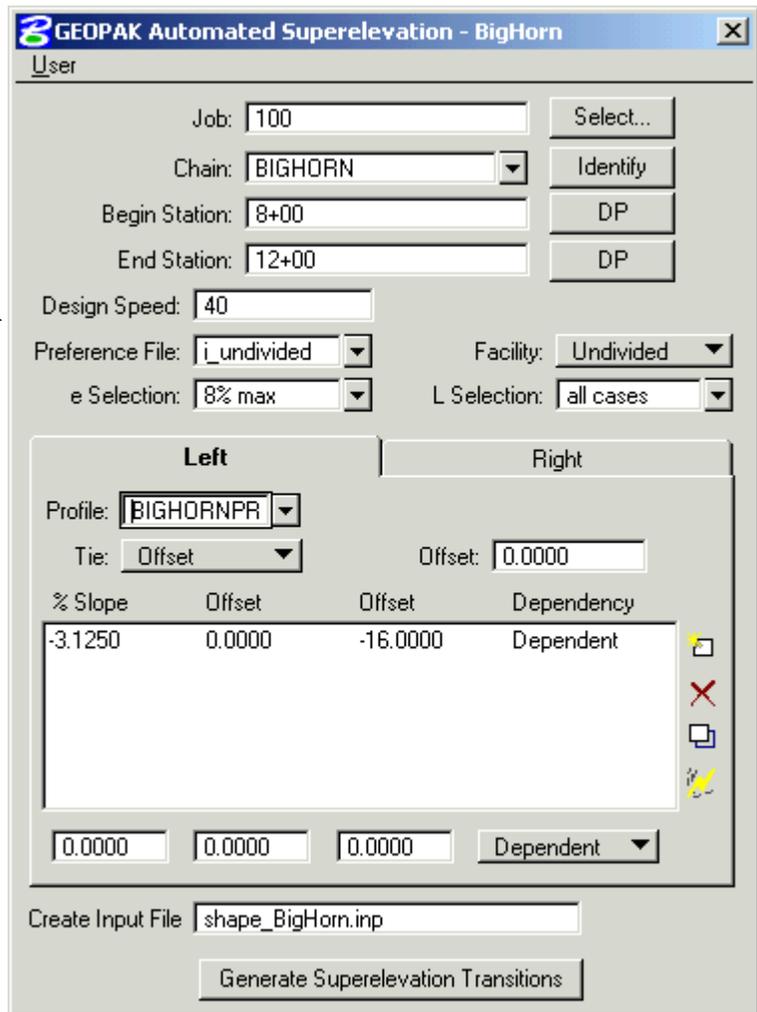
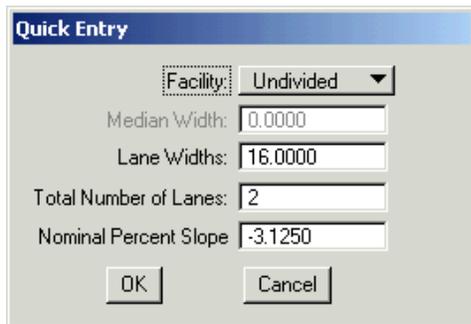
Close the working alignment definition box by clicking on **OK**.

11. Select the **Calculate Superelevation** button from the Project Manager dialog. Copy the MoDOT run to **BigHorn**, and enter the run. Create the Big Horn shapes as follows:

Job: **100**
 Chain: **BIGHORN**
 Begin Station: **8+00**
 Ending Station: **12+00**
 Design Speed: **40**
 Reference File: **i_undvided**
 Facility: **Undivided**
 e Selection: **8% max**
 L Selection: **all cases**
 Profile: **BIGHORNPR**
 Tie: **Offset**

Use the **Quick Entry** dialog to set the lane information to the following:

Facility: **Undivided**
 Lane Widths: **16.00**
 Total Lanes: **2**
 Normal % Slope: **-3.125**



