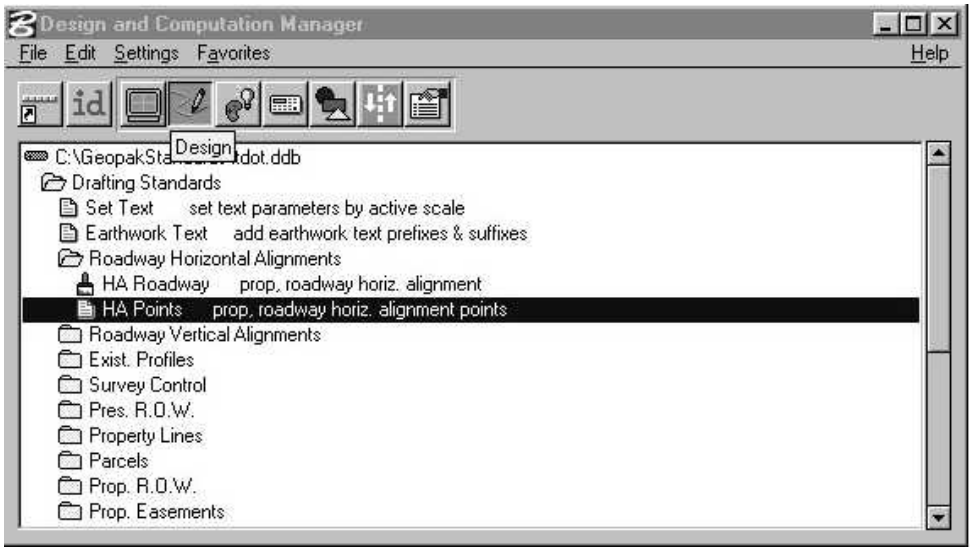
Design & Computation Manager Programs

Geopak's Design & Computation Manager uses Geopak 3 port criteria program files or 3PC files as they are commonly called and Microstation programs to produce special graphic displays or to perform special functions.

This document contains program descriptions and workflows for these special programs listed in the order as they appear in the Design & Computation Manager.

These programs can be activated in two ways.

If you are running in the dialog mode with the expanded D&C Manager window then double click on the item with Design mode active.



If you are running D&C Manager window in the **toolbox** mode then just click on the **Execute Design Keyin** button

Drafting Standards

Tools

Set Text

D&C location: Drafting Standards>Tools> Set Text

Microstation Macro Program: SetText.ba

Description:

This application sets text size, line spacing for multiline text and element weight based on active scale and the desired final plot size of the text.

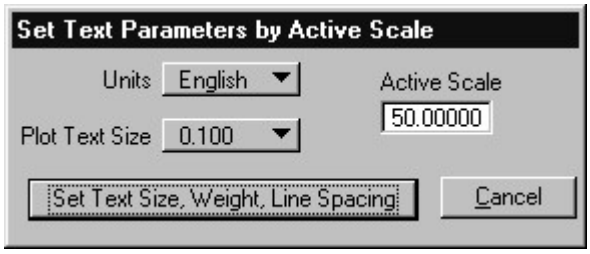
This macro can also be activated from the Microstation drop down menu **TDOT>Text>Set Text Parameters by Active Scale** or by using the keyin **MACRO SETTEXT**.

Special Requirements:

None.

Usage:

Step 1. In D&C manager activate **Set Text**. The **Set Text Parameters by Active Scale** dialog appears. Defaults that come up are English units and a 0.100 plot text size. The active scale value is read from the active scale currently set in the design file.

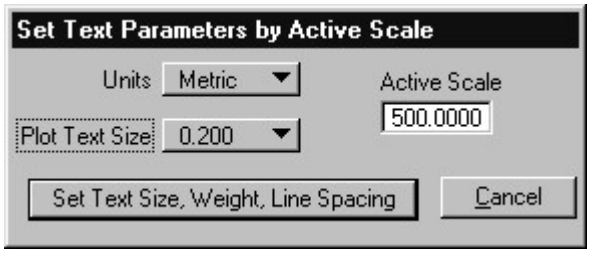


Step 2. Make settings as needed:

Set **Units** to English or Metric.

Set **Active Scale** to an alternate value if needed. If changed this will reset the active scale in the file. **This should be set to the scale at which the text graphics are to be plotted.**

Choose the **Plot Text Size** desired from the standard text size list.



Step 3. Once settings are made click on the **Set Text Size, Weight, Line Spacing** button and the dialog will disappear. Text parameters are set in the file based on the dialog settings. Any Microstation text command can now be used to place text.

Earthwork Text

D&C location: Drafting Standards>Tools> Earthwork Text

Geopak 3PC Program: ew__labels.x
Microstation Macro Program: ew_labels.ba

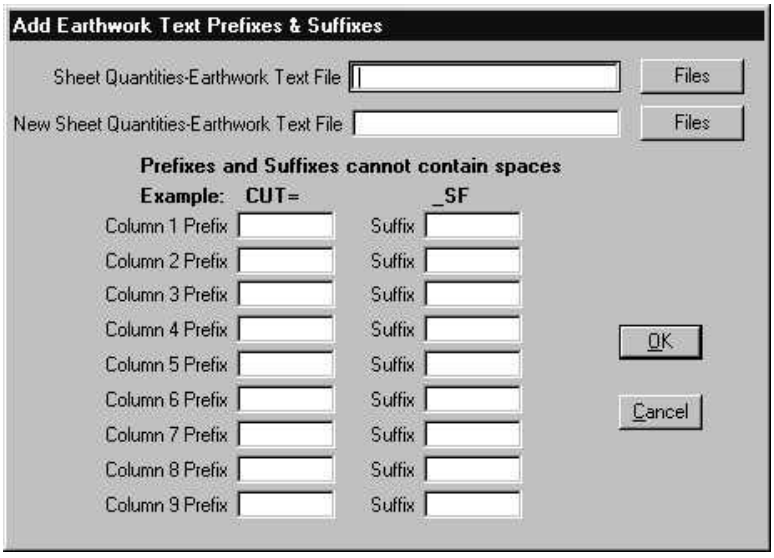
Description:
These two programs work together to add earthwork text prefixes & suffixes to the earthwork text file used when setting up cross section sheets to annotate earthwork areas. The Microstation macro provides the dialog interface and the Geopak 3PC does the file processing.

Special Requirements:
An earthwork text file with end area values must already be created using Geopak's Earthwork calculation program.

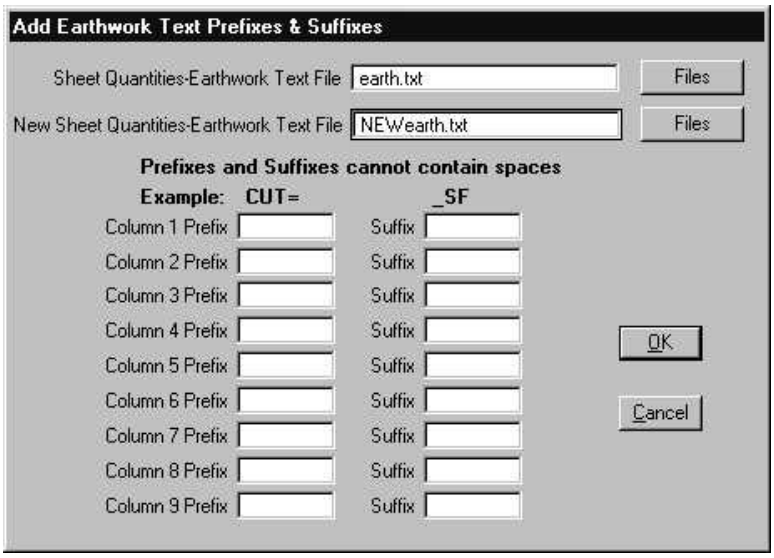
Usage:

Step 1. Generate an earthwork text file with end area values using Geopak's Earthwork calculation program. Note which soil data types are placed in which columns. Example: earth cut in column 1, earth fill in column 2, rock cut in column 3, etc.

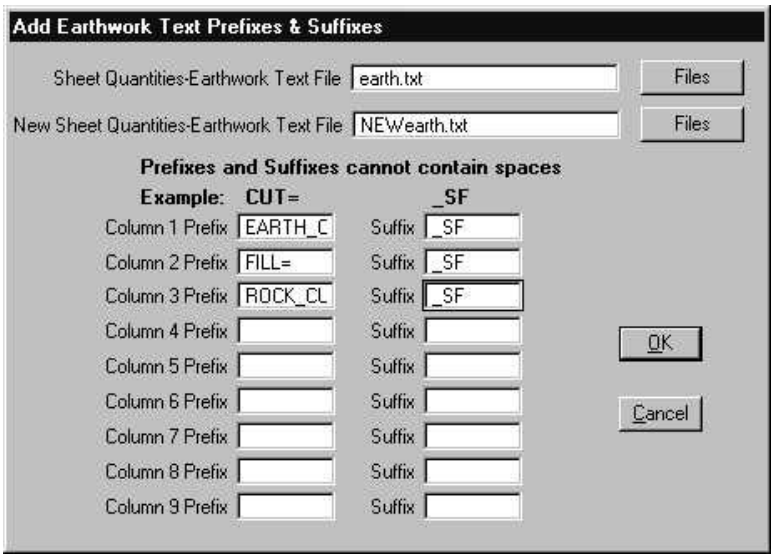
Step 2. In D&C manager activate **Earthwork Text**. The **Add Earthwork Text Prefixes & Suffixes** dialog appears.



Step 3. In the dialog click on the **Files** button to go find the **Sheet Quantities Earthwork Text File** created in step 1. Key in a new file name for the **New Sheet Quantities Earthwork Text File** to be created or if replacing a previous version click on it's **Files** button to grab the filename previously used



Step 4. In the dialog fill in the appropriate prefixes (and suffixes if desired) for the soil data types in each column of the original file. These **cannot** include spaces. If entered they are ignored. For a gap between words key in an underbar instead of a space. Include soil types in prefix as needed such as **EARTH_CUT=** and **ROCK_CUT=**.



Step 5. Once the dialog is filled in for all columns of data from the original file click on the **OK** button. The new file is generated. When the cross section sheets are set up with Geopak then the new earthwork text file should be specified so that earthwork areas are annotated clearly.

Move Raster

D&C location: Drafting Standards>Tools> Move Raster

Microstation Macro Program: moveraster.ba

Description:
This application moves the active raster attachment by a user given datum adjustment factor.

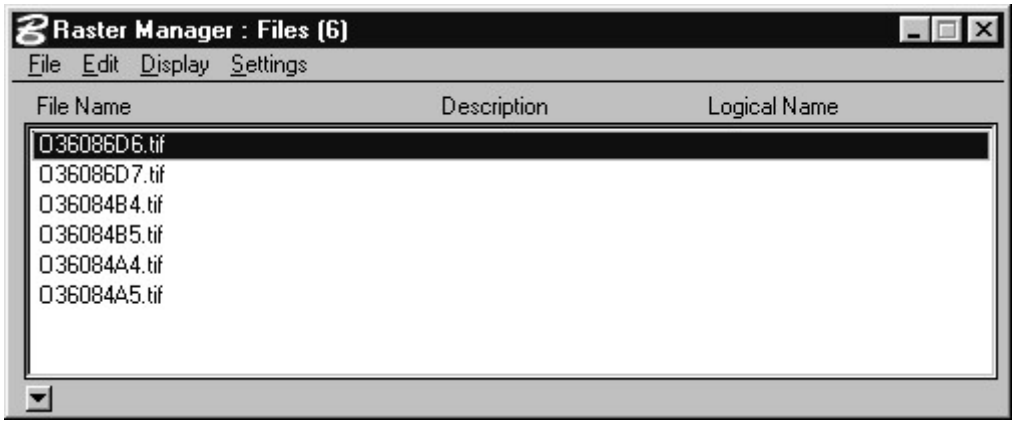
Raster images which are geo-referenced to the Tennessee state plane coordinates will come near our projects but due to the datum adjustment factor on coordinates they will usually be off some. This program will take that value and move the raster attachment to align properly with project data.

This macro can also be activated from the Microstation drop down menu **TDOT>Move Raster by Datum Adjust** or by using the keyin **MACRO MOVERASTER**.

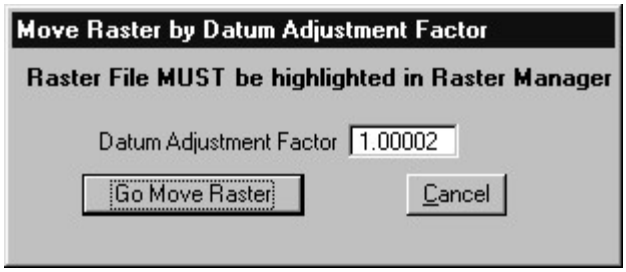
Special Requirements:
Raster Manager must be open with the raster image to be moved highlighted in the dialog.

Usage:

Step 1. In Microstation activate **File>Raster Manager**. Highlight the attachment to be moved.

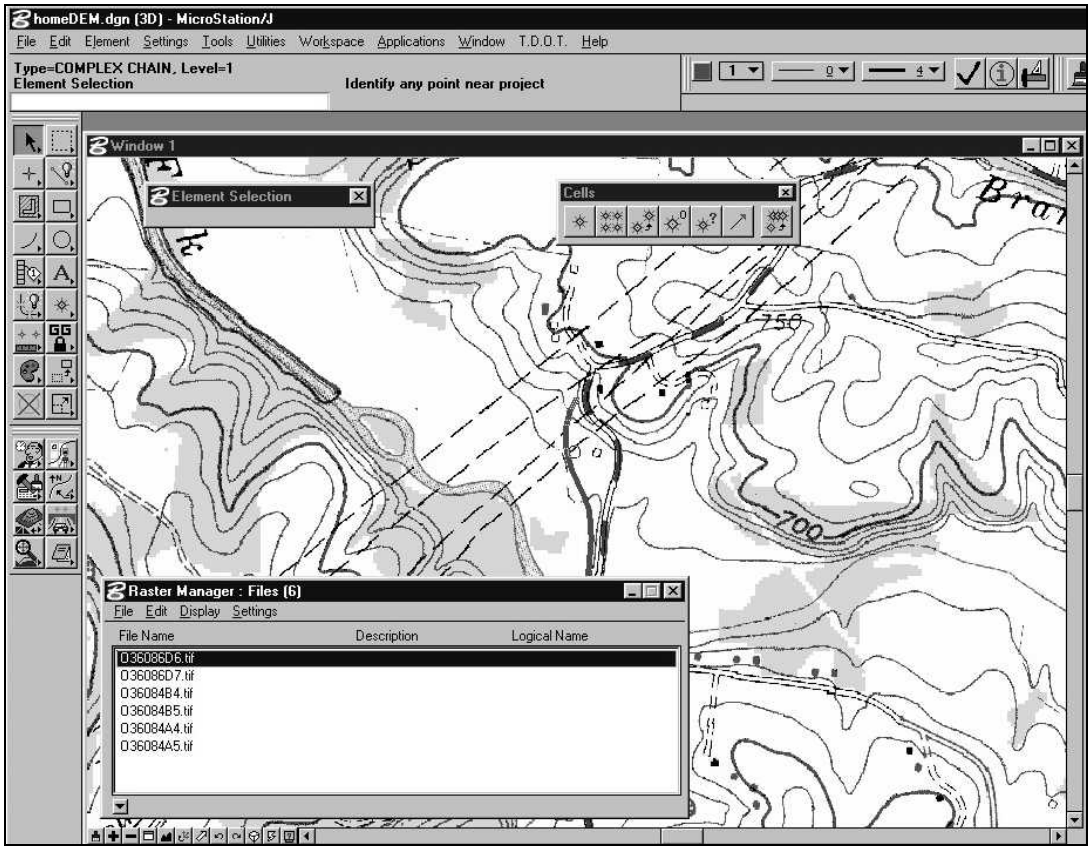


Step 2. In D&C manager activate **Move Raster**. Keyin the datum adjustment factor for the project area. Once that is set click on **Go Move Raster**.



Step 3. The user is then prompted to **Identify any point near project**.

Data point in the project area and the raster attachment is moved to overlay the project data correctly.



Roadway Horizontal Alignments

HA Points

D&C location: Drafting Standards>Roadway Horizontal Alignments>HA Points

Geopak 3PC Program: draw_horiz_points.x

Description:
Uses text symbol characters to mark all points on roadway horizontal alignments. Curve PIs also include short tangent lines with the PI symbol. Multiple alignments can be processed. As each alignment is completed an option to do another is offered.

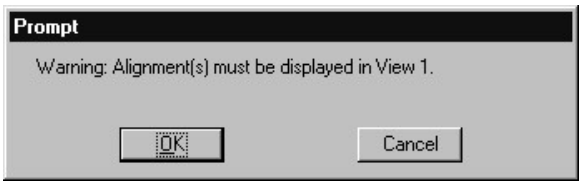
Special Requirements:
All horizontal alignment graphics must be visible in View Window #1.

Usage:

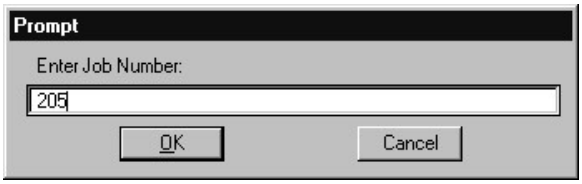
Step 1. Using D&C item **HA Roadway** display the horizontal alignment(s).

Step 2. In **View Window #1** fit view so that all graphics are displayed in the view. If needed turn on level 31.

Step 3. In D&C manager activate **HA Points**. The initial warning message is displayed, Click **OK** to go on.

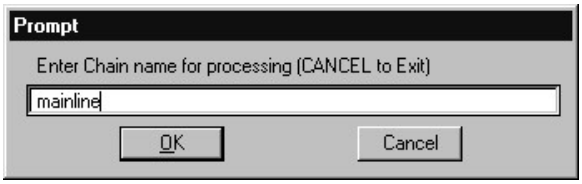


Step 4. You are then prompted for a **job no.** Key that in and click **OK**.



Step 5. You are then prompted for the **scale**. Key that in and click **OK**.

Step 6. You are then prompted for the **chain name.** Key that in and click **OK**.



Step 7. The 3PC processes the chain and places graphics. Finally an option to process another chain is offered. Click **OK** to process another chain or click **Cancel** to exit.

Roadway Vertical Alignments

VA Points

D&C location: Drafting Standards>Roadway Vertical Alignments> VA Points

Geopak 3PC Program: draw_vert_points.x

Description:
Uses text symbol characters to mark points & labels VPCs & VPTs with station & elevation on roadway vertical alignment curves as well as the begin and end points of the vertical alignment if they are not curve points.

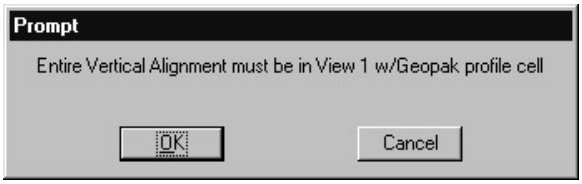
Special Requirements:
All alignment graphics must be visible in View #1 and a Geopak profile cell must be present. The Geopak profile cell **must** be based on a station within the chain, it cannot be set on a station off the chain. If set this way an invalid profile subroutine error will occur.

Usage:

Step 1. Using D&C item **VA Roadway** display the vertical alignment.

Step 2. In **View Window #1** fit view so that all graphics are displayed in the view. If needed turn on levels 31 & 63.

Step 3. In D&C manager activate **VA Points**. The initial warning message is displayed, Click **OK** to go on.



Step 4. You are then prompted for a **job no.** Key that in and click **OK**.

Step 5. You are then prompted for the **chain name.** Key that in and click **OK**.

The 3PC reads the proposed profile and places point symbols with station & elevation text labels at VPCs, VPTs and begin and end points that are not curve points.

Existing Profiles

Profile Grid

D&C location: Drafting Standards>Existing Profiles> Profile Grid

Geopak 3PC Program: draw_profile_grid.x

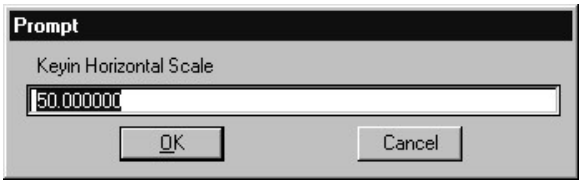
Description:
Draws a working profile grid for a roadway's profile area. This is **not** intended for final plans production but rather as a working aide while developing proposed vertical alignments, drainage structures, etc. It also allows for plotting of profile rolls for longer projects. This program does have numerous prompts but in doing so allows the user total control on the extent of the grid to be placed.

Special Requirements:
Profile's lower left reference origin location must be visible. This is the location which corresponds to the minimum elevation and beginning station of the desired profile grid.

Usage:

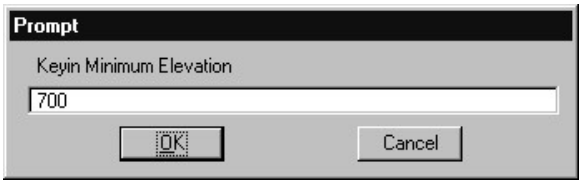
Step 1. In **View Window #1** set the view so that the lower left reference origin location of the profile area is visible in the view.

Step 2. In D&C manager activate **Profile Grid**. You are prompted for a **Horizontal Scale.** Key that value in or take the default value of **50** and click **OK.**

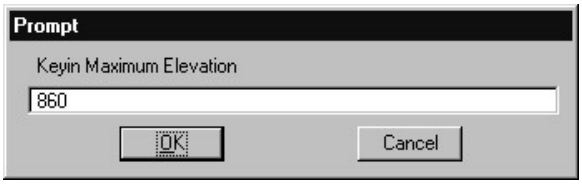


Step 3. You are then prompted for a **Vertical Scale.** Key that value in or take the default value of **5** and click **OK.**

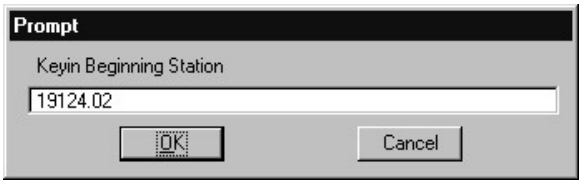
Step 4. You are then prompted for the **Minimum Elevation.** Key that in and click **OK**.



Step 5. You are then prompted for the **Maximum Elevation.** Key that in and click **OK**.

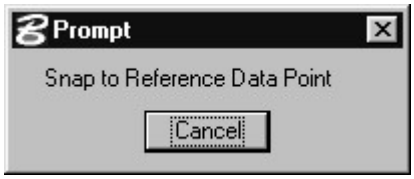


Step 6. You are then prompted for the **Beginning Station.** Key that in and click **OK**. Note that the "+" symbol in the station value is optional.

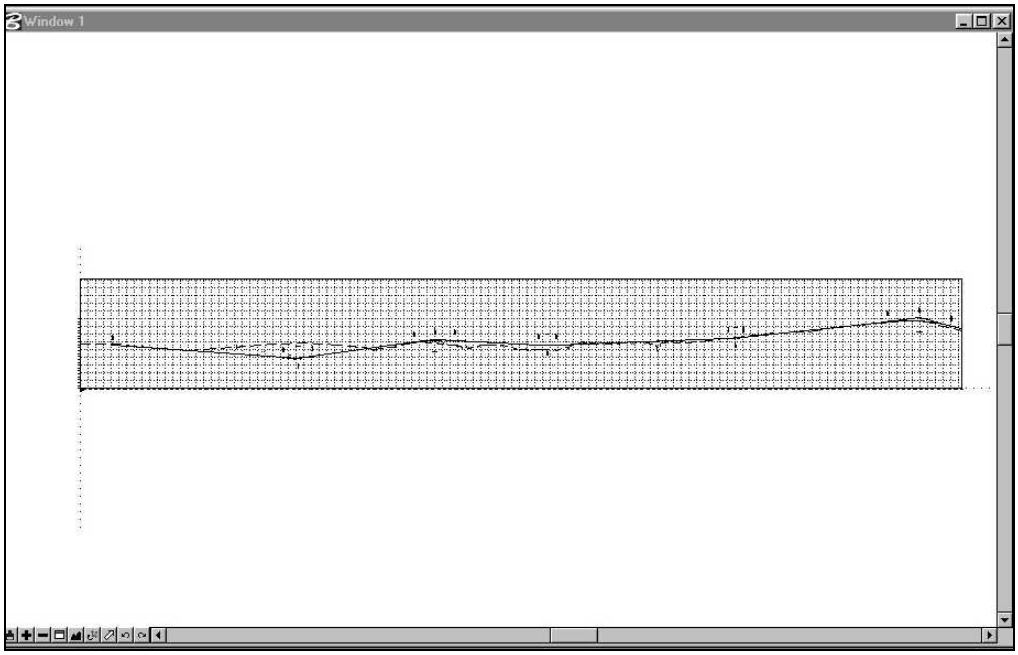


Step 7. You are then prompted for the **Ending Station.** Key that in and click **OK**.

Step 8. Finally you are prompted for the **Reference Data Point.** Snap to the reference location which corresponds to the minimum elevation and beginning station given previously and **Data Point**.



The 3PC generates the profile grid based on your given control values on level 62.



Ex SA/ST System

D&C location: Drafting Standards>Existing Profiles>Ex SA/ST System

Geopak 3PC Program: draw_cb.x

Description:
Draws existing storm and sanitary sewer catch basins, drop inlets & manholes as well as connecting pipes on profile using plan view graphics. Includes annotation of structures and pipes. Produces error log for missing data, etc. Used by Survey personnel.

Special Requirements:
All graphics must be in a Microstation selection set prior to running the program and a Geopak profile cell must be present.

The use of this application requires that field data be collected in a certain manner. Please note that some data can be added or corrected in the office if the field crew does not take all shots required for the 3PC program to run.

When a point is set in the field and coded: **XCB**, **XDI**, **XMHSTS** or **XMHSAS** this sets the top invert of the structure. At this time another point is set using **XBOT** code and the elevation is adjusted to the bottom invert of the structure.

For pipe coding all pipes need a **FROM / TO** field shot, using **?STS** or **?SAS.** Doing this will place the correct custom line style for the existing pipe and place an **XINV** cell at each end of all runs of pipe.

If there is a run of pipe that begins or ends outside the limits of the horizontal alignment this run of pipe needs to be adjusted in the office by placing a **XINV** cell on the pipe run within the limit of the alignment and setting a break in the existing pipe line at that location. To get this done:

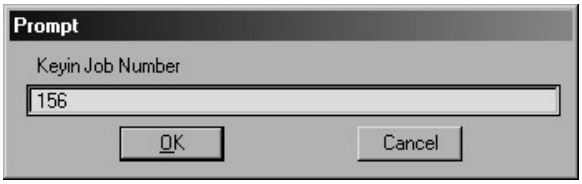
1. On level 30 draw a Microstation line crossing the existing run of pipe within the alignment.
2. Draw another Microstation line from exist. invert to exist. invert on the existing pipe.
3. Temporarily turn off the level of the existing pipe.
4. Using Microstation extend to intersection the second line drawn with the first line placed.
5. Place a **XINV** cell at the new end of this line.
6. Delete the two lines that you placed to locate the new XINV cell.
7. Turn the level of the existing pipe back on
8. Add a break in the existing pipe line at the location of the new XINV cell just placed using Microstation partial delete snapping to the cell location each time to make a zero length break in the pipe line.

Usage:

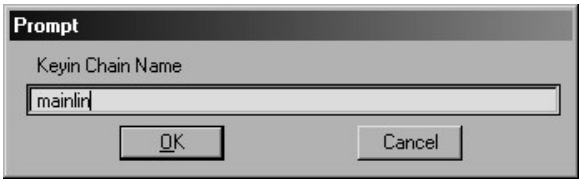
Step 1. Using Microstation's Selection Set tool add all plan view graphics to a selection set..

Step 2. In D&C manager activate **Ex SA/ST System**. The initial warning message is displayed, Click **OK** to go on.

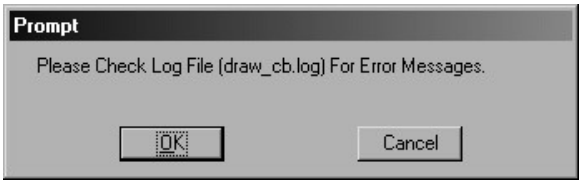
Step 3. You are then prompted for a **job no.** Key that in and click **OK**.



Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.



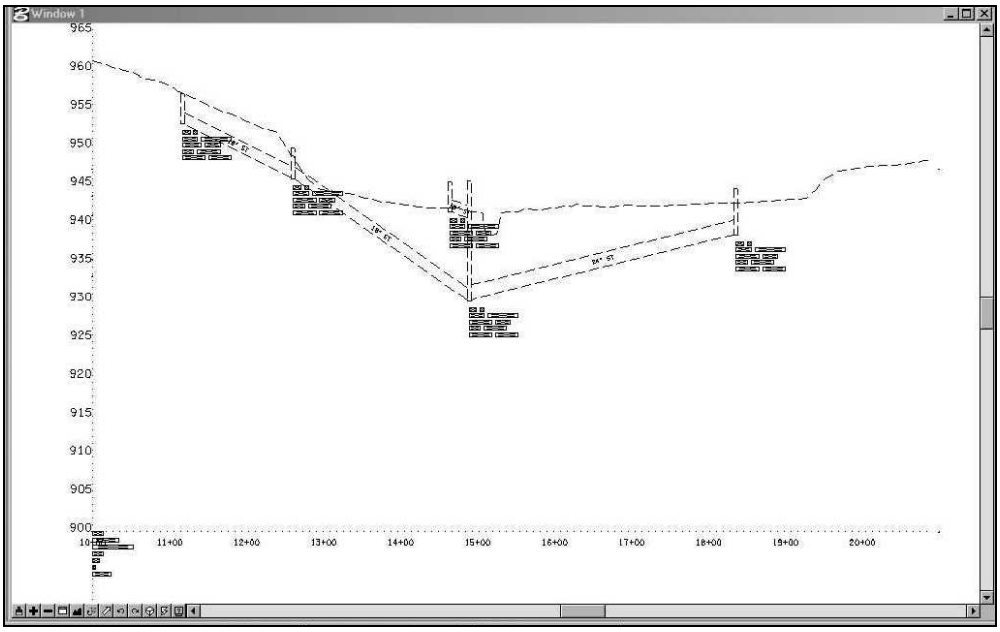
Step 5. If errors are encountered then an error log file named **draw_cb.log** is created and the user is notified with a message prompt**.** Click on **OK** to dismiss this message.



Step 6. If an error log was generated use any ASCII text editor to review errors. Make corrections in plan view graphics as needed, delete any invalid graphics placed previously on the profile and reprocess.

You do not have to re-do the entire project. This can be done on localized areas by limiting the plan view graphics which are placed in the selection set prior to activating the 3PC program.

Step 7. Edit or move text on profile as required. Add CB, MH and DI numbers if a table is used.



BMonPro

D&C location: Drafting Standards>Existing Profiles> BMonPro

Geopak 3PC Program: bmonpro.x

Description:
Draws and labels benchmarks and control points with annotation from plan view on to profile. Used by Survey personnel.

Special Requirements:
All graphics must be in a Microstation selection set prior to running the program and a Geopak profile cell must be present.

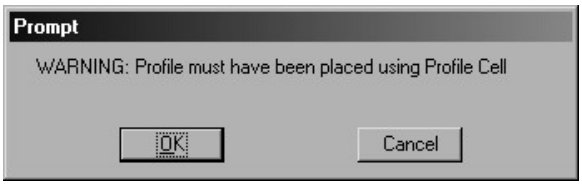
If a benchmark or control point is not within the limit of the horizontal alignment the program will generate an error file noting those.

After running the program check or input the elevation on the profile text. At this time remove any points from the profile that you do not want shown there.

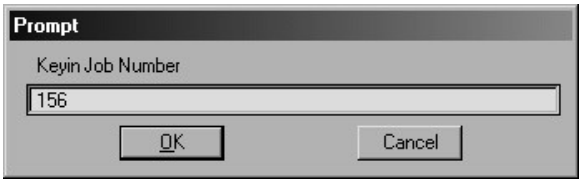
Usage:

Step 1. Using Microstation's Selection Set tool add all plan view graphics to a selection set..

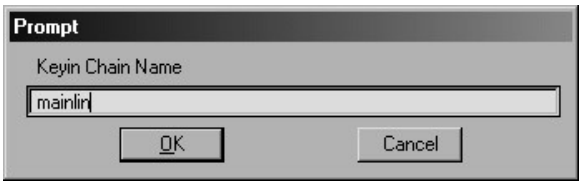
Step 2. In D&C manager activate **BMonPro**. The initial warning message is displayed, Click **OK** to go on.



