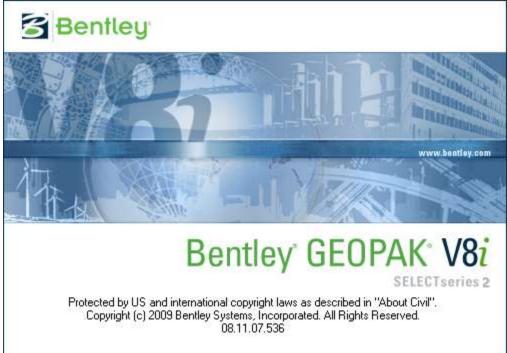


Criteria User Manual



Montana Department of Transportation

EISS CADD Unit

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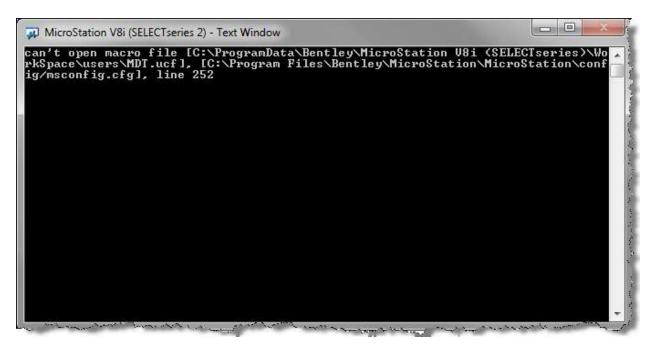
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1 Introduction

GEOPAK is a comprehensive software package for the design and production of plans for roadway and site projects. The software is fully integrated with the MicroStation CAD system to permit true interactive design.

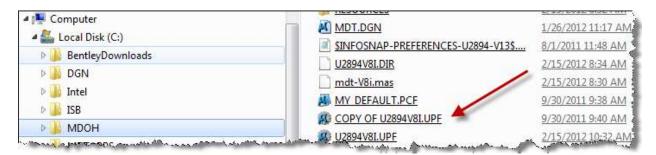
For everyday design work map your W drive to the appropriate drive for all CADD support.

You then need to log off and back on to re-access the drive. If your W: drive is not properly mapped the following text window may appear when attempting to initiate MicroStation:



NOTE: Pictures depicted in this manual are from various samples and/or lab projects. Please double check all of your own dialogs to insure they represent what you want in your own project in order to have an accurate and trouble-free design.

Maintenance suggestion: Once you have all of the preferences set up as you like then go to C:\mdoh and make a copy of your .UPF file. Just copy it into your U: drive or make a copy and rename it right in C:\mdoh. This way you will not lose your preferences should you need to delete the .UPF file. (see below)



2 File Management

These are the Files that will need to be saved on DMS.

The criteria used to determine if the file should be saved was, is it necessary to run the Geopak program and how easily the information can be recreated. All the other files can easily be recreated either by Geopak or simple editing can be found in the w:\rdstd directory. Because of the nature of computers in general, files will become corrupt from time to time. To save work on recreating a corrupted file some but not all of the following files will need to be saved. The following files are the only files you will need to save out on DMS. When you are done using the files, delete any files not on this list.

###zzDTM001.DAT	This is an ASCII file that contains your survey data. You will need to keep this file in case you need to recreate Cross-sections.					
JOB###.GPK	This is a binary file that contains all the information on your horizontal and vertical alignments. The number used when creating this file in Coordinate Geometry should be related to the control number. (i.e. CN 1426, JOB# 142 OR 426) It is necessary to keep this file because Geopak uses it when you run its programs.					
NAME###.IOC	You may create this file if you code your alignment into Coordinate Geometry. This file can be used to recreate your .gpk file. You will want to save this just in case your .gpk file becomes corrupted. (OC stands for operator code) <i>Not everyone will create this file and you will not have to</i> <i>create it just to save it.</i>					
J###OOC.INP	This file may be created if you store an alignment graphically or when you store your profile. You will want to keep it for the same reason you save the NAME###.IOC file. (OC stands for operator code)					
###zzMAP001.DGN	This is the design file that contains your Horizontal and Vertical alignments. You will want to save this file as you have previously.					
###zzXSF001.DGN	This is the design file that contains your Working Cross-sections. These should contain all the information you wish to have plotted. You will want to make sure you save this file (or files if you have more than one).					
###zzEWK001.LOG	This is the log file that is created when you do an earthwork run. This file is used to create your mass diagram. You will not want to save all of your EARTH.LOG files. Keep only the original unmodified log file and the final log file you will use to create your mass diagram with. Delete any other log files you have created.					
###zzEWK001.TXT Note:	This file is created when you do your earthwork run. You will need to save this file to put your unadjusted volumes in your Cross-section Layout file. When you put your Cross-sections into a file to be plotted this file needs to be present to put your unadjusted volumes on the Cross-sections.					
#### = zz =	this is the project number see the Cadd Standards for file naming. this is the design area see Cadd Standards for file naming.					

3 Geopak Road Tools Dialog

Applications will automatically appear in the menu bar.

Geopak may need to be activated if only one menu appears.

After **GEOPAK** is activated, under **Applications** more menus and the **Deactivate GEOPAK** will be available.

There are two options when using GEOPAK ROAD. You can use the pull-down menu similar to the other menus or you can open a palette for most of the GEOPAK functions.

To pull up the palette for GEOPAK go to **APPLICATIONS-GEOPAK ROAD-GEOPAK ROAD Tools**

Eile	<u>E</u> dit	Element	<u>S</u> ettings	<u>T</u> ools	<u>U</u> tilities	Wor <u>k</u> space	Applications	<u>Wi</u> ndow	MDT	Help		
-							GEOPAK			<u>}</u>		
							GEOPAK DR					
							GEOPAK RC			▶ GE	EOPAK ROAD Tools	
							GEOPAK SI GEOPAK SL GEOPAK W	JRVEY	ER	► Pr ► Ac	oject Manager :ti <u>v</u> e Chain Control EOPAK Element Attributes EOPAK 3PC AdH <u>o</u> c Attribute Manager	
										Ge De Qi	ser Preferences eometry esign & Computation Manager uantity Manager	,
											ans Preparation IM <u>T</u> ools	1
										_) Tools	
											ross Sections :ilities	
											elp	_
										At	DOUT GEOPAK	

Project Manager Design & Computation Manager DTM Cross Sections



Horizontal & Vertical Geometry Plans Preparation 3D Tools Utilities & Conversions

3.1 Project Manager

89	<u>1</u>	Project Manager						
K.	2	Active Chain Control						
Í	3	Application Attribute Viewer						
P	<u>4</u>	3PC AdHoc Attribute Manager						
-	Open as ToolBox							

The Project Manager toolbox is depicted above and has four icons. The left tool invokes the Project Manager dialog as depicted below. (See Page 4.1) The second icon opens the Active Chain Control tool box. The third tool is GPK Attribute tool and is utilized to identify the GEOPAK attributes assigned to an element, if any. The fourth is 3PC AdHoc Manager.

3.2 Design & Computation Manager Design & Computation Manager 1 Quantity Manager 2 Open as ToolBox 3.3 DTM 1 DTM Tools Open as ToolBox 3.4 Cross Sections 1 Cross Section Navigator ₩. 2 Run Cross Sections 1 Draw Cross Sections from Surfaces 3 4 Draw Cross Section Tabular Data E. 5 Draw Ancillary Features 6 Cross Section Labeling - Starker E 7 Cross Section Reports 8 Earthworks 9 Limits of Construction 0 Draw Cross Section Cells 1 Q Shape Manager ×2/15 W Draw Patterns by Station Range Ż E Draw Patterns from Cross Sections R Cross Section Sheet Composition

Open as ToolBox

3.5 Horizontal & Vertical Geometry

鳫	<u>1</u>	COGO
2	2	Graphical COGO
T IN	<u>3</u>	Horizontal Alignment Generator
	<u>4</u>	Design Multicenter Curve
_	5	Store Graphics
	<u>6</u>	Auto Store Graphics
Ó.	<u>Z</u>	Subdivide Wizard
شم الأ	8	VPI Based Vertical Alignment Design Tools
Ì	<u>9</u>	Component Based Vertical Alignment Design Tools
•	0	Legal Description Editor
-	Op	en as ToolBox

3.6 Plans Preparation

	<u>1</u>	Plan View Labeling
\leq	2	DP Station Offset
-75	3	Draw Transition
٭	<u>4</u>	Draw Cell by Feature
\$7	<u>5</u>	Draw Cell Group by Feature
	<u>6</u>	Draw Cell Area by Feature
	Ζ	Pavement Markings
95	<u>8</u>	Draw Signs
	9	Profile Labeling
1111)	<u>0</u>	Ground Profiles
	Q	Draw Profiles
2.11	<u>w</u>	Draw Profile Tabular Data
	Ē	Plan/Profile Sheet Composition
<u>;;;;</u>	<u>R</u>	Tables
=	Op	en as ToolBox

3.7 3D Tools

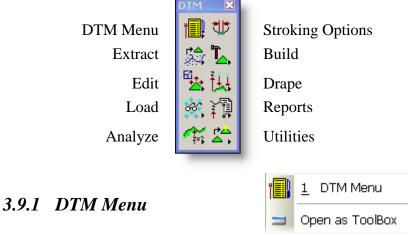
Ŕ	1	Corridor Modeling						
**	2	Drive Through						
	3	3D Modeling						
_	4	Passing Sight Distance						
=	Op	Open as ToolBox						

3.8 Utilities & Conversions

2	<u>1</u>	Text Editor
	2	GeoTech Tools
\$	<u>3</u>	Conversion Tools
69	<u>4</u>	View XML Reports
	Op	en as ToolBox

3.9 Geopak DTM Tools

4



The DTM Menu tool box (first column, top box) is depicted above and is a single icon, which invokes the GEOPAK DTM menu bar as depicted below.

DTM							
Settings	Extract	Build	Edit	Drape	Load	Report	ts <u>A</u> nalysis <u>U</u> tilities
3.9 .2	2 Extra	act too	ol bos	r		Image: Page Image: Page	 <u>1</u> Extract Graphics <u>2</u> Extract XYZ <u>3</u> Extract DEM <u>4</u> Extract Set Format Open as ToolBox
3.9	9.3 Edi	t tool .	box				1Edit Triangles2Edit Duplicate Points3Edit Break Line4Filter Vertices5Join Linear Features6Z Range ClipOpen as ToolBox
3.9	.4 Loa	d tool	box			n 💥	<u>1</u> Load DTM Feature Open as ToolBox

3.9.5 Analyze tool box



⋓

3.9.6 Stroking Options tool box

🖉 DTM Strok	
Durve Stroke Tolerance:	0.10000
Minimum Linear Distance:	25.0000

3.9.7	Build	tool box
-------	-------	----------

3.9.8 Drape tool box

T_	<u>1</u>	Build Triangles
T 88	2	Build Lattice
	<u>3</u>	Build Merge TINs
<u>/</u> e	<u>4</u>	Build Clip TIN
<mark>21</mark> 55	<u>5</u>	Build Pad
2	<u>6</u>	Build Delta TIN
-	Op	en as ToolBox
-	Op	ien as ToolBox
= ₹	ор <u>1</u>	en as ToolBox Drape Vertices
= 現 現	<u>1</u>	Drape Vertices

3.9.9 Reports tool box				Reports Duplicate Point Reports Crossing Feature Reports TIN Statistics Reports Lattice Statistics
		=	J Op	oen as ToolBox
	<mark>r</mark> ≛	<u>1</u>	Conve	rt TIN
	ASCII	2	Conve	rt ASCII to Binary
	ASCII 10101	<u>3</u>	Conve	rt Binary to ASCII
	\wedge	<u>4</u>	Check	Triangulation

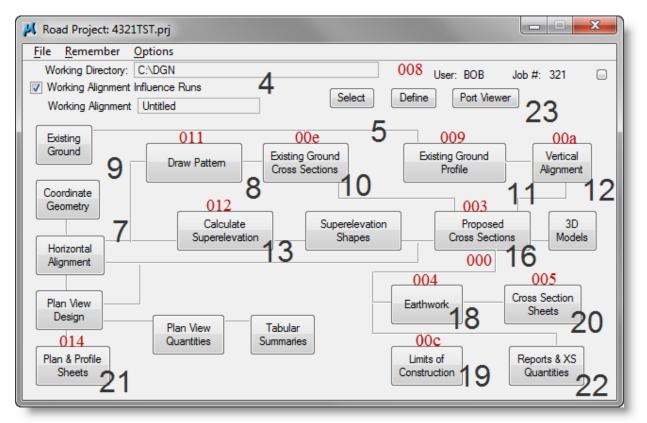
3.9.10Utilities tool box

<u> 18 1</u>	
ft m 目+目 +目	5 Metric<->English
₩,	6 Export DTM
XML ↑	7 Import LandXML
XML ∳	8 Export LandXML
DTM TIN	9 Import InRoads
TIN + DTM	0 Export InRoads
MX ↑	Q Import MX
MX ↓	W Export MX
*	E LIDAR XYZ Tools
-	Open as ToolBox

4 Project Manager

The Project Manager associates projects with their prospective job number, user, working directory, coordinate geometry, and the myriad of project files. This organization of the project keeps the user from having to maintain the different files and their locations associated with a particular project. In addition, many of the GEOPAK functions can be invoked by simply selecting the appropriate box from the dialog, which is set up in a workflow format. The dialog is depicted below.

The **Working Directory, User:** & **Job#:** are set when you create a project, from the Project Manager Dialogs.



The LARGE BLACK numbers on the dialog above correspond to the chapter covering that function. The small RED numbers correspond to the file created when that function's dialog is saved in C:\DGN\geopm\projdbs\user\ folder.

Setting up a project is shown in the following pages.

When Selecting Buttons from the Project Manager you will be asked to Create or Rename the run information. See <u>Section 6</u>

4.1 Setting up a project for Project Manager

Start Microstation and Geopak.

Then Start the Project manager _____

🖪 Project Man	ager 💶 🗆 🔀
<u>Projects</u> <u>D</u> irectory	<u>A</u> dmin
c:\dgn\GEOPM\	
Filter: *.prj	Type: Project 💌
Projects:	Directories:
CLASSV8I.prj Default.prj GBLORG.prj GEOPAK.PRJ GLBORG.prj	[] [projdbs] [c:\dgn\GEOPM\] [A:] [C:] [D:]
Job Number: 234 Description:	Unit System: English
	Cancel

Project Name:	CLASSV8I.prj	
Working Directory:	C:\dgn\	Selec
Job Number:	234 Select	
roject Description:		Preferences
'8i Class Project∣		

- 1. Fill-in Project Name (whatever you want)
- 2. Working Directory (always C:\dgn)
- 3. Job Number (creates JOBnnn.GPK)
- 4. Optional Project Description
- 5. Select Preferences
- 6. Set Preferences for Project
 - Always set up as shown below
 - Geopak handles up to 12 decimal places
 - The Distance needs to be 4 decimals for doing the inverse process.

📕 User P	Preferen	ces		
Unit System: Coordinates: Direction: Station:	English NE Bearing 12+34	<!--</td--><td>Output Accuracy Distance: Station: Angle Seconds:</td><td>99.1234 × 9+99(9).12 ×</td>	Output Accuracy Distance: Station: Angle Seconds:	99.1234 × 9+99(9).12 ×
	ectory: C:\dgn Preferences Preferences		Show this dialo	og at startup Cancel

4.2 Setting up a User for the Project Manager

Select Users > New

Project User Users Project Users: (BOB)	TS: CLASSV8I.prj
[Default]	OP Code:
Description:	
<u> </u>	

Edit User Info
User: BOB
Full Name: MR BOB MULLENIX
OP Code: od
Description:
<u>O</u> K Cancel

- 1. Fill-in Name
- 2. Full Name
- 3. Operator Code Always use OC (See file
- naming in Cadd Standards Manual)
- 4. DO NOT Password Protect the User

4.3 Setting up Feature Preference

Feature Database:	w:\GEOPAK\surveyeng.si	md	90
Apply Best Mate	h Feature Plot Scal	le: 100.0000	
Use Shared Cel	s Point Label Redra	w: Position by SMD Set	tings 🕓

1) Set the SMD File , Directory is w:\Geopak\ US Customary = SURVEYENG.SMD

2) Select OK to return to Geopak Preference then Select COGO Preference

Directory Structure for User

C:\dgn\GEOPM – contains .prj file for each project

PROJDBS – contains .rpt file for each project

DEFAULT – contains default entries for the RUN's in a default project USER (your name) – contains entries for the RUN's within your projects

4.4 Setting up COGO Preference

For More information on COGO Preference see Geopak Help Online – Command Reference > User Preference Optional direct link to Help press F1 when dialog is active

🛙 COGO Preferences 📃 🗆 🔀				
Job (GPK) Open Mode:	Query 💌			
Job (GPK) Directory:	Q			
COGO Input File Directory:	٩			
COGO Output File Directory:	٩			
Redefinition of Element	3			
Force Redefinition Off Upon COGO Activation				
<u> </u>	Cancel			

Job Open Mode - This is normally set to Query. It can also be set to Create or No Create.