Change the Input File to: **shape_bh.inp**

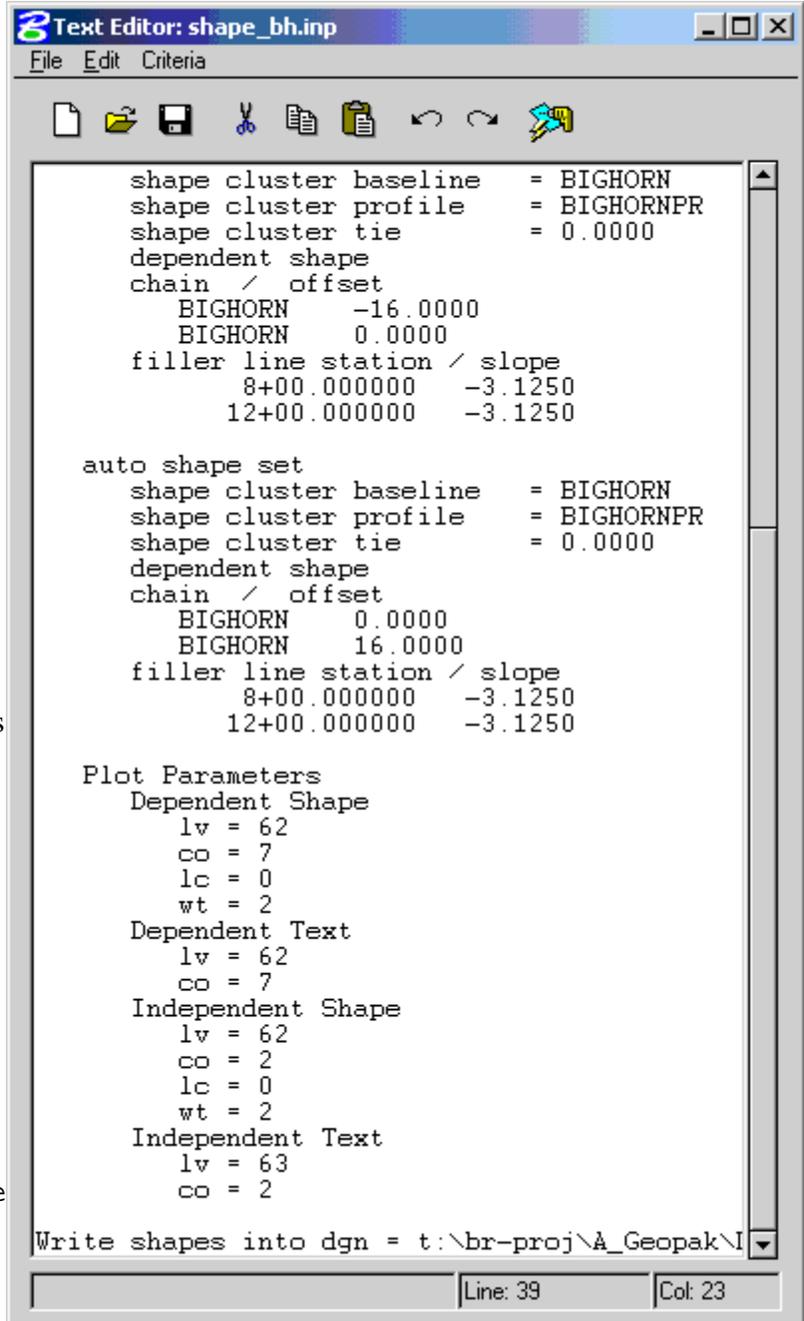
Click on **Generate Superelevation Transitions**.

12. Edit the filler lines for both **auto shape sets** so there is a constant cross slope of **-3.125%** for the full station range and change the second set to an **independent shape**, as depicted to the right. Note: Because the profile grade line is at the center of the roadway, both shapes can get their elevations from the profile (the dependent condition). Changing one of the shapes to independent, however, enables the user distinguish between the two shapes.