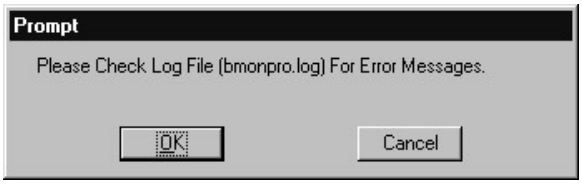
Step 3. You are then prompted for a **job no.** Key that in and click **OK**.



Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.



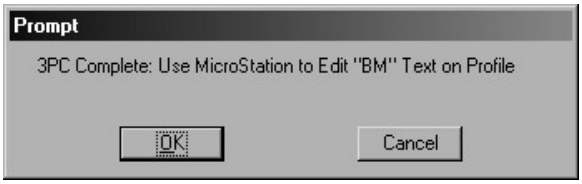
Step 5. If errors are encountered then an error log file named **bmonpro.log** is created and the user is notified with a message prompt**.** Click on **OK** to dismiss this message.



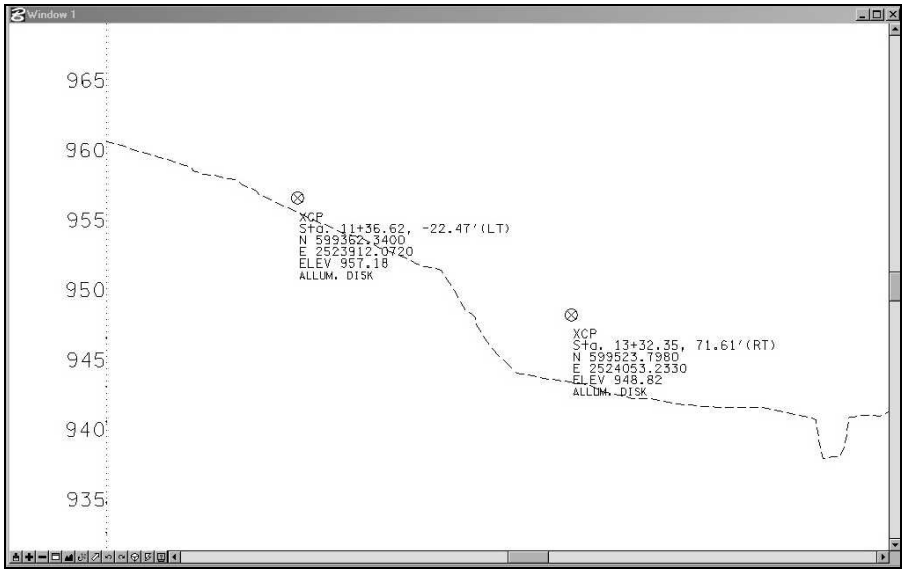
Step 6. If an error log was generated use any ASCII text editor to review errors. Make corrections in plan view graphics as needed and reprocess.

You do not have to re-do the entire project. This can be done on localized areas by limiting the plan view graphics which are placed in the selection set prior to activating the 3PC program.

Step 7. If no benchmarks are found then a message is given indicating that situation otherwise the final completion message is given. Click on **OK** to dismiss this message.



Step 8. Edit/check text on profile as needed to indicate the correct elevation. Any points which are not desired on the profile should be deleted.



OHonPro

D&C location: Drafting Standards>Existing Profiles> OHonPro

Geopak 3PC Program: ohonpro.x

Description:
Draws and labels low wire crossings with annotation from plan view on to profile. Used by Survey personnel.

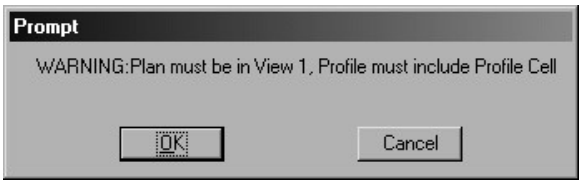
Special Requirements:
All graphics must be in a Microstation selection set prior to running the program and a Geopak profile cell must be present.

The low wire crossing shot needs to be on the proposed centerline if it is not the program will not run. After running the program the user must edit text annotation on the profile to list the temperature, crossing wire types and numbers located at each location. The elevation shown is for the lowest wire only.

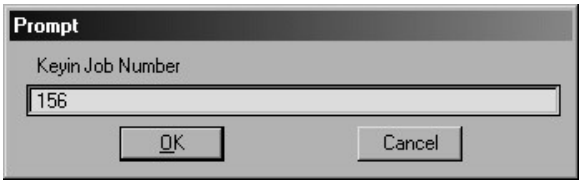
Usage:

Step 1. Using Microstation's Selection Set tool add all plan view graphics in View #1 to a selection set..

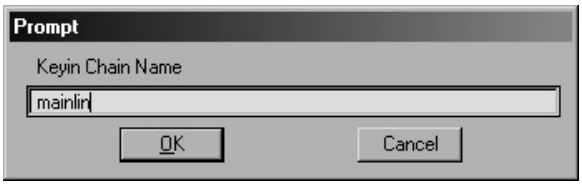
Step 2. In D&C manager activate **OHonPro**. The initial warning message is displayed, Click **OK** to go on.



Step 3. You are then prompted for a **job no.** Key that in and click **OK**.



Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

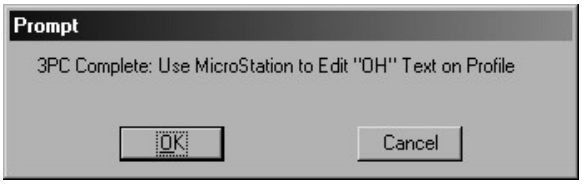


Step 5. If errors are encountered then an error log file named **OHonPRO.log** is created and the user is notified with a message prompt**.** Click on **OK** to dismiss this message.

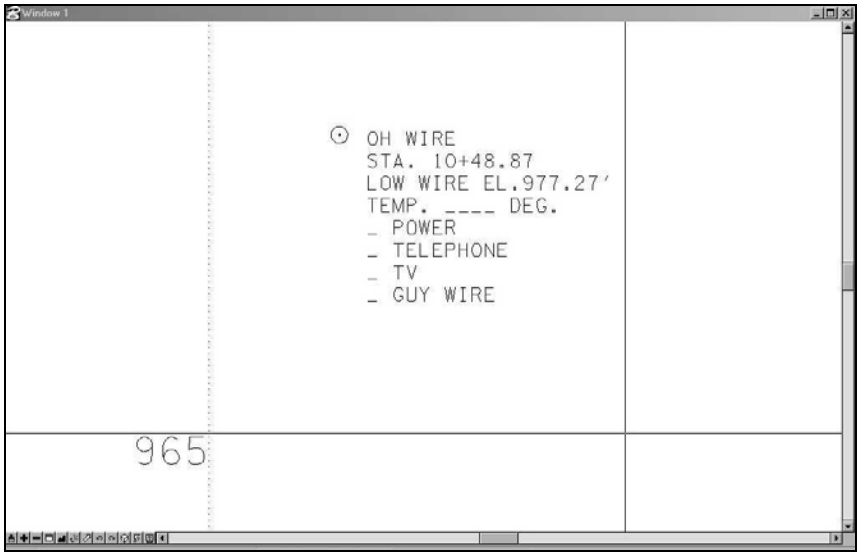
Step 6. If an error log was generated use any ASCII text editor to review errors. Make corrections in plan view graphics as needed, delete any invalid graphics placed previously on the profile and reprocess.

You do not have to re-do the entire project. This can be done on localized areas by limiting the plan view graphics which are placed in the selection set prior to activating the 3PC program.

Step 7. If no overhead wire crossings are found then a message is given indicating that situation otherwise the final completion message is given. Click on **OK** to dismiss this message.



Step 8. Edit text on profile as needed to indicate the temperature, crossing wire types and numbers at each crossing location.



Survey Control

Cntrl Pt Table

D&C location: Drafting Standards>Survey Control>Cntrl Pt Table

Geopak 3PC Program: draw_contrl_pt_table.x

Description:
Builds control point table for placement in plan view. Used by Survey personnel.

Special Requirements:
All graphics must be in a Microstation selection set prior to running the program.

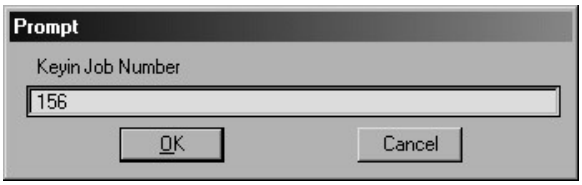
If a benchmark or control point is not within the limit of the horizontal alignment the program will generate an error file noting those.

After building the control point table with this program it is necessary to edit the data to show point numbers, coordinate decimals to 4 places and elevations for benchmarks.

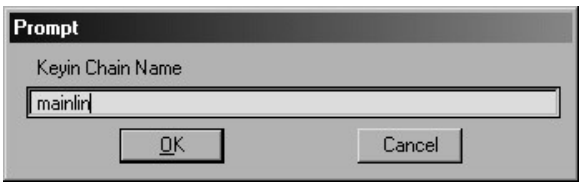
Usage:

Step 1. Using Microstation's Selection Set tool add all plan view graphics to a selection set..

Step 2. In D&C manager activate **Cntrl Pt Table**. You are prompted for a **job no.** Key that in and click **OK**.



Step 3. You are then prompted for the **chain name.** Key that in and click **OK**.

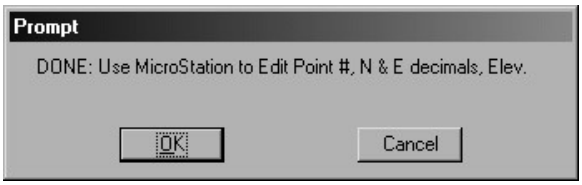


Step 4. You are then prompted for a **Data point** for the table location in the plan view area**.**

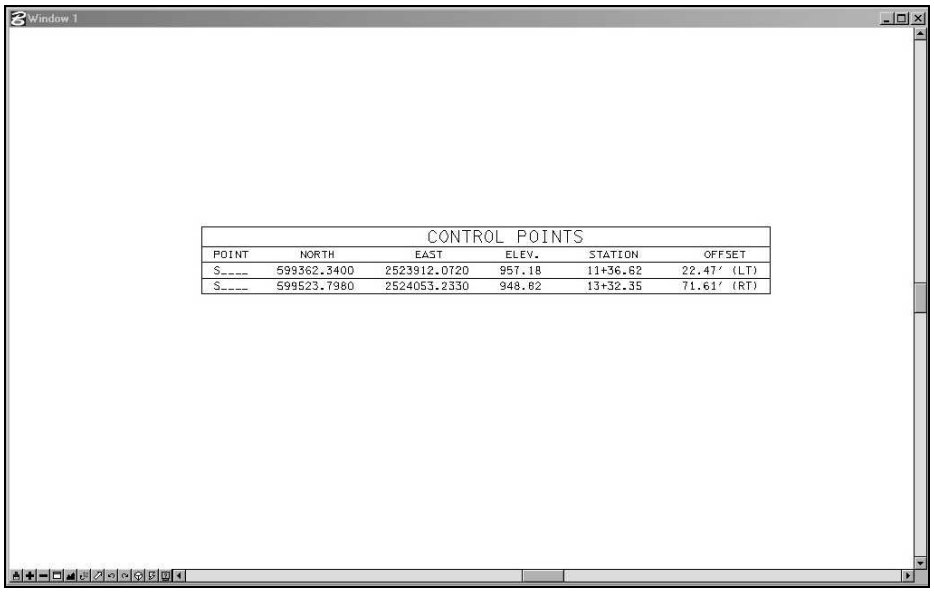
Step 5. If errors are encountered then an error log file named **control_table.log** is created and the user is notified with a message prompt**.** Click on **OK** to dismiss this message.

Step 6. If an error log was generated use any ASCII text editor to review errors. Make corrections in plan view graphics as needed and reprocess.

Step 7. If no control points are found then a message is given indicating that situation otherwise the final completion message is given. Click on **OK** to dismiss this message.



Step 8. Edit the control point data in the table to show point numbers, coordinate decimals to 4 places and elevations for benchmarks.



Prop. R.O.W.

Loss of Access

D&C location: Drafting Standards> Prop. R.O.W.> Loss of Access

Microstation Macro Program: LossOfAccessPattern.ba

Description:
This application sets the parameters needed to pattern a loss of access area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Loss of Access** or by using the keyin **MACRO LOSSOFACCESSPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:

Step 1. Create a Microstation selection set of elements for flood mode or a shape element for element placement mode.

Step 2. In D&C manager activate **Loss of Access**. The **Pattern Area** dialog appears. Defaults that come up are English units and Selection Set Flood mode. The active scale value is read from the active scale currently set in the design file.

Step 3. Make settings as needed:

Set **Units** to English or Metric.

Set **Active Scale** to an alternate value if needed. If changed this will reset the active scale in the file. **This should be set to the scale at which the pattern graphics are to be plotted.**

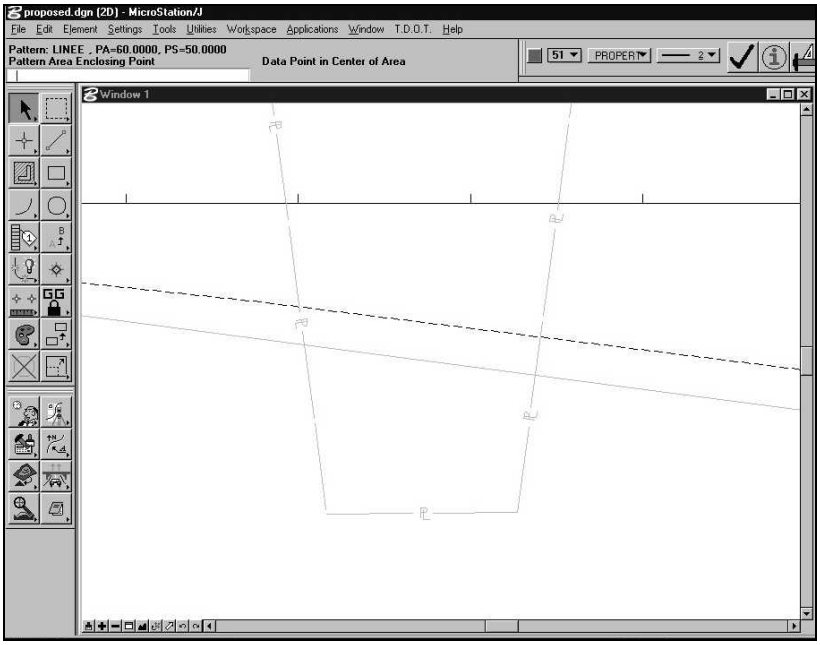
Choose the **Mode** desired from the two options Selection Set Flood or Shape Element.

Step 4. Once settings are made click on the **Apply Area Pattern** button and the dialog will disappear. Area pattern parameters are set in the file based on the dialog settings.

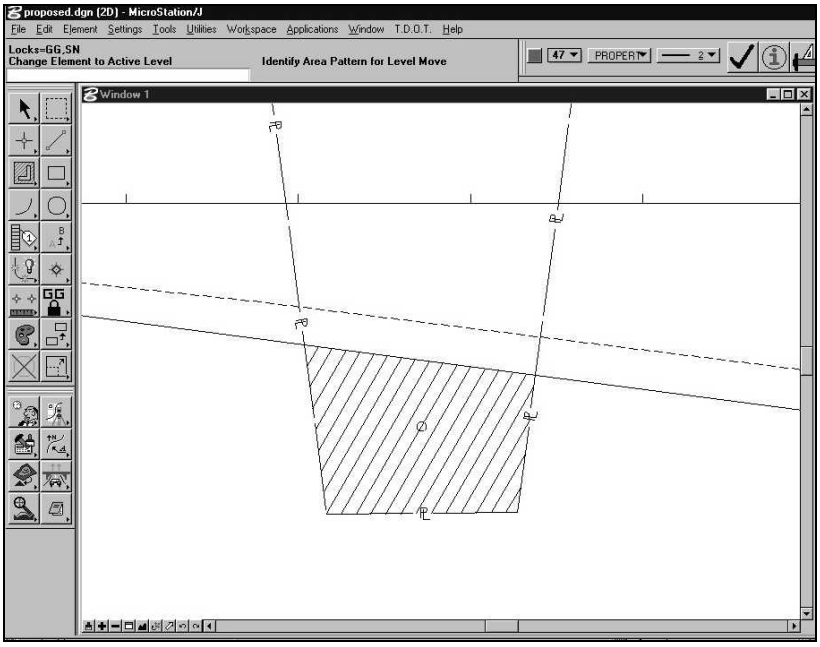
Depending on the area pattern placement mode chosen the following prompts are given:

Selection Set Flood mode:

Step 5. The user is first prompted to **Data Point in Center of Area**. Enter a **data point** somewhere within the area to be patterned.

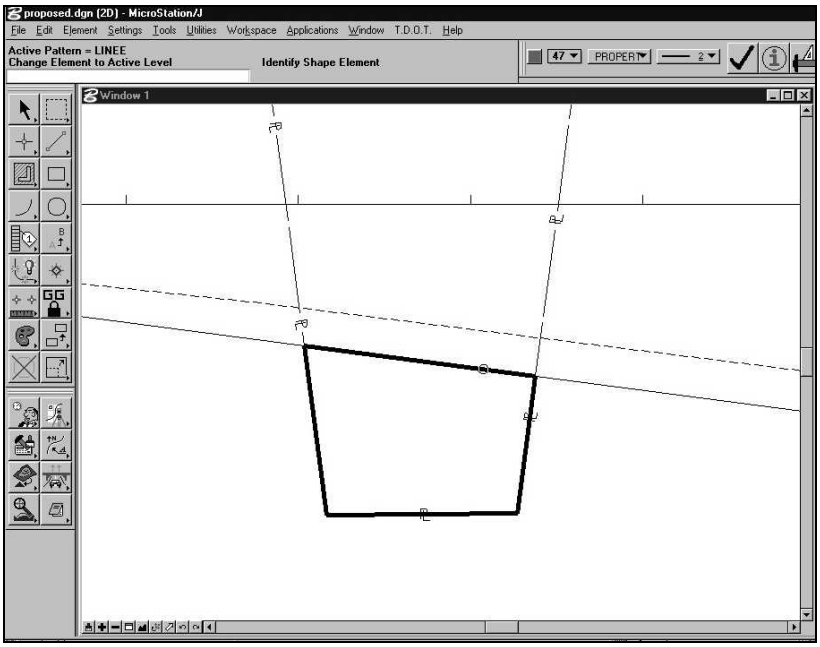


Step 6. The area pattern is applied and the user is then prompted to **Identify Area Pattern for Level Move**. **Data point** any element which is part of the pattern and all of the elements are moved to the appropriate level.

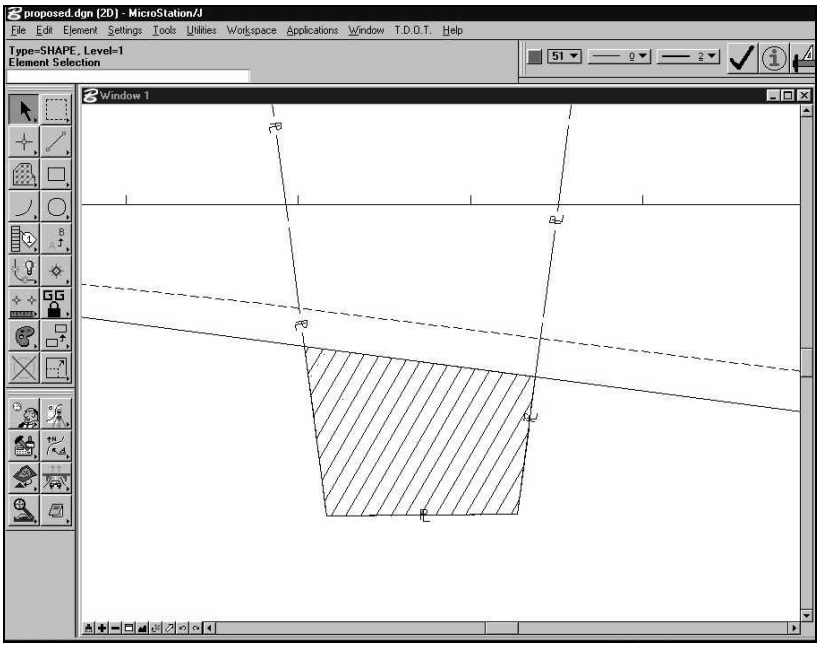


Shape Element mode:

Step 5. The user is prompted to **Identify Shape Element**. **Data point** on edge of shape element to be patterned.



Step 6. The shape element is first level moved to the appropriate pattern level and then the area pattern is applied. After patterning the shape element is automatically level moved to scratch level 30.



ROW Flags

D&C location: Drafting Standards> Prop. R.O.W.> ROW Flags

Geopak 3PC Program: place_row_flags.x

Description:

This application reads a selection set of proposed R.O.W. lines and calculates & then places station and offset flags at each break and if desired R.O.W. markers are placed as well.

The prop. R.O.W. flags are placed at the alignment angle. To aide in the clean up of flag locations the text information and it's horizontal line form a single graphic group allowing them to be easily relocated with a single move command. The leader can then be modified to the new location of the horizontal line. Microstation's Fence Stretch may be used to re-position flags in some cases where flag graphics can be fenced.

Proposed R.O.W. marker types are determined based on the 45 degree rule. Any turn out greater than 45 degrees requires a C marker, any turn in greater than 45 degrees requires a B marker and all others are to be type A markers. The type is labeled with the marker. No marker is placed if there is no change in direction between R.O.W. lines. This is done to prevent placement at R.O.W. and property line intersections.

A ROW marker and it's text label form a single graphic group to aide in clean-up if the marker is to be removed totally. Be sure to turn off graphic group lock prior to repositioning it's text label to avoid moving the marker.

Complete documentation of all prop. R.O.W. procedures can be found in **ProposedROW.pdf.**

Special Requirements:

Proposed R.O.W. lines must be previously displayed using D&C manager and added to a Microstation selection set.

Selection set should contain any **connected** group of prop. R.O.W. lines that are referenced to a specified chain.

Use of line strings or complex chains are not supported.

Usage:

Step 1. Display proposed R.O.W. lines using D&C manager.

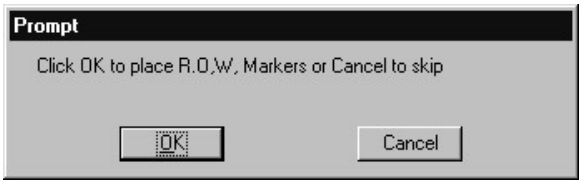
Step 2. Add a connected group of proposed R.O.W. lines to a Microstation selection set.

Step 3. In D&C manager activate **ROW Flags**.

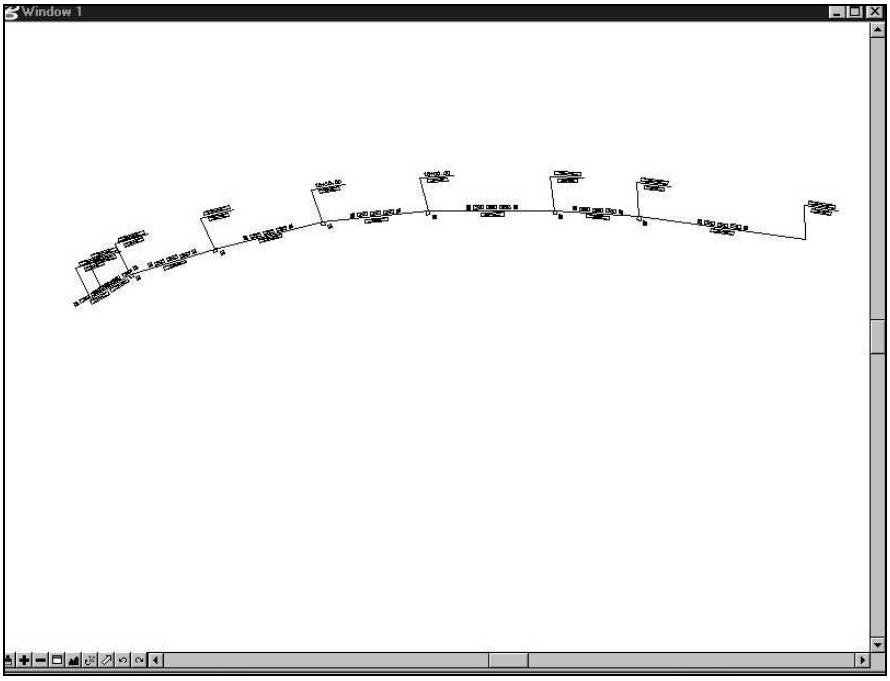
Step 4. You are prompted for a **job no.** Key that in and click **OK**.

Step 5. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 6. Finally you are given an option to place prop. R.O.W. markers. Click **OK** to place them or **Cancel** to skip placement..



Step 7. Station/Offset flags are placed at all locations along the prop. R.O.W. lines in the selection set. If requested prop. R.O.W. markers and their text labels are placed everywhere except at the beginning and end or at any location where there is no change in direction. Use Microstation to re-position labels as needed for clarity in the plans.



ROW Marker

D&C location: Drafting Standards> Prop. R.O.W.> ROW Marker

Geopak 3PC Program: place_row_marker.x

Description:

This application reads a selection set of 2 adjoining proposed R.O.W. lines, calculates the angles between them & then places the appropriate R.O.W. marker and labels it.

Proposed R.O.W. marker types are determined based on the 45 degree rule. Any turn out greater than 45 degrees requires a C marker, any turn in greater than 45 degrees requires a B marker and all others are to be type A markers. The type is labeled with the marker.

A ROW marker and it's text label form a single graphic group to aide in clean-up if the marker is to be removed totally. Be sure to turn off graphic group lock prior to repositioning it's text label to avoid moving the marker.

Complete documentation of all prop. R.O.W. procedures can be found in **ProposedROW.pdf.**

Special Requirements:

Two adjoining proposed R.O.W. lines must be previously displayed using D&C manager and added to a Microstation selection set.

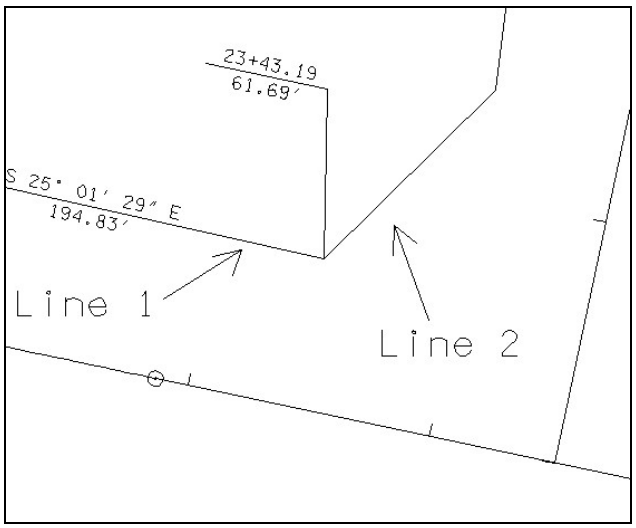
Use of line strings or complex chains are not supported.

Usage:

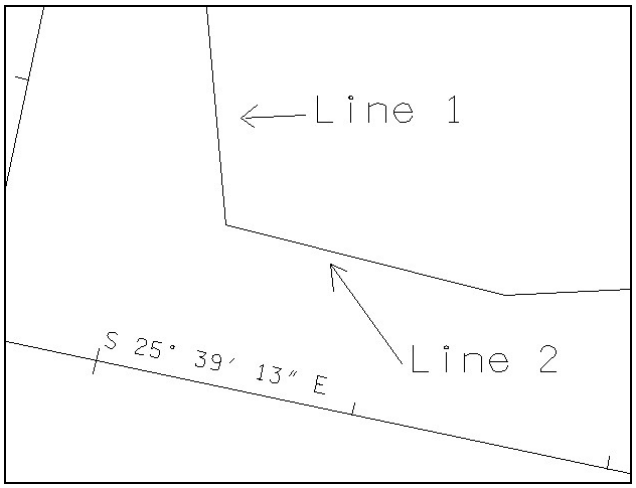
Step 1. Display proposed R.O.W. lines using D&C manager if needed.

Step 2. Create a Microstation selection set of the two adjoining R.O.W. lines. They should be **selected in a forward direction** along the main roadway. Hold **Ctrl** down on the keyboard and **data point** on the lines in order as shown below.

On the first intersection of the side road prop. R.O.W.



or on the other side

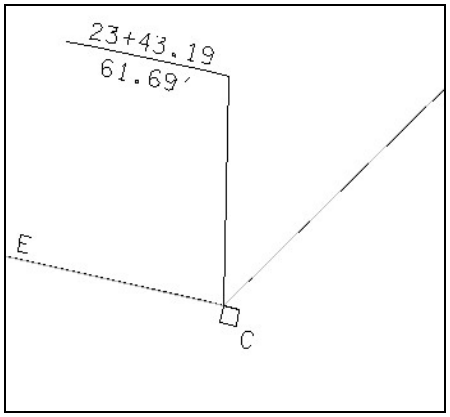


Step 3. In D&C manager activate **ROW Marker**.

Step 4. You are prompted for a **job no.** Key that in and click **OK**.

Step 5. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 6. Angles between prop. R.O.W. lines are measured and the marker is placed. Use Microstation to re-position label as needed for clarity in the plans.



Prop. Easements

Slope Esmt Area

D&C location: Drafting Standards>Prop. Easements> Slope Esmt Area

Microstation Macro Program: SlopeEsmtPattern.ba

Description:
This application sets the parameters needed to pattern a prop. slope easement area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Slope Easement** or by using the keyin **MACRO SLOPEESMTPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Drain Esmt Area

D&C location: Drafting Standards>Prop. Easements> Drain Esmt Area

Microstation Macro Program: DrainEsmtPattern.ba

Description:
This application sets the parameters needed to pattern a prop. drainage easement area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Drainage Easement** or by using the keyin **MACRO DRAINESMTPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Const Esmt Area

D&C location: Drafting Standards>Prop. Easements> Const Esmt Area

Microstation Macro Program: ConstEsmtPattern.ba

Description:
This application sets the parameters needed to pattern a prop. construction easement area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This patterning **is not** required for construction easement for the purpose of slope construction.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Construction Easement** or by using the keyin **MACRO CONSTESMTPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

> **Selection Set Flood** mode: Create Selection Set prior to activating macro
>
> **Shape Element** mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Wetlands Mit A

D&C location: Drafting Standards>Prop. Easements> Wetlands Mit A

Microstation Macro Program: WetlandsMitArea.ba

Description:
This application sets the parameters needed to pattern a prop. wetlands mitigation area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Wetlands Mitigation Area** or by using the keyin **MACRO WETLANDSMITAREA**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

> **Selection Set Flood** mode: Create Selection Set prior to activating macro
>
> **Shape Element** mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Roadway Linework

Reinf Concrete

D&C location: Drafting Standards>Roadway Linework> Reinf Concrete

Microstation Macro Program: ReinforcedConcretePattern.ba

Description:
This application sets the parameters needed to pattern a reinforced concrete area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Reinforced Concrete** or by using the keyin **MACRO REINFORCEDCONCRETEPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Scarify Pvmt

D&C location: Drafting Standards> Roadway Linework > Scarify Pvmt

Microstation Macro Program: ScarifyPattern.ba

Description:
This application sets the parameters needed to pattern an exist. pavement scarify area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Scarify** or by using the keyin **MACRO SCARIFYPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Crown Vetch

D&C location: Drafting Standards> Roadway Linework > Crown Vetch

Microstation Macro Program: CrownVetchPattern.ba

Description:
This application sets the parameters needed to pattern a crown vetch slope area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Crown Vetch** or by using the keyin **MACRO CROWNVETCHPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Private Drives

Pvt Dr Shading

D&C location: Drafting Standards>Private Drives> Pvt Dr Shading

Microstation Macro Program: PvtDrShading.ba

Description:
This application sets the parameters needed to shade in private drives and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Private Drive Shading** or by using the keyin **MACRO PVTDRSHADING**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

HA Driveway Pts

D&C location: Drafting Standards>Private Drives> HA Driveway Pts

Geopak 3PC Program: draw_horiz_points_PvtDr.x

Description:
Uses text symbol characters to mark all points on private drive horizontal alignments.

This is **only** used on more complex or critically located private drives which are developed using roadway tools.

Special Requirements:
All alignment graphics must be visible in View Window #1.

Usage:
This option functions just the same as **HA Points**. See the description of it's usage for details.