When set to Query it will let you know if it is not finding the .gpk file when you open Coordinate Geometry.

- When it does not find a .gpk file with the correct control number it will tell you "Job number XXX does not exist. Do you wish to create job number XXX?"
- At this point you can create a new .gpk file if you wish by clicking on OK or cancel if you need to find out why it's not finding the correct .gpk file.
- When set to Create it will automatically generate a new .gpk file if none is found in the working directory. It will not give you any message that it is creating a new .gpk file.

When set to No Create it will not allow a new .gpk file to be generated if no .gpk file is found.

Select Redefinition of Elements

5 Setting Up Working Alignment

The working Alignment is a place to keep track of or store all the information about your project, such as strip map file, working cross section file and symbology of the elements. You are able to create several working alignments for different alignments, such as mainline or detours.

Road Project: CLASSV8I.prj	
File Remember Options	
Working Directory: C:\dgn	User: BOB Job #: 234
Vorking Alignment Influence Runs	
Working Alignment DESIGN	Select Define Port Viewer
Select Working Alignment	To set up a Working alignment
Name Time	1) Select the Select Button
DESIGN 04/30/2010 13:08:47	 At the Select Working Alignment Dialog
	Select Run > Modify
Description	
OK Cancel	

Run Mod	ify
Name: [DESIGN
Description	GEOPAK V8I CLASS
	<u>OK</u> Cancel

- 3) Type in a name for your working alignment
- 4) Type in a description
- 5) Select OK
- 6) At the Select Working Alignment Dialog select Ok

The working alignment name should now appear in the Project Manager

5.1 Entering Working Alignment Define Information

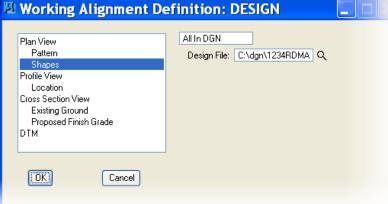
Select the DEFINE button from the Road Project Dialog and fill in the information as shown below. **511** Plan View

🛛 Working Alignment Definition: DESIGN
Plan View Design File: C:\dgn\1234RDMAP00 Q Pattern Chain: DESIGN Q Shapes Design File: C:\dgn\1234RDMAP00 Q Profile View Design File: C:\dgn\1234RDMAP00 Q Location Existing Ground Proposed Finish Grade DTM OK Cancel

5.1.2 Plan View > Pattern

Plan View	By Design File
Pattern	Horizontal Scale: 10 Vertical Scale: 10
Shapes Profile View Location	Design File: C:\dgn\1234RDMA Q
Cross Section View Existing Ground Discoursed Similar Crode	Ly Numbers
Proposed Finish Grade DTM	Colors Match
	Weights:

5.1.3 Plan View > Shapes



- Set Design file to the file that contains the alignment. Most likely this will be your strip map.
- Set Chain to the alignment that will be used throughout the design process. You can delete C:\dgn\ from the Design File names to minimize name lengths.

Note: This should be done after a design alignment has been created. This information is used in most of the dialogs

- 1) Set Button to By Design File
- 2) Set Hor. Scale to 10 &Ver. Scale to 10.
- 3) Set Design File to the file that contains the pattern lines.
- 4) Set Symbology to Lv= P_Geopak_PatternLines_Design, Wt=0 & Style=0. Color and Type can be left blank. (See Cadd Standards Manual)
- 5) Or you can use the RESET/MATCH buttons to set symbology.
- 6) Setting the symbology in the placement is for drawing.
- 1) Set button to All In DGN
- Set Design File to the file that contains the super elevation shapes OR
- 1) Set button to By Search Criteria
- 2) Set Design File to the file that contains the super elevation shapes
- Select Lv Names then Reset/Match. Select a shape element. This should be: P_Geopak_SuperShapes_Design

Note: This should be done after super shapes are drawn.

5.2 Profile View

Working Alignment Definition: DESIGN			
Plan View Pattern Shapes Profile View Location Cross Section View Existing Ground Proposed Finish Grade DTM	Design File: C:\dgn\1234RDMA File Existing Profile: EXPROF Select Proposed Profile: PPROF Select Begin Station: 10+00.00 End Station: 68+00.00		
OK Cancel			

- 1) Set the Design File to the file that the profile is drawn in.
- 2) Set Existing profile to the ground profile
- 3) Set Proposed Profile to the design profile

Note: This should be done after Existing ground profile is created and after a Design profile is created.

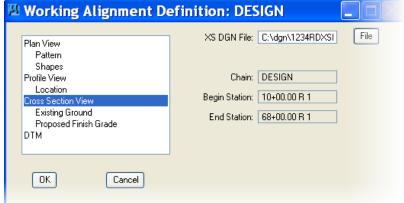
	5.2.1 Profile View > L
Vorking Alignment D	efinition: DESIGN 📃 🗖 🕅
Plan View Pattern Shapes Profile View Location Cross Section View Existing Ground Proposed Finish Grade DTM	Horizontal Scale: 100.0000 Vertical Scale: 10.0000 Station Equation: Gaps DP Station: 10+00.00 R 1 DP Elevation: 2360.0000 DP X: 553978.7616 DP Y: 1254629.2308
OK Cancel	Profile Cell Draw Cell at X,Y Identify Cell

5.2.1 Profile View > Location

- Set the DP Station to the beginning station of the alignment.
 Hint: Try to set it to an even station before your alignment.
- Set DP Elevation to an even elevation below the lowest point of the profiles
- 3) Set DP X & Y: By DP. Click Identify Cell and select the cell containing the profiles.
- 4) Set the scales to a 10:1 exaggeration
- Set the XS DGN File to the working cross section file (the file the cross sections are drawn in)

Note: This should be filled in after the working cross section file has been created.

5.3 Cross Section View



Plan View Pattern	💌 L.	/Names:	E_Ground_XS_Delii	2	
Shapes	Lv	umbers:		1	
Profile View		Colors		10	
Location Cross Section View		Styles;		Ter I	Match
Existing Ground		Weights:		1	Display
Proposed Finish Grade DTM		Types:		1	Reset
	PI.	acement:			

5.3.1 Cross Section View > Existing Ground

1) Set LV= E_Ground_XS_Delineation

Note: This should be filled in after the working cross section file has been created or it can be filled in at the beginning of the project.

Setting the Placement symbology is for drawing.

5.3.2 Cross Section View > Proposed Finish Grade

Plan View Pattern	🔽 Lv Names: e	nt_FinishedGrade	0
Shapes	Lv Numbers:		1
Profile View	Colors		tin 🚽
Location Cross Section View	Styles:		Match
Existing Ground	Weights:		Display
Proposed Finish Grade OTM	Types.		Reset

Set LV= P_Template_Design_Alignment_F inishedGrade & P_Template_Design_Alignment_S ubGrade

Note: This should be filled in after the proposed surface is in the working cross section file or it can be filled in at the beginning of the project.

5.4 DTM

Location Cross Section View Existing Ground	Portview Vertical Scale: 10
Proposed Finish Grade	
DTM	

- If you have a TIN file you may set the Existing ground & Port view TIN to that file
- 2) Set the Scales to 1 & 1 or 10 & 10, either works.

Note: This should be filled in after the DTM file has been created or it can be filled in at the beginning of the project.

NOTE: Setting up the symbology in the Pattern & Existing Ground dialog entries will save those settings and default to that symbology every place they are drawn in the project.

6 Create or Rename a Run

When Selecting Buttons from the Project Manager you will be asked to Create or rename the Run information.

Select Run	
Run	
<u>N</u> ew	Time
<u>С</u> ору →	09/07/2010 13:53:47 09/07/2010 13:52:09
Modify	
Delete	
Description	
Untitled	
	OK Cancel

New Ru	n Name
Run Name:	NAME
Description	INFORMATION DESCRIBING THE RUN
	<u>OK</u> Cancel

6.1 Creating a run

1) Select $\operatorname{Run} > \operatorname{New}$

- 2) Fill-in Run Name
- 3) Description is optional
- 4) Select Ok
- 5) Select Ok From the Previous Dialog

Select Ru	h	
Run		
Name	Time	
NAME	09/07/2010 13:53:47	
Untitled	09/07/2010 13:52:09	
Description		
INFORMATION D	DESCRIBING THE RUN	
	OK Cancel	

6.2 Renaming a Run

1) Select Run > Modify information describing the run

un Mod	lify
Name:	NAME
Description	INFORMATION DESCRIBING THE RUN
	<u>D</u> K Cancel

- 2) Fill-in Run Name
- 3) Description is optional
- 4) Select Ok
- 5) Select Ok From the Previous Dialog

6.3 Copying a Run from one project to another

Whenever you invoke a Button from the Project Manager Diagram you will be asked to Select a Run. You have the option of creating a new run or copying a run from a previous project. Shown here is an example of how to copy a run from the default project.

- 1) Select Run > Copy > Project
- 2) Select Default Project
- 3) Select Default user

Description

- 4) Select the Run
- 5) Rename the run for your project

Project Select	ion
Directory: c:\dgn\GE(OPM\
Projects:	Directories:
CLASSV8I.prj	[]
Default.prj	[projdbs]
GBLORG.prj GEOPAK.PRJ 2	[A:] [C:]
GLBORG.prj	[D:]
	[T:]
Description:	
	Cancel
Select Run To Co	
Name Time	
	17/2007 13:46:17
Untitled 05/	17/2007 13:42:59
4	

Cancel

ΟK

Select Run		
Run		
<u>N</u> ew	Time	
<u>C</u> opy ▶	Project	2010 13:53:47 2010 13:52:09
Modify	User	1
<u>D</u> elete	Run	·
Description Untitled	OK	Cancel
Project U	sers	
Project User: [BOB] [Default] 3	Fu	ser Info II Name: Default Project Code: dp
Description:		
Default User for	starter project	
		Cancel

lew Ru	n Name
Run Name:	EARTH
Description	NEW EARTHWORK RUN CREATED FROM DEFAULT
	5
	OK Cancel

7 Coordinate Geometry & Horizontal Alignment

There are three ways to put an alignment into Geopak

- 1) Use the information from survey or as-built and code the information into Coordinate Geometry (described below.)
- 2) Store an existing alignment from the design file. (Section 33).
- 3) Draw the Alignment graphically in a design file and store it. (Section 32).

Before Starting any project in Geopak be sure to set up the Project Manager. See page 5-1

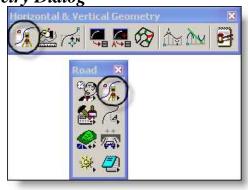
7.1 Store Existing Alignment in Coordinate Geometry

Coordinate Geometry

7.1.1 Geopak Coordinate Geometry Dialog

Within the Project manager dialog select **Coordinate Geometry**, or from the Road Tools Menu or Applications > Geopak Road > Geometry > Coordinate Geometry

Note: If you select COGO Button from the Road Tools Menu It does not Fillin the information in the next dialog.



1) If you are using the Project manager the entire field should be filled in. See page 5-2.

a. It is required to type in JOB NUMBER (up to 3 characters) & OPERATOR CODE (up to 2 characters)

b. Project Name & Subject are optional and do not have to be filled in.

c. Click on OK

The Geopak Coordinate Geometry dialog box will open.

Coordinate Geometry
Project Name: 99999CLASS
Job: 9RM Q
Operator Code: oc
Subject:
OK Cancel

Coordinate Geometry Jo	ob: 234 Operator: oc	
<u>File E</u> dit E <u>l</u> ement <u>V</u> iew <u>T</u> ools		
	🕐 🕼 (** 🦽 , 🔑 🗅 🚓 🔧 ** ** O 🖉 🗹 Bedefine	
Disable Visualization 🛛 💟 OFF (Feature) 🔪	Customize Icons	
COGO Key-in:		~
	✓ Hous ✓ Navigator	
	✓ Inverse	
	Locate Traverse	

If the Navigator icon does not show - View > Icons > Customize > Tools > check Navigator

Coordinate Geometry & Horizontal Alignment



COGO Dialog Box

Setting Temporary Visualization shows elements when highlighted in COGO.

You will use this to store known points and create other elements needed to store a complete alignment. You may use all or only a few of the following dialog boxes to create your alignment.

🍕 🗙 🖻] id 📥 🗎 🕻	⁹ 8				
Element :	Point 💌]				
Name	Feature	Description	Select	Northing	Easting	Elevation
10				1265979.6994	552244.7833	
20				1265891.2815	552785.3601	
30				1265778.7545	553723.5459	
40				1265356.3574	556291.8832	
50				1266814.3368	562634.9999	

COGO Navigator: Use this Dialog to access the Store dialog boxes for Points, Curves, Spirals & Chains

Min. req. pnts.		Proposed range
2000	Cad. Survey (Current 1-999)	1-1999
1000	Road Design (confirm w/RD)	2000-2999
4000	R/W	3000-6999
1000	Placeholder for Traffic	7000-7999
1000	Placeholder for HYD	8000-8999
1000	Placeholder for Bridge	9000-9999
10,000	R/W parcels	10,000-19,999
1000	Placeholder for GEOTECH	20,000-20,999
5000	Placeholder for ENVIRO.	21,000-25,999
	Unused placeholder	26,000-49,999
250,000	Pre-Survey (includes Constr.)	50,000-to end

GEOPAK POINT NUMBERING assignments:

This only affects areas utilizing GEOPAK to store points; placeholders represent potential future usage.

Coordinate Geometry & Horizontal Alignment

7.1.2 To Store Points

In the Navigator Dialog set ELEMENT to Point and Select the Add Element Or from COGO click **ELEMENT>POINT>STORE**

This will open the store points dialog box. This is needed to store your points.

Store P	oint 📃 🗖 🔀
Point Name:	30
Coordinates -	nent
Northing:	1265778.7545000 DP
Easting:	
🔲 St	ation:
Elev-	ation:
E PO	Code:
Point	t Cell: Scale:
E Fea	ature:
📃 Descrij	ption:
	Store Point

1. Fill in the following: Point Number Northing Value Easting Value

2. Fill in any other optional information and make sure the switch to the left is turned on.

3. Click on Store Point.

In the Coordinate Geometry window, the information confirming the storing of the point will appear.

PCode is a value that identifies the point as a feature such as a power pole or edge of pavement. Cells can be associated with points and you can have Geopak place them using the Design and Computation Manager.

Note: Remember to hit return after filling in the fields. If you forget, it remembers the last numbers that were entered and those are the numbers that will be entered when you hit APPLY. Switches must be turned on to use any of the optional features or they will not register.

Important: When entering points that will be used for the alignment (Beginning, Ending & PI points) the Bearing and distance will need to be rounded. **Bearing to the nearest second (0^00'00'')** and **Distances to the nearest one hundredth of a foot (0.01)**. Use the inverse command in COGO to check the Bearing and Distance then use the Tools > Locate > Traverse command to adjust the points. **Hint:** Check each bearing and distance ahead after the point back has been corrected. For instance if you have 4 points stored check the bearing and distance between the first and second point and then correct the second point, then check the bearing and distance between the second and third point and correct the third and so on.

7.1.3 Inverse Tool

Go to **Tools > Inverse** This will open the Inverse Tool Dialog.

124 Iu	iverse	
	Point List 10 20 30 40 50	
	Compute Distance along Chain: <a>Select>	N.

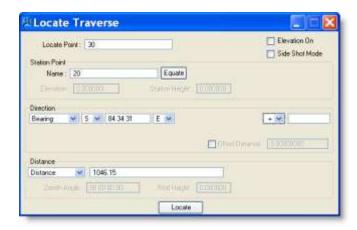
Use Inverse to check the distance and bearing between point(s).

Use the Locate > Traverse to fix the points. If points will not inverse then delete all c:\program files\bentley\geopak\bin*.rsc files from your local drive and retry.

7.1.4 To Locate Points From Stored Points

Go to TOOLS > LOCATE > TRAVERSE

This will open the Locate Traverse dialog box. This will locate points relative to points already stored.



1. Distance can be set to *Value, Between two points* or *Radius of a curve* and Direction can be set to *Value, Bearing, Azimuth, or between two points.*

2. Fill in the following Locate Point Start Point Distance (Round to the nearest .01) Direction (round to the nearest second 0^00'00")

3. It is optional to designate an offset distance left or right of centerline (Make sure Offset Distance switch is checked if you wish to use this).