Under **Plot Parameters**, change the level (lv) and the color (co) settings to the values shown below in **bold** text, which are the values set in the BigHorn Working Alignment:

```

Dependent Shape
  lv = 62
  co = 7
  lc = 0
  wt = 2
Dependent Text
  lv = 62
  co = 7
Independent Shape
  lv = 62
  co = 2
  lc = 0
  wt = 2
Independent Text
  lv = 62
  co = 2
    
```

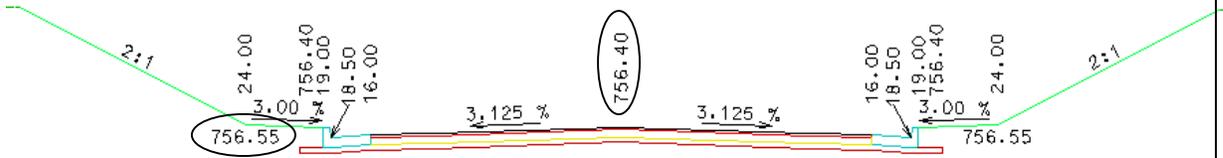


After editing the input file, save the changes by clicking on floppy disk icon and run it by clicking on the **Create Superelevation Shapes** icon.

Exit the text editor.

Exit the superelevation run and save the changes to it and the MicroStation file.

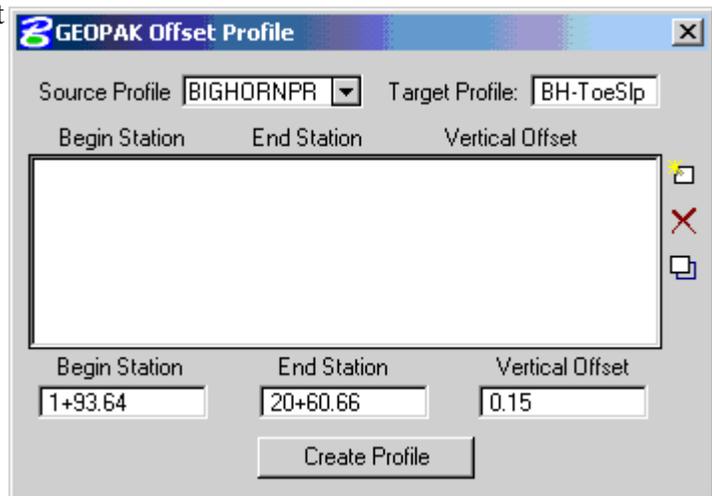
13. The fill slopes will also be shaped to determine the bridge length. Since these shapes need to be associated with a profile, a location for the profile needs to be determined. The toe of the slope is the most logical location. From the cross section below, it can be determined that the toe of the slope is 0.15' above the roadway profile with a constant offset of 24' left and right.



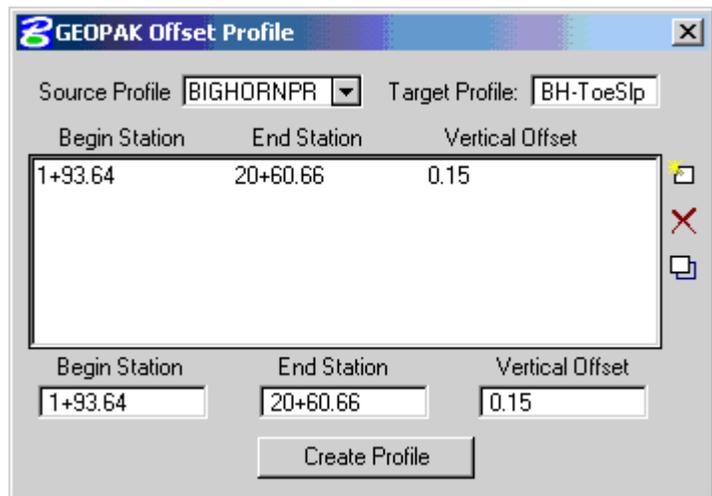
Go into Coordinate Geometry. Select **Element > Profile > Offset**. This will bring up the dialog box shown to the right.

Enter the following information as shown in the top figure to the right:

Source Profile: **BIGHORNPR**
 Target Profile: **BH-ToeSlp**
 Begin Station: **1+93.64**
 End Station: **20+60.66**
 Vertical Offset: **0.15**



Once this information is entered, click on the **Add** icon , which is the top icon on the right side of the dialog box. This will add the station range and the offset to the list box as depicted in the bottom figure to the right. To delete an item from the list box, highlight the line and click on the **Delete** icon , which is the middle icon on the right side of the dialog. If changes need to be made to an item in the list box, highlight that line, edit information in the fields at the bottom of the dialog and click on the **Edit** icon .