VA Driveway Pts

D&C location: Drafting Standards>Private Drives> VA Driveway Pts

Geopak 3PC Program: draw_ vert _points_PvtDr.x

Description:
Uses text symbol characters to mark points & labels VPCs & VPTs with station & elevation on private drive vertical alignment curves as well as the begin and end points of the vertical alignment if they are not curve points.

This is **only** used on more complex or critically located private drives which are developed using roadway tools.

Special Requirements:
All alignment graphics must be visible in View #1 and a Geopak profile cell must be present.

Usage:
This option functions just the same as **VA Points**. See the description of it's usage for details.

Exist. Drainage

HA Stream Pts

D&C location: Drafting Standards> Exist. Drainage > HA Stream Pts

Geopak 3PC Program: draw_horiz_points_ Stream.x

Description:
Uses text symbol characters to mark all points on exist. stream horizontal alignments.

Special Requirements:
All alignment graphics must be visible in View Window #1.

Usage:
This option functions just the same as **HA Points**. See the description of it's usage for details.

Prop. Drainage

Plan Box

D&C location: Drafting Standards>Prop. Drainage> Structures in Plan>Plan Box

Microstation Macro Program: drawboxplan.ba

Description:
This application is used to draw a proposed box culvert or bridge in the plan view.

Supports English or Metric application.

Special Requirements:
The centerline of the structure must be established prior to running the application.

Usage:

Step 1. Establish the centerline of the structure. This may have been done during the design process using Geopak Drainage or with Microstation tools but here we will illustrate the use of Geopak's **Draw Pattern** tool to get this done. From Project Manager or the Geopak tool box activate the Draw Pattern tool.

Set the **job number** and **chain name** for the roadway.

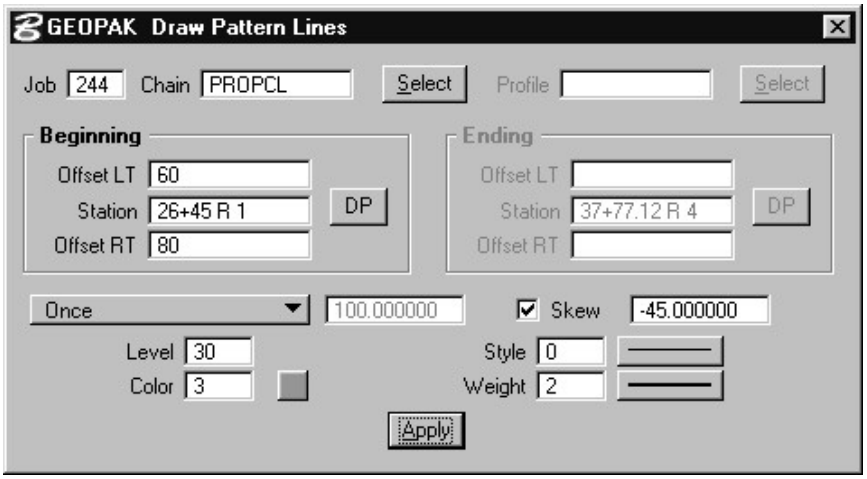
Change the placement control at the bottom for placement **Once** and change symbology settings as desired.

Only the Beginning side of the dialog should be active now and there you now can set the **Offset LT, Station & Offset RT.**

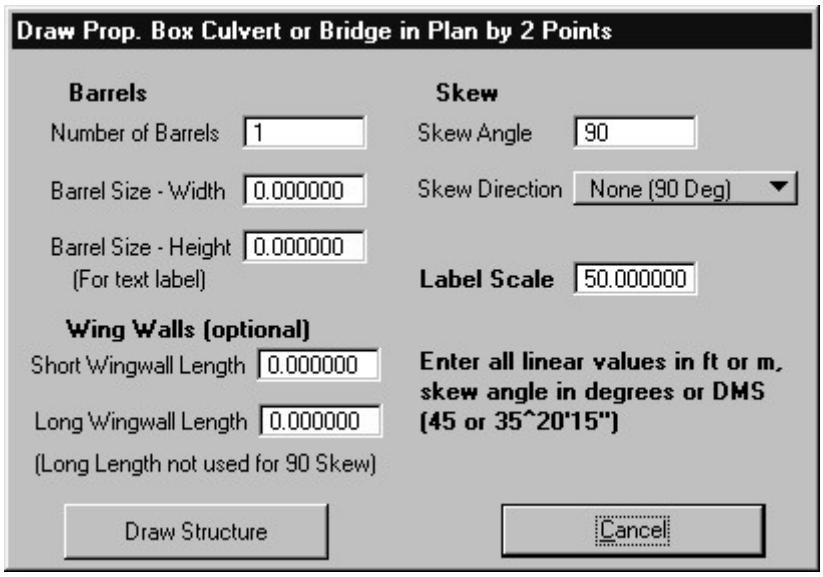
If the structure is at 90 degrees (0 degrees on dialog) you can go ahead and hit **Apply** to draw the structure. If the structure is skewed click on the **Skew** option.

Skew values in this dialog are measured from a normal 90 degree line not the centerline as we normally consider them. So to get the skew value to enter in the dialog. subtract the skew from 90. Skews to the left should be entered as positive and skews to the right as negative. (Example: 60 degree skew left 90-60=30)

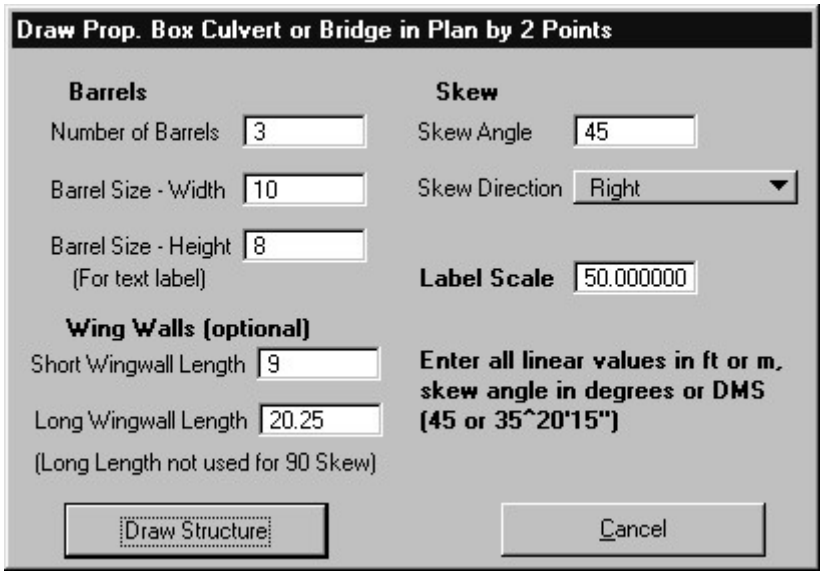
In this example our box bridge is 45 degrees right so we enter a -45 for the skew value. Hit **Apply** to draw the structure centerline.



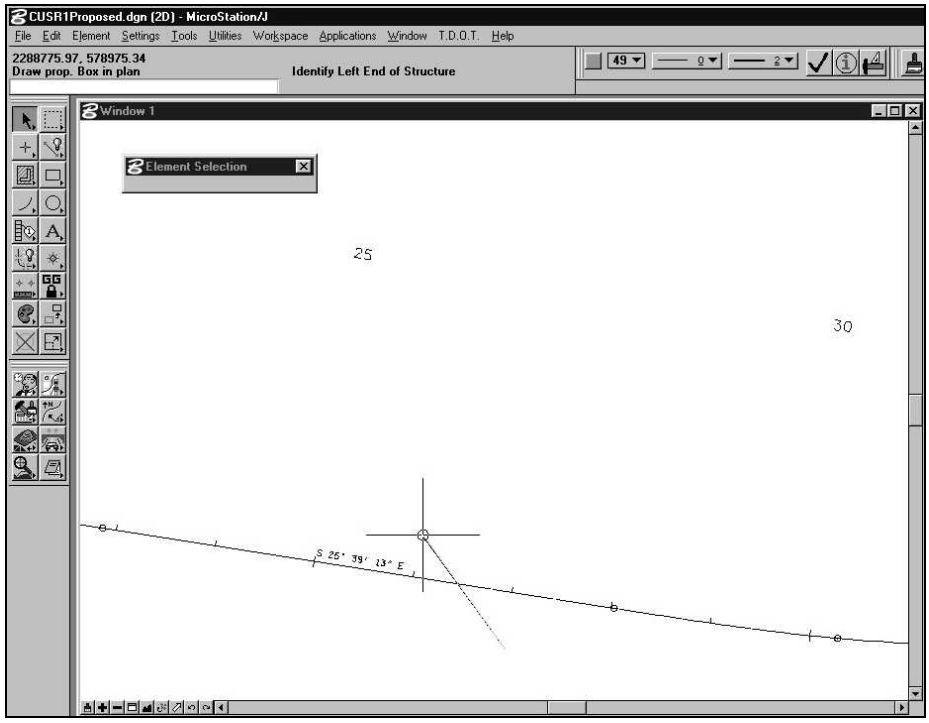
Step 2. In D&C manager activate **Plan Box**. The **Draw Box Culvert or Bridge in Plan by 2 Points** dialog opens**.** Defaults which are displayed . . . **Number of Barrels 1, Skew Angle 90, Skew Direction None** & **Label Scale (Current Active Scale).** Note that skew angles in degrees minutes & seconds are supported and wing walls are optional.



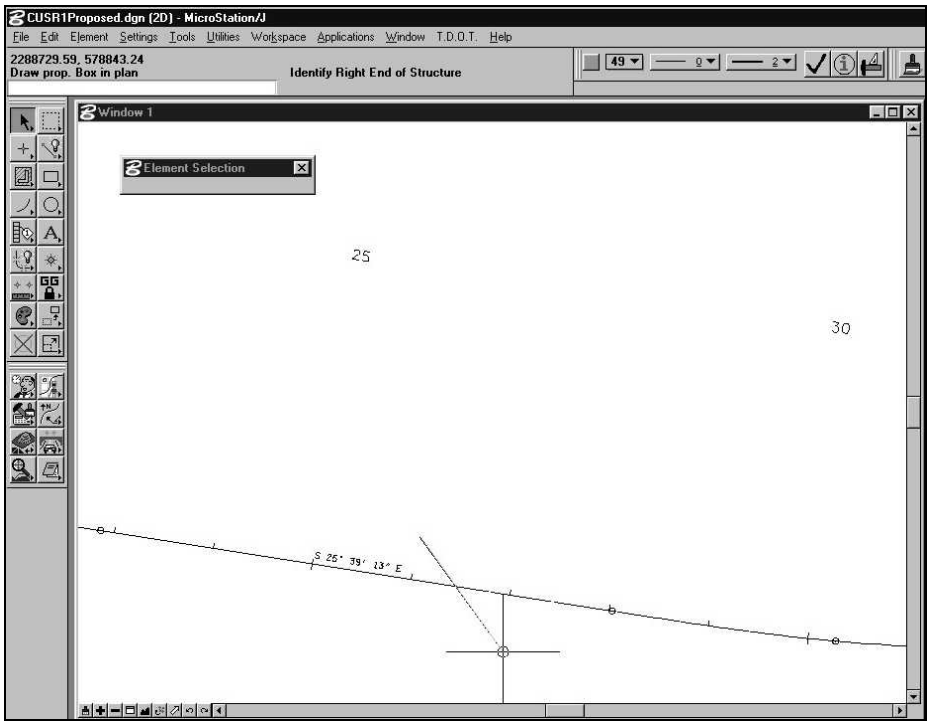
Step 3. Make settings in the dialog as needed for the structure you need to draw. In our example we are placing a 3 @ 10X8 structure at a 45 degree skew right. From standard structure drawing STD-15-111 we get the short wingwall (WS) length of 9' and a long wingwall (WL) length of 20.25'. Once settings are made click on the **Draw Structure** button.



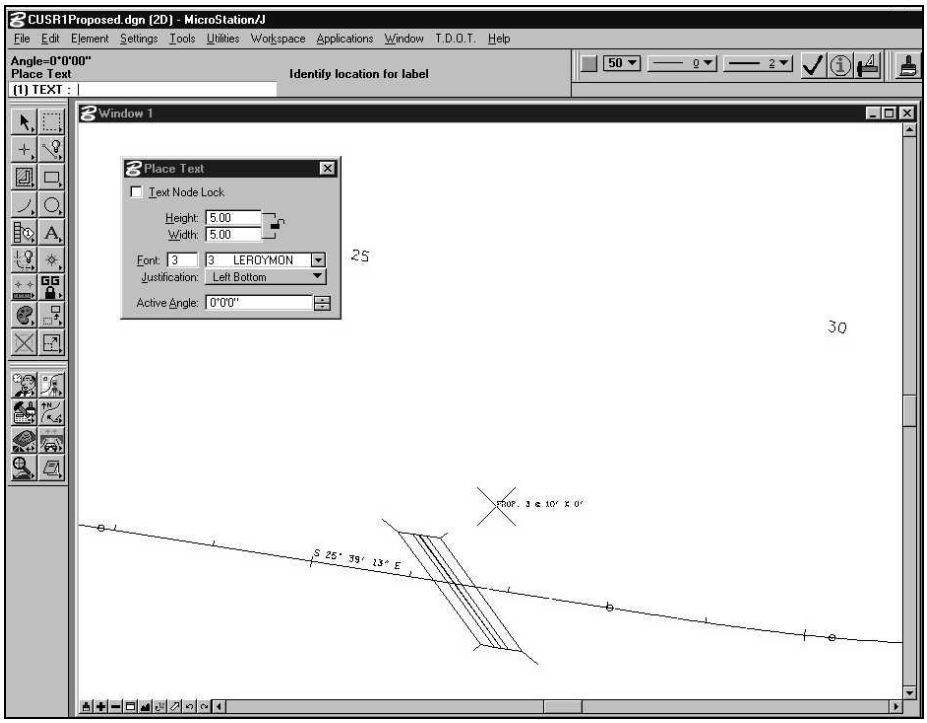
Step 4. You are then prompted to **Identify Left End of Structure**. **Snap** and **Data point** at that end of the structure centerline.



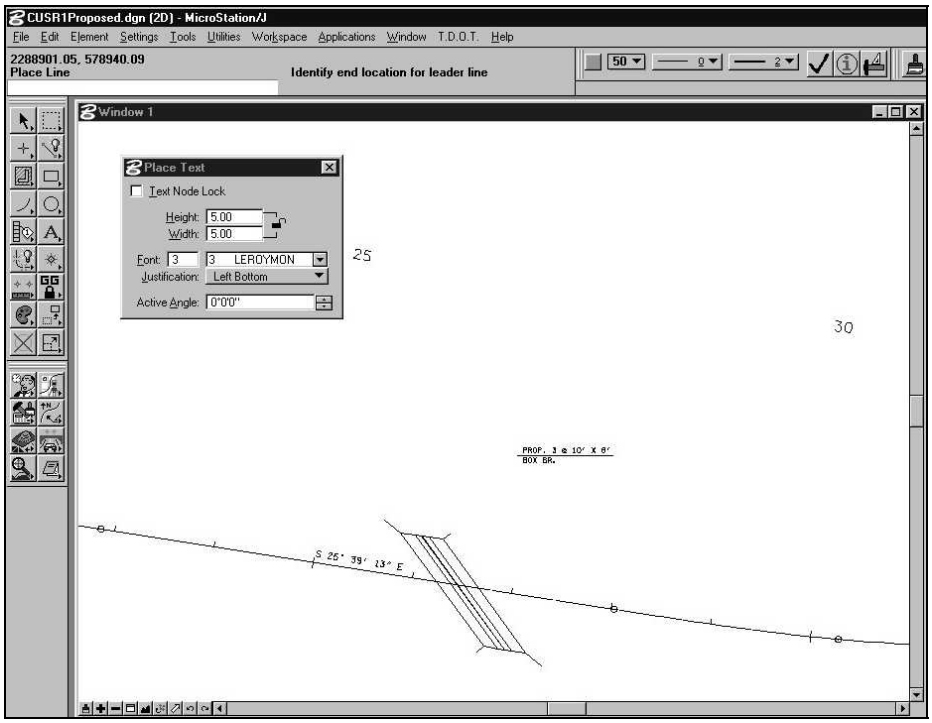
Step 5. You are then prompted to **Identify Right End of Structure**. **Snap** and **Data point** at that end of the structure centerline.



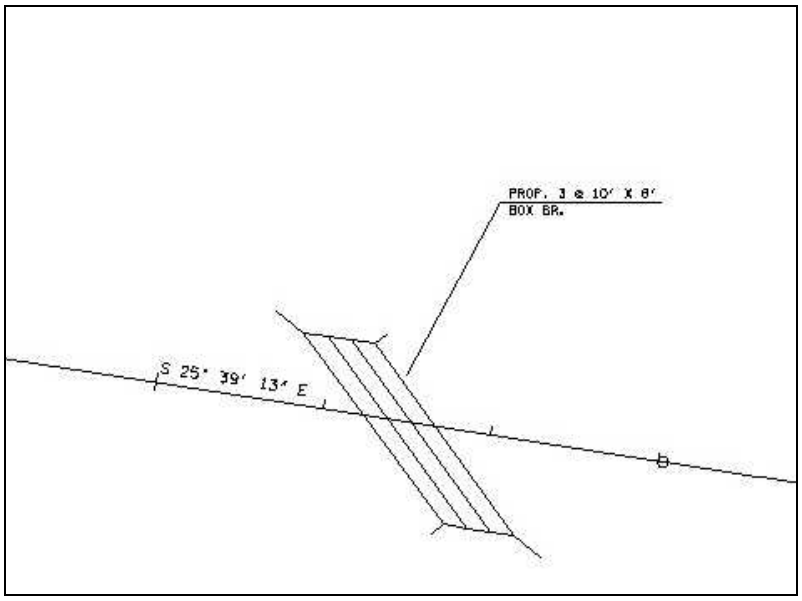
Step 6. The structure is drawn and the user is prompted to **Identify location for label.** A **Reset** can be given to skip placement or **Data point** at location for label to be placed.



Step 7. Finally if the label was placed you are prompted to **Identify location for leader line**. **Data point** at structure where you wish the leader line to end.



Step 8. The structure with label is now complete. Note that centerline length of structure is checked to determine whether label should specify bridge or culvert.



A Endwall

D&C location: Drafting Standards>Prop. Drainage> Structures in Plan>A Endwall

Microstation Macro Program: drawAEWplan.ba

Description:

This application used draw a proposed type A endwall on a pipe end in the plan view. All control values in dialog are based on data in standard roadway drawing D-PE-1.

Endwall information used for placement and associated quantities are added to CSV file **EndwallTabulation.csv**.

Supports English or Metric application.

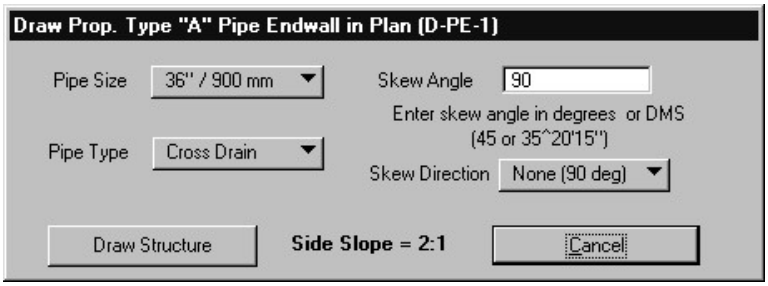
Special Requirements:

The proposed pipe must be drawn in the plan view.

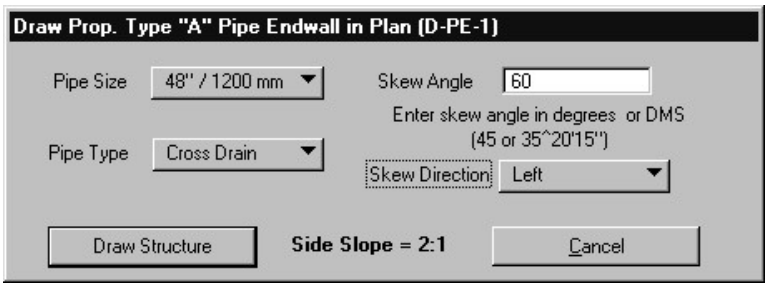
Usage:

Step 1. Draw the proposed pipe in the plan view. This may have been done during the design process using Geopak Drainage, with Microstation tools or by using Geopak's **Draw Pattern** tool with D&C Manager's **Place Influence** on to set the appropriate symbology for the desired pipe size. See Step 1 of the **Plan Box** program description above for an explanation of using the Draw Pattern tool for this.

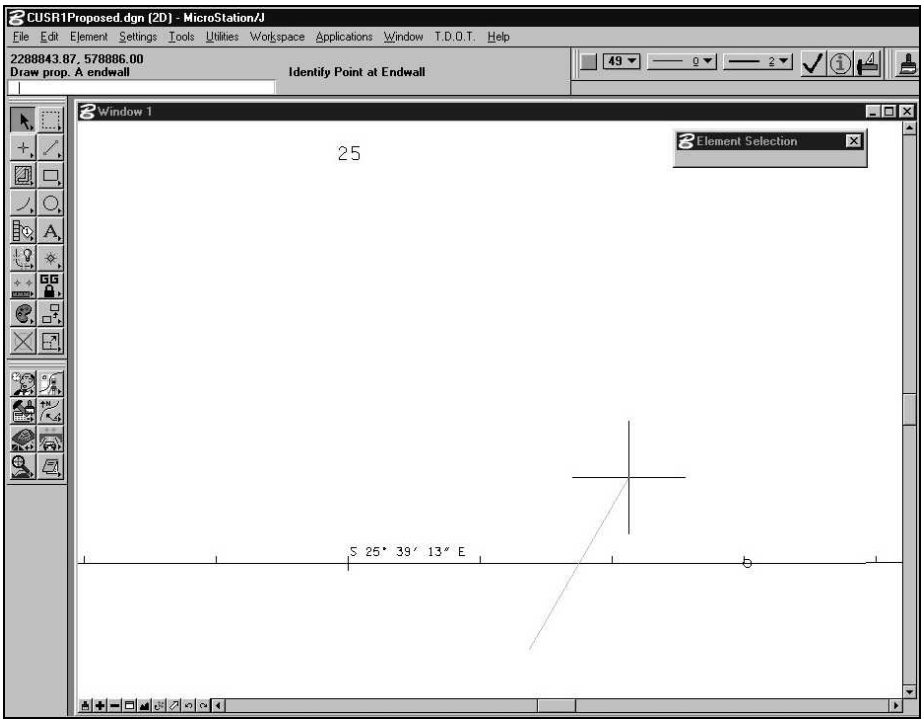
Step 2. In D&C manager activate **A Endwall**. The **Draw Prop. Type "A" Pipe Endwall in Plan** dialog opens**.** Defaults which are displayed . . . **Pipe Size 36", Pipe Type Cross Drain, Skew Angle 90** & **Skew Direction None.** Also note that skew angles in degrees minutes & seconds are supported.



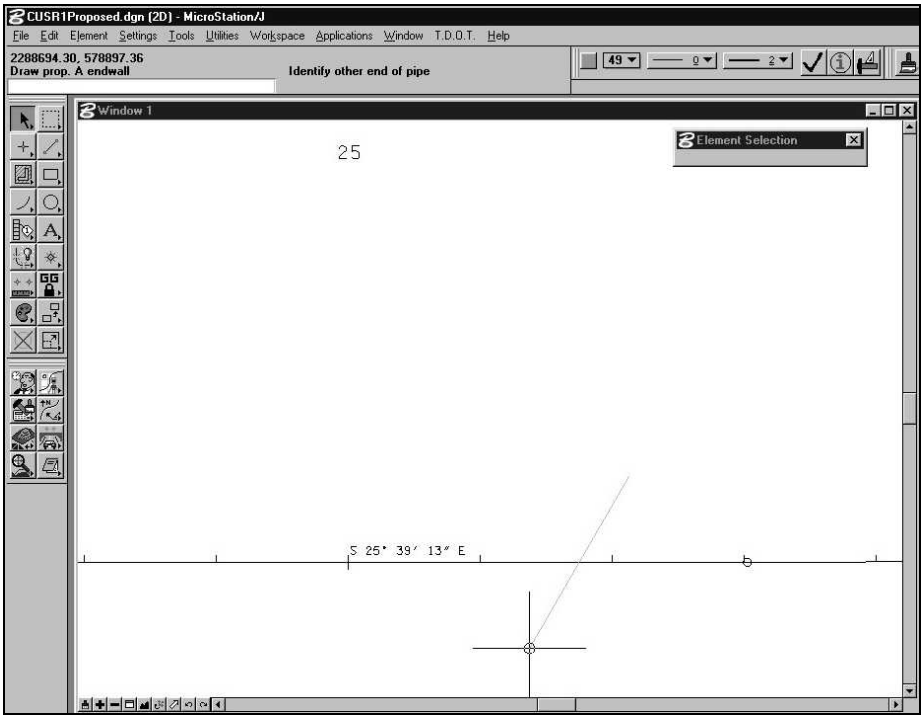
Step 3. Make settings in the dialog as needed for the pipe endwall you need to draw. In our example we are placing an endwall on a 48" pipe cross drain at a 60 degree skew left. The **Pipe Type** setting controls the level for placement. Once settings are made click on the **Draw Structure** button.



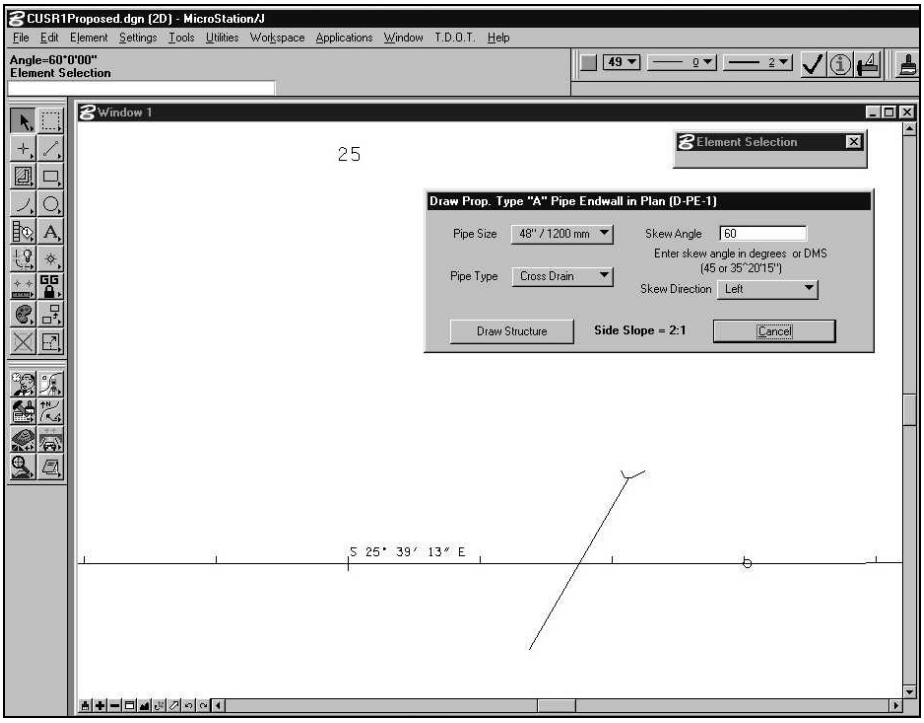
Step 4. You are then prompted to **Identify Point at Endwall**. **Snap** and **Data point** at the end of the pipe where endwall should be drawn.



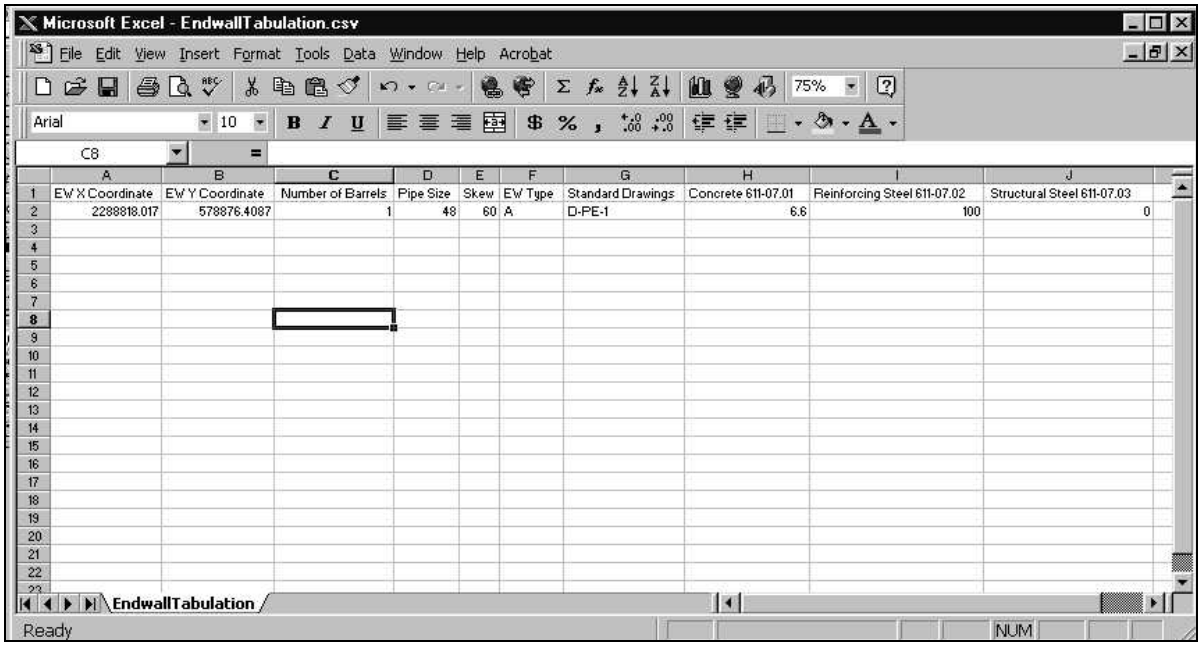
Step 5. You are then prompted to **Identify other end of pipe**. **Snap** and **Data point** at the other end of the pipe.



Step 6. The endwall is drawn and the dialog re-appears. You can click on **Draw Structure** to place another endwall of the same type at the other end or click on **Cancel** to exit the program.



Step 7. When endwalls are placed in graphics, information used for placement and associated quantities are added to CSV file **EndwallTabulation.csv** in your project directory. Data from this file can later be imported into Excel and used to tabulate final quantites for endwalls.



	A	B	C	D	E	F	G	H	I	J
1	EW X Coordinate	EW Y Coordinate	Number of Barrels	Pipe Size	Skew	EW Type	Standard Drawings	Concrete 611-07.01	Reinforcing Steel 611-07.02	Structural Steel 611-07.03
2	2288818.017	578876.4087	1	48	60	A	D-PE-1	6.6	100	0

U Endwall

D&C location: Drafting Standards>Prop. Drainage> Structures in Plan>U Endwall

Microstation Macro Program: drawUEWplan.ba

Description:

This application used draw a proposed type U endwall on a pipe end in the plan view. Endwall can be placed with safety grate if required. All control values in dialog are based on data in standard roadway drawings D-PE-3B, D-PE-4, D-PE-4B & D-PE-6B.

Endwall information used for placement and associated quantities are added to CSV file **EndwallTabulation.csv**.

Supports English or Metric application.

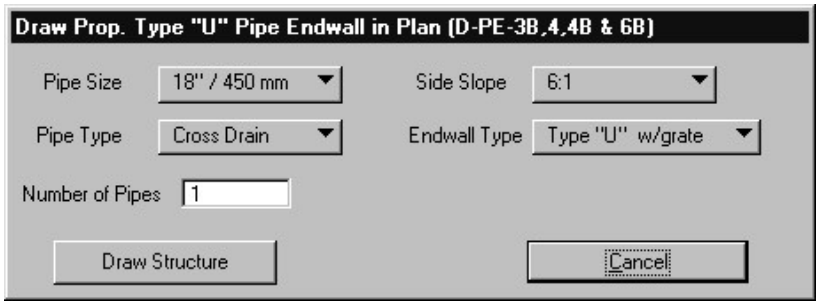
Special Requirements:

The proposed pipe must be drawn in the plan view.

Usage:

Step 1. Draw the proposed pipe in the plan view. This may have been done during the design process using Geopak Drainage, with Microstation tools or by using Geopak's **Draw Pattern** tool with D&C Manager's **Place Influence** on to set the appropriate symbology for the desired pipe size. See Step 1 of the **Plan Box** program description above for an explanation of using the Draw Pattern tool for this.