4. When all the information is entered, click on Locate button.

In the Coordinate Geometry window, the information confirming the storing of the point will appear.

There are a number of other LOCATE commands available. For more information on other commands see Geopak Help Online – Command Reference > Geometry OR *press F1 when dialog is active.*

7.1.5 To Store Simple Curves

In the Navigator Dialog set ELEMENT to Curve and Select the Add Element Or Go to **ELEMENT > CURVE > STORE > BY TANGENTS**

This opens the store curve dialog box which creates a curve using information that may be available. *Curve names should not be the same as the alignment name and can be up to eight characters long.*

Curve name: C1	Station PC	
Point Back. 10 Print 20 Pri Point. 20	Dersert Radus 🛩 3200	Ahead Tangent Point Ahead 30
	Store Curve	

1. Fill in the Curve name

2. Click the arrows on the back and ahead tangents until the diagram matches the type of information you have to enter.

3. Element Reference can be set to *Radius, Degree, Tangent or Length*.

4. Fill in the information asked for in the Back Tangent Reference, Element Reference, and Ahead Tangent Reference.

5. Click on STORE CURVE.

In the Coordinate Geometry window, the information confirming the storing of the curve will appear. Information such as PC, PI, PT, and other curve data will be displayed.

This is the most common dialog box you will use. For information on other methods of storing simple curves see Geopak Help Online – Command Reference > Geometry OR press F1 when dialog is active.

7.1.6 To Store Curves with Spirals

In the Navigator Dialog set ELEMENT to Point and Select the Add Element Or Go to ELEMENT > SPIRAL > STORE > BY TANGENTS