When the list box is complete, click on the **Create Profile** button. This will store the target profile, as indicated by the following message in the MicroStation Status Bar in the lower left hand corner of the MicroStation window: *“Profile BH_ToeSlp saved. Store Profile commands saved in BH_ToeSlp100.icu.”* This file is stored in the working directory and may be viewed using UltraEdit or any other text editor.

14. Click on the **Select** button in Project Manager. **Copy** the **BigHorn** working alignment to **BH-Slope** and enter the new working alignment.

Click on the **Define** button and adjust the following definitions:

In the **Shapes** section, change the **Colors** to **3**.

Under **Profile View**, change the **Proposed Profile** to **BH-TOESLP**.

Click **OK**.

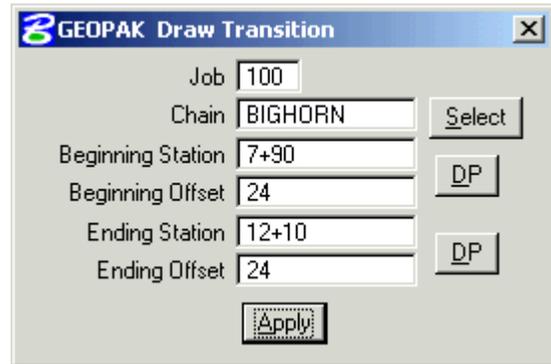
To facilitate the creation of the shapes using **Shape Maker**, set **Level 1** as the **active** level, use **Level Manager** to **turn off levels 61 and 63**, and **turn off** the display for any **referenced files**. All that should be visible after doing this are the shapes for Big Horn Dr.

Choose **Plan View Design** from Project Manager. This will bring up the toolbox shown to the right. Select **Draw Transition**, which is the third tool in the toolbox.



Use Draw Transition to draw the following lines to serve as longitudinal lines for shapes:

<u>Beginning Station</u>	<u>Beginning Offset</u>	<u>Ending Station</u>	<u>Ending Offset</u>
7+90	24	12+10	24
7+90	-24	12+10	-24
7+90	-70	12+10	-70
7+90	70	12+10	70

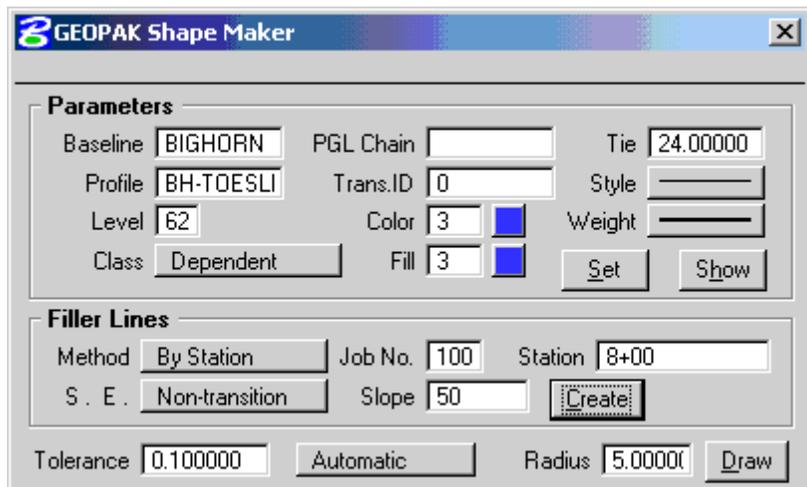


Close the **Draw Transition** and the **Plan View Design** dialog boxes after the four lines are drawn.

15. Click on **Superelevation Shapes** in Project Manager.

Fill in the dialog so it is like the one to the right (wt = 2). Once this is completed, click on the **Create** button. This will draw a filler line at station 8+00.

Change the Station to **12+00** and click the **Create** button a second time to draw the other filler line at Station 12+00.