Step 2. In D&C manager activate **U Endwall**. The **Draw Prop. Type "U" Pipe Endwall in Plan** dialog opens**.** Defaults which are displayed . . . **Pipe Size 18", Pipe Type Cross Drain, Number of Pipes 1, Side Slope 6:1** & **Endwall Type w/grate.** Note that multiple pipes and 2:1 or 1.5:1 slopes are only allowed with pipe sizes 18"-30" and if a grate is specified but not required the endwall is drawn without the grate.

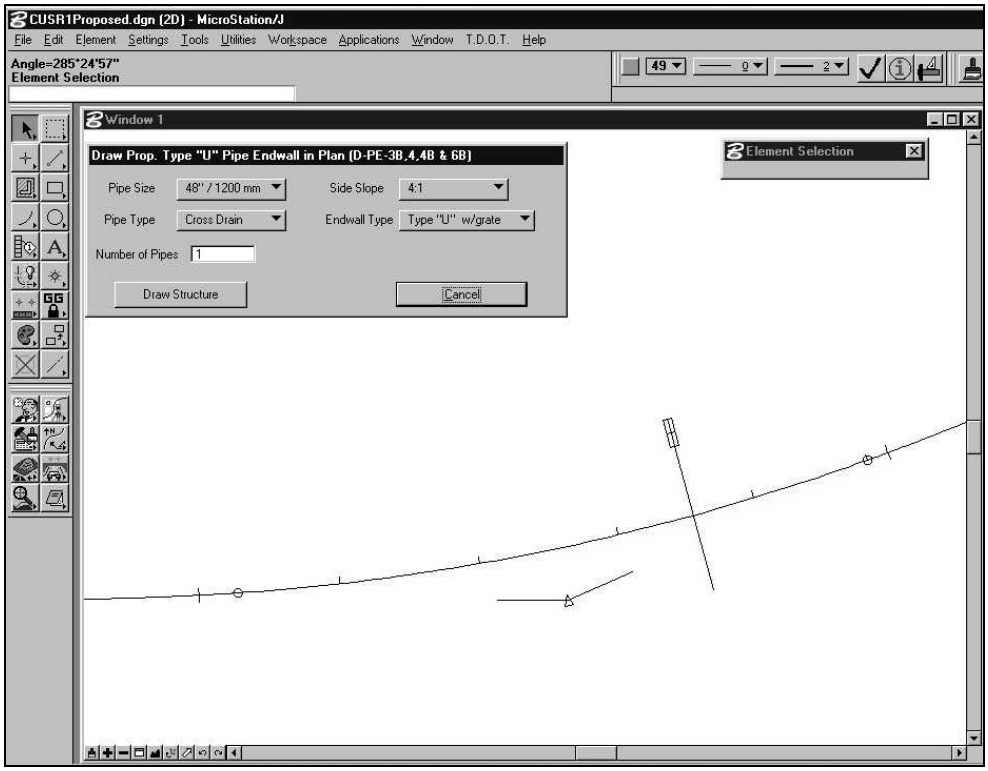


Step 3. Make settings in the dialog as needed for the pipe endwall you need to draw. The **Pipe Type** setting controls the level for placement. Once settings are made click on the **Draw Structure** button.

Step 4. You are then prompted to **Identify Point at Endwall**. **Snap** and **Data point** at the end of the pipe where endwall should be drawn.

Step 5. You are then prompted to **Identify other end of pipe**. **Snap** and **Data point** at the other end of the pipe.

Step 6. The endwall is drawn and the dialog re-appears. You can click on **Draw Structure** to place another endwall of the same type at the other end or click on **Cancel** to exit the program.



Step 7. When endwalls are placed in graphics, information used for placement and associated quantities are added to CSV file **EndwallTabulation.csv** in your project directory. Data from this file can later be imported into Excel and used to tabulate final quantities for endwalls.

SD Endwall

D&C location: Drafting Standards>Prop. Drainage> Structures in Plan>SD Endwall

Microstation Macro Program: drawSDEWplan.ba

Description:

This application used draw a proposed type SD endwall on a pipe end in the plan view. All control values in dialog are based on data in standard roadway drawings D-SEW-6DA & D-SEW-12D.

Endwall information used for placement and associated quantities are added to CSV file **EndwallTabulation.csv**.

Supports English or Metric application.

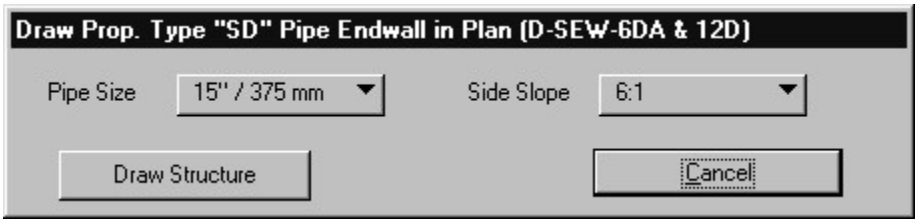
Special Requirements:

The proposed pipe must be drawn in the plan view.

Usage:

Step 1. Draw the proposed pipe in the plan view. This may have been done during the design process using Geopak Drainage, with Microstation tools or by using Geopak's **Draw Pattern** tool with D&C Manager's **Place Influence** on to set the appropriate symbology for the desired pipe size. See Step 1 of the **Plan Box** program description above for an explanation of using the Draw Pattern tool for this.

Step 2. In D&C manager activate **SD Endwall**. The **Draw Prop. Type "SD" Pipe Endwall in Plan** dialog opens**.** Defaults which are displayed . . . **Pipe Size 15"** & **Side Slope 6:1.** Note that 12:1 side slopes are only allowed with pipe sizes 15"-18".

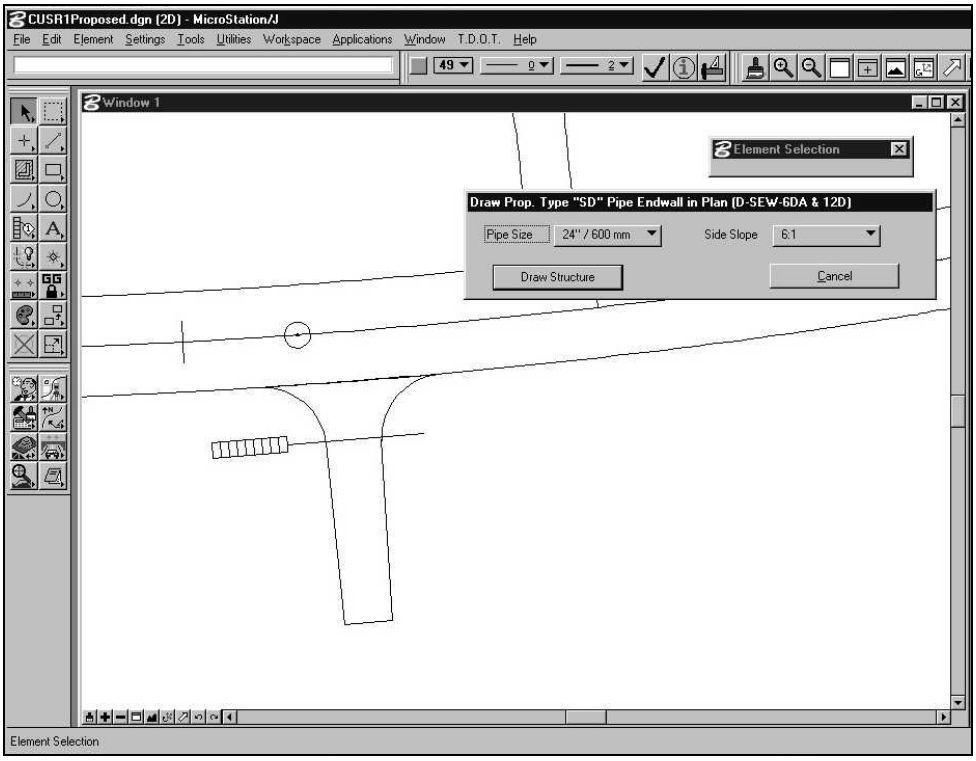


Step 3. Make settings in the dialog as needed for the pipe endwall you need to draw. Once settings are made click on the **Draw Structure** button.

Step 4. You are then prompted to **Identify Point at Endwall**. **Snap** and **Data point** at the end of the pipe where endwall should be drawn.

Step 5. You are then prompted to **Identify other end of pipe**. **Snap** and **Data point** at the other end of the pipe.

Step 6. The endwall is drawn and the dialog re-appears. You can click on **Draw Structure** to place another endwall of the same type at the other end or click on **Cancel** to exit the program.



Step 7. When endwalls are placed in graphics, information used for placement and associated quantities are added to CSV file **EndwallTabulation.csv** in your project directory. Data from this file can later be imported into Excel and used to tabulate final quantities for endwalls.

ST Endwall

D&C location: Drafting Standards>Prop. Drainage> Structures in Plan>ST Endwall

Microstation Macro Program: drawSTEWplan.ba

Description:
This application used draw a proposed type ST/straight endwall on a pipe end in the plan view. All control values in dialog are based on data in standard roadway drawing D-PE-4.

Endwall information used for placement and associated quantities are added to CSV file **EndwallTabulation.csv**.

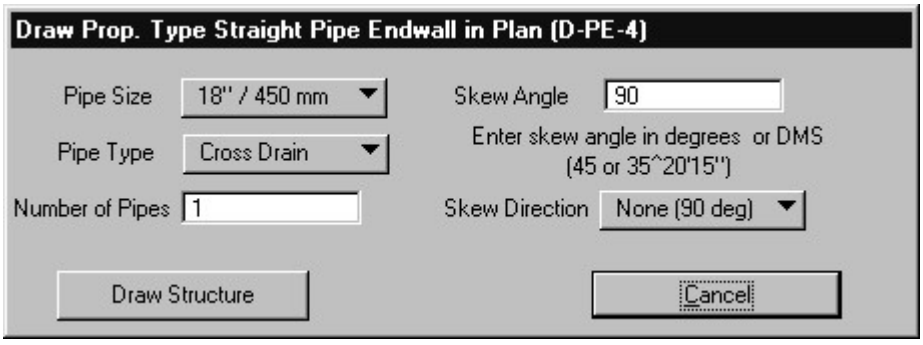
Supports English or Metric application.

Special Requirements:
The proposed pipe must be drawn in the plan view.

Usage:

Step 1. Draw the proposed pipe in the plan view. This may have been done during the design process using Geopak Drainage, with Microstation tools or by using Geopak's **Draw Pattern** tool with D&C Manager's **Place Influence** on to set the appropriate symbology for the desired pipe size. See Step 1 of the **Plan Box** program description above for an explanation of using the Draw Pattern tool for this.

Step 2. In D&C manager activate **ST Endwall**. The **Draw Prop. Type Straight Pipe Endwall in Plan** dialog opens**.** Defaults which are displayed . . . **Pipe Size 18", Pipe Type Cross Drain, Number of Pipes 1, Skew Angle 90** & **Skew Direction None.** Note that skew angles in degrees minutes & seconds are supported**..**

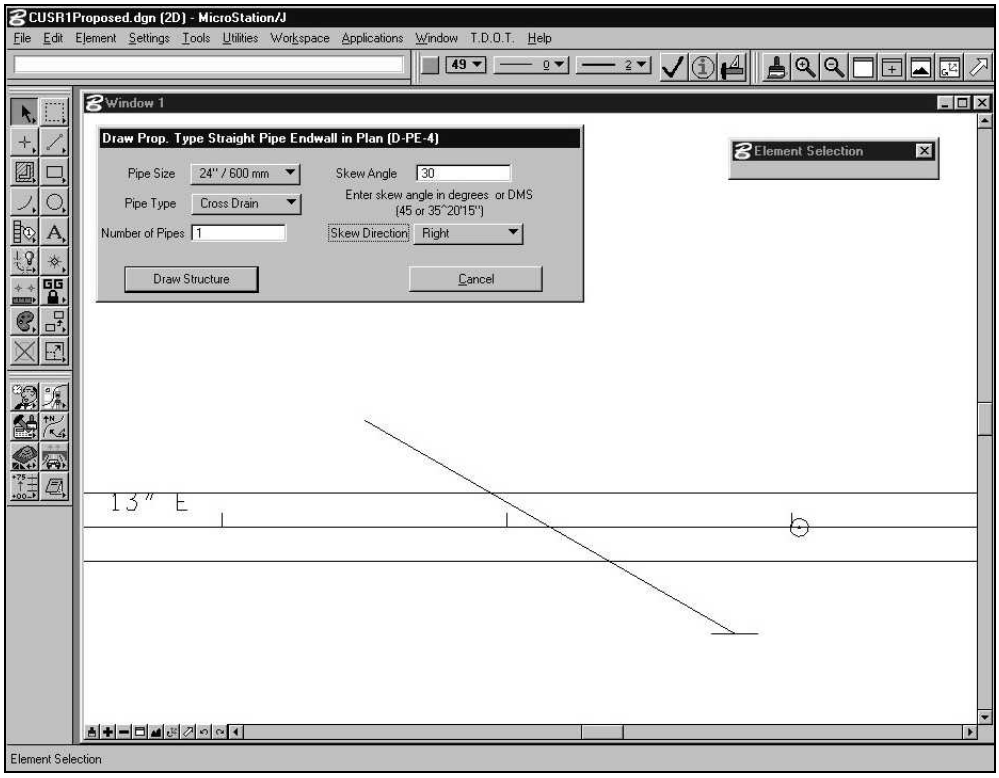


Step 3. Make settings in the dialog as needed for the pipe endwall you need to draw. The **Pipe Type** setting controls the level for placement. Once settings are made click on the **Draw Structure** button.

Step 4. You are then prompted to **Identify Point at Endwall**. **Snap** and **Data point** at the end of the pipe where endwall should be drawn.

Step 5. You are then prompted to **Identify other end of pipe**. **Snap** and **Data point** at the other end of the pipe.

Step 6. The endwall is drawn and the dialog re-appears. You can click on **Draw Structure** to place another endwall of the same type at the other end or click on **Cancel** to exit the program.



Step 7. When endwalls are placed in graphics, information used for placement and associated quantities are added to CSV file **EndwallTabulation.csv** in your project directory. Data from this file can later be imported into Excel and used to tabulate final quantities for endwalls.

L Endwall

D&C location: Drafting Standards>Prop. Drainage> Structures in Plan>L Endwall

Microstation Macro Program: drawLEWplan.ba

Description:

This application used draw a proposed type L endwall on a pipe end in the plan view. All control values in dialog are based on data in standard roadway drawing D-PE-4.

Endwall information used for placement and associated quantities are added to CSV file **EndwallTabulation.csv**.

Supports English or Metric application.

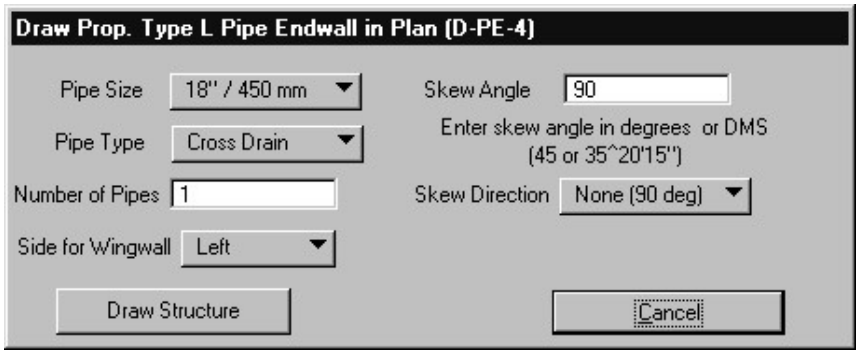
Special Requirements:

The proposed pipe must be drawn in the plan view.

Usage:

Step 1. Draw the proposed pipe in the plan view. This may have been done during the design process using Geopak Drainage, with Microstation tools or by using Geopak's **Draw Pattern** tool with D&C Manager's **Place Influence** on to set the appropriate symbology for the desired pipe size. See Step 1 of the **Plan Box** program description above for an explanation of using the Draw Pattern tool for this.

Step 2. In D&C manager activate **L Endwall**. The **Draw Prop. Type L Pipe Endwall in Plan** dialog opens**.** Defaults which are displayed . . . **Pipe Size 18", Pipe Type Cross Drain, Number of Pipes 1, Side for Wingwall Left, Skew Angle 90** & **Skew Direction None.** Note that skew angles in degrees minutes & seconds are supported**..**

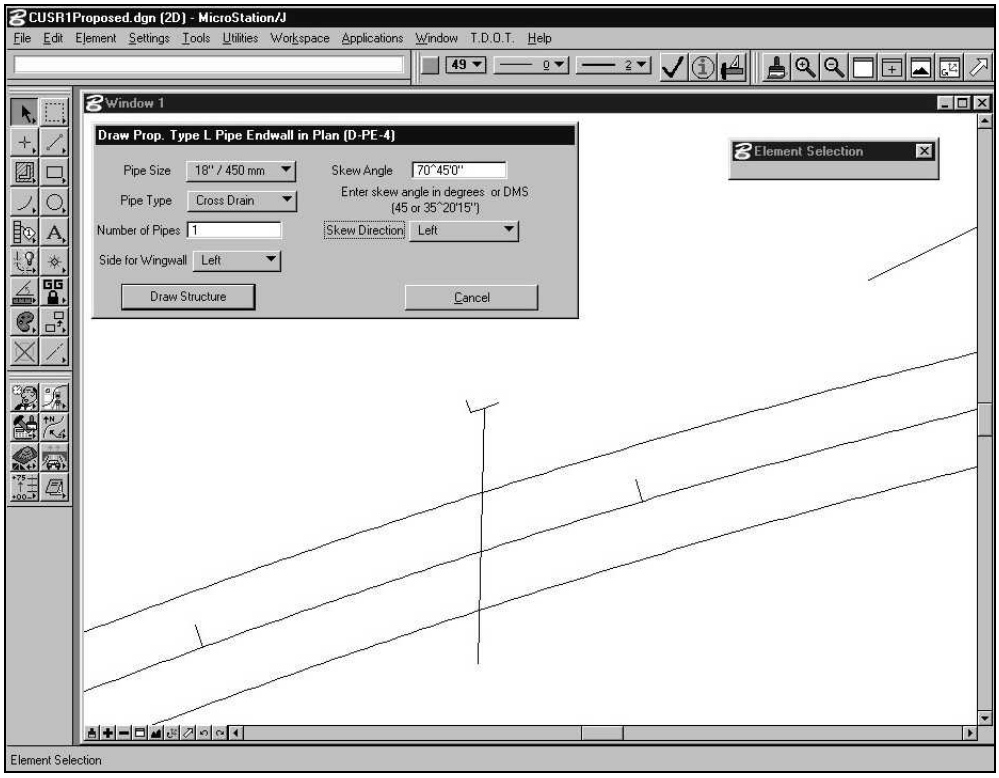


Step 3. Make settings in the dialog as needed for the pipe endwall you need to draw. The **Pipe Type** setting controls the level for placement. **Side for wingwall** is as seen looking out away from roadway. Once settings are made click on the **Draw Structure** button.

Step 4. You are then prompted to **Identify Point at Endwall**. **Snap** and **Data point** at the end of the pipe where endwall should be drawn.

Step 5. You are then prompted to **Identify other end of pipe**. **Snap** and **Data point** at the other end of the pipe.

Step 6. The endwall is drawn and the dialog re-appears. You can click on **Draw Structure** to place another endwall of the same type at the other end or click on **Cancel** to exit the program.



Step 7. When endwalls are placed in graphics, information used for placement and associated quantities are added to CSV file **EndwallTabulation.csv** in your project directory. Data from this file can later be imported into Excel and used to tabulate final quantities for endwalls.

Profile Box

D&C location: Drafting Standards>Prop. Drainage> Structures on Profiles>Profile Box

Microstation Macro Program: drawboxprofile.ba

Description:
This application is used to draw a proposed box culvert or bridge on a profile.

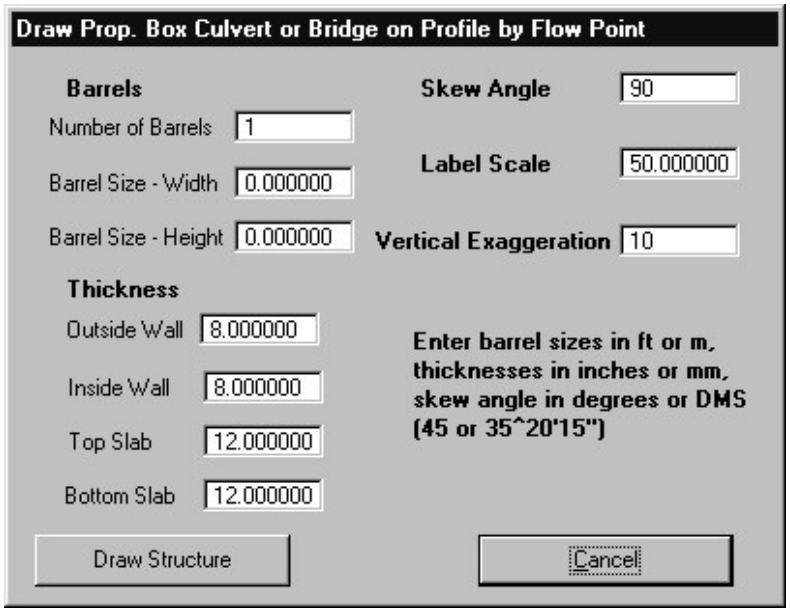
Supports English or Metric application.

Special Requirements:
The center flow line point of the structure must be located in graphics prior to running the application.

Usage:

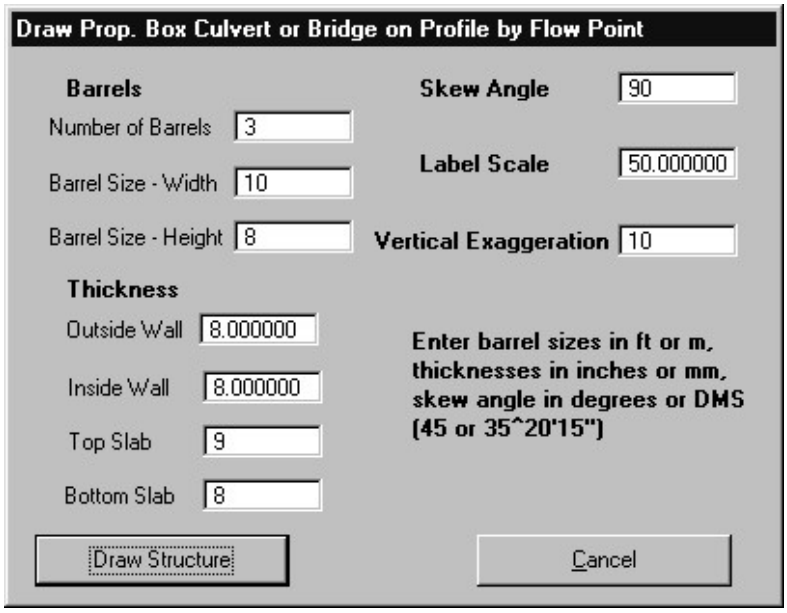
Step 1. Establish the center flow line point of the structure. This may be located with Microstation tools or with Geopak's **Vertical Alignment Generator** and it's **Issue Data Point** tool.

Step 2. In D&C manager activate **Profile Box**. The **Draw Box Culvert or Bridge on Profile by Flow Point** dialog opens**.** Defaults which are displayed . . . **Number of Barrels 1, Outside Wall 8 inches, Inside Wall 8 inches, Top Slab 12 inches, Bottom slab 12 inches, Skew Angle 90, Label Scale (Current Active Scale)** & **Vertical Exaggeration 10.** Note that skew angles in degrees minutes & seconds are supported.

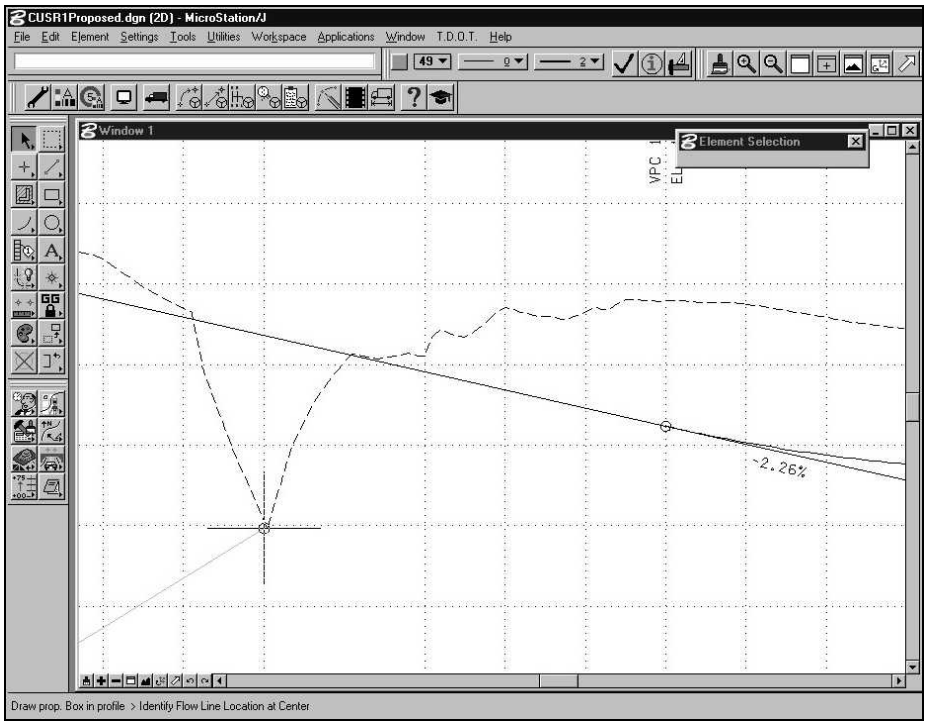


Vertical Exaggeration should usually be 10 for profiles …
(Example: 50 scale horiz. / 5 scale vert. = 10)
It is provided for special profile cases and for the occasional need to draw on culvert sections which would use an exaggeration value of 1.

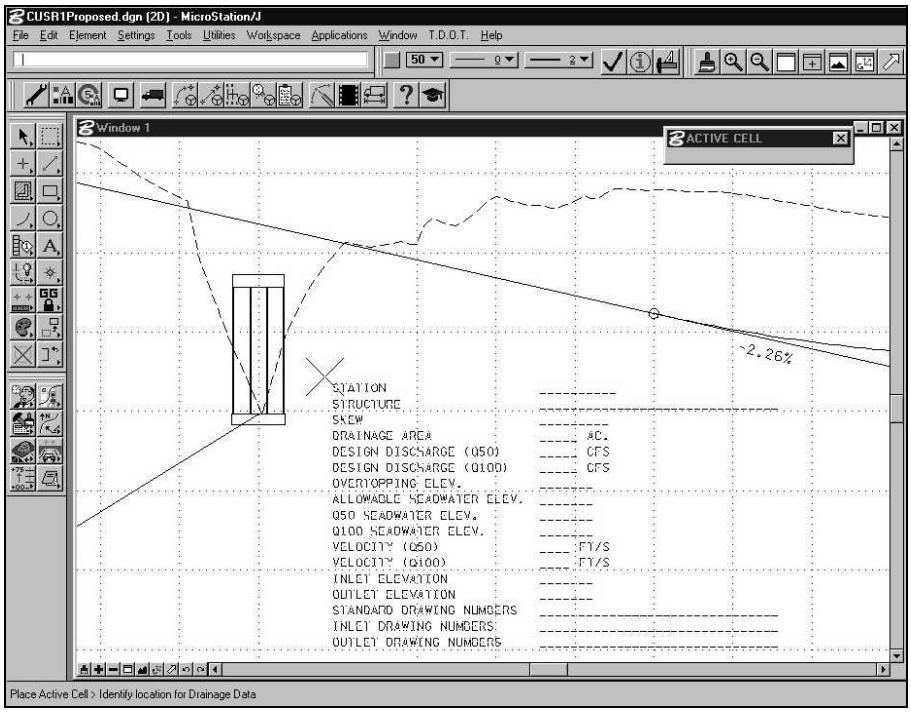
Step 3. Make settings in the dialog as needed for the structure you need to draw. In our example we are placing a 3 @ 10X8 structure with a 3' fill height at a 90 degree skew. From standard structure drawing STD-15-79 we get the outside wall (WT) thickness of 8" and an inside wall (IT) thickness of 8" so we can use the defaults. The top slab (ST) thickness is 9" and the bottom slab (SB) thickness is 8" so we enter those. Once settings are made click on the **Draw Structure** button.



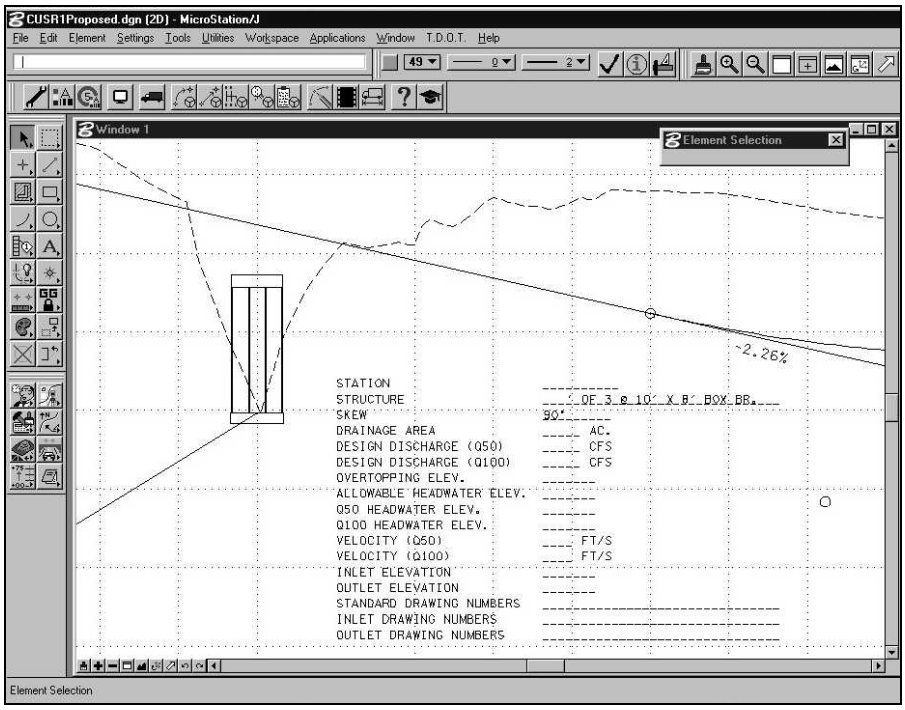
Step 4. You are then prompted to **Identify Flow Line Location at Center**. **Snap** and **Data point** at the flow line point.



Step 6. The structure is drawn and the user is prompted to **Identify location for Drainage Data.** A **Reset** can be given to skip placement or **Data point** at location for the data cell to be placed.



Step 8. The data cell is placed and **size, type & skew data** is added. Note that centerline length of structure is checked to determine whether text should specify bridge or culvert.



Profile Slab

D&C location: Drafting Standards>Prop. Drainage> Structures on Profiles>Profile Slab

Microstation Macro Program: drawslabprofile.ba

Description:
This application is used to draw a proposed slab culvert or bridge on a profile.

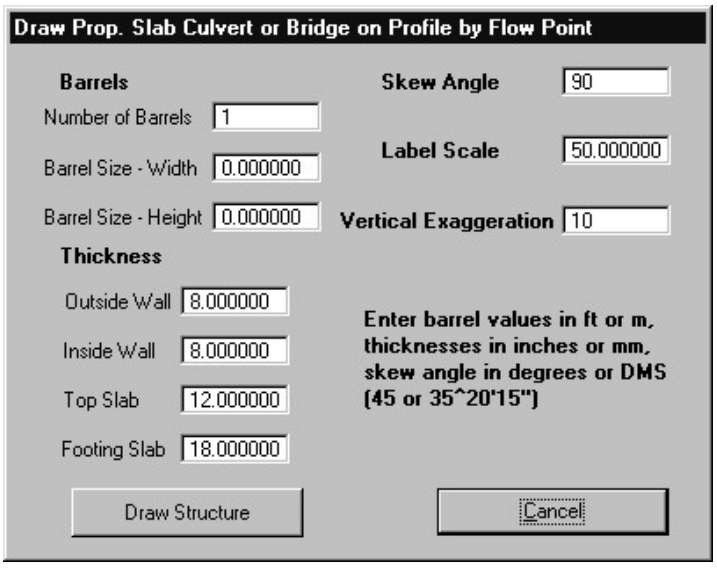
Supports English or Metric application.