Spilal Name: 3	Type	SCS		and the second s
Back Targent	Elevent			Ahead Tangeri
	Entry Length		200	1.1.1
~~~	Redut	4	3(200	~*
Paint Back	Eak Length	iM.	200	Point Ahead
10				30
Pl Point				
20				

- 1. Set the Spiral Type to SCS.
- 2. Fill in the Spiral name

3. Click the arrows on the back and ahead tangents until the diagram matches the type of information you have to enter.

4. Entry Length and Exit Length should be set to the Spiral length.

5. Element Reference can be set to *Radius, Degree, Tangent or Length.* 

6. Fill in the information asked for in the Back Tangent Reference, Element Reference, and Ahead Tangent Reference.

7. Click on STORE SPIRAL.

In the Coordinate Geometry window, the information confirming the storing of the curve will appear. Information such as PISCS, Total tangent, Total Length, Total Delta, CS, ST, TS, SC and other curve data will be displayed.

This is the most common dialog box you will use. For more information on other methods of storing spiral curves see Geopak Help Online – Command Reference > Geometry OR *press F1* when dialog is *active*.

Coordinate Geometry will make three separate elements with this command.

These elements are spiral C1B, Curve C1, Spiral C1A

The B stands for the spiral before the simple curve. The A stands for the spiral after the simple curve.

Make sure any points you use to store these curves have already been stored or created in a previous command.

See Appendix A: Storing a Spiral with Master PI

#### 7.1.7 To Store the Chain from the Elements In the Navigator Dialog set ELEMENT to Chain and Select the Add Element Or Go to ELEMENT > CHAIN > STORE > FROM ELEMENTS

This will open the store chain dialog box. This allows you to create alignments from elements that have been stored. You may use alignment designations that you are familiar with such as G, A, B, etc. or names such as CL, ALT1, EXIST, etc. The only exception is if you are using RDS data, then the existing alignment has to be called G.

🛛 Store Chain From Elements 🛛 🗌 🗖 🔀				
Chain Name: DESIGN Begin at 0.00 🖌	Element Selection Element Type: Point			
Element List 10 CUR C1 CUR C2 CUR C3 50 Store Chain	Add 50			

- 1. Fill in Chain Name (up to 8 characters)
- 2. The next box can be set to *Station*, *Begin at 0+00 or As Is*.
- 3. Fill in beginning station if you choose this option
- 4. You now have two options
  - a. You can type the elements of the chain into the dialog box (This works best if you have several spiral curves. i.e. **SCS c1** This element doesn't exist under element types). Make sure to put a space between all the labels and elements.

Or

- b. Use box next to Add button
  - 1. Set to first element (i.e. curve)
  - 2. Choose first element
  - 3. Click on Add
  - 4. Repeat steps 1-3 until all elements are listed
- 5. When all the elements are listed in the dialog box, click on **Store Chain** button to create chain. Eg. STORE CHAIN DESIGN 10 CUR C1 SCS C2 SCS C3 50 STATION 0+00

After all the desired chains are saved and any necessary modifications such as equations (Section 30) are made, it is time to exit Coordinate Geometry. If you wish to save the COGO commands for future use or modification, you should go to FILE SAVE. *Note: this is not necessary because all the elements have been saved in a .gpk file. Element modification can be done without rerunning the commands.* 

*Rule of Thumb:* If it is not easily recreated, such as having to type in commands, save the COGO file. If the computer easily recreates it, don't save the COGO file.

*Important:* When storing Spiral-Curve-Spiral Curves be sure to enter them as <u>SCS cuvrename</u>. This is the only way to get the Master PI and Total Spiral information to show in the Describe Chain command. Eg. SCS SCS1 SCS SCS2 designates 2 spiral curves in a chain.

Coordinate Geometry & Horizontal Alignment

#### 7.1.8 To Get a Printout of Alignment Information

(This may be done *any* time after the chain has been created)

In the Navigator Dialog set ELEMENT to Chain and Select the Print/Describe Element Or Go to **ELEMENT > CHAIN > UTILITY** This will open the Chain > Describe dialog box



1. Highlight the chain you wish to see the information on.

2. Click on Describe. The information will appear in the Coordinate Geometry window.

Preferences	×
Input File <u>U</u> tility	
Input File Lestore	
<u>D</u> atabase Utilities	
<u>I</u> mport	•
<u>E</u> xport	
E <u>xi</u> t	

🖾 Input Fi	ile Utility	
File Name cogo	Subject [None]	
Output	Output File: cogo Apply	

#### Go to **FILE > INPUT FILE UTILITY**

This will open a dialog box in which you can enter a file name, select OUTPUT from the drop-down box and hit Apply.

You may now print this file from any file editor, such as NOTEPAD.

Close COGO dialog box.

Click NO to SAVE file.

NOTE: The preferences > output accuracy > distance may be changed to 2 decimals for future processes. See page 4-2.

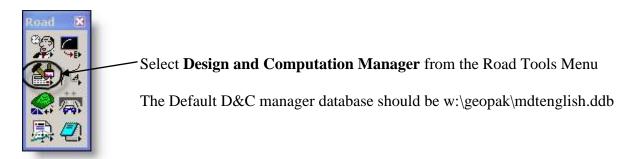
📕 Design and Computation Manager

#### 7.2 Draw Horizontal Alignment - Design and Computation Manager

00

X

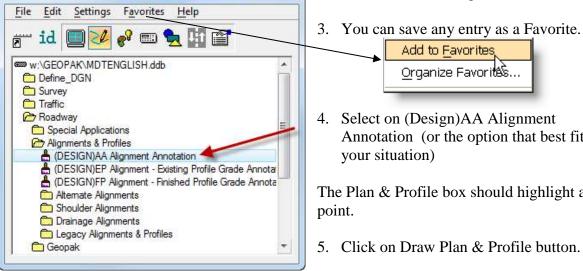
See Geopak Help Online – Command Reference > Design and Computation Manager Optional direct link to Help press F1 when dialog is active



- 1. Double Click on Roadway under Content.
- 2. Double click on Alignments & Profiles.

Add to <u>F</u>avorites

Organize Favorités.



(DESIGN) Aligr	
Place Influence	
Adhoc Attributes	Match Point Text
New Element Only	Draw Plan & Profile

4. Select on (Design)AA Alignment Annotation (or the option that best fits your situation)

The Plan & Profile box should highlight at this point.

- 5. Click on Draw Plan & Profile button.
- 6. If you are using Project manager Geopak will go directly to Plan & Profile Draw, otherwise it will stop at this dialog.

Open Job				
Јов) 🛛	Job JRM Q			
<u>O</u> K Cancel				

Enter the Job Number and select OK

🛙 Draw Plan & Profile 📃 🗖 🔀					
Item: (DESIGN) Alignment Annotation					
Element Type Chains	Label Scale: 100				
Key-in Points:					
Select Chain to Draw DESIGN					
DESIGN	Line Direction Labels				
	Line Length Labels				
	🔲 Line Labels Only				
	Curve Labels				
	🔽 Curve Data				
	Curve Labels Only				
	Place Curve Data by DP				
	Spiral Labels				
	Spiral Data				
	Spiral Labels Only				
	Place Spiral Data by DP				

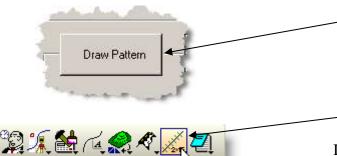
Draw Pl	an & Profile	X
Item:	(DESIGN) Alignment Annotation	
Element Type:	Stationing 🔽 Label Scale: 100	
Key-in Points:		
Select Chain to	<ul> <li>Tick Marks</li> <li>Tick Mark Stations</li> <li>PC/PT/TS/CS/SC/ST/PI Label</li> <li>PI Labels</li> <li>Small Ticks</li> <li>Ticks Left; Labels Left</li> <li>Large Ticks</li> <li>Ticks Left; Labels Left</li> <li>Control Point Labels</li> </ul>	***

- 1. Change Element Type: to Chains.
- 2. Line Direction Label & Curve Data should be turned on.
- 3. Click **only once** on the Alignment you wish to draw the Line Direction Labels and Curve Data should appear on the strip map.
- 4. Change Element Type: to Stationing See next dialog

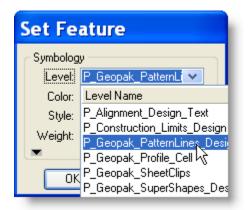
- Tick Marks, Tick Marks Station & PC & PT & CS... labels should be turned on (PI's are not placed on our strip map any longer).
- 2. Click **only once** on the chain to be stationed. This draws in the items checked in the dialog box.
- 3. Close this dialog

Your Horizontal Alignment should now be drawn in your design file according to the Road Design and Cadd Standards Manual standards.

# 8 Draw Pattern8.1 Draw pattern lines



ų	Draw Pat	tern Lines				
	Job: 234 Q	Chain: DESIGN		💌 🖧 Profile:	PPROF	V
	Beginning Left Offset(+):	300	]	Ending Left Offset(+):	300	
	Station:	10+00.00	<b>*</b> ••	Station:	115+79.09	+++
	Right Offset(+):	300	]	Right Offset(+):	300	
	Increment	50.00		Skew Angle	.0.00	
	Level	Symbology:		Draw Pa	ttern Lines	



If pattern lines are within 3 ft of each other remove the 50 ft pattern lines. In some cases the first and last pattern line could be a 50 foot pattern line and a horizontal control point. There may be two pattern lines at the same station; one of the pattern lines will need to be deleted.

US Customary - LV=P_Geopak_PatternLines_Design and/or LV=P_Geopak_PatternLines_Approach and/or LV=P_Geopak_PatternLines_Detour and/or LV=P_Geopak_PatternLines_FrontRD and/or LV=P_Geopak_PatternLines_Ramp Or

 2) Select Draw Pattern Lines by Station from the Road tool
 Menu

If you are using Project manager you will need to Create or Rename a run.

If you are using the Project manager the following will be filled in already

- a) Job
- b) Chain
- c) Stations

Otherwise fill them in.

Set the Offsets to 300 Feet both left and right. This should be sufficient for most designs.

Set the Button to Increment and Rural = 50 Feet, Urban = 25 Feet.

The symbology may have been set in the Project Manager DEFINE of the pattern working alignment definition. See <u>page 5-2</u>. If so, then it should be saved and default to this each time this dialog box appears.

Set the Pattern Lines Symbology to Lv=(see levels to left), Wt=0, Style=0, Color is your preference. NOTE: Draw each type of pattern line a different color to be able to get a critical cross section report.

If symbology levels you need do not show go to level manager and select GEOPAK filter.

Select Draw Pattern Lines. The pattern lines will be drawn in your active file.

Draw Patte	ern Lines	
Job: 234 🔍 Cł	hain: DESIGN	💽 🎉 Profile: PPROF 💽
Station: 10	00 0+00.00 +	Ending Left Offset(+): 300 Station: 115+79.09 ++
Once	mbology:	Skew Angle 0.00

#### 8.2 Draw Pattern Lines From Cross Sections



	Set Feature
	Symbology Level: P Geopak_PatternLive Color: P_Geopak_PatternLines Weight: 0 V OK Cancel
E Di	aw Pattern Lin 🔳 🗆 🔀
XS DG	N File: C:\dgn\1234RDXSF001.DGN
XS Ba	seline: DESIGN
Sym	pology:
	Draw Pattern Lines

US Customary - LV=P_Geopak_PatternLines_Design and/or LV=P_Geopak_PatternLines_Approach and/or LV=P_Geopak_PatternLines_Detour and/or LV=P_Geopak_PatternLines_FrontRD and/or LV=P_Geopak_PatternLines_Ramp

#### **Options:**

Draw pattern lines at Horizontal Control points, Superelevation Transitions, and Bridge Ends. Use the ONCE option and specify the station in Beginning for one pattern line.

This is required in order to get the needed information to the survey crews. The survey crew needs the critical cross section for the data collects to allow them to stake out the project.

Select Create Pattern lines from Xsections from Road Tool Menu.

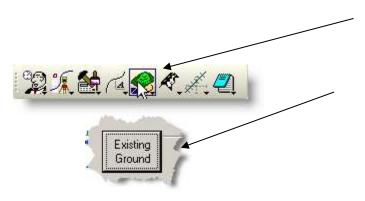
Note: Be sure you are in the strip map before drawing the pattern lines.

- Check the Pattern Lines Symbology to Lv=(see levels to left), Wt=0, Style=0, Color is your preference. The symbology may have been set in the Project Manager DEFINE of the pattern working alignment definition. See page 5-2. If so, then it should be saved and default to this each time this dialog box appears. If required levels do not show in the symbology selection dialog box, then open the level manager and select GEOPAK as the level filter.
- 2. Set the XS Dgn to the file you drew the cross sections in. (This is called the working cross section file)
- 3. Select Draw Pattern Lines. The pattern lines will now be drawn in the active design file.

Note: Be sure to set the pattern definition under working alignment definition. See Page 5-2

# 9 Existing Ground – DTM

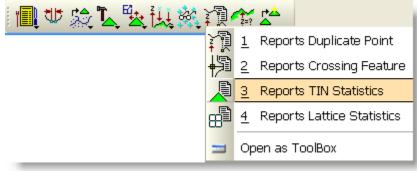
Survey/Photogrammetry generates the DTM (.tin) files so this chapter is to check that file and show what it contains.



Go to **Applications-GEOPAK ROAD > DTM Tools**, or **DTM on the Road Tools Dialog** or Click on **Existing Ground** button in *Road Project.* 

A TIN file, generated by Photogrammetry, should exist already for the project. This is the Digital Terrain Model file. The following may be done to check that file.

#### 9.1 Triangle Statistics



Go to Reports TIN Statistics

This will open a dialog box that gives information about triangulated file.

📕 Re	port Tin	St 📘	
TIN: 1	234RDDTM00	D7.TIN C	٤
Decir TIN Sta	mal Points: 2 atistics	<b>*</b>	
Numbe	r of Data Po r Of Lines:	334747	
Numbe	r Of Triangle r Of Breaks: r Of Contour	es: 221049 0 s: 0	
Number Of Voids: 28 Number Of Islands: 0			
Numbe	r Of Holes:	0	
North Easl Elev	Minimum 1263290.81 551982.87 2391.20	1267323.10 570084.74	
Process			

This allows you to check and make sure that all your points are not at the same spot or any other mistakes that are obvious such as 1000-foot difference in elevations when you only have a max. 100 foot difference.



Go to LOAD > DTM Feature This will open the Load DTM Feature dialog.

- Click File > Open
- Select W:\GEOPAK\
- DTMEXISTING.lpf or DTMPROPOSED.lfp or EROSION.lpf file that sets symbology for loaded features. (below)

Name	Number 🛆	Description	Logical	Color
*E_Misc_DTM_Boundary [STANDARD]	1137	Survey - Existing DTM Boundary - Line	Master	4
E_Misc_DTM_BoundaryPoint [STANDARD]	1138	Survey - Existing DTM Boundary - Point		4
E_Misc_DTM_BoundaryText [STANDARD]	1139	Survey - Existing DTM Boundary - Text		
*E_Misc_DTM_GradeBreak [STANDARD]	1140	Survey - Existing Grade Break - Line	Master	7 🗖
E_Misc_DTM_GradeBreakPoint [STANDARD]	1141	Survey - Existing Grade Break - Point		7 🗖
E_Misc_DTM_GradeBreakText [STANDARD]	1142	Survey - Existing Grade Break - Text		
*E_Misc_DTM_GroundShot [STANDARD]	1143	Survey - Existing Ground Shot - Point	Master	2
E_Misc_DTM_GroundShotText [STANDARD]	1144	Sivey - Existing Ground Shot - Text		
E_Misc_DTM_Island [STANDARD]	1145	Survey - Existing DTM Island - Line		<mark>-</mark> 5
E_Misc_DTM_IslandPoint [STANDARD]	1146	Survey - Existing DTM Island - Point		<mark>-</mark> 5
E_Misc_DTM_IslandText [STANDARD]	1147	Survey - Existing DTM Island - Text		
E_Misc_DTM_MiscDTMLine [STANDARD]	1148	Survey - Existing DTM Misc Line - Line		
E_Misc_DTM_MiscDTMLinePoint [STANDARD]	1149	Survey - Existing DTM Misc Line - Point		
E_Misc_DTM_MiscDTMLineText [STANDARD]	1150	Survey - Existing DTM Misc Line - Text		
E_Misc_DTM_MiscDTMPoint [STANDARD]	1151	Survey - Existing DTM Misc Point - Point		📕 З
E_Misc_DTM_MiscDTMPointText [STANDARD]	1152	Survey - Existing DTM Misc Point - Text		
*E_Misc_DTM_Obscure [STANDARD]	1153	Survey - Existing DTM Obscure - Line	Master	7 📃
E_Misc_DTM_ObscurePoint [STANDARD]	1154	Survey - Existing DTM Obscure - Point		7
E_Misc_DTM_ObscureText [STANDARD]	1155	Survey - Existing DTM Obscure - Text		
E_Misc_DTM_SurfaceExisting [STANDARD]	1156	Survey - Existing Surface - Line		2
E_Misc_DTM_SurfaceExistingPoint [STANDARD]	1157	Survey - Existing Surface - Point		2
E_Misc_DTM_SurfaceExistingText [STANDARD]	1158	Survey - Existing Surface - Text		
1				

Load DT File Load File: TIN Display Preferen Load: Extent	M Feature	TM007.'	TIN	ME.	۹ [	Lo	ad
	E_Contours_Ma	4	Weight 0 1 3 0	Style 0 0 0	Display OFF OFF ON ON ON		양1 81 오 8
Minor Lines Smooth: None Range V Mi	E_Contours_Mi Minor Inter Registrat nimum Z: 2391.19	ion: 0.			n Area:	2.000 0.000 Re	

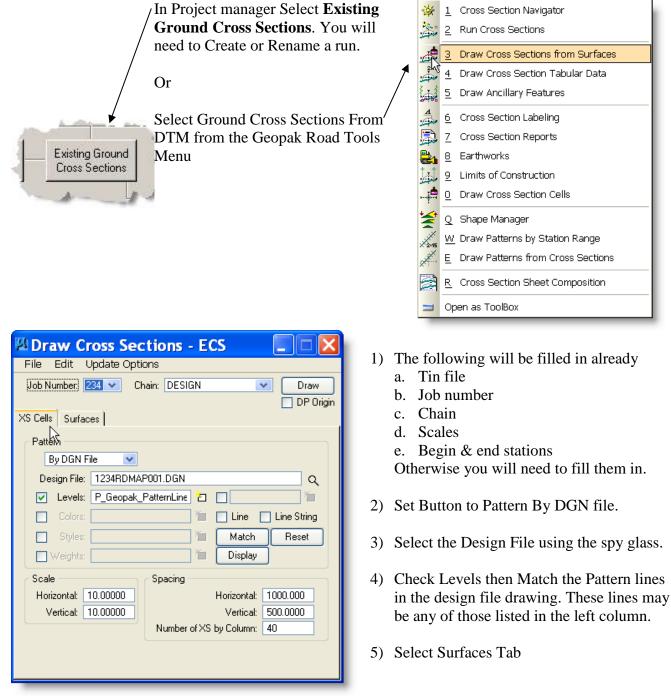
- Set Load File to TIN and use spy glass button to select the Tin file.
- 2) Set the Feature to the feature you wish to display.