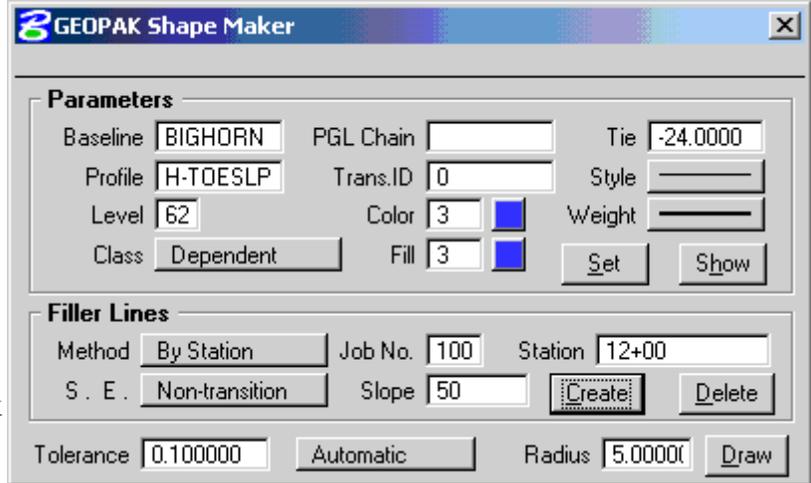


Click on the **Draw** button and data point inside the closed in area on the right side of Big Horn Drive. Note: On the screen it is actually to the left of the existing shapes.

16. Repeat the process on the left side of Big Horn Drive, which is to the right of the existing shapes on the screen.

Change the Tie to **-24.00**, set the Station to **8+00** and click on the **Create** button to draw the first filler line.

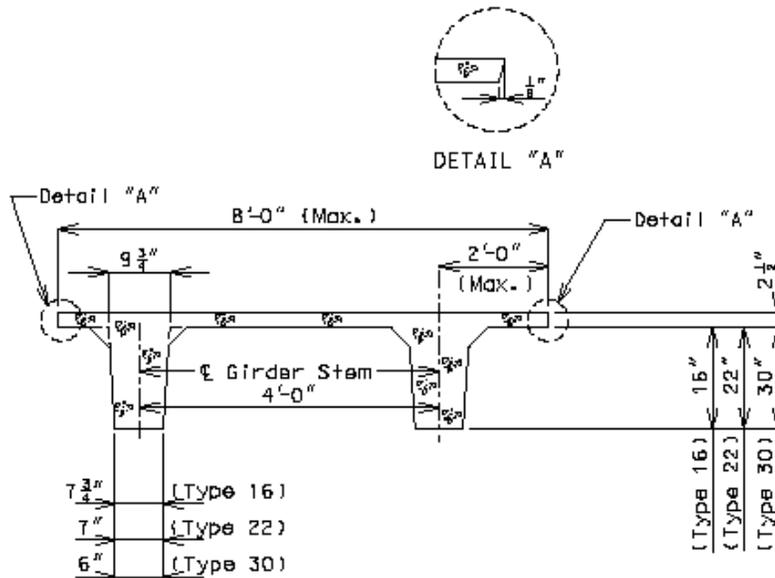
Change the Station to **12+00** as shown to the right and click on the **Create** button to draw the second filler line.



Click on the **Draw** button and data point inside the closed in area on the left side of Big Horn Drive. Note: On the screen it is actually to the right of the existing shapes.

Refresh the view. Turn on **Level 63** and **save** the changes to the MicroStation drawing. Exit Shape Maker.

17. A profile for Route 50 is needed to define the maximum height of the fill slopes. This profile is based upon the minimum clearance of 1' from the top of the end bent beam to the top of the fill slope (**BM 3.77.2.2-2**, Effective May 2002). Since Big Horn Dr is 39' wide, Type 30 P/S Concrete Double Tee Girders will be used (based on **BM 3.56.1.6-1**, Effective Nov. 2000, as shown on the following page). From the figure below (**BM 3.56.1.1-10**, Effective Nov. 200), the web depth is 30". Allowing 1/4" for the bearing pads, 1/4" for camber, and 8 1/2" for the deck, gives a total depth of 39" ($30 + 1/4 + 1/4 + 8 1/2$) = 3.25'. Adding the 1' clearance results in the maximum height of the fill slope at 4.25' below the top of the deck.