Special Requirements:
The center flow line point of the structure must be located in graphics prior to running the application.

Usage:

Step 1. Establish the center flow line point of the structure. This may be located with Microstation tools or with Geopak's **Vertical Alignment Generator** and it's **Issue Data Point** tool.

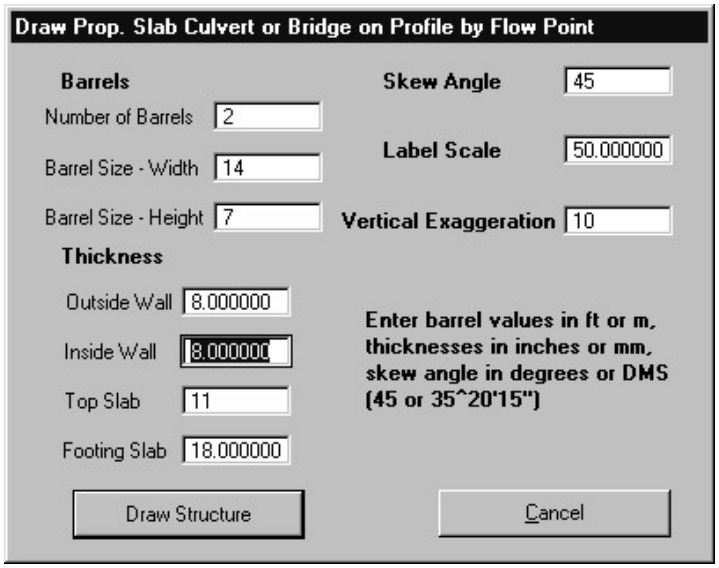
Step 2. In D&C manager activate **Profile Slab**. The **Draw Slab Culvert or Bridge on Profile by Flow Point** dialog opens**.** Defaults which are displayed . . . **Number of Barrels 1, Outside Wall 8 inches, Inside Wall 8 inches, Top Slab 12 inches, Footing slab 18 inches, Skew Angle 90, Label Scale (Current Active Scale)** & **Vertical Exaggeration 10.** Note that skew angles in degrees minutes & seconds are supported.



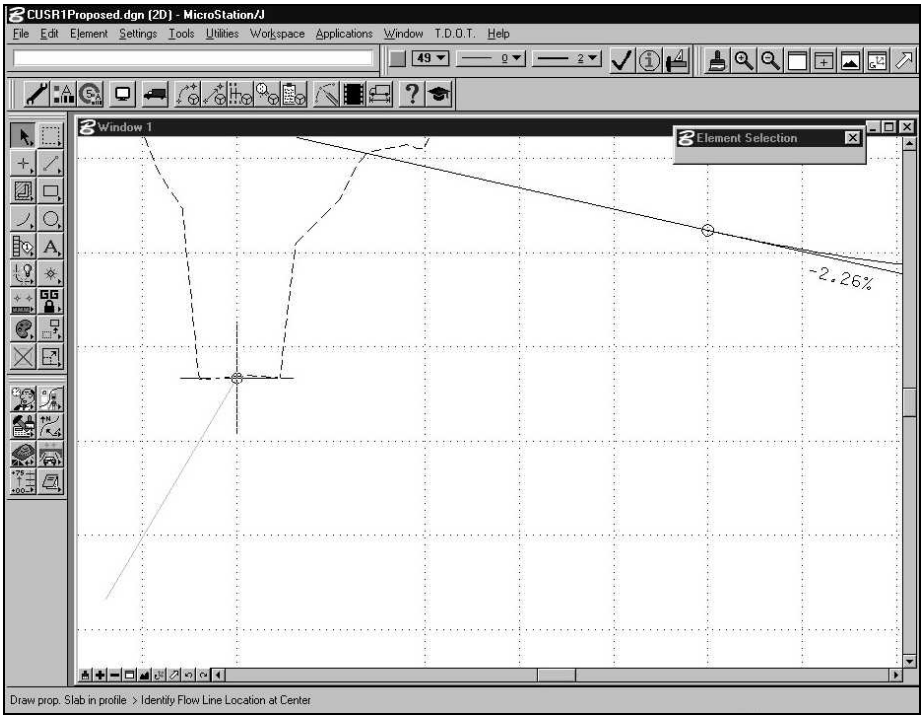
Vertical Exaggeration should usually be 10 for profiles …
(Example: 50 scale horiz. / 5 scale vert. = 10)
It is provided for special profile cases and for the occasional need to draw on culvert sections which would use an exaggeration value of 1.

Footing Slab thickness should be 18" for most standard slab culvert and bridge structures but is provided for special cases where it may not be.

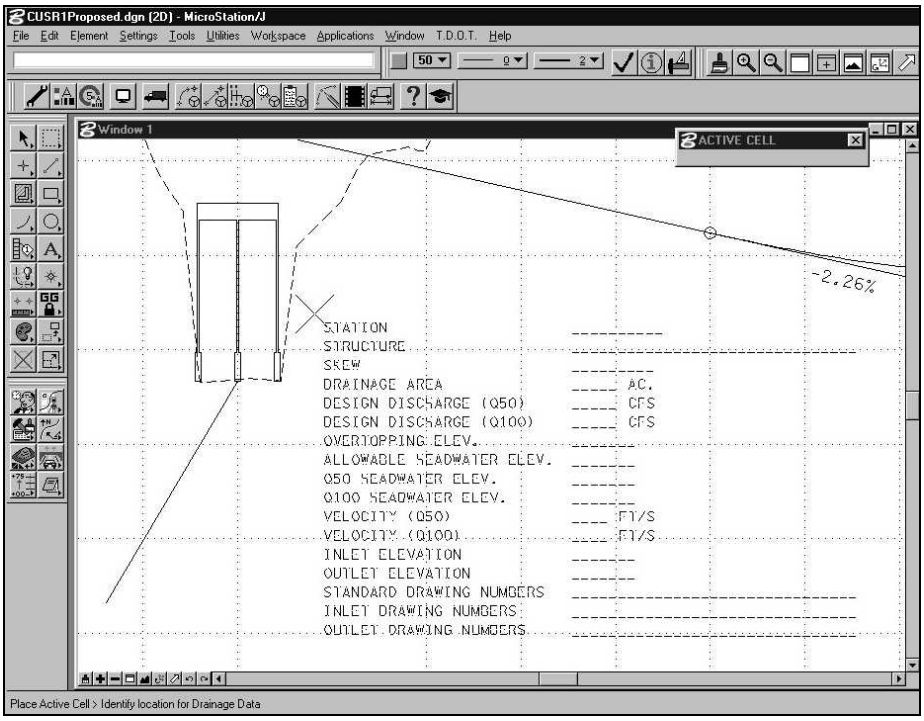
Step 3. Make settings in the dialog as needed for the structure you need to draw. In our example we are placing a 2 @ 14X7 structure with a 6' fill height at a 45 degree skew. From standard structure drawing STD-15-122 we get the outside wall (WT) thickness of 8", an inside wall (IT) thickness of 8" and a footing slab thickness of 18" so we can use the defaults. The top slab (ST) thickness is 11" so we enter that. Once settings are made click on the **Draw Structure** button.



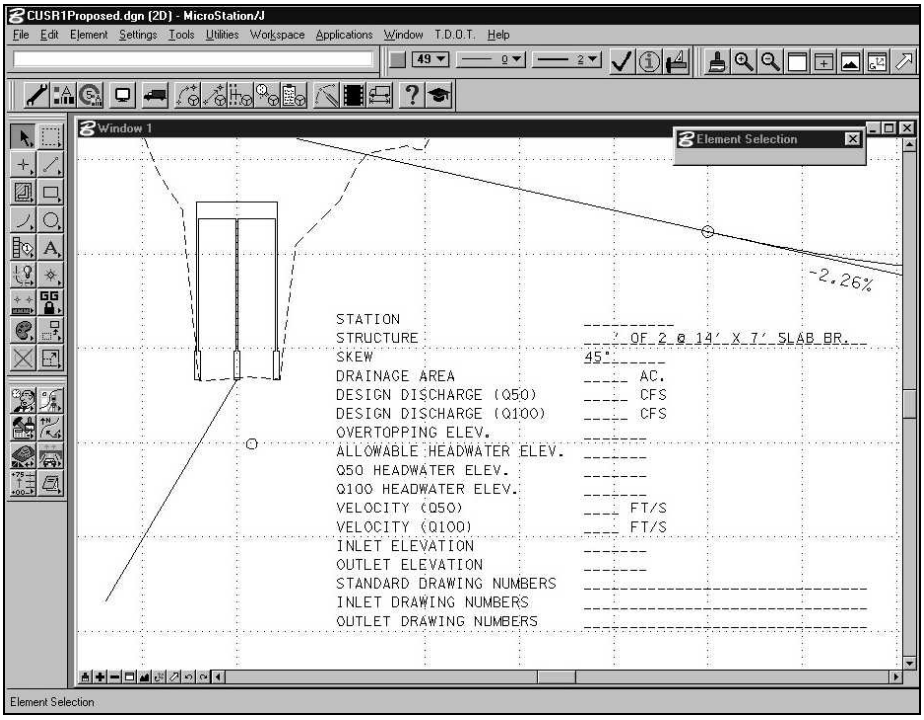
Step 4. You are then prompted to **Identify Flow Line Location at Center**. **Snap** and **Data point** at the flow line point.



Step 6. The structure is drawn and the user is prompted to **Identify location for Drainage Data.** A **Reset** can be given to skip placement or **Data point** at location for the data cell to be placed. Due to the 45 degree skew, structure widths are adjusted.



Step 8. The data cell is placed and **size, type & skew data** is added. Note that centerline length of structure is checked to determine whether text should specify bridge or culvert.



Profile Pipe

D&C location: Drafting Standards>Prop. Drainage> Structures on Profiles>Profile Pipe

Microstation Macro Program: drawpipeprofile.ba

Description:
This application is used to draw a proposed pipe(s) on a profile.

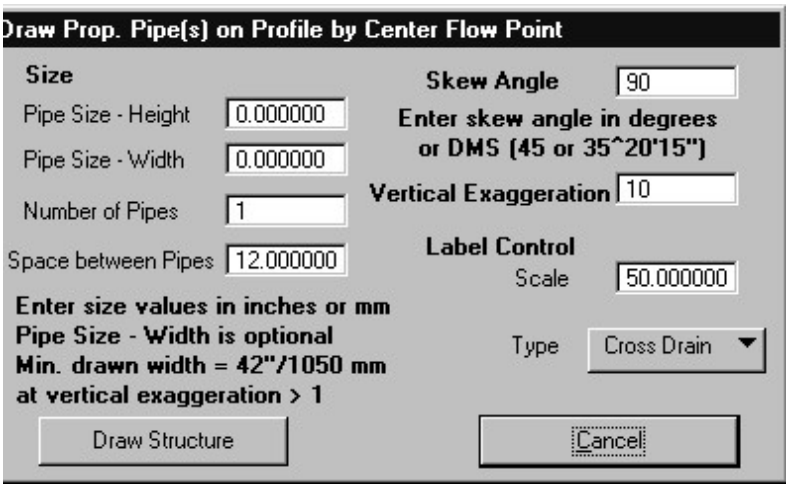
Supports English or Metric application.

Special Requirements:
The center flow line point of the pipe(s) must be located in graphics prior to running the application.

Usage:

Step 1. Establish the center flow line point of the pipe(s). This may be located with Microstation tools or with Geopak's **Vertical Alignment Generator** and it's **Issue Data Point** tool.

Step 2. In D&C manager activate **Profile Pipe**. The **Draw Prop. Pipe(s) on Profile by Center Flow Point** dialog opens**.** Defaults which are displayed . .**Number of Pipes 1, Space between Pipes 12 inches, Skew Angle 90, Vertical Exaggeration 10, Label Control - Scale (Current Active Scale) & Label Control - Type Cross Drain.** Note that skew angles in degrees minutes & seconds are supported.

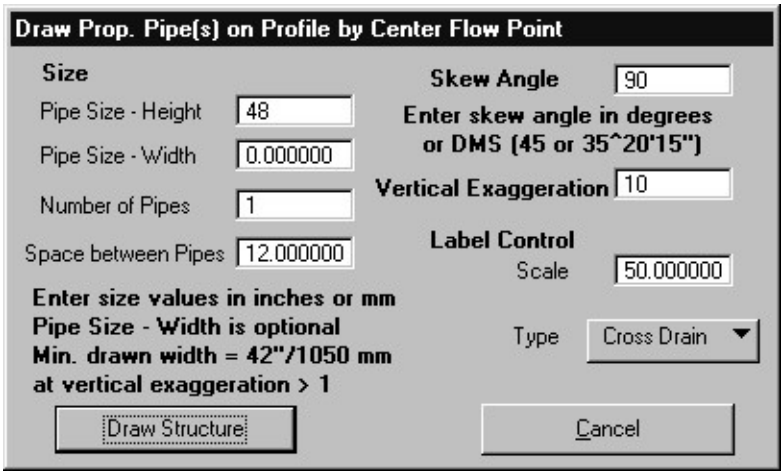


Pipe Size - Width is optional and is provided so that horizontal & vertical oval pipes can be drawn as needed.

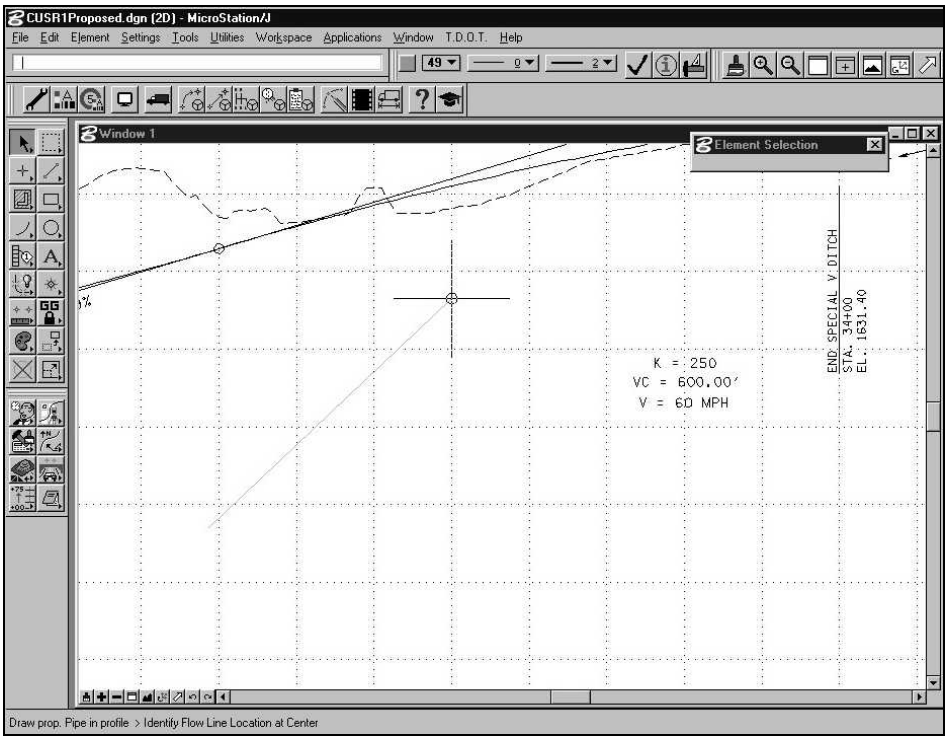
Vertical Exaggeration should usually be 10 for profiles …
(Example: 50 scale horiz. / 5 scale vert. = 10)
It is provided for special profile cases and for the occasional need to draw on culvert sections which would use an exaggeration value of 1.

Label Control - Type controls the format of labeling provided.
Cross Drain - Profile Drainage Data Cell
Storm Sewer - EW storm sewer drainage code cell with leader line
Side Drain - Text label: __' OF *pipe size*" S.D. REQD.

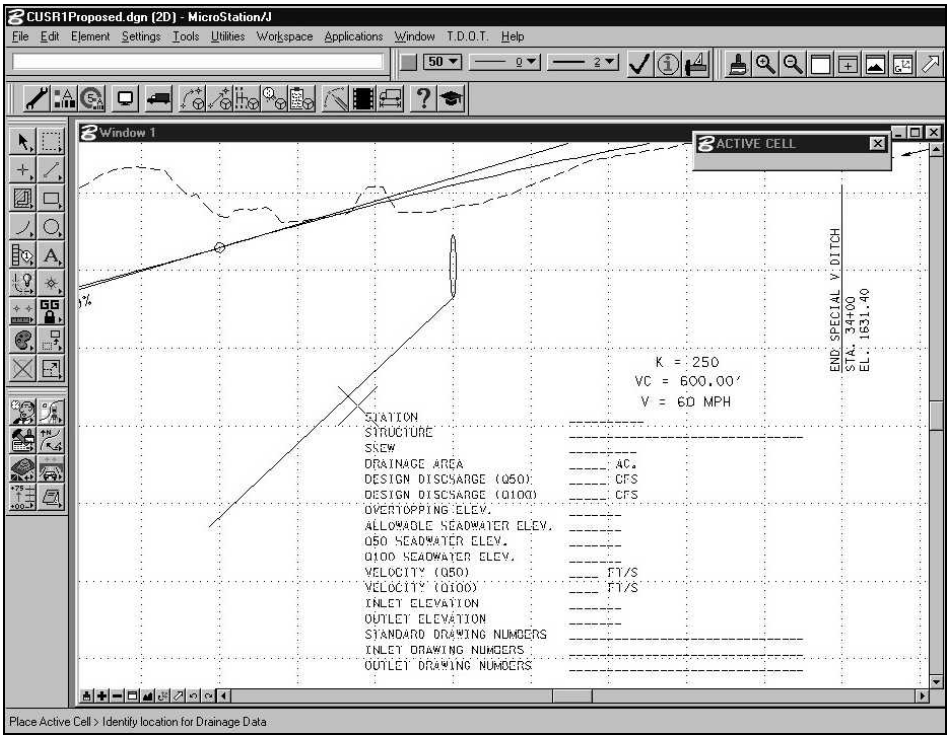
Step 3. Make settings in the dialog as needed for the pipe(s) you need to draw. In our example we are placing a 48" cross drain at a 90 degree skew. Once settings are made click on the **Draw Structure** button.



Step 4. You are then prompted to **Identify Flow Line Location at Center**. **Snap** and **Data point** at the flow line point.

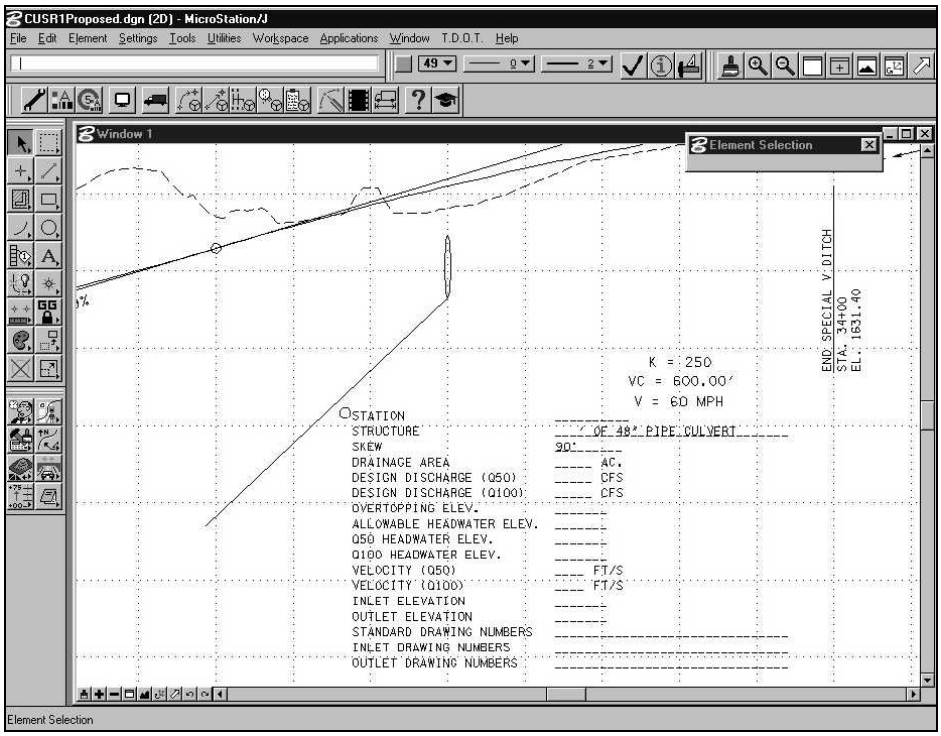


Step 6. The pipe is drawn and the user is prompted to **Identify location for Drainage Data.** A **Reset** can be given to skip placement or **Data point** at location for the data cell to be placed.

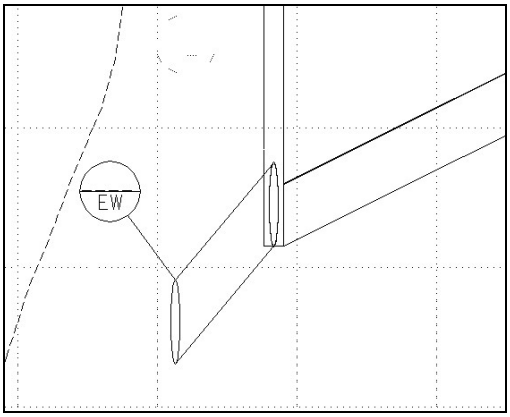


Since it is difficult to see small pipes on profiles when drawn at actual size, this program plots pipes at a **minimum width of 42"(3.5')** when the Vertical Exaggeration is greater than 1. The pipe height is always shown at actual size times the Vertical Exaggeration value.

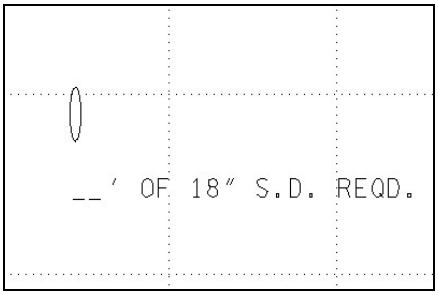
Step 8. The data cell is placed and **size, type & skew data** is added.



Storm Sewer label example:



Side Drain label example:



HA Ditch Pts

D&C location: Drafting Standards>Prop. Drainage>Special Ditches> HA Ditch Pts

Geopak 3PC Program: draw_horiz_points_ Ditches.x

Description:

Uses text symbol characters to mark all points on special ditch horizontal alignments.

Special Requirements:

All alignment graphics must be visible in View Window #1.

Usage:

This option functions just the same as **HA Points**. See the description of it's usage for details.

VA Ditch Pts

D&C location: Drafting Standards>Prop. Drainage> Special Ditches> VA Ditch Pts

Geopak 3PC Program: draw_ vert _points_ Ditches.x

Description:

Uses text symbol characters to mark points & labels VPCs & VPTs with station & elevation on special ditch vertical alignment curves as well as the begin and end points of the vertical alignment if they are not curve points.

Special Requirements:

All alignment graphics must be visible in View #1 and a Geopak profile cell must be present.

Usage:

This option functions just the same as **VA Points**. See the description of it's usage for details.

Rip-Rap Area

D&C location: Drafting Standards>Prop. Drainage> Rip-Rap Area

Microstation Macro Program: RipRapPattern.ba

Description:
This application sets the parameters needed to pattern a rip-rap area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Rip Rap** or by using the keyin **MACRO RIPRAPPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

> **Selection Set Flood** mode: Create Selection Set prior to activating macro
>
> **Shape Element** mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Flow Direction

D&C location: Drafting Standards>Prop. Drainage> Flow Direction

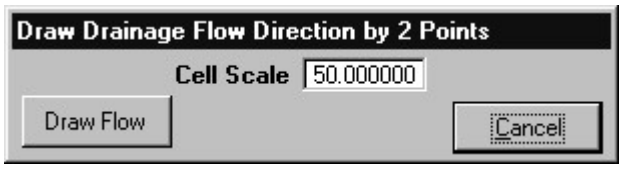
Microstation Macro Program: drawflowdirection.ba

Description:
This application used draw a flow direction arrowhead with leader line.

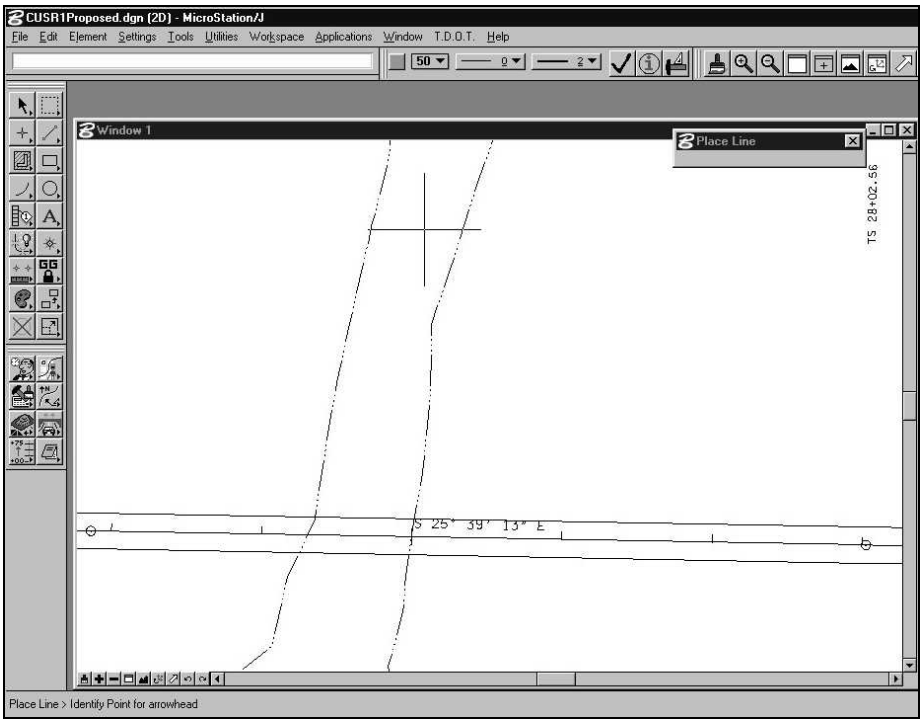
Special Requirements:
None

Usage:

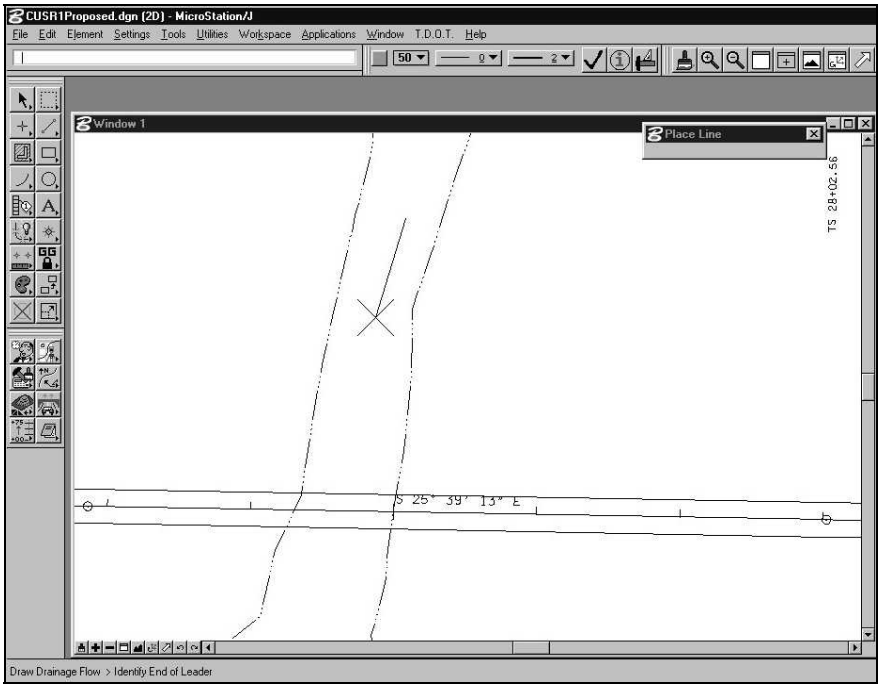
Step 1. In D&C manager activate **Flow Direction**. The **Draw Flow Direction by 2 Points** dialog opens**.** The only entry field is **Cell Scale** which reflects the current active scale. Reset this value if needed and click on the **Draw Flow** button.



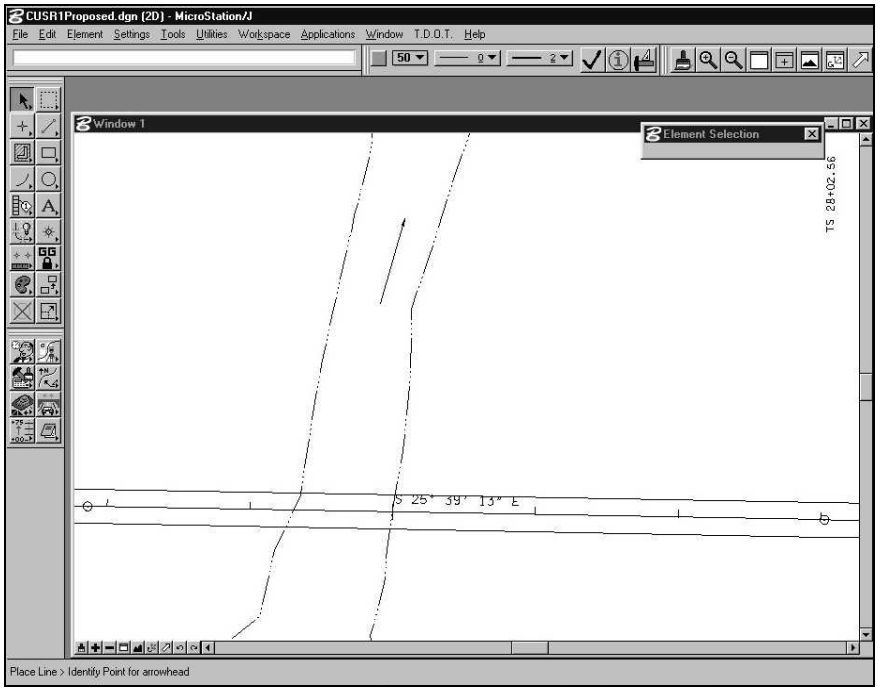
Step 2. You are then prompted to **Identify Point for Arrowhead**. **Data point** at the location for the arrowhead.



Step 3. You are then prompted to **Identify End of Leader Line**. **Data point** at the location for the other end of the leader line.



Step 4. The leader line is completed and the arrowhead is added. You can continue to place additional flow direction indicators if desired. These graphics are a graphic group so they can easil;y be moved if needed. This application is intended for showing the flow direction on a creek of river but could be used to develop flow patterns for a drainage map although Geopak's DTM Tools will do this automatically.



Guardrail

Vehicle Path

D&C location: Drafting Standards> Guardrail> Vehicle Path

Microstation Macro Program: traject.ba

Description:
This application used draw a vehicle trajectory path to help determine the point of need for guardrail.

The vehicle path is placed at a user defined angle from the edge of the traveled way in tangent sections and in curves a tangent is generated from the curve element.

Special Requirements:
The edge of traveled way linework (prop. edge of pavement and/or centerline) and hazard location must be drawn in the file.

When placement is near the end of tangent sections then the path should be checked since it may start beyond the end of the tangent.

When the path falls within a spiral or curve then good engineering judgement should be used to ensure adequate protection from the hazard.

In spirals you may wish to use a path located by divergent angle based on the tangent near the beginning of the spiral and a tangent line from the spiral as it nears the curve. Since Geopak uses curve strings to plot in spirals then only tangent paths can be placed from spirals using this program.

Usage:

Step 1. Locate hazard locations and display centerline and edge of proposed pavements.