- 3) If displaying contours be sure to click the READ button to get elevation information.
- 4) Select Load button

Notes: If displaying triangles, the triangles should now be displayed on the screen laid over your alignment. Now you can visually inspect the triangle file for any gaps that should not exist or if there are extra triangles that should not be there. If there are, go back to Build-Triangles and adjust the side length until it looks right. A contour map may be created by using the **macro**: RD > Create DGNs > select Contour Map File, English and use the PH file as the Base Map > Create DGN'S - creates ####RDCMA001.dgn.

## **10 Existing Ground Cross Sections**

### **10.1 Creating Ground Cross Sections**

Be sure you have a pattern line before you create cross sections.



10-1

US Customary - LV=P_Geopak_PatternLines_Design and/or LV=P_Geopak_PatternLines_Approach and/or LV=P_Geopak_PatternLines_Detour and/or LV=P_Geopak_PatternLines_FrontRD and/or LV=P_Geopak_PatternLines_Ramp

File Edit Update	Sections - ECS Options	; <u> </u>
Job Number: 166 💌	Chain: COUNTYEX	Draw     DP Origin
Type Name	Display Settings	Method
TIN 5166000DIDTM		Triangles 🔁
		₩ ₩
Details		
Tin File: 💌 🤱	5166000DIDTM001.TIN	Q
	5166000DIDTM001.TIN Triangles 🔽	Q Type: Line String 💟
		·
Method: Display Settings		Type: Line String 💌
Method:	Triangles 💌	Type: Line String 💌 Filter Tolerances
Method: Display Settings By Feature	Triangles 💌	Type: Line String  Filter Tolerances Horizontal: 0.3000

The symbology may have been set in the Project Manager DEFINE of the cross section. See <u>page 5-4</u>. If so, then it should be saved and default to this each time this dialog box appears.

á id	OK Close
<ul> <li>Roadway</li> <li>Special Applications</li> <li>Alignments &amp; Profiles</li> <li>Geopak</li> <li>Plan</li> <li>XS</li> </ul>	
🕒 🕒 XS-EGRND Existing Grou	nd Delineation

- 1) Select a .TIN file using the spy glass icon next to TIN FILE.
- 2) Set Method to **Triangles** and Type to **Line String**.

#### 3) Display Settings:

- 1) Select Feature
- 2) Select D&C Manager (paintbrush icon)
- 3) Select Roadway > XS > XS-EGRND
- 4) Select OK (see below left)
- 4) Set Void symbology, using COPY/PASTE from display settings.
- 5) Change Void color to 0 (white).
- 6) You must *Add or Modify Surface* before plotting cross sections.
- 7) Generate Working XS dgn, if you haven't yet. See section 10.2 below.
- 8) Make sure you're in the cross section file. Select *Draw*. This will plot the cross section in the active design file. (This is called the working cross section file)

Note: Be sure to set the Cross section view & existing ground definition under working alignment definition. See <u>page 5-3</u>.

## **10.2 Generate Existing Cross Section Drawing:**

Plane	Pavet	and Preservate	n Mei I		1
N			11		-
-				_	State Map
-			1	_	Series
		they Serves	# of Files		
14		1	1		51
		1	1		
		1	1		
		1	1		
		1	1		
		1	1		1 C
		1	1		
		1	1.	.4	1.
					10
			Bing Serves           4         0           4         0           4         0           4         0           4         0           4         0           4         0           4         0           4         0	Ing Sens.         # of Figs           4         1         1           4         9         1         1           4         9         1         1           4         9         1         1           4         9         1         1           4         9         1         1           4         9         1         1           4         9         1         1           4         9         1         1           4         9         1         1	Img Seres         # of Flies           4         1         1         4           4         5         1         4           4         1         1         4           4         1         1         4           4         1         1         4           4         1         1         4           4         1         1         4           4         1         1         4           4         1         1         4           4         1         1         4           4         1         1         4

Macro – Road Design > Create DGN > Select Working X-Sections and English > Create DGN'S This creates a _____RDXSF001.dgn file.

This may be done at any time during this process **before** the DRAW button is selected.

## 11 Existing Ground Profile

#### Open GROUND PROFILE dialog

Existing Ground	1
Profile	1

1) Within the Project manager dialog select **Existing Ground Profile** 

If you are using Project manager you will need to Create or Rename a run.

🛛 Ground	Profil
Profile Name:	EXPROF
Job Number:	234 Q
Operator:	oc
Chain:	DESIGN 💦
Offset:	0.000
Beg Station:	10+00.00
End Station:	115+79.09
Increment 💌	5.000 TIN 💌
Radius of outpu	t circle: 10.0
TIN File: C:\dg	n\1234RDDTM007.TIN 🤍
	Apply







- If you are using the Project manager working alignment Define then the following will be filled in already. See <u>page 5-3</u>
  - a. Job number
  - b. Operator
  - c. Chain
  - d. Begin & end stations

e. Tin File (from survey, district or photo) Otherwise you will need to fill them in.

- 2) Set the Offset to 0.00 (for the centerline elevations)
- Set Increment to 5 or 10 depending how detailed the DTM data is. (Photogrammetry = 5, Data Collector = 10)
- 4) Select Apply.
- 1) Select OK. This will save the input data into the file selected

Note: You may change the file name to a COGO Input to save the file as a backup.

1) Press the YES button. This will store the profile in the GPK file.

Note that the profile can be stored later if the NO button is selected using the input file stored above. Open the input file within COGO and process it to store the profile.

- Press the Yes button to remove the temporarily 3D element use to create the profile.
- 3) Close Ground Profile window and click YES to save settings.

📕 Design and Computation Manager File Edit Settings Favorites Help

w:\GEOPAK\MDTENGLISH.ddb

Special Applications 🗁 Alignments & Profiles

Alternate Alignments

C Shoulder Alignments

Drainage Alignments Legacy Alignments & Profiles

🛔 (DESIGN)AA Alignment Annotation

📕 (EXISTING) Profile ... 🔔

id id

🛅 Define_DGN

🛅 Geopak

Place Influence

New Element Only

C Survey

🛅 Traffic 🗁 Roadway

### **11.1 Draw Vertical Alignment - Design and Computation Manager**

۸

Ξ



📌 📖 🐂 🛄 😭

(DESIGN)EP Alignment - Existing Profile Grade Annotating (DESIGN)EP Alignment - Finished Profile Grade Annotation)

Match Point Text

Draw Plan & Profile

Select Design and Computation Manager from the Road Tools Menu

Be sure you have the W:\GEOPAK\MDTENGLISH.DDB file loaded.

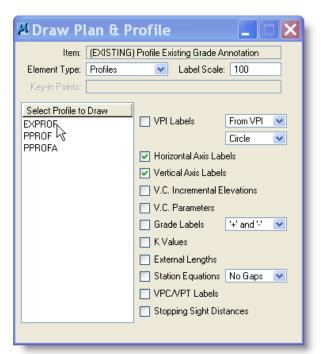
- 1) Double Click on **Roadway** under Content.
- 2) Double click on Alignment & Profiles under Content.
- 3) Select on (DESIGN)EP Alignment -**Existing Profile Grade Annotation**
- 4) Click on Draw Plan & Profile button.

If you are using Project manager Geopak will go directly to Plan & Profile Draw, otherwise it will stop at this dialog.

Open Job	
Job) 1rc	Select
<u>0</u> K	Cancel

5)	Enter	the .	Job	Number	and	select	OK
----	-------	-------	-----	--------	-----	--------	----





🛛 Profile - EXI	PROF 🔣
Profile Range Begin Station:	10+00.00
_	
End Station:	115+79.09
Begin Elevation:	2,499.4280
End Elevation:	2,440.0665
Maximum Elevation:	2594.0480
Minimum Elevation:	2398.5913
Plot Settings	
Horizontal Scale:	100.0000
Vertical Scale:	10.0000
Begin Station:	10+00.00
End Station:	115+79.09
Strip Grade Increment:	
Profile Reference Point	
Reference Station:	10+00.00 R 1
Reference Elevation:	2360.0000
X:	553978.7616
Y:	1254629.230E DP
Profile Cell	
PGL Chain: DESIGN	~
Draw Cell at XY	Identify Cell
ОК	Cancel

Open the design file _____RDMAP001.dgn you are working on.

Select a space in your design file away from the current drawings.

Horizontal & Vertical Axis Labels should be turned on for *Existing Profile*.

Select the profile you wish to plot.

The profile dialog will open. See below.

The top of this dialog will give you information about the profile and allow you to set the scale, stations and increment.

Leave the Strip grade Increment blank.

The bottom of this dialog allows you to set the parameters of how the vertical alignment will be placed in the design file.

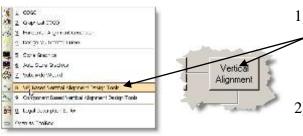
The DP Station should be your beginning station of your reference grid. Use the closest even station before your alignment.

DP Elevation is the lowest elevation of your reference grid. This should be below the minimum elevation of your profile. Use the closest 30 feet below the Minimum Elevation.

DP X & DP Y set the location of the lower left corner of the reference grid. Hint: **Draw cell At XY**. This will allow easy recall of profile location.

When everything is set to draw the vertical alignment, select OK.

## **12 Vertical Alignment**



🛛 Settings 🛛 🛛 🕅
Job: 234 🔍
Operator Code: oc
PGL Chain: DESIGN 💌
Horizontal Scale: 100.000000
Vertical Scale: 10.000000
Reference Station: 10+00.00 R 1
Reference Elevation: 2360.000000
X: 553978.7616C
Y: 1254629.230E
Profile Cell
Draw Cell at XY
<u>D</u> K Cancel
Preferences
Elevation Increment: .001
Length Increment: .001
Grade Increment: .0001
Maintain Curve Length

Hold Vertical Curve

<u>0</u>K

Window Center Current VPI

Ķ

Cancel

- Within the Project manager dialog select
   Vertical Alignment or select VPI Based Vertical Alignment Generator from the Road tool Menu
- 2) If you are using Project manager you will need to Create or Rename a run.
  - 1) If you are using the Project manager working alignment Define then the following will be filled in already. See page 5-3.
  - a. Job number
  - b. Chain
  - c. Reference Station (this is for reference grid)
  - d. Reference Elevation (this is for reference grid)
  - e. Horizontal Scale
  - f. Vertical Scale

Otherwise you will need to fill them in.

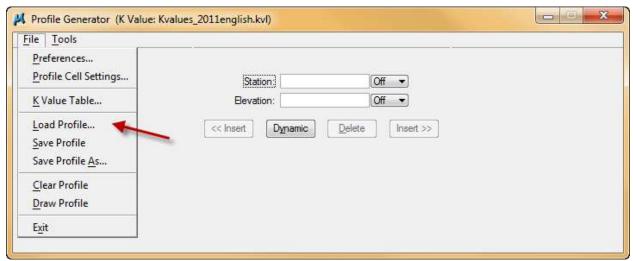
- 2) Click Identify Cell then Tentative and Select the Profile Cell. This should fill in the above information.
- 3) Select on OK

User Preference for the profile Generator.

Click File > Preferences on Profile Generator. If using the COGO Best Fit tool, make sure the Max Shot Distance preference is set correctly. This preference should be set so that no two points are farther apart than the distance specified in this preference. The program uses this Max Shot Distance when determining the order of the candidate points.

Insure the K Value Table being used is: W:\GEOPAK\Kvalues_2011english.kvl

rofile Cell Settings	File					
Value Table	Op	en	Sag Maximum	Crest Minimum	Crest Maximum	T
oad Profile	Sav	e	10.0	3.0	3.0	
ave Profile	Sav	e As	17.0	7.0	7.0	1
		eeryske///	26.0	12.0	12.0	
ve Profile <u>A</u> s	Exit		37.0	19.0	19.0	
ear Profile	35	49.0	49.0	29.0	29.0	
	40	64.0	64.0	44.0	44.0	
aw Profile	45	79.0	79.0	61.0	61.0	
įt 🛛	50	96.0	96.0	84.0	84.0	
<u></u>	55	115.0	115.0	114.0	114.0	
	60	136.0	136.0	151.0	151.0	
	80	231.0	231.0	384.0	384.0	
		ΟΚ	Cancel	Add	Delete	h



If you have a profile you wish to edit, go to FILE-LOAD. This allows you to edit already created vertical alignments.

If you are creating a new vertical, begin by entering your first station. If you Select on dynamic, you will be able to place your VPI graphically or you may key-in the value.

Note: If you are typing the Station, Elevation, Grade etc. be sure to select return to enter the numbers.

🖽 Profile Generator	(Active Profile: PPROF, K Value: K)	Values_20 🔳 🗖 🔀
<u>F</u> ile <u>T</u> ools		
VPI 1	VPI 2	VPI 3
Station: 10+00.000	Station: 21+00.000 Off 💌	Station: 30+50.000
Elevation: 2499.428	Elevation: 2495.160 Off 💌	Elevation: 2464.410
Back Grade: -0.3880 Off		Fwd Grade: -3.2368 Off 💌
Length: 1100.000	<pre></pre>	Length: 950.000
(	Symmetrical Vertical Curve	
	Speed: 60 🛩 L: 500.000	
Station: 18+50.000	HP Station: 18+50.000 K: 175.5099	Station: 23+50.000
Elevation: 2496.130 H	PElevation: 2496.130 SSD: 628.750	Elevation: 2487.068
Previous 1		▶ 5 <u>N</u> ext

To create the 2nd VPI Select on **INSERT-AFTER**. This will move you to the next VPI.

The VPI in the center is always the one that you will be creating or editing.

Clicking on DYNAMIC will allow you to graphically move and place VPI's. Clicking on INSERT will always create new VPI's. Clicking on **NEXT** or **PREV** will allow you to move back and forth between the VPI's.

If you have a profile you wish to edit, go to **FILE-LOAD**. This allows you to edit already created vertical alignments.

Normal vertical entry process:

- 1. Enter beginning VPI dynamically and place at starting elevation.
- 2. Place next VPI at some multiple of 20' and set elevation to nearest .05 of where you want it.
- 3. Lock the elevation and go through setting the L (length) to a good round number.
- 4. Adjust as needed to match your speed, length and sight distance.

To create a vertical curve for the design speed, change the **Speed** to the desired speed. Beware if a zero appears in the speed box it will kick you out and you will have to start over. This will give you the desirable length of curve for that speed in the Length box. Round the length up to the nearest 50' increment.

Note: The Speed, Length, or K values can be entered to determine the vertical curve length. The length should always be rounded up to the nearest 5 foot increment.

Adjustments can be made to the station, elevation, forward or back grade. When these are adjusted the vertical curve desirable length is adjusted automatically.

1. Go to **FILE > SAVE PROFILE**.

Save Profile As
Profile: PROF
Input File: j5RMooc.inp
<u> </u>

2. Type in name of profile. (Max. 5 characters) like PROF

This will append the input lines used to create the profile to the job input file created by Geopak. The file name will be call J<u>iobOoc</u>.inp. Where "job" is the Job Number and "oc" is the operator code. For example the file may be called j9RMOoc.inp. Shown below is an example of the input lines.

Coordinate Geometry Input lines created by Profile Generator

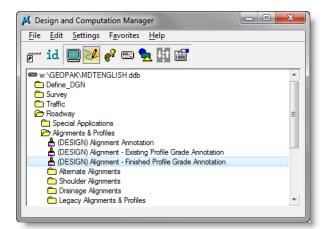
STORE PROFILE PROF VPI 1 S 1000.000000000 E 2799.880000000 U 224.8275862073 VPI 2 S 1200.000000000 E 2799.950000000 L 224.8275862073 VPI 3 S 2224.6600000001 E 2809.1719400000 Bridge end VPI 4 S 2693.600000001 E 2813.3924000000 Bridge end VPI 5 S 2786.1600000001 E 2814.2254400000 END PROFILE

3. Hit return and Select on OK.

The next step is to draw the new profile over the existing ground profile.

## 12.1 Draw Vertical Alignment - Design and Computation Manager





(DESIGN) Prof	ile F1 🖃 🗆 🔀
Place Influence	
Adhoc Attributes	Match Point Text
New Element Only	Draw Plan & Profile
	Ne

Open Design and Computation Manager

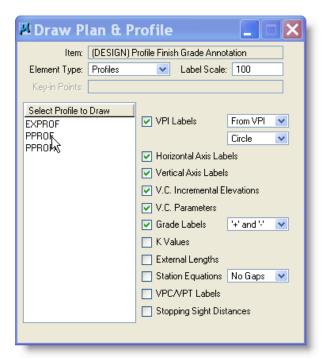
Be sure the you have the MDTENGLISH.DDB file loaded

- 1) Double Click on **Roadway** under Content.
- 2) Double click on **Alignment & Profiles** under content
- 3) Double click on either **Urban** or **Rural** under Content
- 4) Select on (DESIGN) Alignment Finished Profile Grade Annotation
- 5) Click on Draw Plan & Profile button.