SECTION THRU P/S CDNC. DBL. TEE GIRDER

Using **Offset Profile**, create profile **50-PR-SLP** 4.25' below Route50PR.

Bridge Manual

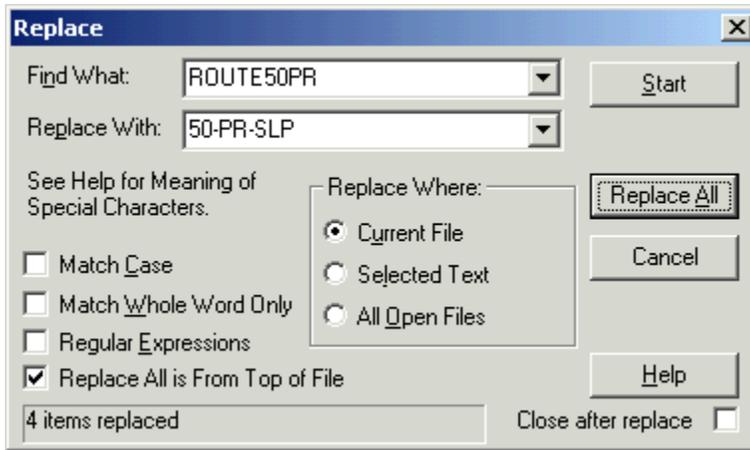
P/S Concrete Double-Tee Girders - Sec. 3.56

30'-10" ROADWAY
GIRDER SPAN LENGTH (HS20 & HS20 MILITARY LOADING)

Superstructure

Span Length from Bent to Bent	Allowable Span Length For P/S Concrete Double-Tee Girder Spans					
	Type 30		Type 22		Type 16	
	Span Length	Girder Seq. No.	Span Length	Girder Seq. No.	Span Length	Girder Seq. No.
20'	20' thru 28'	320	20' thru 29'	230	20' thru 23'	130
21'						
22'						
23'						
24'						
25'						
26'						
27'						
28'	29' thru 34'	330	30' thru 34'	240	24' thru 28'	140
29'						
30'						
31'						
32'	35' thru 40'	340	35' thru 37'	251	29'	151
33'						
34'						
35'						
36'	41' thru 44'	351	38' & 39'	262	Big Horn Dr. Width = 39'	
37'						
38'						
39'	45' & 46'	362	<p>Note: The maximum span lengths shown for P/S Double-Tee Girders are based on a minimum of 2-spans (continuous) being used. If one of these P/S Double-Tee Girders is used as one simple span, then the span lengths should be reduced from the maximum allowable span shown, and the girder design should be checked.</p>			
40'						
41'						
42'						
43'						
44'						
45'						
46'						
47'	47' thru 49'	372				
48'						
49'	50' thru 52'	383				
50'						
51'						
52'						

18. The profile **50-PR-SLP** will be used for shapes that represent the maximum height surface for the bridge fill slope. These will be added to pattern_shape_j5p0100.dgn by editing and running an existing INP file.



Open **shape_50.inp** in UltraEdit. Highlight the shape cluster profile **ROUTE50PR**. Go to the UltraEdit pull down menu **Search > Replace**, to bring up the dialog to the left.

Enter **50-PR-SLP** in the **Replace With:** field as shown. Click on the **Replace All** button to change the name of the profile in the file.

Go to the 2nd and 4th auto shape sets and change the offset range to the values shown below (the value to be changed is shown in bold):

Changes to 2nd auto shape set
 chain / offset
 ROUTE50 -42.0000
 ROUTE50 -**64.0000**

Change to 4th auto shape set
 chain / offset
 ROUTE50 42.0000
 ROUTE50 **64.0000**

Scroll down to the **Plot Parameters** section of the input file and change level (lv) and color (co) symbology to the values shown below in bold.

```

Plot Parameters
  Dependent Shape
    lv = 60
    co = 8
    lc = 0
    wt = 2
  Dependent Text
    lv = 60
    co = 8
  Independent Shape
    lv = 60
    co = 4
    lc = 0
    wt = 2
  Independent Text
    lv = 60
    co = 4
    
```

Save the file as **shape_50_slp.inp**. This input file will be run later.