Step 2. In D&C manager activate **Vehicle Path**. The **Draw Vehicle Trajectory Path** dialog opens**.** It contains the following settings to control the program's function:

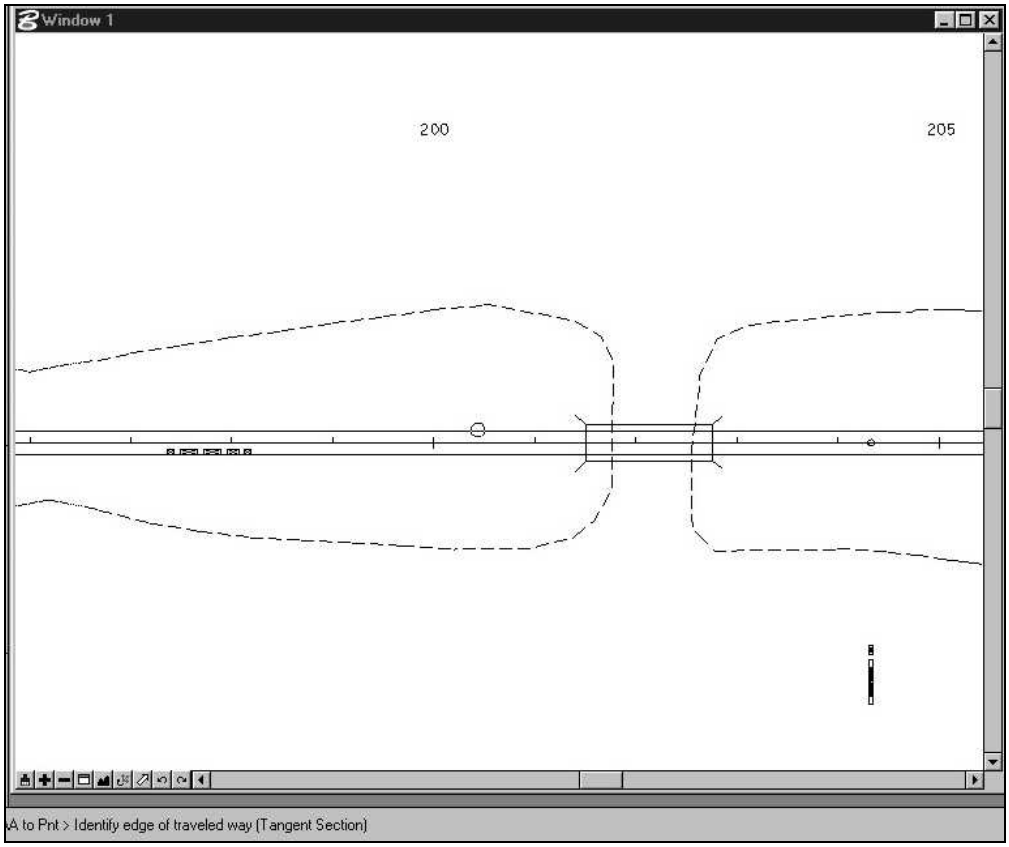
Alignment Orientation : Tangent Section or **Curve Section**
For tangent sections a line is drawn at the given angle from the edge of the traveled way to the hazard. For curve sections a line tangent to the curve is drawn from the edge of the traveled way to the hazard.

Path to Hazard Location: Begin or **End** & **Left** or **Right**.
This is the general location of where the path originates in relation to the hazard going forward along the centerline.

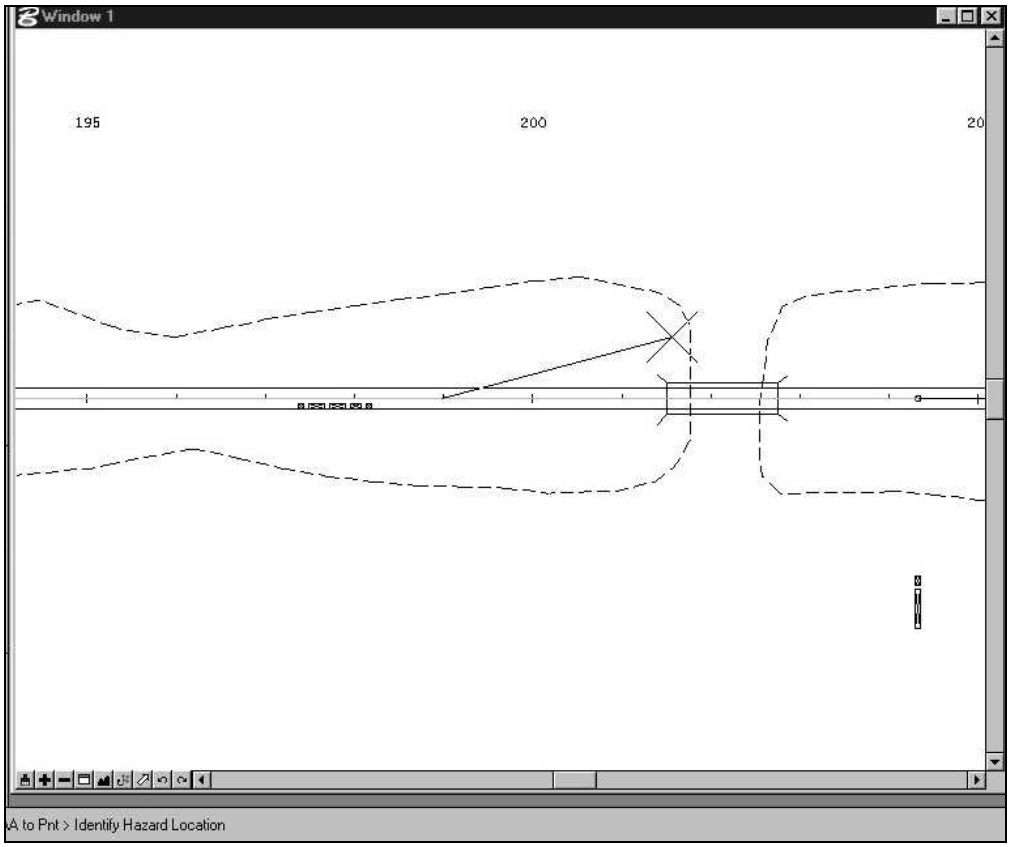
Tangent Trajectory Angle: numeric value.
This is the angle which will be used to draw trajectory paths from tangents. Default value of 15 degrees is given.

Make settings as needed and click on the **Draw Trajectory Line** button.

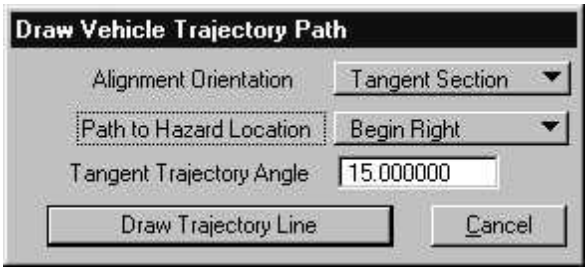
Step 3. You are then prompted to **Identify edge of travel way. Data point** on the edge of pavement or centerline. In this example we are working with a 2 lane roadway in a tangent section at the beginning of a bridge on the left so we data point on the centerline for that location.



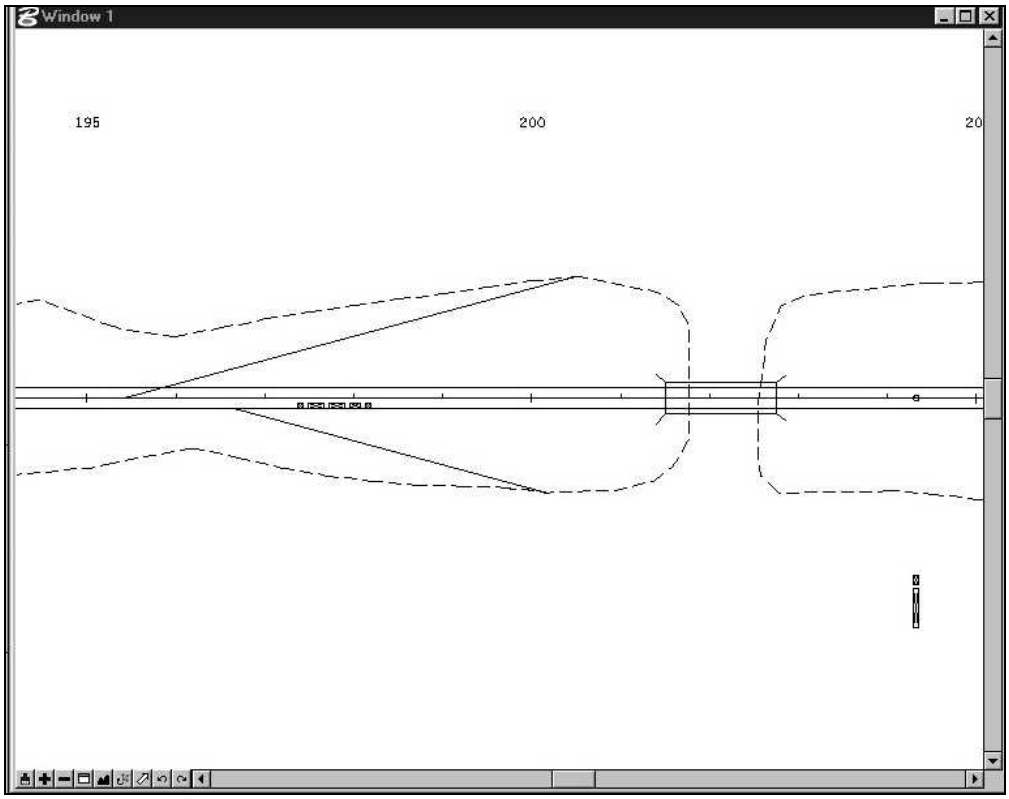
Step 4. The trajectory line appears floating along the centerline and you are then prompted to **Identify Hazard Location.** I our example the first hazard is a 2:1 slope prior to the bridge so we snap to that slope tie and **Data point**. The path line is drawn and the **Draw Vehicle Trajectory Path** dialog re-appears.



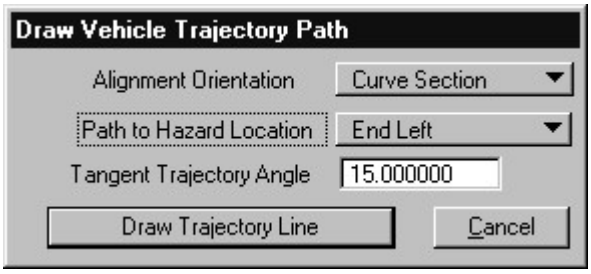
Step 5. You can click **Cancel** to quit or make new settings and click **Draw Trajectory Line** to place another trajectory line. In our example we reset it to **Begin Right** to continue.



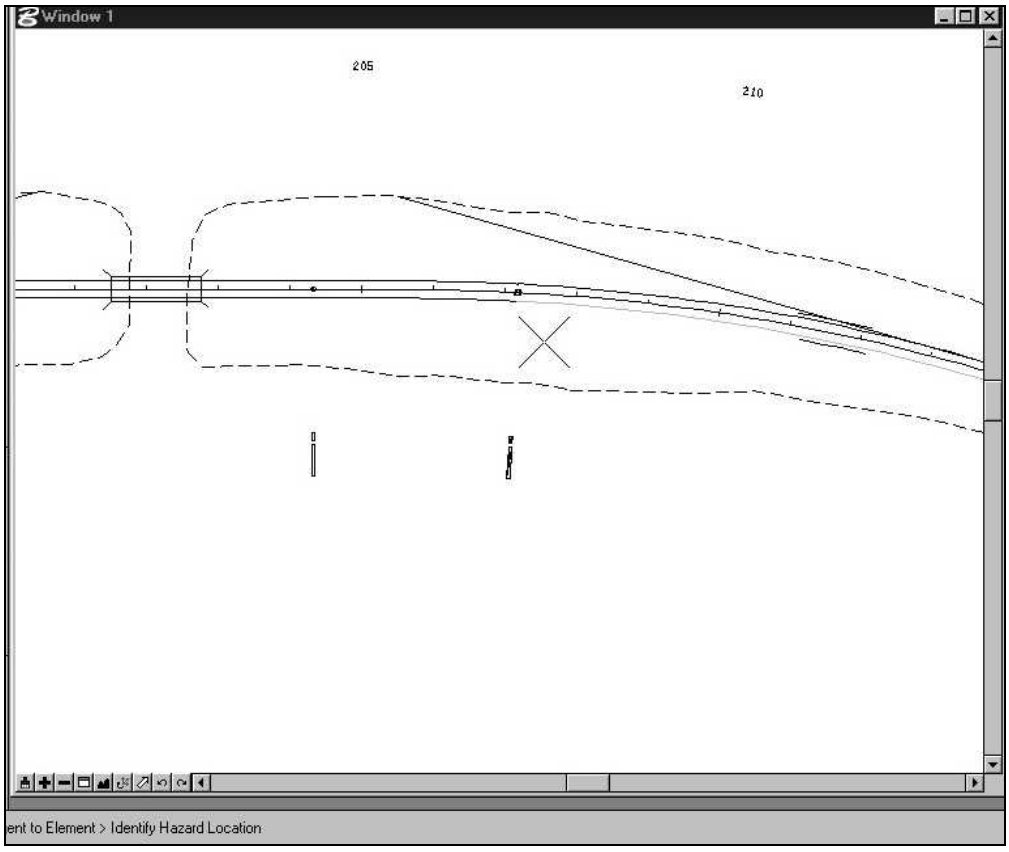
Step 6. Repeating steps 3 & 4 this time we identify the right edge of pavement and data point at the beginning of 2:1 slopes on the right side.



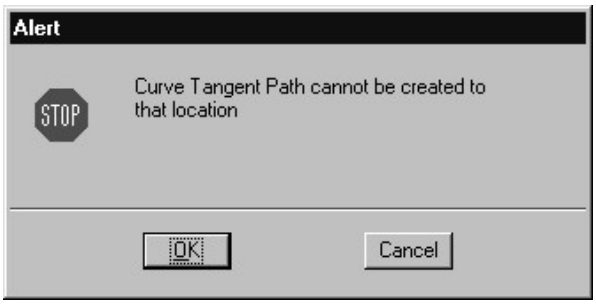
Step 7. In our example the roadway approach at the end of the bridge is in a curve so we reset the Alignment Orientation to a **Curve Section**, the Path to Hazard Location to **End Left** and click **Draw Trajectory Line** to continue.



Step 8. Repeating steps 3 & 4 this time we identify the left edge of pavement past the bridge in the curve and data point at the end of 2:1 slopes on the left side. A curve tangent path line is drawn. After resetting to **End Left** we attempt to place a tangent from the centerline to the end of 2:1 slopes on the right.



Since a tangent cannot be placed on the inside of a curve the following error message is displayed. Good engineering judgement will have to be used in areas such as this one.



WARNING:
Anytime the trajectory path begins within a spiral or curve then good engineering judgement should always be used to ensure adequate protection from the hazard.

GR Br End Prop.

D&C location: Drafting Standards> Guardrail> GR Br End Prop.

Geopak 3PC Program: place_Br_end_GR.x

Description:
This application plots the standard length of bridge end guardrail (26' 10 3/4") with the appropriate custom linestyle.

This 3PC is used to plot the bridge end guardrail separately when minimum installations of guardrail at bridge ends which already include this guardrail section do not provide adequate protection.

Locations for guardrail are plotted by station and offset to directly reflect alignment conditions.

This program is based on distances in feet so it is **not** applicable on metric projects.

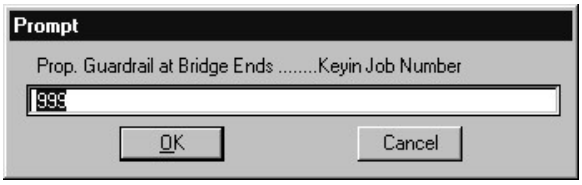
Special Requirements:
Bridge end location for beginning of guardrail must be located graphically so that it can be identified when using program.

Usage:

Step 1. Locate bridge end location for beginning of guardrail.

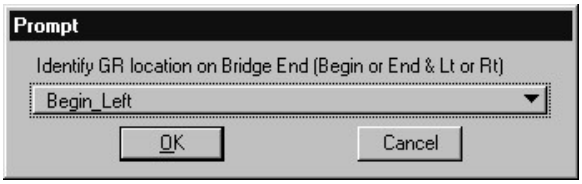
Step 2. In D&C manager activate **GR Br End Prop.**

Step 3. You are prompted for a **job no.** Key that in and click **OK**.



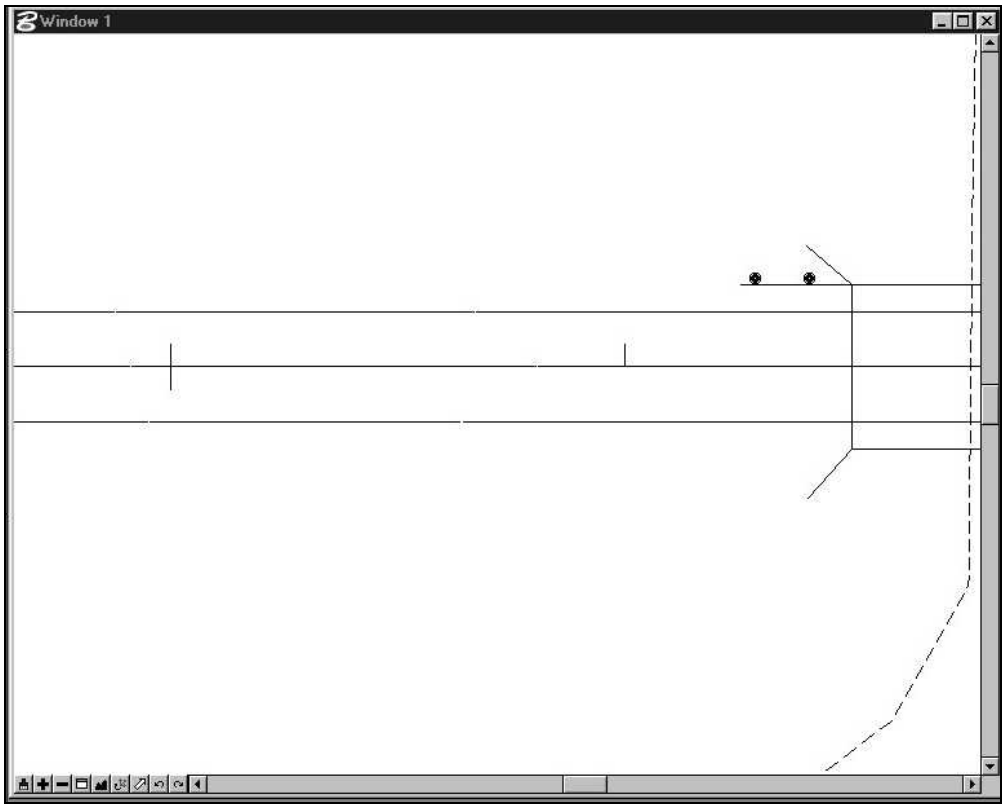
Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 5. You are then prompted for the guardrail location in relation to the bridge end, **Begin** or **End** and **Left** or **Right** (going in the direction of the centerline). Pick the appropriate option from the list box and click **OK**.



Step 6. You are then prompted to **Snap & Data end of the bridge Rail** where the guardrail begins**. Snap** and **Data Point** at that location.

The standard length of bridge end guardrail (26' 10 3/4") is drawn in using the appropriate custom linestyle.



GR Term 12_2:1

D&C location: Drafting Standards> Guardrail> GR Term 12_2:1

Geopak 3PC Program: place_12_2to1_terminal.x

Description:
This application plots a type 12 guardrail terminal, the 13:1 taper and curve to tie to the guardrail at the roadside. A type text label is placed for the terminal as well as a point at the terminal location for later use in calculating quantities. The special slope limit lines used by cross section criteria to show pads and alter side slopes are also plotted on level 30.

This 3PC is for use when cut backslopes are at a **2:1** slope.

Locations for guardrail and special slope limit lines are plotted by station and offset to directly reflect alignment conditions.

This program is based on distances in feet so it is **not** applicable on metric projects.

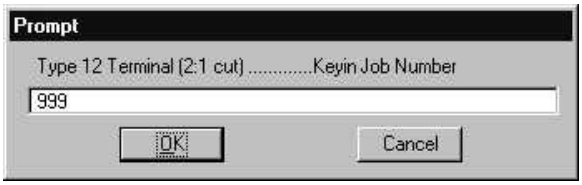
Special Requirements:
Point of need at ditch line and guardrail offset location at roadside must be located graphically so that they can be identified when using program.

Usage:

Step 1. Locate point of need at ditch line and guardrail offset location at roadside.

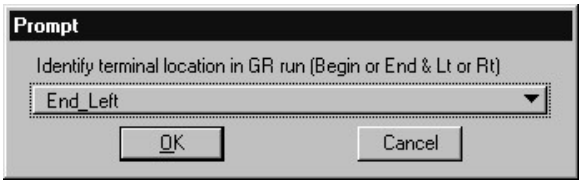
Step 2. In D&C manager activate **GR Term 12_2:1**.

Step 3. You are prompted for a **job no.** Key that in and click **OK**.



Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

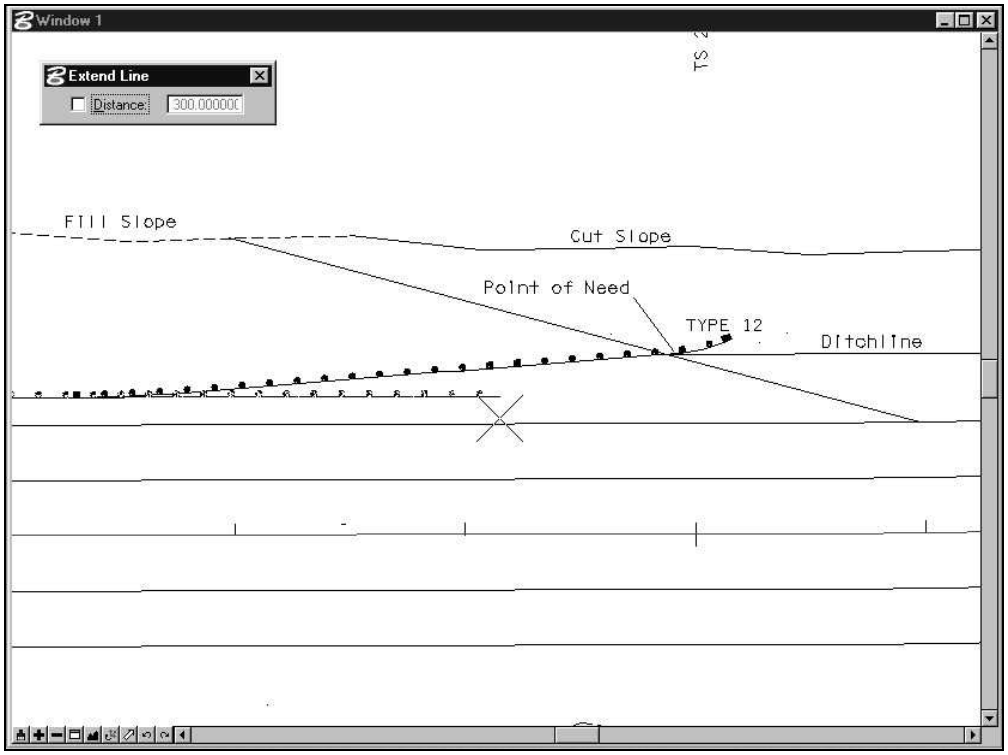
Step 5. You are then prompted for the terminal location in the guardrail run, **Begin** or **End** and **Left** or **Right** (going in the direction of the centerline). Pick the appropriate option from the list box and click **OK**.



Step 6. You are then prompted for the **Point of Need at Ditch.** Snap to that location and **Data Point**.

Step 7. Finally you are prompted to **Data on guardrail at roadside. Snap** and **Data Point** on the guardrail anywhere along the roadway. This **does not** have to be at any critical location in the guardrail line. The location where the 13:1 taper starts will be calculated and located by the program.

Step 8. All line work is plotted in the file based on the given information. Use Microstation's modify commands to adjust the guardrail run along the roadway to end where curve into 13:1 taper begins.



Special slope limit lines are placed on level 30. It may be necessary to turn that level on to see them after processing.

GR Term 12_4:1

D&C location: Drafting Standards> Guardrail> GR Term 12_4:1

Geopak 3PC Program: place_12_4to1_terminal.x

Description:

This application plots a type 12 guardrail terminal, the 13:1 taper and curve to tie to the guardrail at the roadside. A type text label is placed for the terminal as well as a point at the terminal location for later use in calculating quantities. The special slope limit lines used by cross section criteria to show pads and alter side slopes are also plotted on level 30.

This 3PC is for use when cut backslopes are at a **4:1** slope.

Locations for guardrail and special slope limit lines are plotted by station and offset to directly reflect alignment conditions.

This program is based on distances in feet so it is **not** applicable on metric projects.

Special Requirements:

Point of need at ditch line and guardrail offset location at roadside must be located graphically so that they can be identified when using program.

Usage:

This option functions just the same as **GR Term 12_2:1**. See the description of it's usage for details.

GR Term Type 13

D&C location: Drafting Standards> Guardrail> GR Term Type 13

Geopak 3PC Program: place_13_terminal.x

Description:
This application places a type 13 guardrail terminal cell, a type text label and a point at the terminal location for later use in calculating quantities.

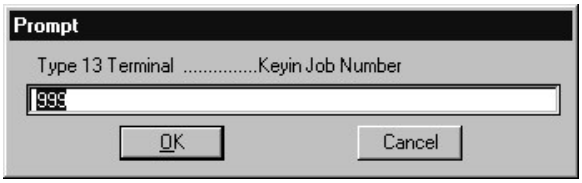
Special Requirements:
Terminal location at guardrail along roadside must be located graphically so that it can be identified when using program.

Usage:

Step 1. Locate terminal location at guardrail along roadside. For the type 13 terminal this is **6.25' past the end of hazard location (except for median bridge pier protection which requires a minimum distance of 12.5' past the pier)**.

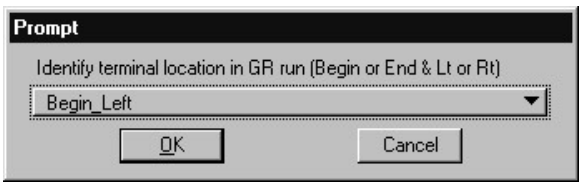
Step 2. In D&C manager activate **GR Term Type 13**.

Step 3. You are prompted for a **job no.** Key that in and click **OK**.



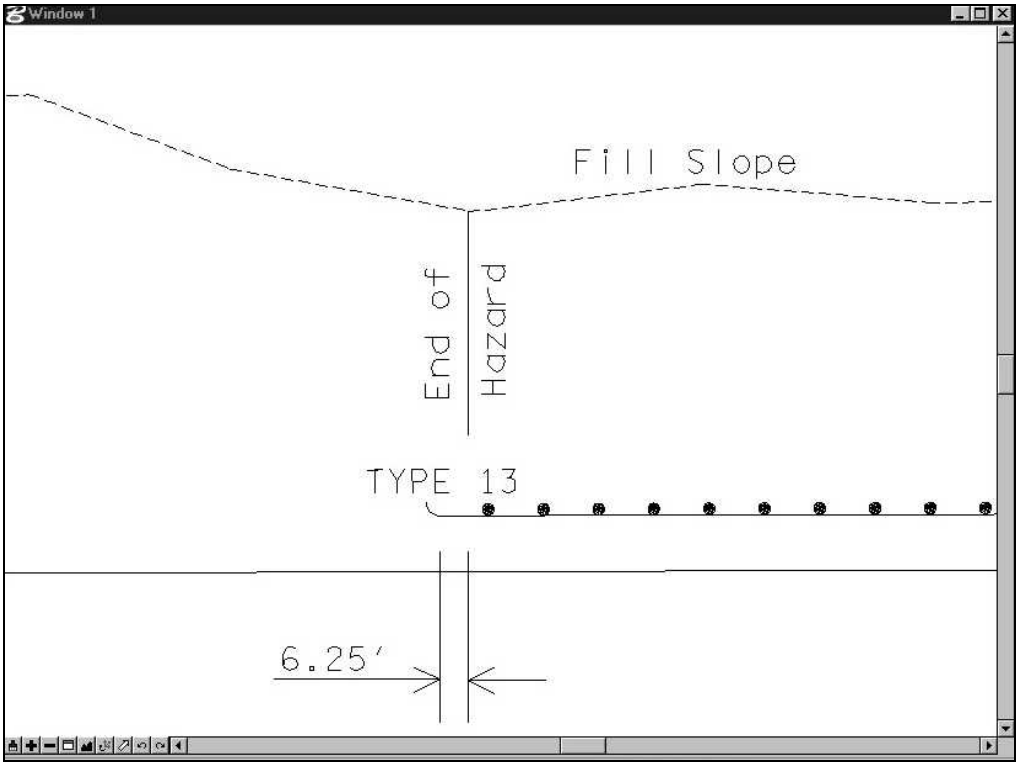
Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 5. You are then prompted for the terminal location in the guardrail run, **Begin** or **End** and **Left** or **Right** (going in the direction of the centerline). Pick the appropriate option from the list box and click **OK**.



Step 6. Finally you are prompted to **Snap & Data terminal location. Snap** and **Data Point** on the guardrail at the terminal location.

All graphics are placed in the file based on the given information.



GR Term Type 21

D&C location: Drafting Standards> Guardrail> GR Term Type 21

Geopak 3PC Program: place_21_terminal.x

Description:
This application plots a type 21 guardrail terminal with the appropriate custom linestyle and terminal end cap. A type text label is placed for the terminal. The special slope limit lines used by cross section criteria to show pads and alter side slopes are also plotted on level 30.

Locations for guardrail and special slope limit lines are plotted by station and offset to directly reflect alignment conditions.

This program is based on distances in feet so it is **not** applicable on metric projects.

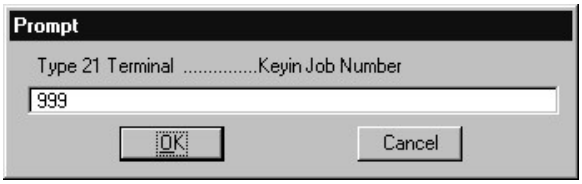
Special Requirements:
Terminal beginning location at guardrail along roadside must be located graphically so that it can be identified when using program.

Usage:

Step 1. Locate beginning of terminal location at guardrail along roadside. For the type 21 terminal this is **12.5' back from the point of need location**.

Step 2. In D&C manager activate **GR Term Type 21**.

Step 3. You are prompted for a **job no.** Key that in and click **OK**.

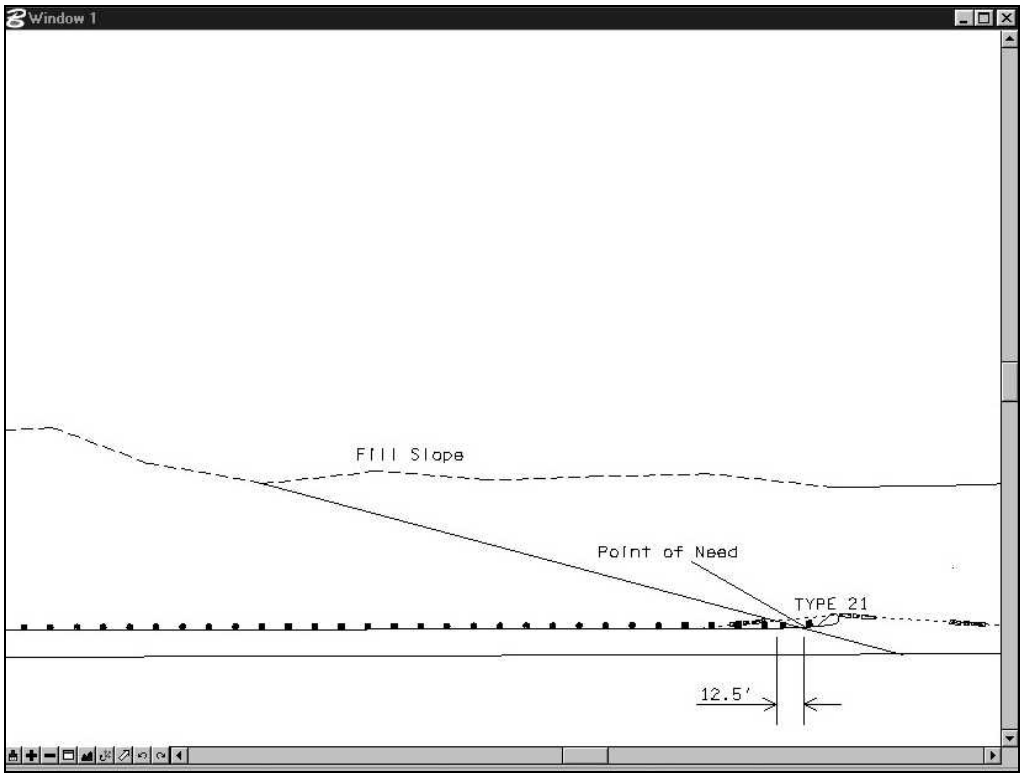


Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 5. You are then prompted for the terminal location in the guardrail run, **Begin** or **End** and **Left** or **Right** (going in the direction of the centerline). Pick the appropriate option from the list box and click **OK**.