If you are using Project manager Geopak will go directly to Plan & Profile Draw, otherwise it will stop at this dialog.

Open Job		
Job) 1rc	Select	
<u>O</u> K Cancel		

7) Enter the Job Number and select OK



🛿 Profile - PPROF 🛛 🗙		
Profile Range		
Begin Station:	10+00.00	
End Station:	68+00.00	
Begin Elevation:	2,499.4280	
End Elevation:	2,587.2867	
Maximum Elevation:	2587.2867	
Minimum Elevation:	2477.1453	
Plot Settings		
Horizontal Scale:	100.00000	
Vertical Scale:	10.00000	
Begin Station:	10+00.00	
End Station:	68+00.00	
Strip Grade Increment:		
Profile Reference Point		
Reference Station:	10+00.00 R 1	
Reference Elevation:	2360.000000	
X:	553978.7616	
Y:	1254629.230E DP	
Profile Cell		
PGL Chain: DESIGN		
Draw Cell at XY	Identify Cell	
ОК	Cancel	

VPI Labels, Horizontal & Vertical Axis Labels, V.C. Increment Elevations, V.C. Parameters & Grade Labels should be turned on for *Design Profile*.

Click on the profile you wish to plot.

The profile dialog will open. See below.

Click Identify Cell and select the cell of that grid. This will fill in some needed information.

The top of this dialog will give you information about the profile and allow you to set the scale, stations and increment.

Leave the Strip grade Increment blank.

The bottom of this dialog allows you to set the parameters of how the vertical alignment will be placed in the design file.

The DP Station should be your beginning station of your reference grid. Use the closest even station before your alignment.

DP Elevation is the lowest elevation of your reference grid. This should be below the minimum elevation of your profile. Use the closest 30 feet below the Minimum Elevation.

DP X & DP Y set the location of the lower left corner of the reference grid. The grid should already be defined for existing profile

When everything is set to draw the vertical alignment, select OK.

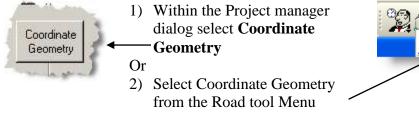
You may now close all dialog boxes.

## 13 Calculate Superelevation

### 13.1 Storing Superelevation rate on Curves

# *NOTE:* Storing the Superelevation rates on the curves only needs to be done to get the super elevation on the curve data.

Prior to creating the Superelevation file the Superelevation rates need to be stored in Coordinate Geometry for the curves. If you wish to have the super information appear in you curve data on your horizontal alignment, you will need to do this before you draw the alignment.



If you are using Project manager you will need to Create or Rename a run.



To determine the proper Superelevation rates see pages 9.3(3) (English) and 9.3(4) (Metric) in the Road Design Manual.

ngth Radius Delta Degree of Curv [°] e
ngth Radius Delta Degree of Curv [°] e
ngth Radius Delta Degree of Curv e
ngth Radius Delta Degree of Curvie
ngth Radius Delta Degree of Curvie
1.0229 4000.0000 2° 26' 59.00'' 1° 25' 56.62'' 0.0800
4.5329 4000.0000 2* 30' 0.00'' 1* 25' 56.62'' 0.0700
44.6604 5000.0000 22° 17' 3.00'' 1° 8' 45.30'' .03

- 1) Go to COGO Navigator
- 2) Set Element to Curve
- 3) Select the curve to change in the "e" column. Determine super rate for curve in table by radius and design speed. If normal crown then leave e column blank.
- 4) Type in the super rate (i.e. .03)
- 5) For curves with spirals there is no need to store the super rate on the spirals.

🖾 Coordinate Geometry Job: 234 Operator: oc
<u>File E</u> dit E <u>l</u> ement <u>V</u> iew <u>T</u> ools
$\mathbf{\mathcal{R}} \cong \mathbf{\mathcal{I}} \stackrel{*}{\leftarrow} $
Temporary Visualization 🔽 OFF (Feature) 🔽 📴rowse 99.1234 🔽 9^9'9.12'' 🔽 <<
COGO Key-ini CHANGE CURVE C3 E .03
<* 1 CHANGE CURVE C1 E .08 Original superelevation rate: (No Elevation) Modified superelevation rate: 0.0800
Original superelevation rate: (No Elevation) Modified superelevation rate: 0.0800
Original superelevation rate: (No Elevation) Modified superelevation rate: 0.0700
<* 3 CHANGE CURVE C3 E .03
Original superelevation rate: (No Elevation) Modified superelevation rate: 0.0300

After the Curves have the super rate stored on them you can draw the Horizontal alignment and the Super rate will appear in the curve data. See <u>page</u> 7-8 on how to draw the Horizontal Alignment. Important: The curve data will need to be edited for the super rate. Geopak places it as S = 0.06% it should be shown as S = 6%.

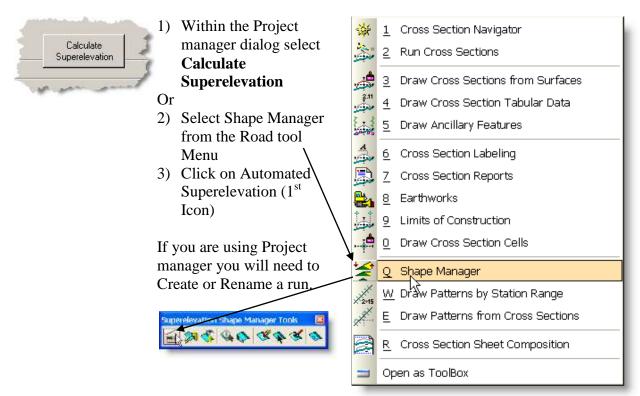
## 14 Custom Line Styles

Sometimes a line style defined in the D&C Manager is correct, but just doesn't fit the purpose in your drawing. That's when custom line styles can be used. Elements > Line Styles > Custom

This shows the default line style (top) and scaled up line style (bottom). Many uses for this too

8 Line Styles		
Names P_DRAINAGE_PIPE P_GATE P_GUARDRAIL P_SLOPE_CUT SLO P_SLOPE_DAYLIGF P_SLOPE_DAYLIGF	Width           □rigin:         0.0000           End:         0.0000           ✓         Scale factor:         3.000000           Shift:         None         ✓	
w:\RESOURCES\GPKDD	DB.RSC	
Click to Activate (P_0	(UARDRAIL)	

## 15 Generate Superelevation (SHAPES)



🗵 Automated Superelevation 🔳 🗖 🔀		
Station Range		
Chain: DESIGN 💌 🔊		
Begin: 10+00.00 ++++		
End: 10+00.00 ***		
Facility: Undivided		

See below for information on the Directories, Preference and symbology dialogs.

Superelevation	File Directories		
Preference Files Path:	w:\GEOPAK\	Q	Default
e Files Path:	w:\GEOPAK\	Q	Default
Length Files Path:	w:\GEOPAK\	Q	Default
Autoshape Input Files Path:		Q	Default
Clear All Default All			
OK Cancel			

Default Directory set by the system for the Geopak Superelevation setup files.

Automated S	Superel	evation 📃 🗆 🔀
File		
<u>D</u> irectories		Station Range
Preferences	۹	Chain: DESIGN 💽 🛵
Level Symbology		Begin: 10+00.00 🚸
Eever Symbology	$\sim$	End: 10+00.00 ++++
<u>E</u> xit		Epoilitur Undivided

🛛 Superelevatio	n Preferences:AK\S 🗖 🗖 🔀
Eile	
🔁 🚔 🖬 ជុ	
e Runo	off Length 📔 Tangent Runout 📔 Adjust Factors 🛛 👌 💶
e Method:	Radius Table 🔽
Table Name:	S_E_2LANEOPENROAD_E
Speed Interpolation:	Linear V
Radius Interpolation:	Conservative Entry S_E_2LANEOPENROAD_E.CSV
e Rounding Increment:	1.000000

The _E file is used in this preference tab (e).

Superelevation Preferences:AK\S				
<u>F</u> ile				
ా 🚅 🖬 ఫ				
e Runoff L	ength 🔋 Tangent Runout 📔 Adjust Factors 🛛 🕅 💶			
Spiral				
<ul> <li>Spiral Length = Runoff Len</li> </ul>	gth 🔘 Spiral Length = Runoff Length + Tangent Runout			
Circular Curve				
Runoff Length Method:	e Table 💌			
Table Name:	S_E_2LANEOPENROAD_L.CS Q 🖻			
Speed Interpolation:	Linear V			
e Interpolation:				
Width Basis:	Nominal Lane Width			
Nominal Lane Width:	12.00			
Consider Half Lane If Width <	7.00			
Length Rounding Increment:	0.010000			

The  $_L$  file is used in this preference tab (Runoff Length)

📕 Automated S	Superelevation - U	Intitled	-	x
<u>F</u> ile				
		Station Range	•	
Job:	234 Q	Chain: DESK	GN 🔻	Å.
Design Speed:	60	Begin: 10+0	0.00	+++
Transition ID:	Linear 💌	End: 14+5	).98	+++
Preference File:		Facility:	Undivided	-
e Selection:			All Cases	-
	S_E_LOWSPEEDURBAN			
Profile: <sele< td=""><td colspan="4">S. E. MULTILANEHIGH</td></sele<>	S. E. MULTILANEHIGH			
Tie: Offset	S_M_LOWSPEED	URBAN	0	
% Slope			ependent	
-2.0000	-0.0000 -1	2.0000	2	
				×
4				
				₩
Create Input File: 1234RDSUP001.inp				
Generate Superelevation Transitions				

Then the corresponding preference file (.sep) is used in the superelevation dialog drop-down.

🗵 Automated Superelevation 🔲 🗖 🔀				
File	_			
Directories		Station Range		
<u>P</u> references	۹	Chain: DESIGN 💌 🖧		
Level Symbology		Begin: 10+00.00 ++++		
		End: 10+00.00 ***		
<u>E</u> xit				

🛿 Superelev 🔳 🗆 🗙	Set Feature
Dependent Shapes:	Symbology Level: R Geopak_SuperSh V Color: Style: P_Geopak_SuperShapes
 	Weight: 2 V OK Cancel

Set Symbology: File > Level Symbology Double-click in black boxes to set each one.

Dependant Shapes: Level = (see levels at left), Co=6,

Style=0, Wt=2

Independent Shapes: Level = (see levels at left), Co=1, Style=0, Wt=2

Levels for US Customary: P_Geopak_SuperShapes_Approach P_Geopak_SuperShapes_Design P_Geopak_SuperShapes_Detour P_Geopak_SuperShapes_Frontage P_Geopak_SuperShapes_Ramp

📕 Automated S	Superelevation	- Unt	titled			x	
<u>F</u> ile							
			Station R	ange			
Job:	234 Q		Chain: D	ESIGN	▼ ,	8	
Design Speed:	60		Begin: 1	0+00.00	•	€+	
Transition ID:	Linear	-	End: 1	4+50.98	•	••	
Preference File:	OPENROAD	•	Fac	ility: Undivi	ded	•	
e Selection:	8% e max	•	L Selec	tion: All Cas	es	•	
I	Left			Right			
Profile: PROF	•						
Tie: Offset	▼		Offset:	0.0000			
% Slope	Offset	Offs	et	Depende	nt 🛛	_	
-2.0000	-0.0000	-12.	0000	V			S
						×	c.
						″ ◀-	
Create Input		IPON	1 inn		0	2 🖪	
Create Input File: 1234RDSUP001.inp							
Generate Superelevation Transitions							
		_			NL		ļ

#### QUICK ENTRY

Quick Entry	
Facility	Undivided 💌
Median Width:	0.0000
Lane Widths:	12.0000
Total Number of Lanes:	2
Nominal Percent Slope	-2.0000
ОК	Cancel

If you are using Working Alignment Define skip to step 5

- 1) Fill in Job Number
- 2) Fill in the Design Speed
- 3) Fill in Chain
- 4) Fill in Begin and End Station
- 5) Set Preference File
- 6) The following should be set automatically by Preference file.
  - a) e Selection
  - b) Facility
  - c) L Selection

If not set to defaults see Directory Setting above.

Setting up the Left and Right shape clusters

- 1) Fill in the profile to be used
- -2) Select Quick entry See dialog below
- 3) Fill in name of super input file to be created.
- 4) Select Generate Superelevation Transition and see Superelevation Text Editor Dialog .
- 1) Fill in Lane widths
- 2) Fill in number of lanes
- 3) Fill in nominal percent slope
- 4) Select OK and return to dialog above.

🖾 Text Editor: 1234RDSUP001.INP 📃 🗖 🔀				
<u>File E</u> dit <u>C</u> riteria				
D 🛎 🖬 👗 🖿 🖺 🗠 🗠 🎘				
/* Superelevation Settings and Parameter Create Superelevation Sha				
Project Name: c:\dgn\GEOPM\CLASSV8I.prj User: c:\dgn\GEOPM\projdbs\BOB Run Name: SUPR				
Unit System is english. Created input file "1234RDSUP001.INP".				
Created activity log file "1234RDSUP001.log". Created on Wed, Sep 15, 2010 at 11:15.				
Using Preference File "S_E_2LANEOPENROAD" Using e Selection of "8% e max". Using Length Selection of "All Cases"				
Using Design Speed of 60.000000.				
*/				
auto shape job number = 234				
Line: 1  Col: 1				

## **15.1** Adjusting super transitions

📕 Automated S	uperelevation -	Untitled		×	
<u>F</u> ile					
		Station Ra	nge		
Job:	234 Q	Chain: DE	sign 👻	Å.	
Design Speed:	60	Begin: 10	+00.00	+++	
Transition ID:	Linear 🔹	End: 14	+50.98	+++	
Preference File:	OPENROAD -	Facil	ity: Undivided	-	
e Selection:	8% e max 💌	L Selection	on: All Cases	•	
L	Left Right				
Profile: PROF	<b>•</b>				
Tie: Offset	•	Offset: 0	.0000		
% Slope	Offset	Offset	Dependent	]	
-2.0000	-0.0000	-12.0000	V		
				×	
4					
₩					
Create Input File: 1234RDSUP001.inp					
Generate Superelevation Transitions					

This Dialog appears when you select Generate Superelevation Transition from the Automated Superelevation dialog.

Review the super input file and once you are satisfied that it is correct then – File > Save

#### NOTE: Using Save As ALWAYS attempts to save the file to C:\ thus it doesn't show up in C:\dgn

Click Create Superelevation Shapes to draw the shapes into the design file.

This new option in Geopak has replaced the option of using the _eop profile.

If you have no superelevations calculated then there should be NO "A" profile generated.

The "A" profile adjusts the profile for superelevations and stays on centerline. The design profile goes from centerline to inside edge of pavement on corners.

🖾 Text Editor: 1234RDSUP001.INP 🛛 📃 🗖 🔀
<u>File E</u> dit <u>C</u> riteria
D 🛎 🖬 👗 🛍 🛍 🗠 ભ 🐲
/* Superelevation Settings and Parameters:
Project Name: c:\dgm\GEOPM\CLASSV8I.prj User: c:\dgm\GEOPM\CLASSV8I.prj User: c:\dgm\GEOPM\projdbs\BOB Run Name: SUPR Unit System is english. Created input file "1234RDSUP001.INP". Created activity log file "1234RDSUP001.log". Created on Wed, Sep 15, 2010 at 13:23. Using Preference File "S_E_2LANEOPENROAD" Using Peference File "S_E_2LANEOPENROAD" Using Length Selection of "8% e max". Using Length Selection of "All Cases" Using Design Speed of 60.000000.
*/ auto shape
job number = 234
auto shape set shape cluster baseline = DESIGN
Line: 42 Col: 1

The following is only for example and should not be used unless changes are needed to the generated superelevations.

After Generating Superelevation transitions change the transitions length in the Geopak text editor and save the changes.

<b>Text Editor: 1234</b> File Edit Criteria	RDSUP00	1.INP 🔲 🗖 🔀
🗋 🛩 🖬 👗 🛍 🖺	6 G G	<b>R</b>
job number = 234		<u>^</u>
auto shape set		
shape cluster base	line = DES	IGN
shape cluster prof:	ile = PPR	OFA /* Derived from
shape cluster tie	= 0.0	000
dependent shape chain / offset		
Chain / Offset DESIGN -12.(	0000	
DESIGN -0.00		
filler line station	n / slope	
10+00.000000	-2.0000	
13+65.035507		
15+27.035507 15+68.458406		
17+30.458406		/* Curve Cl */ 🛁
22+19.063621		
24+62.063621		/* Curve C2 */
25+23.196552		/* Curve C2 */
27+66.196552		
41+07.980862		(* a) (* a) (* (* a)
41+34.980862 60+31.041268		/* Curve C3 */ /* Curve C3 */
60+58.041268		y curve cs -y
115+79.085912	-2.0000	
auto shape set		
shape cluster base	Line = DES	
		Line: 42 Col: 1



<u>Fi</u>le

Job: 9RM Q

Preference File: OPENROAD

Left

Offset

Create Input File: 9999RDSUP001.inp

0.0000

4

-

•

Offset

-12.0000

Generate Superelevation Transitions

e Selection: 8% e max

Design Speed: 45

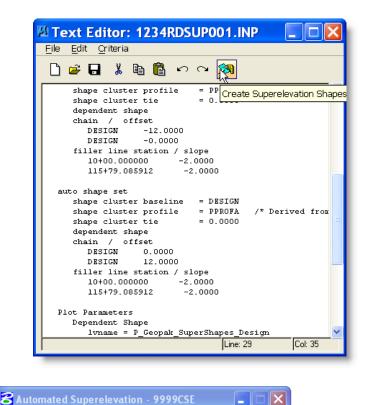
Profile: PROF

% Slope

-2.0000

Tie: Offset

Transition ID: Linear



Station Range

Chain: DESIGN

Begin: 10+00.00

End: 27+87.32

Offset: 0.0000

Facility: Undivided

L Selection: All Cases

Right

Dependent

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After Be sure to save the changes.

Draw the Super shapes and close the editor.

If you changed the original superelevation file input file then click on the Recompute Adjusted Profile button.

This updates the A profile file with the changes you entered in the generated superelevation input file.

Don't forget to keep the Working Alignment Definition up-to-date. (section 5).

Recompute Adjusted Profile

🛛 Road Project: CLASSV8I.prj	
<u>File R</u> emember <u>O</u> ptions	
Working Directory: C:\dgn	User: BOB Job #: 234
Working Alignment Influence Runs	
Working Alignment DESIGN	Select Define Port Viewer

## 16 Draw Transition Data

#### Applications > GEOPAK > ROAD > Plans Preparation > DRAW TRANSISTION

Applications W	indow MDT <u>H</u> elp	) 📂 🖯 🍓 🖌 🕒 🕼 🗠	· ~ 🎯 ? 🔄 • 🧶 A
GEOPAK 🕨	Deactivate GEOPAK	*~׬_1 🖾 💖	局品↓□ 国 瓢 ③
Map 🕨	ROAD 🕨	ROAD Tools	
	SITE	Project Manager	
	DRAINAGE	Corridor <u>M</u> odeling	
	WATER SEWER   LANDSCAPE  Training	<u>S</u> ite Modeling Acti <u>v</u> e Chain Control Element Attr <u>i</u> butes	
	About GEOPAK	3PC AdHoc Attribute Manager User Preferences Geometry Design & Computation Manager Quantity Manager	
		Plans Preparation ► DTM Tools	Plan View <u>L</u> abeling <u>D</u> P Station/Offset
		<u>3</u> D Tools	Draw Transition

OR



🖾 Draw	Transi 📃 🗖 🔀
Job:	234 Q
Chain:	DESIGN 🔽 🛵
Begin Station:	10+00.00
Begin Offset:	-14.000000
End Station:	115+79.09
End Offset:	-14.000000
	Draw

Open **Draw Transition** Dialog from the Geopak Tools Menu.

If you are using Project manager the Job # and Chain will be filled-in.

Fill in:

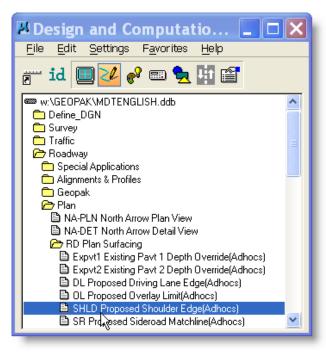
- 1) Beginning Station
- 2) Beginning Offset
- 3) Ending Station
- 4) Ending Station
- 5) Select Apply

Note: The Element that is drawn will be placed at the Active Symbology.

Geopak Help Online – Command Reference > Plans Preparations or F1 on active dialog

## 16.1 Draw Shoulder/Widening Areas

This example: Add 2' shoulders for entire project.



SHLD Propose	d Sh 💶 🗆 🗙
Place Influence	
Adhoc Attributes	Match Point Text
New Element Only	Draw COGO Element

ቆ 💡		
Name	Туре	Value
DESCRI	Remarks	Prop Shoulder Edge(Adhocs)
Surface	Numeric	999
SubSurfa	Numeric	999
Profile Name	String	none
Chain Name	String	none
Outside T	Numeric	999
Inslope B	Numeric	12
Inslope E	Numeric	12
Inslope SI	Numeric	-2

Step One

Select **Paved Shoulder** D&C Path = Roadway/Plan/RD Plan Surfacing/SHLD

NOTE: Commonly used entries should be set up in your favorites.

#### Step Two

Check on Place Influence and Adhoc Attributes.

#### Step Three

Within the Adhoc Attribute setting window enter the appropriate values.

Hint: *This is the only place to enter the Inslope Widths.* 

Note: For help select Question Mark

🖾 Draw	Transi 🔳 🗖 🔀
Job:	234 Q
Chain:	DESIGN 🔽 📈
Begin Station:	10+00.00
Begin Offset:	-14.000000
End Station:	115+79.09
End Offset:	-14.000000
	Draw
	μĘ

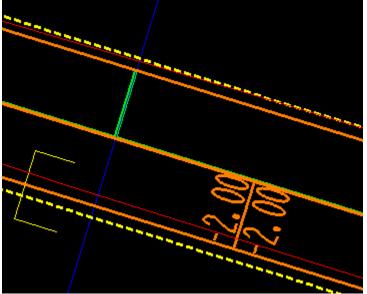
Step Four

Draw a MicroStation Element that represents the shoulder.

You may wish to use Draw Transition to place a line in the MicroStation map file that represents the shoulder of the new roadway.

Change offsets to + for other side of centerline.

This Example shows the Shoulder line that represents the shoulder point drawn 14' from center line.



## 16.2 Curb & Gutter

Donia	n and C	Computatio 🔳 🗖 🗙
	t Settings	
id id		P 💷 🔁 🛄 🖀
	PAK\MDTEN	GLISH.ddb
🗖 Define	_DGN	
💼 Surve C Traffic	·	
📄 🗁 Roadv	way	
	cial Application nments & Profil	
🗋 🛅 Geo	pak	103
Plar		Arrow Plan View
		Arrow Detail View
	D Plan Surfaci D Plan Gradin	2
📔 🛅 R	D Plan Utilities	3
	D Plan Topog D Plan Bridge:	
	D Plan Draina; D Plan Draina;	
	D Profile	Califica
	01)Clearing & I 02)Remove SI	
	01)Plant Mix	
	11)Cold Milling 01)Portland Ce	g ement Pavement
🔁 (5	51)Portland Ce	ement Concrete
	01)Metal Wate 02)Remove &	er Service Lines
	03)Drainage	Treidy Curvert
	04)Manholes 8 00)Currente il 8	
	06)Guardrail & 07)Fences	Conc. Barrier
📔 🛅 (6	08)Sidewalks	
	09)Curbs & Gu (609)Define_E	
6	(609)Pay_Item	ns
	⇒ (609)STD C 60901020	JUIDS 00 CURB & GUTTER-CONC(Adhocs)
		00-1 MISC CURB & GUTTER-CONC
		00-1 MOUNTABLE CURB(Adhocs) 50 GUTTER-CONC VALLEY(Adhocs)
-	_	
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6090	10200	CUKB 🔤 🗌 🛂
Place In	ifluence	
Adhoc A	Attributes	Match Point Text
a de la come		Draw COGO Element
New Ele	ment Unly	Draw COGO Element
1		
<b>EI 6090</b>	10200	CURB & G 🗐 🗖 🔀
	10200	
ድ 💡		
Name	Туре	Value
PAY ITEM PAY ITEM	Remarks Unit	CURB & GUTTER-CONC
Chain Name	Unit String	LF
Profile Name	String	none
Base Ext	A1	
Buffer Width	Numeric	0
Buffer Cut	Numeric	0 0 50:1
Buffer Fill	Numeric String String	0 50:1 50:1
Buffer Fill Cr Agg T	Numeric String String Numeric	0 50:1 50:1 0.30
Buffer Fill	Numeric String String	0 50:1 50:1

Gutter Th... Numeric

0.50

Requirements

- Graphical line that represents the Shoulder at the face of the curb and gutter.
- 2) Graphical line that represents the Curb & Gutter.

Step One

#### **Curb and Gutter**

D&C Path = Roadway/Plan/(609) Curbs & Gutters/(609) Pay_Items/(609) STD Curbs/609010200

NOTE: Commonly used entries should be set up in your favorites.

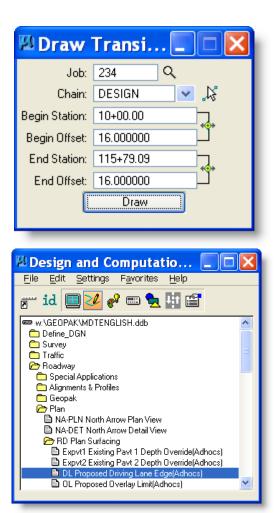
Step Two

Check on Place Influence and Adhoc Attributes.

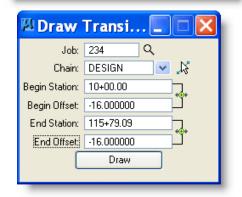
#### Step Three

Within the Adhoc Attribute setting window enter the appropriate values.

Note: For help select Question Mark



ቱ 💡 👘		
Name	Туре	Value
DESCRI	Remarks	Prop Driving Lane Edge(Adhocs)
Surface	Numeric	999
SubSurfa	Numeric	999
Profile Name	String	none
Chain Name	String	none



#### Step Four

Draw a Microstation Element that represents the Curb & Gutter.

Hint: When Drawing the Right Curb & Gutter put the Stations in backwards. Or use "Change Direction" keyin to reverse the Curb & Gutter line.

#### Step Five

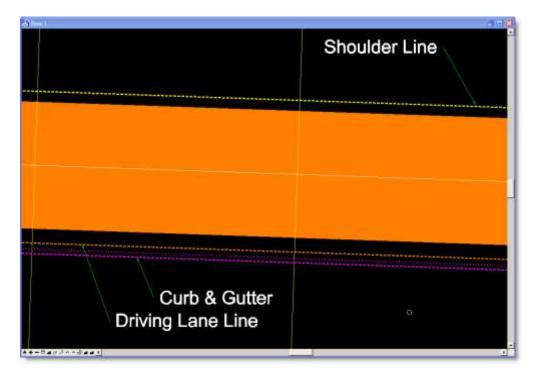
Draw a MicroStation Element that represents a Driving Lane. *The Driving Lane line is required for the criteria to change from Asphalt to Concrete.* 

#### Step Six Within the Adhoc Attribute setting window enter the appropriate values.

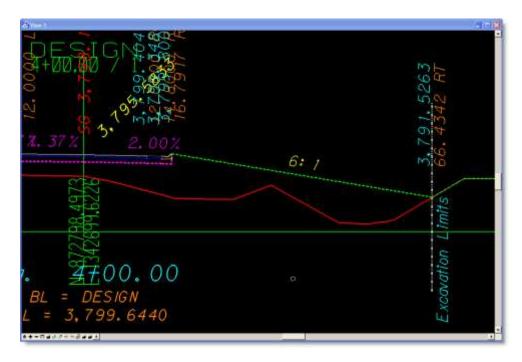
Note: For help select Question Mark

Draw a MicroStation Element that represents the Driving Lane.

This Example shows the Curb & Gutter line that represents the face of curb drawn 15 feet from center line. Shoulder line is also draw at face of curb.



#### Completed process



## 16.3 Sidewalk

2) Desi	ign and C	omputa	tio	
	dit <u>S</u> ettings		Help	
id		p 📼 🗣		
	ine_DGN	GLISH.OOD		
Sur				
📔 🗀 Trai				
	pecial Application			
	lignments & Profil eopak	les		
P 🗁 P	lan			
	NA-PLN North A NA-DET North A			=
	RD Plan Surfaci	-		
	RD Plan Grading RD Plan Utilities			
6	RD Plan Topog			
	RD Plan Bridges RD Plan Draina			
0	RD Profile	-		
	(201)Clearing & I (202)Remove SI			
🗅	(401)Plant Mix			
	(411)Cold Milling (501)Portland Ce		nt	
0	(551)Portland Ce	ement Concrete	e	
	(601)Metal Wate (602)Remove &		S	
🗅	(603)Drainage	-		
	(604)Manholes 8 (606)Guardrail &			
0	(607)Fences			
	(608)Sidewalks 🔁 (608)Define_D	GN		
	🖹 608-SWE Si	idewalk Edge (/		<u>,</u>
	608-DL1 Sid 608-DL2 Sid			
	_	-	`	
608	-SWE Si	dewall	k	
	e Influence			
	oc Attributes		Match Point	Text
New	Element Only	Dr	aw COGO E	lement
-				
11 200	CHUE CI			
	-SWE Si	dewalk		
ድ <mark>የ</mark>				
Name	Туре	Value		
DESCRI PAY ITEM	Remarks Unit	Edge Of Si SY	idewalk	
Sidewalk		1.5		
Sidewalk	. Numeric	0.33		
Sidewalk	Numeric	0.21		

0.21

1.5

0

2.0 2.0

none

none

Sidewalk... Numeric

Buffer Width Numeric

Buffer Cut... String Buffer Fill... String

Profile Name String

Chain Name String

String

Greenway...

Requirements

- 1) Graphical line that represents the Curb & Gutter.
- 2) Graphical line that represents the Driving Lane.
- **3)** Graphical line that represents the front and back of sidewalk

#### Step One

Select Sidewalk D&C Path = Roadway/Plan/(608) Sidewalks/ (608) Define_DGN/608-SWE

#### Step Two

Check on Place Influence and Adhoc Attributes.

Step Three

Within the Adhoc Attribute setting window enter the appropriate values.

Draw	Transi 🔳 🗖 🔀
Job:	234 Q
Chain:	DESIGN 🔽 💦
Begin Station:	10+00.00
Begin Offset:	4.400000
End Station:	25+17.60
End Offset:	4.400000
	Draw

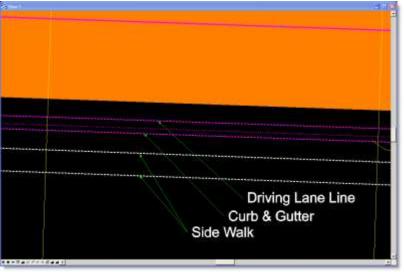
Step Four

Draw a Microstation Element that represents the Sidewalk.

Hint: Be sure to draw a line for front and back of sidewalk.

**Note:** For help select Question Mark

This Example shows the Curb & Gutter line that represents the face of curb drawn 15 feet from center line. Shoulder line is also draw at face of curb.



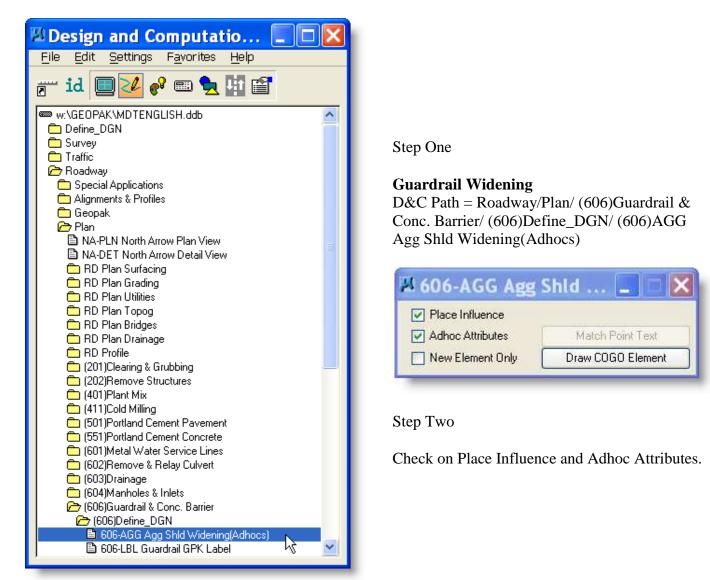
Completed process example:

797.9049 1.0000 LT 1.799.5149 12.0000 LT	23. 1333 RT 25. 1333 RT 25. 1333 RT 25. 1333 RT 25. 9420 5. 997 2 RT	2
50 2.002.00%	2. 00 5050 % 6: / 81082 × 17 81082 × 17	
	Volume 799, 8349	

### 16.4 Guardrail and Guardrail Widening

#### **Requirements:**

- 1) Graphical line that represents the Widening.
- 2) Graphical line that represents the Box Beam Guardrail.



四 606-4	AGG Ag	g Shld Wide 📃 🗆 🔀
ۍ <mark>ዋ</mark>		
Name	Туре	Value
DESCRI	Remarks	Agg Shoulder Widening(Adhocs)
Begin Slo	String	-2
End Slope	String	-2

Step Three

Within the Adhoc Attribute setting window enter the appropriate values.

Note: For help select Question Mark

<b>2:1. X</b> (	Ta 🤗 🦧 👾 💋 🛛 📳 🏷	
1	1 Plan View Labeling	
2 DP Station Offset		
🔥 <u>3</u> Draw Transition 📐		
	v	
🖾 Draw	Transi 💶 🗖 🔀	
Job:	234 Q	
Chain:	DESIGN 🔽 💦	
Begin Station:	10+00.00	
Begin Offset:	15.600000	
End Station:	25+17.60	
End Offset:	15.600000	
[	Draw	

 Hesign and Computation Mana...

 File
 Edit

 Settings
 Favorites

 Help

 H

606010265 G	UARD 😑 🗆 🔀
Place Influence	
🗹 Adhoc Attributes	Match Point Text
New Element Only	Draw COGO Element

Initiate Draw Transition, if not active.

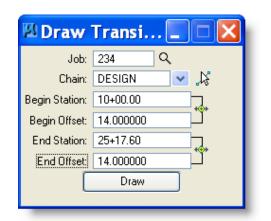
Step Four

Draw a Microstation Element that represents the Guardrail Widening.

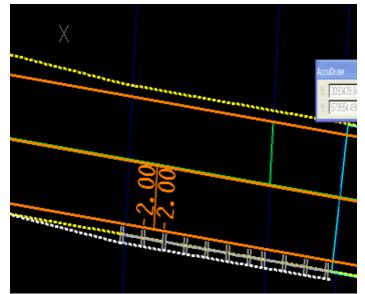
Step Five **Box Beam Guardrail** D&C Path = Roadway/Plan/ (606)Guardrail & Conc. Barrier/ (606)Pay_Items/ (606)Box Beam Rail/ 606010265 GUARD RAIL-BOX BEAM/BR APPR-SEC

Step Six

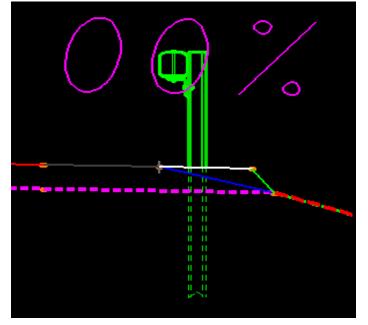
Check on Place Influence and Adhoc Attributes.



Step Seven Draw a MicroStation Element that represents the Guardrail.



Example shows guardrail drawn on the shoulder and guardrail widening drawn 1.5' beyond the shoulder.



Example shows cross-section with box beam guardrail and guard rail widening beyond shoulder.

## **17 Proposed Cross Sections**

Because of the complexity of this process only the simplest method will be explained. This Method requires that the Geopak Project Manager DEFINE is used. (see <u>Chapter 5</u>)

Proposed C	ross Sections - PCS 🛛 📃 🗖 🔀
Eile	
KS DGN File	XS DGN File: C:\dgn\1234RDXSF001. Q
Pattern	
Existing Ground	Tolerance: 0.001000
Shapes	
Shape Clusters	
Define DGN Variables	
Define Variables Plot Parameters	
Drainage	
Working Aligna	nent Definition: DESIGN 🗸 🔤 🗙
NAMA NAMA NAMA NAMA NA	
Plan View	XS DGN File: C.\dgv\1234RD\\SI File
Patern Shaper	
Profile View	Chars DESIGN
Location Cross Section View	Begin Station 10+00.00 R 1
Existing Enound	End Station: 68+00.00 R 1
Proposed Finish Grade DTM	
55547	
OK Ca	nce
KS DGN File	
Reliteri Existing Ground Shapes Detine DGN Vasiables Detine Vasiables Pict Paremeters Dreinage	Use Working Alignment Definition By DGN File W DESIGN Horecontal Scale: 10 DGN File: C'udgn/1234RDM4P001 DGN Q, Search Critece Use Cudgn/1234RDM4P001 DGN Q
Rotern Existing Ground Shapes Shape Clusters Define DRN Vasiables Define Vasiables Plot Parameters	By DGN Re Charz DESIGN Vision DESIGN Vision DESIGN Vision DESIGN Vision Scale 10 DGN Flex C Volgo/s1234FIDM4P001 DGN Q, Search Ditters Vision Vision DESIGN Vision Vision Vision Company PatternLine Vision V
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Ration Existing Ground Shapes Shape Duriter Define Variables Pot Parameters Dreinage Vorking: Alignme an View	By DGN Ne V Charz DESIGN Vetical Scale: 10 DGN Fle: C'udgoN1234RDM4P001 DGN Q, Search Criters Vetical Scale: 10 Vetical Scale: 10 OGN Fle: C'udgoN1234RDM4P001 DGN Q, Search Criters Vetical Scale: 10 Vetical Sca
Ration Existing Ground Shapes Shapes Charters Define Vasiables Plot Parameters Define age Plot Parameters Define age Norking Alignman an View Pattern	By DGN Verical Scale: 10 Charz: DESIGN Verical Scale: 10 DGN Fle: C'udgoN1234RDM4P001 DGN Q, Search Criters Verical: P_Geopal, PatternLine: 2 Verical: 2 March Deplay: Reset Busiles March DESIGN
Ration Existing Ground Shapes Shape Duriter Define Variables Plot Parameters Dremage Vorking: Alignme an View Ratery Shapes of View	By DGN Re V Charz DESIGN Vetical Scale: 10 DGN Fle: C'udgn/1234FDM4P001 DGN Q, Search Criters Verifier Scale: P Geopal, PatternLine: C Scale: Scale:
Ration Existing Ground Shapes Shapes Duriters Define Vasiables Plot Parameters Dreimage Aortking Alignm Shapes Offer Wew Shapes Offer Wew Scottern	By DGN Re V Cherz DESIGN Vetical Scale: 10 DGN Fle: C'udgn/1234FDM4P001 DGN Q, Search Criters Verifier Scale: Scale: 10 Verifier Scale: Scale: 10 Vetical Scale: 10 Natch Design Fie Hoscorial Scale: 10 Vetical Scale: 10 Design Fie C'udgn/1234FDMA Q, Vetical Scale: 10 Design Fie Lv Harret: P_Geopal, Patterni, C1
Ration Existing Ground Shapes Shape Duriters Define Variables Pot Parameters Dreinage Vorkting Alignm An Vew Pattern Shapes Josefon Vew Location Science Giound	By DGN Re V Charz DESIGN Vetical Scale: 10 DGN Fle: C'udgn/1234FDM4P001 DGN Q, Search Citates Vetical Scale: 10 Vetical Scale: 10 Vetical Scale: 10 Vetical Scale: 10 Vetical Scale: 10 Vetical Scale: 10 Design Fie Hotsorial Scale: 10 Vetical Scale: 10 Design Fie Lv Harres: P_Geopal, Patterni, C Uv Harres: P_Geopal, Patterni, C Vetical Scale: 10 Vetical S
Ration Existing Ground Shapes Dative DGN Vanables Define Vanables Plot Parameters Dreimage Vorkking Alignm an View Ratew Shapes offe View Location Shapes offe View Existing Ground Proposed Finith Grade	By DGN Re V Charz DESIGN Vetical Scale: 10 DGN Fle: C'udgo/1234FDM4P001 DGN Q, Search Ditoto Verifier Scarz Scarz Match Display Reset By Design Fle Hostontal Scale: 10 Vetical Scale: 10 Design Fle Vetical Scale: 10 Design Fle Vetical Scale: 10 Natch Scale: 10 Vetical Scale: 10 Design Fle Vetical Scale: 10 Natch
Ration Existing Ground Shapes Shape Duriters Define Variables Pot Parameters Dreinage Vorkting Alignm An Vew Pattern Shapes Josefon Vew Location Science Giound	By DON Re Charz DESIGN Charz DESIGN Charz DESIGN Horeontal Scale: 10 DGN Fa: C'vdgn/1234FDM4P0D1.DGN C, Search Diteon United Scale: 0 Display Reset  By Design Fie Horeontal Scale: 10 Design Fie C'vdgn/1234FDMA Q, Lv Name: P_Geopal, Pattern C

#### Proposed oss Sections In Project Manager Select Proposed Cross Sections

### **XS DGN FILE:**

If you are using the Define Alignment this will fill-in the XS DGN File. This is file created for the existing cross sections. The tolerance defaults to .1, but should be changed to .001.

Note: Sometimes a super XS shows as flat (0 slope). Changing this to 0.01 or 0.015 may fix that problem.

**Example:** Working Alignment Definition – Cross Section View

### **PATTERN:**

Check "Use Working Alignment Definition" if you have defined this information.

Or

Fill-in The Chain, Scale & Design File. Lv=P_Geopak_PatternLines_Design

**Example:** Working Alignment Definition – Plan View - Pattern

III Deserved Course	
Proposed Cross	Sections - PCS
File XS DGN File Pattern Existing Ground Shapes Shape Clusters Define DGN Variables Define Variables Plot Parameters Drainage	Use Working Alignment Definition DGN File: 1\dgn\1234RDXSF001.DGN Search Critere U Lv Names: E_Ground_XS_Delineat Lv Numbers: Corors: 4 Styles: 4 Weight: 4
	Types 7 Match Display Reset
Working Alignmen	t Definition: DESIGN
Plan View Pattern Shapess Profile View Location Cross Section View Billing Grann Proposed Finish Grade DTM	Lu Names: E_Ground_XS_Deb     D     Lu Names: E_Ground_XS_Deb     U     D     Serve     Ser
DK Cancel	s Sections - PCS
Eile XS DGN File Pattern Existing Ground Shapes Shape Clusters Define DGN Variables Define Variables Plot Parameters Drainage	Use Working Alignment Definition
U Working Alignmen	t Definition: DESIGN
Plan View Patern Shopes Profile View Location Close Section View Existing Ground Proposed Finish Grade DTM DK. Cancel	Allin DGN Design File (C.Vdgn/1234RDMA) Q