Step 6. Finally you are prompted to **Snap & Data terminal location. Snap** and **Data Point** on the guardrail at the terminal location.

All line work is plotted in the file based on the given information.



Special slope limit lines are placed on level 30. It may be necessary to turn that level on to see them after processing.

GR Min Inst 21

D&C location: Drafting Standards> Guardrail> GR Min Inst 21

Geopak 3PC Program: place_21_min_install.x

Description:
This application plots a type 21 guardrail terminal, regular guardrail and bridge end guardrail with the appropriate custom linestyles and terminal end cap for a minimum installation at a bridge end. A type text label is placed for the terminal. The special slope limit lines used by cross section criteria to show pads and alter side slopes are also plotted on level 30.

Locations for guardrail and special slope limit lines are plotted by station and offset to directly reflect alignment conditions.

This program is based on distances in feet so it is **not** applicable on metric projects.

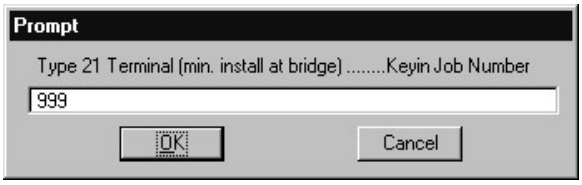
Special Requirements:
Bridge end location for beginning of guardrail must be located graphically so that it can be identified when using program.

Usage:

Step 1. Locate bridge end location for beginning of guardrail.

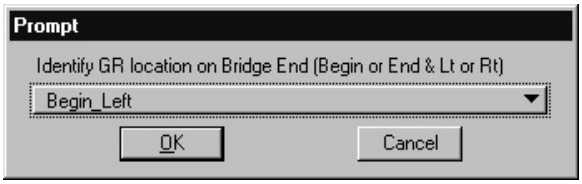
Step 2. In D&C manager activate **GR Min Inst 21**.

Step 3. You are prompted for a **job no.** Key that in and click **OK**.



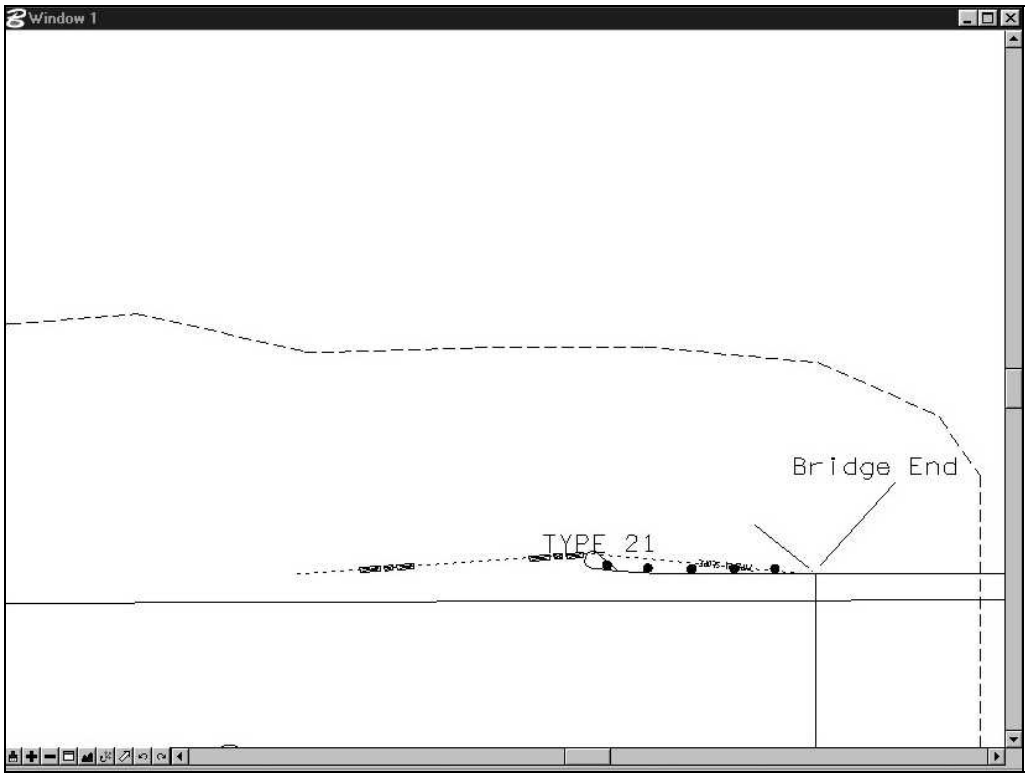
Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 5. You are then prompted for the guardrail location at bridge end, **Begin** or **End** and **Left** or **Right** (going in the direction of the centerline). Pick the appropriate option from the list box and click **OK**.



Step 6. Finally you are prompted to **Snap & Data GR begin location. Snap** and **Data Point** on the bridge end where guardrail begins.

All line work is plotted in the file based on the given information.



Special slope limit lines are placed on level 30. It may be necessary to turn that level on to see them after processing.

GR Term Type 38

D&C location: Drafting Standards> Guardrail> GR Term Type 38

Geopak 3PC Program: place_38_terminal.x

Description:
This application plots a type 38 guardrail terminal with the appropriate custom linestyle and terminal end cap. A type text label is placed for the terminal. The special slope limit lines used by cross section criteria to show pads and alter side slopes are also plotted on level 30.

Locations for guardrail and special slope limit lines are plotted by station and offset to directly reflect alignment conditions.

This program is based on distances in feet so it is **not** applicable on metric projects.

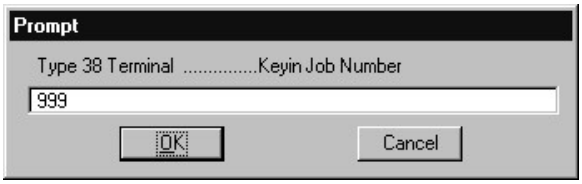
Special Requirements:
Terminal beginning location at guardrail along roadside must be located graphically so that it can be identified when using program.

Usage:

Step 1. Locate beginning of terminal location at guardrail along roadside. For the type 38 terminal this is **37.5' back from the point of need location**.

Step 2. In D&C manager activate **GR Term Type 38**.

Step 3. You are prompted for a **job no.** Key that in and click **OK**.

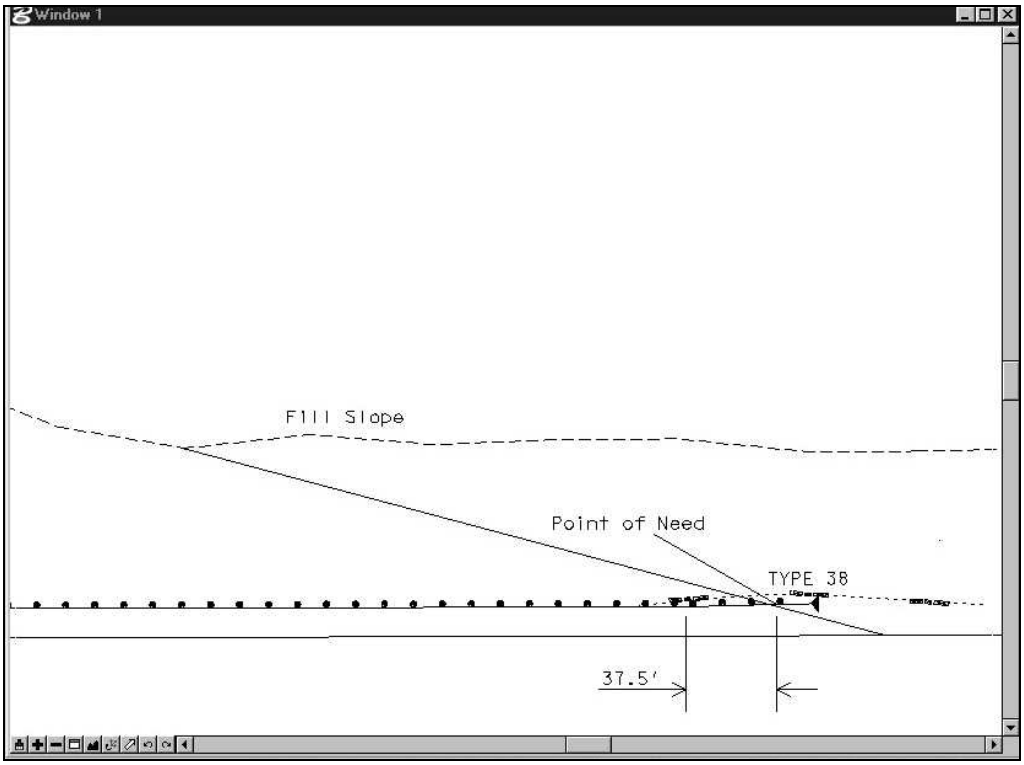


Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 5. You are then prompted for the terminal location in the guardrail run, **Begin** or **End** and **Left** or **Right** (going in the direction of the centerline). Pick the appropriate option from the list box and click **OK**.

Step 6. Finally you are prompted to **Snap & Data terminal location. Snap** and **Data Point** on the guardrail at the terminal location.

All line work is plotted in the file based on the given information.



Special slope limit lines are placed on level 30. It may be necessary to turn that level on to see them after processing.

GR Min Inst 38

D&C location: Drafting Standards> Guardrail> GR Min Inst 38

Geopak 3PC Program: place_38_min_install.x

Description:

This application plots a type 38 guardrail terminal and bridge end guardrail with the appropriate custom linestyles and terminal end cap for a minimum installation at a bridge end. A type text label is placed for the terminal. The special slope limit lines used by cross section criteria to show pads and alter side slopes are also plotted on level 30.

Locations for guardrail and special slope limit lines are plotted by station and offset to directly reflect alignment conditions.

This program is based on distances in feet so it is **not** applicable on metric projects.

Special Requirements:

Bridge end location for beginning of guardrail must be located graphically so that it can be identified when using program.

Usage:

This option functions just the same as **GR Min Inst 21**. See the description of it's usage for details.

GR Term In-Line

D&C location: Drafting Standards> Guardrail> GR Term In-Line

Geopak 3PC Program: place_InLine_terminal.x

Description:
This application places a type in-line guardrail terminal cell, a type text label and a point at the terminal location for later use in calculating quantities.

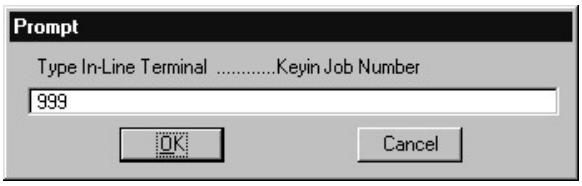
Special Requirements:
Guardrail radius location for this terminal must be located graphically so that it can be identified when using program.

Usage:

Step 1. Draw guardrail radius along roadway pavement radius.

Step 2. In D&C manager activate **GR Term In-Line**.

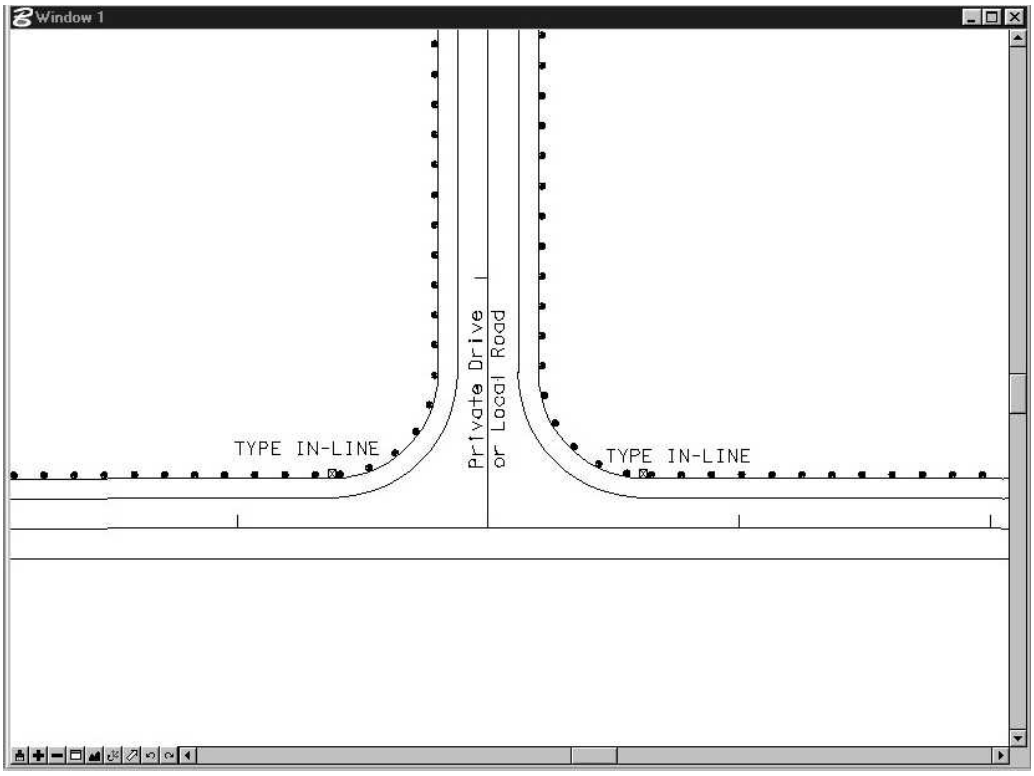
Step 3. You are prompted for a **job no.** Key that in and click **OK**.



Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 5. Finally you are prompted to **Snap & Data terminal location. Snap** and **Data Point** at the end of the radius of guardrail for the terminal location.

Step 6. All graphics are placed in the file based on the given information. Move text label as needed for clarity and if needed add a leader line.



GR Min Inst Med

D&C location: Drafting Standards> Guardrail> Median GR> GR Min Inst Med

Geopak 3PC Program: place_median_min_br_end.x

Description:
This application plots in the minimum length of guardrail required in the median at tangent non-skewed bridges with the appropriate custom linestyle and terminal end cap. A type text label is placed for the terminal. The special slope limit lines used by cross section criteria to alter median slopes are also plotted on level 30.

Locations for guardrail and special slope limit lines are plotted by station and offset to directly reflect alignment conditions.

This program is based on distances in feet so it is **not** applicable on metric projects.

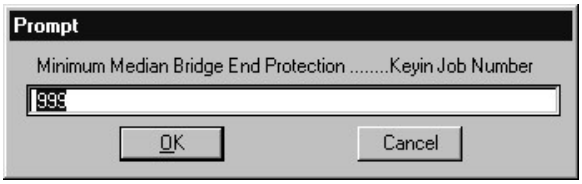
Special Requirements:
Bridge end location for beginning of guardrail must be located graphically so that it can be identified when using program.

Usage:

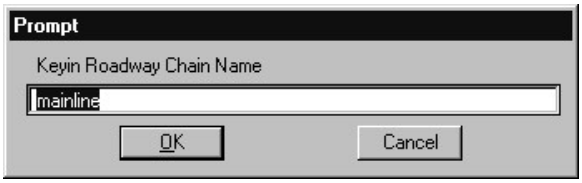
Step 1. Locate bridge end location for beginning of guardrail.

Step 2. In D&C manager activate **GR Min Inst Med**.

Step 3. You are prompted for a **job no.** Key that in and click **OK**.



Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

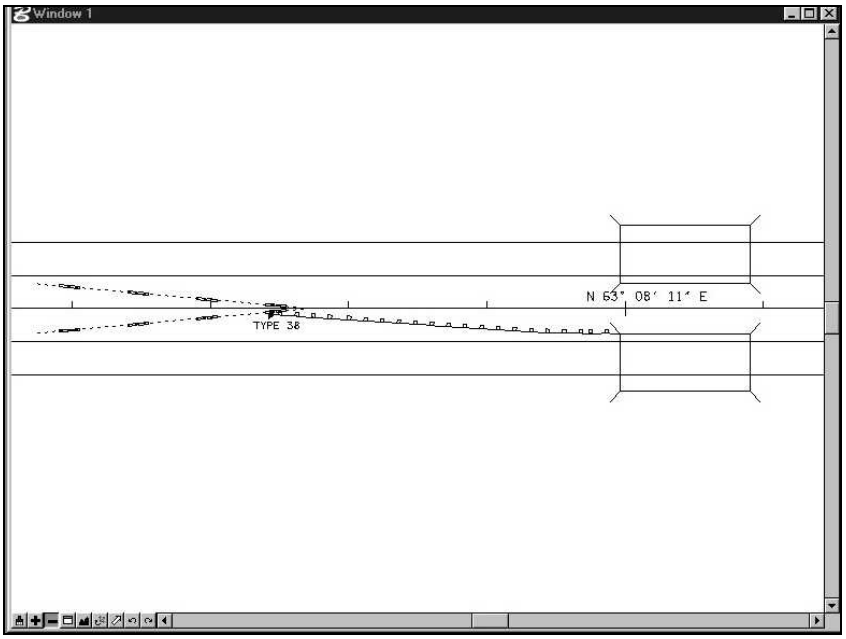


Step 5. You are then prompted for the median width (**30'. 36', 48', 60' or 64'**). This refers to distance between the inside edges of the proposed travel lanes. Pick the appropriate width from the list box and click **OK**.

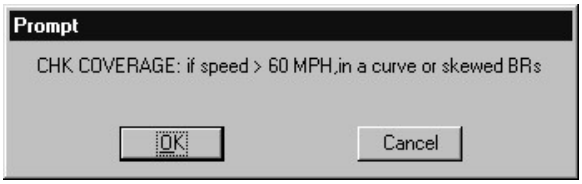
Step 6. You are then prompted for the guardrail location on the bridge end, **Begin** (on right bridge) or **End** (on left bridge). Pick the appropriate option from the list box and click **OK**.

Step 7. Finally you are prompted to **Snap & Data end of Bridge Rail. Snap** and **Data Point** on the end of the bridge where guardrail begins.

All line work is plotted in the file based on the given information.



After completion of graphics the following warning message is given reminding the user that this guardrail layout is based on a tangent roadway with 2 non-skewed bridges. **If either of these are not true for this installation or your design speed is greater than 60 miles per hour then the guardrail should be checked for adequate coverage of the hazard.**



Note that in cases where this standard length of rail does not provide adequate coverage then additional rail can be added and then D&C manager item **GR Med Br Ends** can be used to plot in the guardrail from the 50' curve through the terminal.

GR Med Br Ends

D&C location: Drafting Standards> Guardrail> Median GR> GR Med Br Ends

Geopak 3PC Program: place_median_br_end_prot.x

Description:

This application places guardrail from the beginning of the 50' curve through the taper to the terminal in the median at bridge ends. It is intended for use in areas where the minimum installation is not adequate due to design speed, curvature or skewed bridges. After setting up the bridge end rail and the extra regular rail for additional protection then this program can be utilized to plot in the remaining guardrail with terminal using the appropriate custom linestyle and terminal end cap. A type text label is placed for the terminal. The special slope limit lines used by cross section criteria to alter median slopes are also plotted on level 30.

Locations for guardrail and special slope limit lines are plotted by station and offset to directly reflect alignment conditions.

This program is based on distances in feet so it is **not** applicable on metric projects.

Special Requirements:

End of guardrail beside shoulder / beginning of 50' guardrail curve location must be located graphically so that it can be identified when using program.

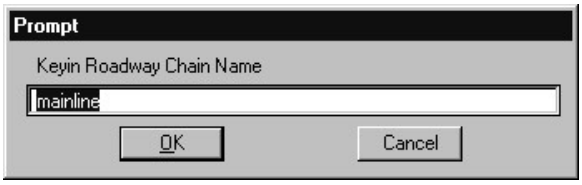
Usage:

Step 1. After establishing additional guardrail coverage needed, draw in guardrail beside shoulder to location for beginning of 50' guardrail curve.

Step 2. In D&C manager activate **GR Med Br Ends**.

Step 3. You are prompted for a **job no.** Key that in and click **OK**.

Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

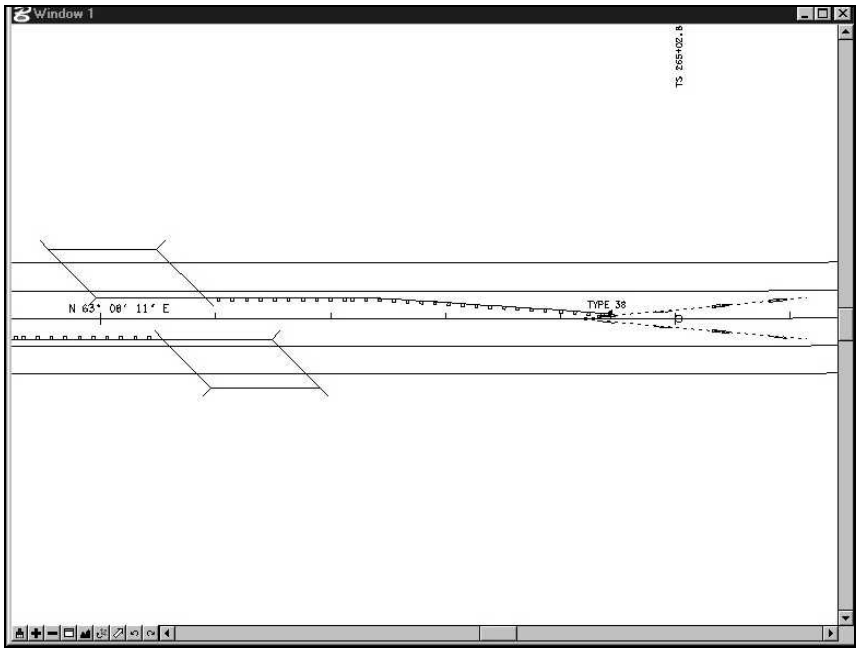


Step 5. You are then prompted for the median width (**30'. 36', 48', 60' or 64'**). This refers to distance between the inside edges of the proposed travel lanes. Pick the appropriate width from the list box and click **OK**.

Step 6. You are then prompted for the guardrail location on the bridge end, **Begin** (on right bridge) or **End** (on left bridge). Pick the appropriate option from the list box and click **OK**.

Step 7. Finally you are prompted to **Snap & Data end of regular GR. Snap** and **Data Point** at the end of the guardrail along the shoulder where the 50' guardrail curve begins.

All line work is plotted in the file based on the given information.



GR Med Earth Berm

D&C location: Drafting Standards> Guardrail> Median GR> GR Med Earth Berm

Geopak 3PC Program: place_median_earth_berm.x

Description:
This application plots in the proposed median earth berm required at the end of bridges. The quantity of earth required for the berm in cubic yards is calculated and appended to a CSV file named **MedianEarthBerms.csv** along with the station and chain of the earth berm.

This program is based on distances in feet so it is **not** applicable on metric projects.

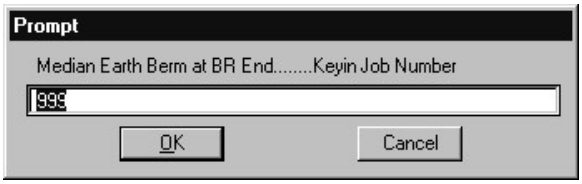
Special Requirements:
Bridge end locations must be located graphically so that it can be identified when using program.

Usage:

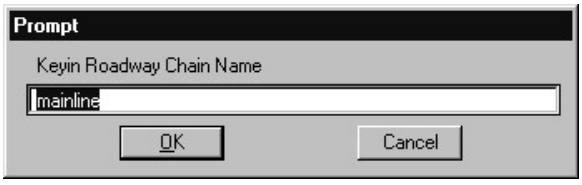
Step 1. Locate bridge end locations.

Step 2. In D&C manager activate **GR Med Earth Berm**.

Step 3. You are prompted for a **job no.** Key that in and click **OK**.



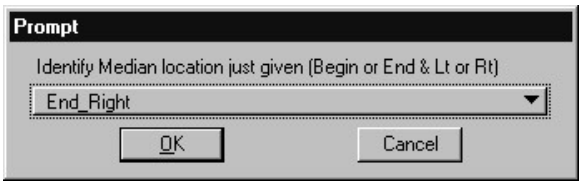
Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.



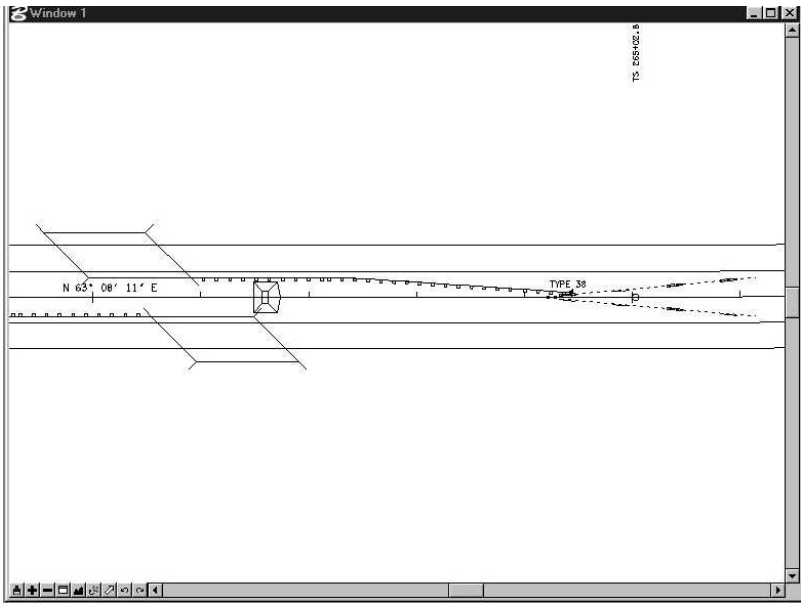
Step 5. You are then prompted for the median width (**30'. 36', 48', 60' or 64'**). This refers to distance between the inside edges of the proposed travel lanes. Pick the appropriate width from the list box and click **OK**.

Step 6. Next you are prompted to **Snap & Data extreme end of BRs. Snap** and **Data Point** at the end of the bridge on left or right that is first encountered moving in either direction along the roadway centerline.

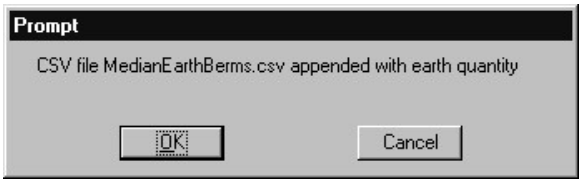
Step 7. You are then prompted for the median location just given, **Begin** or **End** and **Left** or **Right** (going in the direction of the centerline). Pick the appropriate option from the list box and click **OK**.



All line work is plotted in the file based on the given information.



After completion of graphics the quantity of earth required for the berm in cubic yards is calculated and appended to a CSV file named **MedianEarthBerms.csv** along with the station and chain of the earth berm which is indicated to user in the following message prompt.



Example of berm earthwork data placed in **MedianEarthBerms.csv** (based on 48' median):

mainline	259+96.23	68
mainline	261+48.57	68
mainline	272+65.15	68
mainline	274+86.06	68

GR Med Br Piers

D&C location: Drafting Standards> Guardrail> Median GR> GR Med Br Piers

Geopak 3PC Program: place_median_br_pier_prot.x

Description:

This application places guardrail from the beginning of the 50' curve through the taper to the terminal in the median for protection at bridge piers. After setting up the guardrail beside the shoulder in front of the bridge piers then this program can be utilized to plot in the remaining guardrail with terminal using the appropriate custom linestyle and terminal end cap. A type text label is placed for the terminal. The special slope limit lines used by cross section criteria to alter median slopes are also plotted on level 30.

Locations for guardrail and special slope limit lines are plotted by station and offset to directly reflect alignment conditions.

This program is based on distances in feet so it is **not** applicable on metric projects.

Special Requirements:

End of guardrail beside shoulder / beginning of 50' guardrail curve location must be located graphically so that it can be identified when using program.

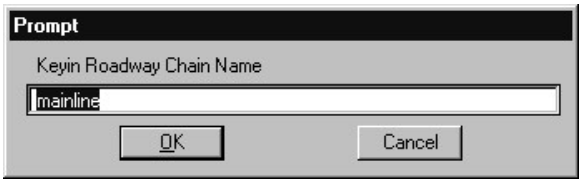
Usage:

Step 1. Draw in guardrail beside shoulder to location for beginning of 50' guardrail curve.

Step 2. In D&C manager activate **GR Med Br Piers**.

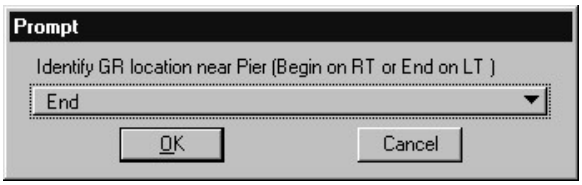
Step 3. You are prompted for a **job no.** Key that in and click **OK**.

Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.



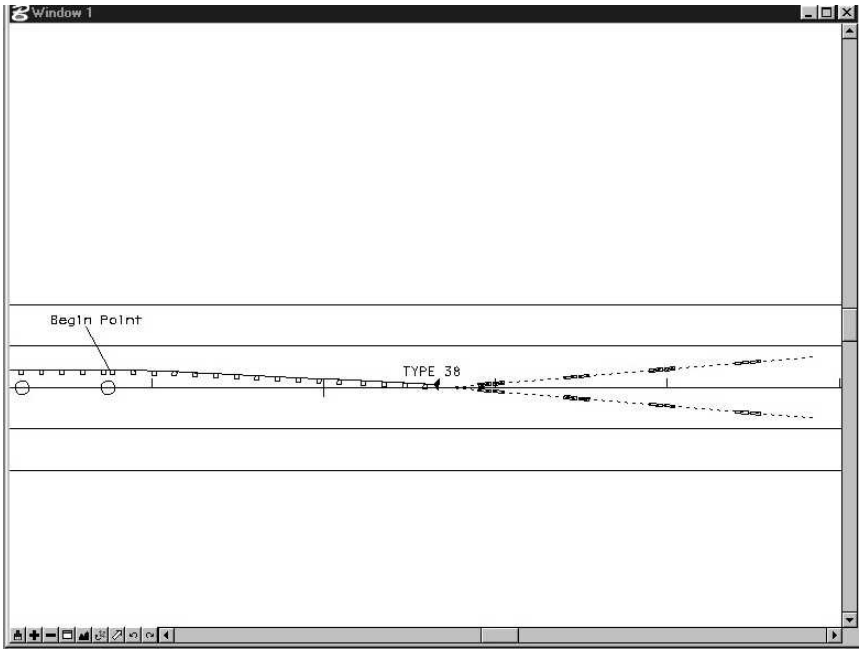
Step 5. You are then prompted for the median width (**30'. 36', 48', 60' or 64'**). This refers to distance between the inside edges of the proposed travel lanes. Pick the appropriate width from the list box and click **OK**.

Step 6. You are then prompted for the guardrail location near the bridge pier, **Begin** (on right bridge) or **End** (on left bridge). Pick the appropriate option from the list box and click **OK**.

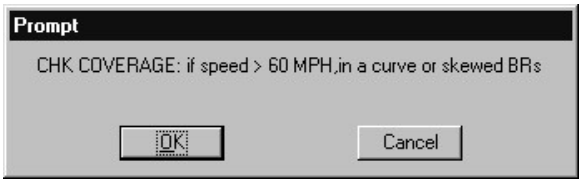


Step 7. Finally you are prompted to **Snap & Data end of regular GR. Snap** and **Data Point** at the end of the guardrail along the shoulder where the 50' guardrail curve begins.

All line work is plotted in the file based on the given information.



After completion of graphics the following warning message is given reminding the user that **if the roadway is in a curve, the bridges are skewed or if the design speed is greater than 60 miles per hour then the guardrail should be checked for adequate coverage of the hazard.**



Traffic Control (Temporary)

Work Zone Area

D&C location: Drafting Standards>Traffic Control (Temporary)> Work Zone Area

Microstation Macro Program: WorkZonePattern.ba

Description:
This application sets the parameters needed to pattern a work zone area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Traffic Control - Work Zone** or by using the keyin **MACRO WORKZONEPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Erosion Control

Tmp Slope Drain

D&C location: Drafting Standards>Erosion Control> EC Devices>Tmp Slope Drain

Microstation Macro Program: TempSlopeDrain.ba

Description:

This application draws a temporary slope drain on the plans at a user specified pipe size with inlet symbol and optional rip-rap placed at the outlet.

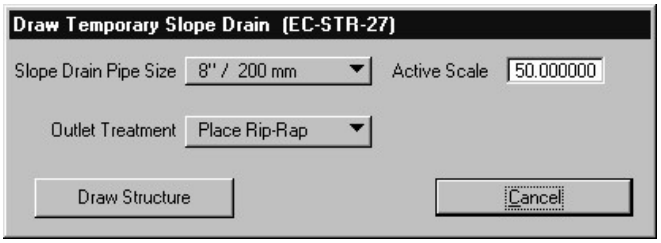
This macro can also be activated by using the keyin **MACRO TEMPSLOPEDRAIN**.

Special Requirements:

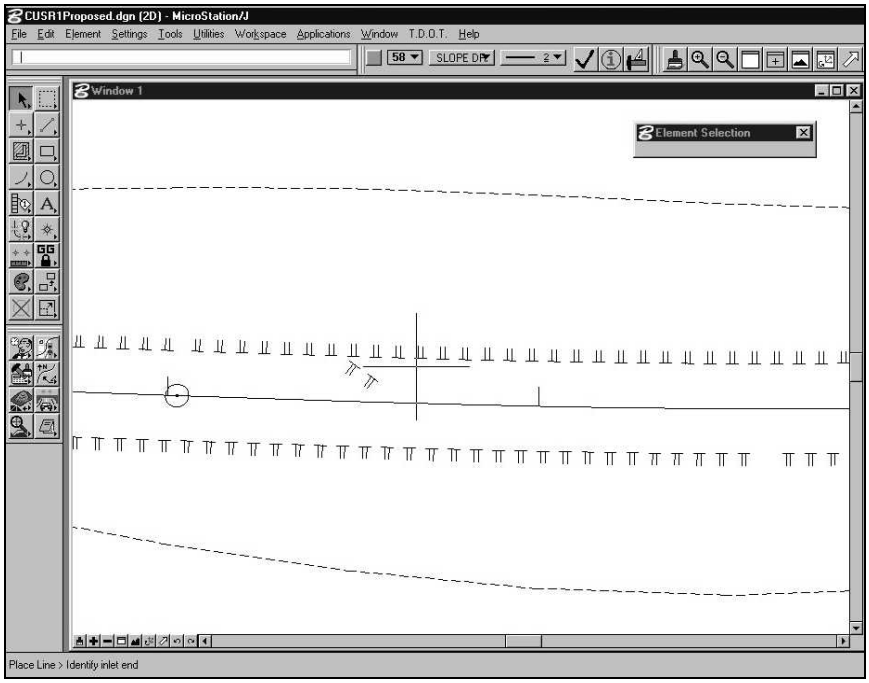
None

Usage:

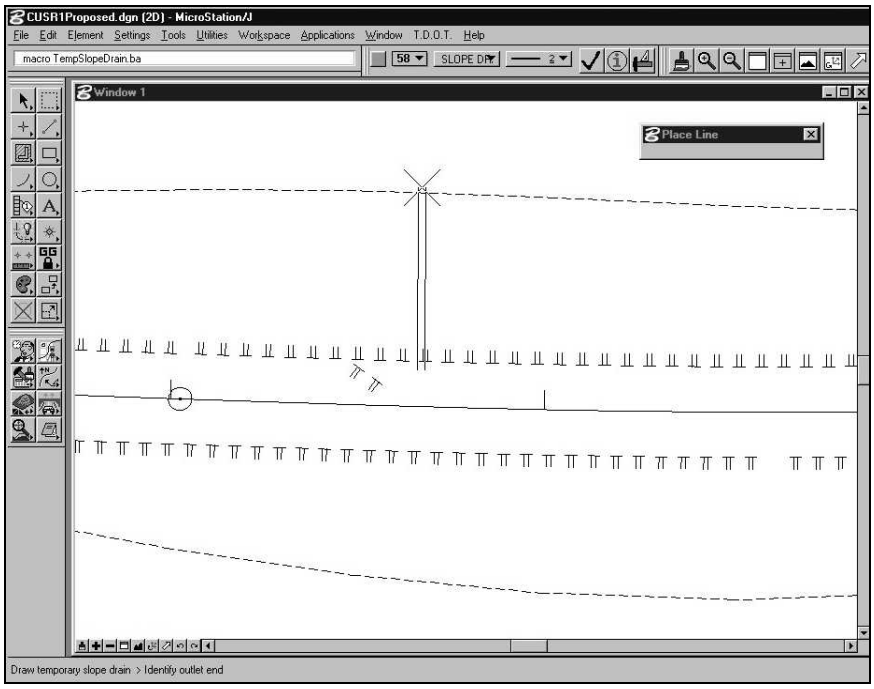
Step 1. In D&C manager activate **Tmp Slope Drain**. The **Draw Temporary Slope Drain** dialog opens**.** Defaults which are displayed . . . **Slope Drain Pipe Size 8", Outlet Treatment Place Rip-Rap** & **Active Scale (current active scale).** The active scale controls the size of the inlet symbol cell and the outlet rip-rap cell if specified for placement. Make settings as needed and click on the **Draw Structure** button.



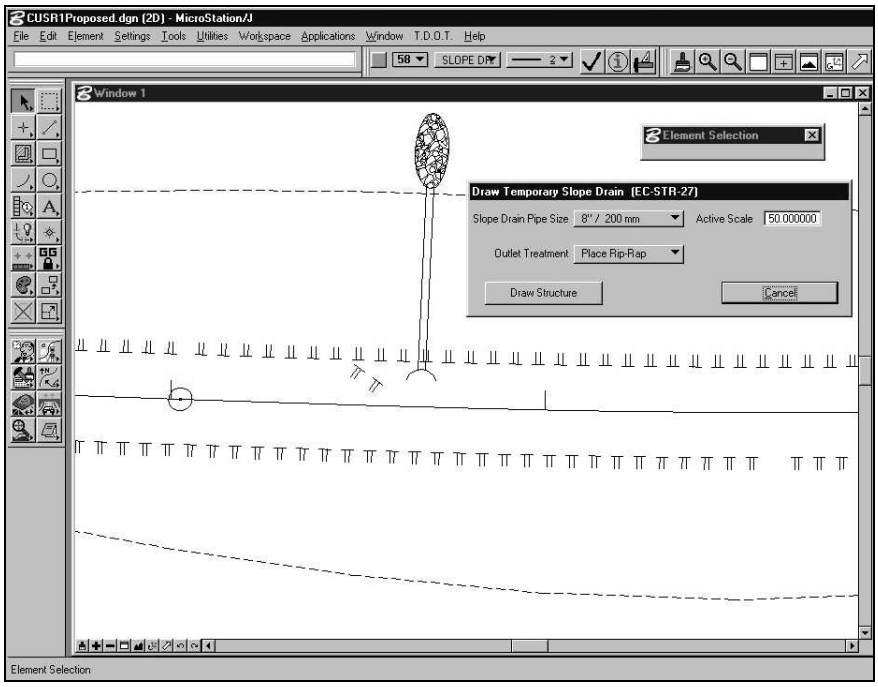
Step 2. You are then prompted to **Identify inlet end**. **Data point** at the location for the inlet of the temporary slope drain.



Step 3. You are then prompted to **Identify outlet end**. **Data point** at the location for the outlet of the temporary slope drain.



Step 4. The temporary slope drain is drawn and the dialog re-appears. You can click on **Draw Structure** to place another temporary slope drain or click on **Cancel** to exit the program.



EC Rip-Rap Area

D&C location: Drafting Standards> Erosion Control> EC Devices> EC Rip-Rap Area

Microstation Macro Program: ECRipRapPattern.ba

Description:
This application sets the parameters needed to pattern an erosion control rip-rap area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Erosion Control - Rip-Rap** or by using the keyin **MACRO ECRIPRAPPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

BrushSedBarrier

D&C location: Drafting Standards> Erosion Control> EC Devices> BrushSedBarrier

Microstation Macro Program: BrushBarrierPattern.ba

Description:
This application sets the parameters needed to pattern a brush sediment barrier and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Erosion Control - Brush Barrier** or by using the keyin **MACRO BRUSHBARRIERPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This item used with D&C Manager's **Place influence** mode can be used along with Microstation to define the brush sediment barrier limit with a shape or other elements prior to flooding with pattern using program.

This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Dewatering Stru

D&C location: Drafting Standards> Erosion Control> EC Devices> Dewatering Stru

Microstation Macro Program: DewateringPattern.ba

Description:
This application sets the parameters needed to pattern a dewatering structure and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated from the Microstation drop down menu **TDOT>Area Patterns>Erosion Control - Dewatering** or by using the keyin **MACRO DEWATERINGPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This item used with D&C Manager's **Place influence** mode can be used along with Microstation to define the dewatering structure limit with a shape or other elements prior to flooding with pattern using program.

This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Construction Supers

TDOTsuper1

D&C location: Construction Supers> TDOTsuper1

Geopak 3PC Program: tdotsup1.x

Description:
Adds user specified superelevation data to horizontal alignment curves. Used by Construction personnel.

Special Requirements:
All horizontal alignment graphics must be visible in View Window #1.

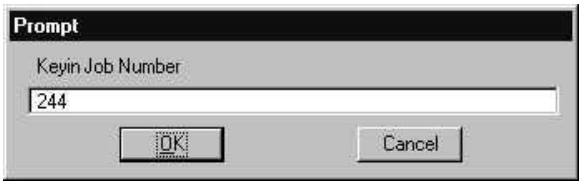
Usage:

Step 1. Using D&C item **HA Roadway** display the horizontal alignment(s).

Step 2. In **View Window #1** fit view so that all graphics are displayed in the view. If needed turn on level 31.

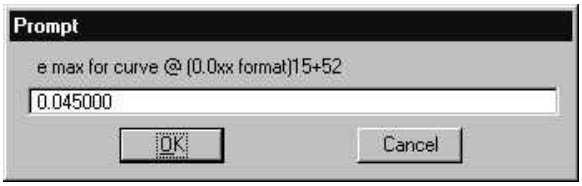
Step 3. In D&C manager activate **TDOTsuper1**.

Step 4. You are prompted for a **job no.** Key that in and click **OK**.



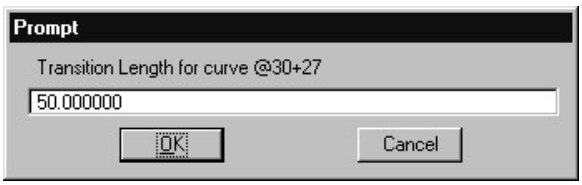
Step 5. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 6. The 3PC processes the chain and finds the first curve. You are first prompted for the **superelevation rate (e max)** for the curve. Key that in and click **OK**.

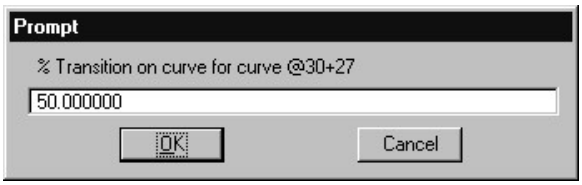


If the curve is a simple curve without spirals:

Step 7. You are then prompted for the **transition length** for the curve. Key that in and click **OK**. Complex curves with spirals use the spiral length instead of prompting for this value.



Step 8. You are then prompted for the **% of the transition on the curve**. Key that in and click **OK**.



If the curve is a complex curve with spirals or when steps 6 through 8 are completed for a simple curve:

Step 9. The 3PC processes the chain and looks for additional curves. Depending on the type of curve found, steps 6 through 8 are repeated as needed. On each curve the data entered is written to the curve elements. When all curves are processed the chain completion message is displayed.

Once the chain is completed D&C item **TDOTsuper2** or **TDOTsuper3** can then be used.

TDOTsuper2

D&C location: Construction Supers> TDOTsuper2

Geopak 3PC Program: tdotsup2.x

Description:
Draws pattern lines with station values at critical superelevation transition points as well as the begin & end and builds autoshape input file for superelevation using values entered with D&C item **TDOTsuper1.** Used by Construction personnel.

This application is specifically for **undivided crown roadways**.

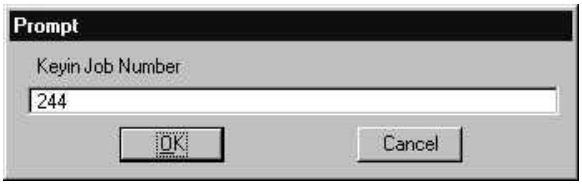
Special Requirements:
Superelevation information must be written to horizontal alignment graphics with D&C item **TDOTsuper1**.

Usage:

Step 1. Using D&C item **TDOTsuper1** to set up superelevation information.

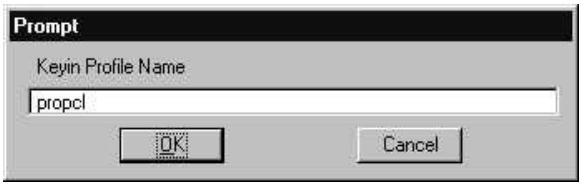
Step 2. In D&C manager activate **TDOTsuper2**.

Step 3. You are prompted for a **job no.** Key that in and click **OK**.

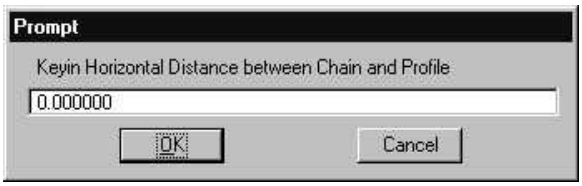


Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 5. You are then prompted for the **profile name.** Key that in and click **OK**.

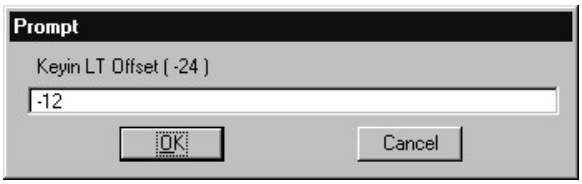


Step 6. You are then prompted for the **Horizontal Distance between Chain and Profile.** Key that in and click **OK**.



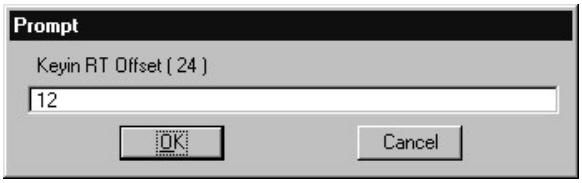
This is referring to the **tie offset** which is usually **0** for undivided crown roadways which is the default value given.

Step 7. You are then prompted for the **Left Offset** which is used to define the outside limit of the superelevation shape to the left. Key that in and click **OK**.

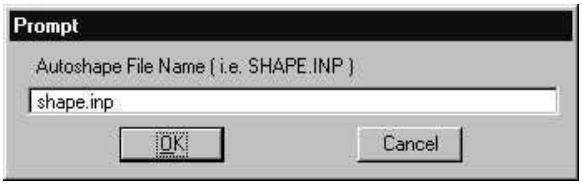


Offsets to the left of the centerline are always negative numbers.

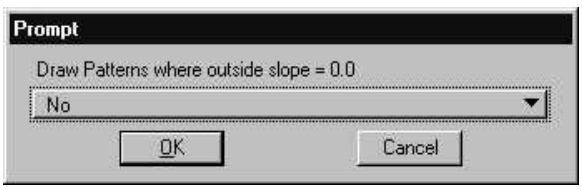
Step 8. You are then prompted for the **Right Offset** which is used to define the outside limit of the superelevation shape to the right. Key that in and click **OK**.



Step 9. You are then prompted for the **Autoshape File Name**. This is the superelevation shape input file the program is to create. Key that in and click **OK**.

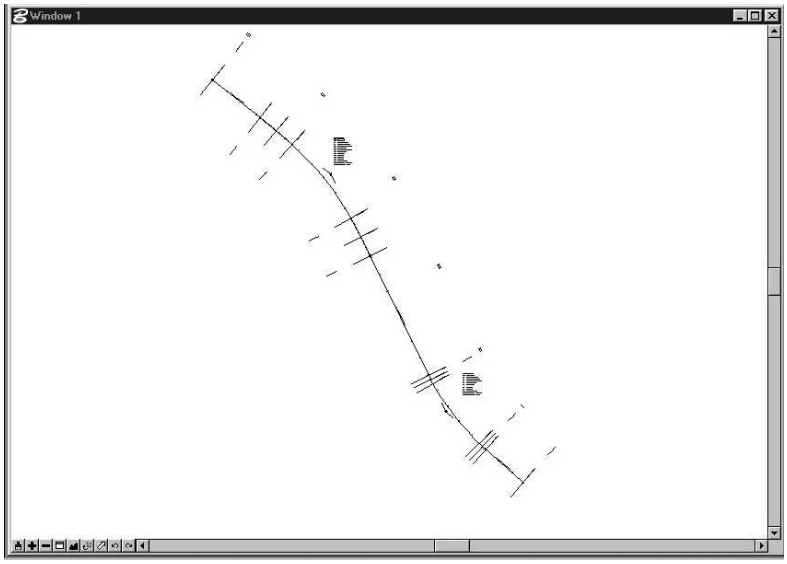


Step 10. You are then given the option to place patterns where the outside slope = 0.000 (zero slope). Pick **Yes** or **No** and click **OK**.

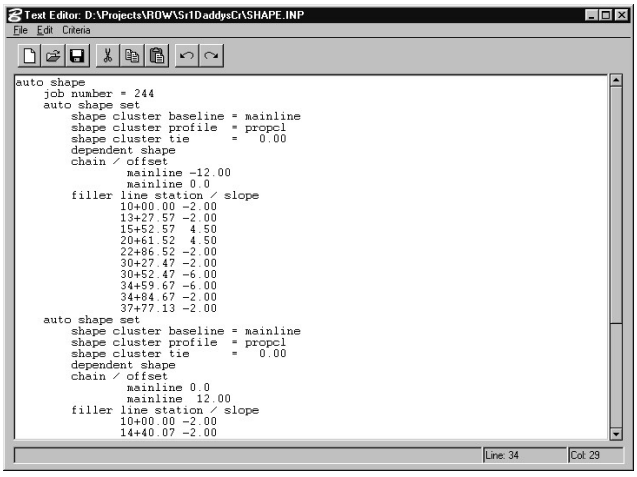


Step 11. Finally you are prompted for the **Microstation DGN filename** that supershapes are to be written into. Key in the filename and click **OK**..

The pattern lines are drawn and annotated with station values in the open Microstation DGN file.



The autoshape input file is created and can be reviewed with any text editor. If desired, transitions back to existing cross slopes can be added at the ends by editing station and cross slopes listed. Note that cross slopes must be in a percentage format.



Geopak's **Autoshape Builder** can now be used to process this input file to build superelevation shapes for the roadway.

TDOTsuper3

D&C location: Construction Supers> TDOTsuper3

Geopak 3PC Program: tdotsup3.x

Description:
Draws pattern lines with station values at critical superelevation transition points as well as the begin & end and builds autoshape input file for superelevation using values entered with D&C item **TDOTsuper1.** Used by Construction personnel.

This application is specifically for **divided roadways** or **ramps**.

Special Requirements:
Superelevation information must be written to horizontal alignment graphics with D&C item **TDOTsuper1**.

This program **must** be run twice to set up autoshape input files for left & right side of divided highways.

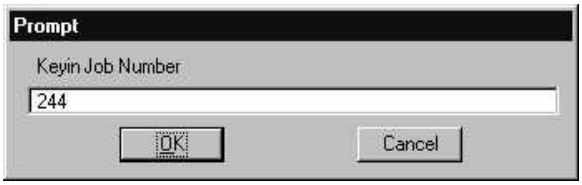
In most cases it is only necessary to run once to the left for ramps.

Usage:

Step 1. Using D&C item **TDOTsuper1** to set up superelevation information.

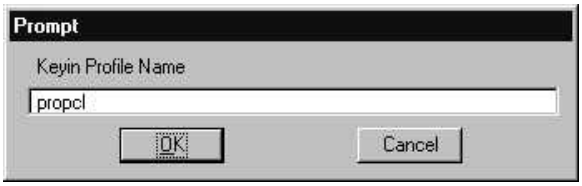
Step 2. In D&C manager activate **TDOTsuper3**.

Step 3. You are prompted for a **job no.** Key that in and click **OK**.



Step 4. You are then prompted for the **chain name.** Key that in and click **OK**.

Step 5. You are then prompted for the **profile name.** Key that in and click **OK**.



Step 6. You are then prompted for the **Offset to the inside edge of pavement or PGL (profile grade line).** Key that in and click **OK**.

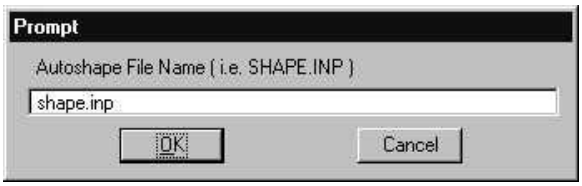
Normally for ramps… this value would be **0**. All other offsets to the left of the centerline are **always** negative numbers.

Step 7. You are then prompted for the **Offset to the outside edge of pavement** which is used to define the outside limit of the superelevation shape. Key that in and click **OK**.

Step 8. You are then prompted for the **Normal Crown slope.** This must be entered in a percentage format such as -2. Key that in and click **OK**.

Normally for ramps… this value would be a **positive 2 percent** (i.e. 2). Only in special cases where ramp supelevation shapes are set up to the right would this value be -2.

Step 9. You are then prompted for the **Autoshape File Name**. This is the superelevation shape input file the program is to create. Key that in and click **OK**.

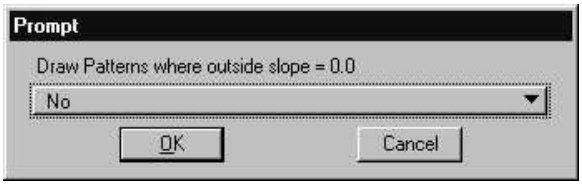


On the second pass for the opposite side of the road, keyin a different filename than entered on the first pass to avoid overwriting the first file (i.e. shape2.inp).

Step 10. You are then given the option to **Draw Patterns?**. Pick **Yes** or **No** and click **OK**.

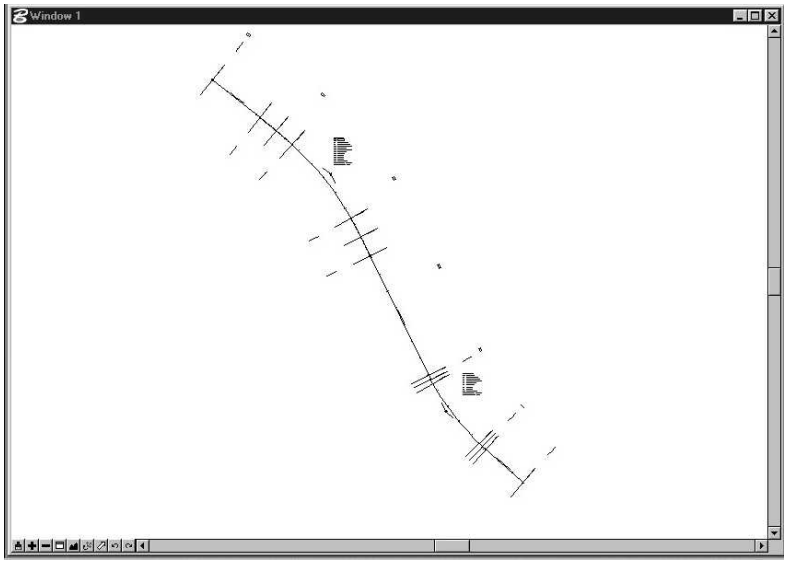
On the first pass using this program you would normally say **Yes** and on the second pass to set up the other side of the divided roadway you would say **No** having already placed patterns.

Step 11. If you said Yes to place patterns then you are then given the option to place patterns where the outside slope = 0.000 (zero slope). Pick **Yes** or **No** and click **OK**.

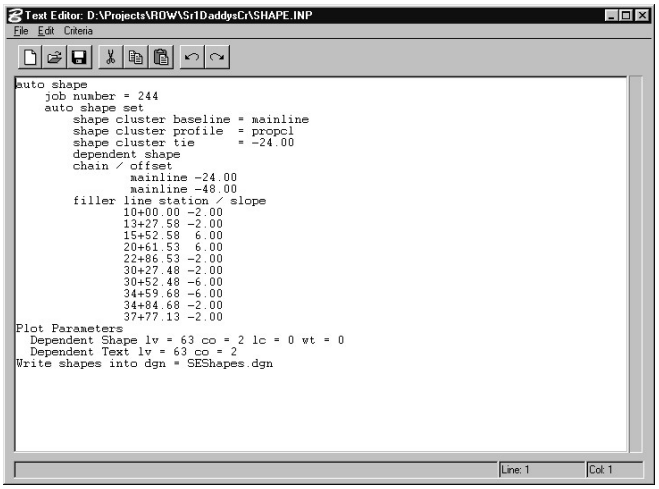


Step 12. Finally you are prompted for the **Microstation DGN filename** that superelevation shapes are to be written into. Key in the filename and click **OK**..

If the pattern line option was chosen then they are drawn and annotated with station values in the open Microstation DGN file.



The autoshape input file is created and can be reviewed with any text editor. If desired, transitions back to existing cross slopes can be added at the ends by editing station and cross slopes listed. Note that cross slopes must be in a percentage format.



Geopak's **Autoshape Builder** can now be used to process this input file to build superelevation shapes for one side of the roadway or you may wish to run this program again to set up the opposite side of the roadway and then process both autoshape input files at the same time.

Step 13. Repeat steps 2 through 12 to set up the opposite side of a divided highway.

Functional

HA Points F

D&C location: Drafting Standards>Prop. Drainage>Special Ditches> HA Points F

Geopak 3PC Program: draw_func_horiz_points.x

Description:
Uses text symbol characters to mark all points on functional horizontal alignments.

Special Requirements:

All alignment graphics must be visible in View Window #1.

Usage:

This option functions just the same as **HA Points**. See the description of it's usage for details.

Pvmt Pattern F

D&C location: Functional> Pvmt Pattern F

Microstation Macro Program: FuncPvmtPattern.ba

Description:
This application sets the parameters needed to pattern a functional pavement area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated by using the keyin **MACRO FUNCPVMTPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Br Pattern F

D&C location: Functional> Br Pattern F

Microstation Macro Program: FuncBrPattern.ba

Description:
This application sets the parameters needed to pattern a functional bridge area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated by using the keyin **MACRO FUNCBRPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

ROW Pattern F

D&C location: Functional> ROW Pattern F

Microstation Macro Program: FuncROWPattern.ba

Description:
This application sets the parameters needed to pattern a functional R.O.W. area and places the pattern using Microstation's **Pattern Area Flood by Selection Set** or **Pattern Area by Element**.

This macro can also be activated by using the keyin **MACRO FUNCROWPATTERN**.

Special Requirements:
Depending on the mode of area pattern placement to be used take the following actions:

Selection Set Flood mode: Create Selection Set prior to activating macro

Shape Element mode: Create shape element prior to activating macro

Usage:
This option functions just the same as **Loss of Access**. See the description of it's usage for details.

Pay Items
R.O.W.
ROW Markers

D&C location: Pay Items> R.O.W.> ROW Markers

Geopak 3PC Program: count_row_markers.x

Description:
This application reads a selection set of a given sheet area & then counts all R.O.W. markers and appends this info to a CSV file named **ROWmarkers.csv**.

Data in the file reads sheet no., number of A's, number of B's, number of C's.

Special Requirements:
Microstation selection set which includes graphics from level 46 must be active.

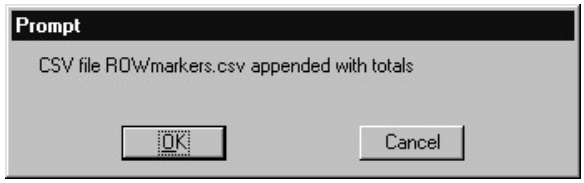
Usage:

Step 1. Turn on level 46 if not already on. Create a Microstation selection set of elements for the first sheet area.

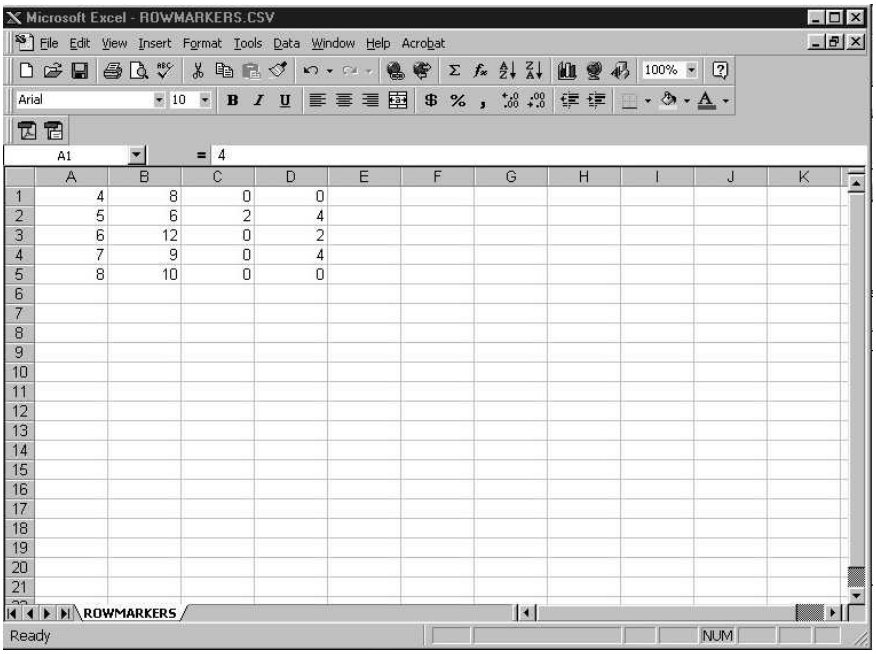
Step 2. In D&C manager activate **ROW Markers**.

Step 3. You are prompted for the **sheet no.** Key that in and click **OK**.

Step 4. The selection set is processed and graphics are read looking for proposed R.O.W. marker cells (**PROWA**, **PROWB** & **PROWC**). When processing is finished the numbers are totaled and appended to CSV file **ROWmarkers.csv** .Click **OK** to dismiss the completion message.

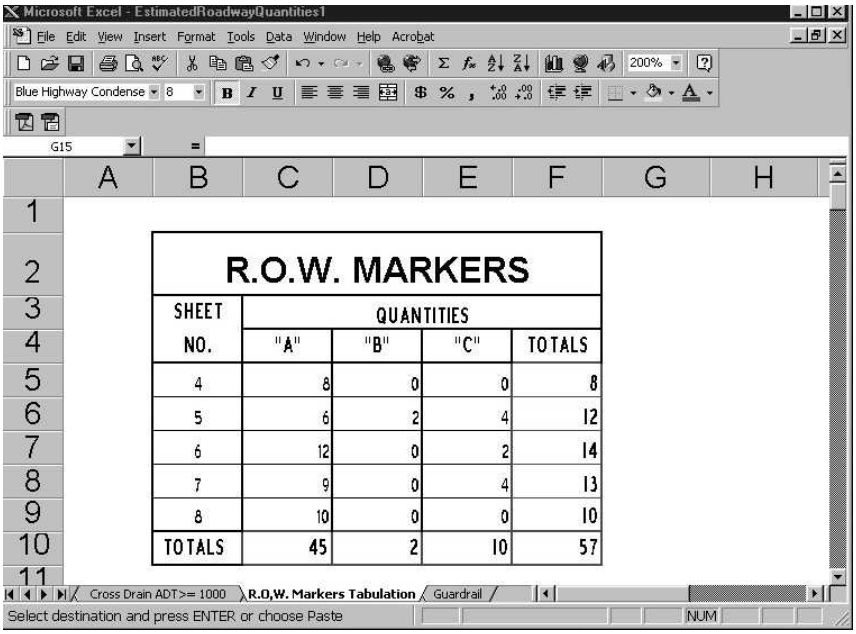


Step 5. Repeat steps 1 through 4 for the remaining sheet areas. At any time Excel can be used to review the contents of the CSV data file being built. Remember the data in the file reads sheet no., number of A's, number of B's, number of C's.



	A	B	C	D
1	4	8	0	0
2	5	6	2	4
3	6	12	0	2
4	7	9	0	4
5	8	10	0	0

Step 6. When all sheets have been counted, open **ROWmarkers.csv** with Excel, highlight all the data and click **Copy**. Open your projects estimated roadway quantities Excel file to your R.O.W. markers tabulation worksheet. Use Insert to add this worksheet if needed. Click into the first field of the block, right click choose **Paste Special,** set to **Values** and click **OK** to paste the data into the block.



R.O.W. MARKERS				
SHEET NO.	QUANTITIES			
	"A"	"B"	"C"	TOTALS
4	8	0	0	8
5	6	2	4	12
6	12	0	2	14
7	9	0	4	13
8	10	0	0	10
TOTALS	45	2	10	57