### **EXISTING GROUND:**

Check "Use Working Alignment Definition" if you have defined this information.

Or

Fill-in the Design File where cross sections are located. LV=E_Ground_XS_Delineation

**Example:** Working Alignment Definition – Cross Section View – Existing Ground

#### **SHAPES:**

Check "Use Working Alignment Definition" if you have defined this information.

Or

Fill-in Design File where the Super Elevation shapes were drawn. Note: Existing features must always be run in shapeless mode.

**Example:** Working Alignment Definition – Plan View - Shapes

	Proposed Cros	ss Sectio	ons - PCS		
F	ile				
,	S DGN File	Chain	Tie/DCI	Profile	
	attern	Chain DESIGN	Tie/PGL 0.000000	PPROFA	
	xisting Ground	DESIGN	10.000000	THINK	Typical
	hapes				Thick
	hape Clusters				Scan
	efine DGN Variables efine Variables			* n (* 1555.0	
	edefinable Variables	Chain: DES		🕈 Profile: PPRO	
	lot Parameters		Apply Profile at:	Tie 🔽 0.000	000
D	rainage	Add	Modify De	elete Up	Down
	Side Slope Conditions				
	LT				
	BT				
	Define Mo	odify	Delete	Up	Down
			Delete		Down
	Criteria Files				
	Name shoulder.x	Description	der 09-25-08.		<u> </u>
	slopes.x	New Slope:			
	end_process.x	End Proces			~
	Add	Delete	Up		Down
		Delete			
	Add	TievPGL 0.000000 F SIIS? <u>Tou</u>	Sters	I CARE	
	Loos News	iut L	<u></u> 4	<b>E</b> 15	a
	warder the state				
	Chan DESIGN	Tie/PGL 4 0.00000	Profile PROFA	Trick	1
	and and a set	ESIG7 Tie Bally 3	Delete	ROFA: Scan Ip Down	
	ons - NewSurf				



#### **SHAPE CLUSTERS:**

See Following Pages for 2 steps on filling out this dialog.

Note: Steps 1 & 2 can be done manually without the help of the Dialogs.

#### **Shape Clusters Step 1**

- Select the Scan button and the List of Clusters dialog box will open.
- 2) Then select a shape cluster from the **List of Cluster** dialog.
- 3) Select **Add** and the shape cluster will be added to the list to the left.
- 4) Close The List of Clusters Dialog.

Repeat for each Cluster until all clusters have been added.

#### **Shape Cluster Step 2**

- 1) Select one of the Clusters from the list
- 2) Select Typical Button
- Within the Typical Section Dialog Select the Cell name of the Typical that best fits your typical section. (next page)
- 4) Select range of application
- 5) Select the **Apply** button
- 6) For HELP click Description

ş		6
(Englis	n) RECON	ISTRUCT TYPICAL SECTION
Cell P/JW	Descuption Matic ROW, Metric Scedi	Job Number 234 Template Template Designed to Wolk with: 1 Shape Duster
Cal POW SEED SIDEWA SIDEWA	Description Mubic RDW/ Metic Row/ Metic Recon Metic Recon	Job Number 234 Template Designed to Wolk with: 1 Shape Cluster Template Designed to Wolk with: 1 Shape Cluster Template Desception
Cel FOW SEED SEEW SDEWW HD Carting Feelures SDEwW HD Carting Feelures HD-Postor Provided HD-Postor Ind Secting 3	Description Mathic ROW Methic Seeds Methic Recon	Job Number 234 Template Designed to Wolk with: 1 Shape Cluster

Proposed Cros	s Sections - PCS	
<u>F</u> ile		
XS DGN File Pattern Existing Ground Shapes Shape Clusters Define DGN Variables Define Variables Redefinable Variables Plot Parameters Drainage	Variable By file: All	DGN
Variable Name:		Level Symbology 💌
DGN File: Search Criteria Lv Names: Colors: Styles: Weights: Match	play Reset	Add Modify

Proposed Cros	ss Sections - PCS 📃 🗖 🔀					
Eile						
XS DGN File Pattern Existing Ground Shapes Shape Clusters Define DGN Variables Define Variables Redefinable Variables Plot Parameters	Variable     Value       Process Station Range?Y or N     N       Existing Features Dgn     123       Proposed Features Dgn     123       English XS Text Size     1       Proposed Profile Dgn     123       ROW Map File     123					
Variable Name: RDW Map File						
Value: 1234ROMAP001.DGN Add Modify						

7) Repeat for each Cluster

Note: Thick button is no longer used.

This fills in the Side Slope Condition for this Cluster and also Criteria Files for both the Left and Right Side Slope Condition

NOTE: With criteria there are only 4 typicals that may be used for English projects - x10's – existing features, new pavement, overlay and topsoil & seeding.

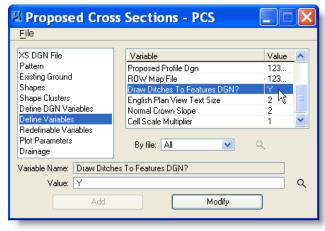
### ANY OTHER SELECTION MAY CAUSE UNPREDICTABLE RESULTS!

### **DEFINE DGN VARIABLES:**

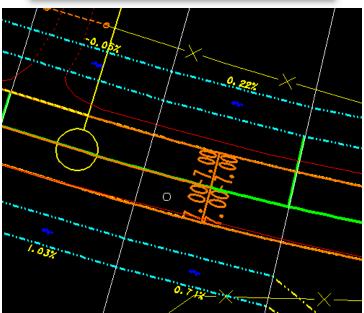
Bypass Define DGN Variables.

**Note:** Using the new Criteria files the widening area can be done with graphical elements in the Microstation map file. There is no need to define them.

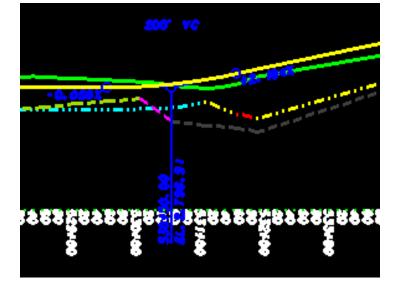
- 1) Select the variable to change.
- 2) Type the new Value.
- 3) Select Modify to change Value
- 4) Enter all dgn files you have available for the project.
- 5) Change English XS Text Size to 1.0 or something that looks good with all of the text generated. An example of all the text generated is on page 16-7.



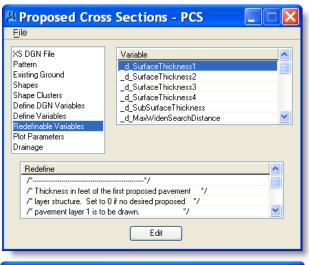
Setting the Draw Ditches to Feature DGN to 'Y' will result in drainage showing on the map and profile.



Results shown in the map file



Results shown on the profile.



#### **Redefinable Variables Editor** /* Thickness in feet of the first proposed pavement /* layer structure. Set to 0 if no desired proposed /* pavement layer l is to be drawn. /* EXAMPLE: /* if (Sta >= 0+00 R 1) then /* _d_SurfaceThicknessl /* = 8/12 /* ł if (Sta >= 0+00 R 1) then _d_SurfaceThickness1 = 8/12 Cancel Save

🛛 Proposed Cros	ss Sections - PCS 📃 🗖 🔀
Eile	
XS DGN File Pattern Existing Ground Shapes Shape Clusters Define DGN Variables Define Variables Redefinable Variables Plot Plot Parameters Plot Plot Fill Gaps between Clu Fill Gaps between Clu Fransition Definition Intersect between Clu Process Clusters as II Remove Skewed Eff Process Only Section Process Only Section	Isters Apply Shape Transition Codes  Indicated

- 1) Select the variable to change.
- 2) Select Edit.
- 3) Change the Value
- 4) Select **Save** to update

NOTE: The top surfacing layer can be either dirt or plant mix it does not matter to Geopak except in the way the criteria is set up. If you only have one layer you must use the first layer otherwise it will not place the correct line at the bottom of the surfacing layer for Geopak to calculate it correctly in Earthwork.

- Set the XS Lines symbology to LV= Default
- 2) Remove all the checks from the Plot area.
- 3) CHECK Remove Skewed Effect*
- 4) File > Save Settings
- 5) File > Run

A new entry is available – pavement shapes – this plots the proposed pavement lines – before these were *always* plotted, now you have the option to turn the pavement lines off.

* You may not want to check remove skewed effect if you need actual calculated slopes to show. Not checking it may also cause an error – see next page - one of Geopak's quirks.

S	ARSE-E-UNRKV, slope RT	Check string validit	y/myntax at location indicated	-
	*****		*****	:
		******		
12P	ARSE-E-INCOMP.	Incomplete input de	ta.	-
******	*********	•••••	*******************************	******

🗵 Proposed Cross Section 🛛 🔀
Output
To Log File 😪 🛛 temp.log
Pause On Each Section
Criteria Viewer Apply
Disable View Update

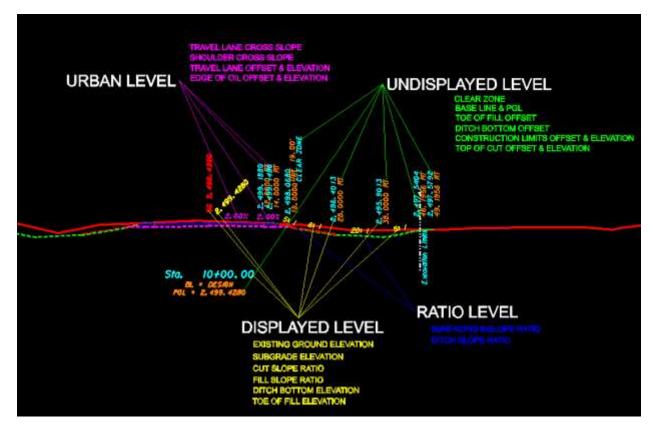
*This is the error received when Remove Skewed Effect is causing the problem. If checked, uncheck it...If not checked, check it...Then run again.

Click File > Save Settings then RUN

Output to log file and Pause on each section.

Check the first station and, if OK, remove pause check and continue.

Completed Process Example:



Text here is set to 1 via English XS Text Size in Definable Variables.

# **17.1 Review or Label Cross Sections**

## 17.1.1 Review Cross Sections



Use this dialog to move around within the working cross section file and find a specific cross

When this dialog is opened it will automatically search for all the cross sections in the design file.

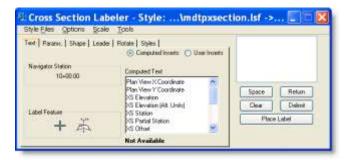
The double arrows take you to the beginning and end stations

The single arrows will take you forward or backward one cross section at a time.

The small window Button will reset the navigator and returns the user to the first section.

# 17.1.2 Cross Section Labeler





Open the Cross Section Labeler

- 1) Select Identify Element or DP
- 2) Set the Parameters to place the Label or Open and select an existing Style.
- 3) Place the Label

Note: See the Geopak Help Online – Command **Reference** > Cross Sections

### 17.2 List all Stations with Working Cross Sections

Open the cross section file for your project: XXXXRDXSF001.DGN Open D&C Manager and click the Design icon.

🛙 Design and Computatio 🔳 🗖 🔀
<u>File E</u> dit <u>S</u> ettings F <u>a</u> vorites <u>H</u> elp
产 id 🔲 🗾 🧬 💷 🐂 👫 😭
💼 Define_DGN 📃
Survey
C Traffic
Brecial Applications
🗎 3PC - Cross Section Text Report 🔤
3PC - Place North Arrow On Alignment
3PC - Place Grid on Profile VBA - Extract Cell Features From DGN
VBA - Drainage
VBA - Draw Utility Cells On XS
VBA - Create List of Working XS
💼 Alignments & Profiles よう 💼 Geopak
Plan

Double click on Roadway > Special Applications > VBA-Create List of Working XS Brings up this dialog window so you can enter the job, chain and the output file you wish to create.

List XS	S Stations 1.0 👘 🔀
Job: Chain:	234 T
Output Fil	e Name XSLIST.TXT
	Process

Click Process and this window shows what results were found and the file created in c:\dgn.



# 18 Adhoc Attribute Manager



# **18.1 Editing Adhoc Attributes**

Numeric

String

String

Numeric

Numeric

Numeric

Numeric

999.000000

none

none 999.000000

4.000000

4.000000 -2.000000

SubSurface Thickness

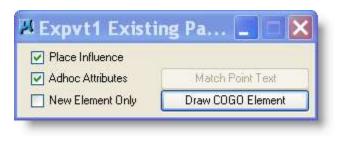
Profile Name

Chain Name

Outside Thickness Inslope Begin Width

Inslope End Width

Inslope Slope %



🖾 Expvt1	Existing	; Pavt 1 Depth 📃 🗆 🔀
ቆ 💡		
Name	Туре	Value
DESCRIPTION	Remarks	Existing Pavt 1 Depth Override(Adhocs)
BeginThickness	Numeric	999
EndThickness	Numeric	999
l		

Open Adhoc Attribute Manager From Application Menu.

Note: It's a good idea to close the D&C Manager while using the Adhoc Manager. Otherwise, your symbology may not be what you are expecting.

Use the Adhoc Attribute Manager to change the "smart" lines.

1) Make sure preferences are set to **replace**.

	Set Mode :	Replace	K
🛛 AdHoc At	Window :	Center	-s
File	🗹 Hilite		
Preferences	2005		

- 2) Click Identify Element and select the line to be changed.
- 3) Make changes as needed to the attributes
- 4) Click Set Attributes

On certain Design and Computation elements used by the criteria the user has the option of assigning AdHoc Attributes to the element in order to directly control the criteria. The Adhoc Attribute's options will become visible to the user when the Adhoc Attributes option is selected when drawing with D&C and using the D&C Tool Settings:

NOTE: Entered attributes override any Redefinable Variables entered when doing proposed cross-sections.

# **18.2 Changing Adhoc Attributes**

🖾 AdHoc At	tribute M	anager	
File			
🗖 🐼 🔊	$\leftrightarrow$		
Name	Туре	Value	]
			×
Pref			
Window :	Part of the second seco		
Window : ✓ Hilite	Center		
AdHoc At	tribute <i>l</i>	Manager	
File			
🔲 <mark>ør</mark> 🎖 🍳	§ 🔶 🔶		

 Mame
 Type
 Value

 Name
 Type
 Value

 PAY ITEM
 Remarks
 GUARD RAIL-BOX BEAM/8 FT POST

 PAY ITEM
 Unit
 LF

Value

Name Identify Element pe

Once an element has been drawn to the plan view using Design and Computation manager, it may be desirable to revise certain adhoc values. The following steps should be followed to change the attributes of an element already placed in the design file.

## 1. On the MicroStation top menu, open APPLICATIONS > GEOPAK ROAD > GEOPAK 3PC ADHOC ATTRIBUTE MANAGER.

This dialog will appear:

2. From the File pull down menu select Preferences and change the Set Mode to Replace as shown in this dialog.

3. Select the icon to identify the plan element that contains the AdHoc Attribute(s) to be revised.

4. Select the plan element with a left mouse click and accept with a second mouse click to populate the dialog with the current adhoc attributes of the element. The dialog will now look something like this:

"⊐ ★

🖾 AdHoc A	Attribute M	anager 📃	
File			
<b>.</b>	ॐ ← →		
Name	Туре	Value	
PAY ITEM	Remarks	GUARD RAIL-BOX BEAM/10 FT POS	×-
PAY ITEM	Unit	LF 🗼	2
		GUARD RAIL-BOX BEAM/10	) FT PC

🛿 AdHoc Attribute Manager 📃 🗖 🗙				
File				
Name	Set Attributes	Value		
PAY ITEM	Hema	iks GUARD RAIL-BOX BEAM/10 FT POS		
PAY ITEM	Unit	LF	2	
			$\sim$	
·				

dialog to the new desired value by
clicking on the current adhoc setting and
type in a new value and press enter or tab
to accept the change.

5. Revise the value of the adhoc(s) in the

6. Select the icon entitled "Set Attributes" and then left mouse click on the plan element(s) that require the change and left click a second time to accept the change. The attributes should now be changed.

Expvt1 Existi	ng Pa 🔳 🗖 🔀	
Place Influence		
Moc Attributes	Match Point Text	
New Element Only	Draw COGO Element	

**IMPORTANT:** Design and Computation Manager's "Place Influence" MUST be turned OFF to be able to change adhoc attributes.

# **19 Earthwork**

# **19.1 Earthworks Dialog**

This Method will require that the Geopak Project Manager be used.



In Project manager Select Earthwork

After the Select Run Dialog opens **copy** the DEFAULT project and DEFAULT user to create a new run. For more information see <u>page 6-2</u>

HINT: Because most of the information within these dialogs is standard it is much easier to **copy the information from the DEFAULT Project and DEFAULT User within Project Manager.** Doing this requires the Project Working Alignment Definition be up-to-date. (section 5).

🛛 Road Project: CLASSV8I.prj				
<u>File R</u> emember <u>O</u> ptions				
Working Directory: C:\dgn		User: BOB	Job #: 234	
Working Alignment Influence Runs     Working Alignment DESIGN	Select	Define Port View	wer	_

ile	
KS DGN File	XS DGN File: C:\dgn\1234RDXSF001.DGN Q
Soil Types	Tolerance: 0.001000
Earthwork Shapes Dutput Format	Vertical Search Distance: 500.00
Add/Subtract Volume	Baseline: DESIGN
Centroid Adjustment Skip Areas	Begin Station: 10+00.00 R 1
gnore Areas	End Station: 68+00.00 R 1

If you are using the Define Alignment this will fill-in the XS DGN File Baseline and the Begin and End Station.

If you copied this run from the Default project all of the Dialog will be filled in.

Earthwork - EARTI	н 📃 🗖 🔀
<u>F</u> ile	
XS DGN File	Soil Type Items
Soil Types Earthwork Shapes Output Format	Existing Ground Existing Suitable1 Proposed Finish Grade
Add/Subtract Volume Centroid Adjustment	Proposed Undercut1 Proposed Undercut3
Skip Areas Ignore Areas Sheet Quantity	Search Criteria
Class Existing Ground  Class Uncl_Exc	V Ly Names: E_Ground_XS_Delineat
Multiplication Factors	Lv Numbers:
Roadway Excavation: 1.000 Subsoil Excavation: 1.000	Colors: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Subsoil Excavation: 1.000 Fill: 1.000	Veights: 1
	Match Display Reset
Add	Delete Modify

- 1) Select Existing Ground
- 2) Soil type is "Earth"
- 3) Multi-Factors are all 1.
- 4) Uncheck "Use Working Alignment Definition"
- 5) Select level name E_Ground_XS_Delineation
- 6) Click Modify to update.

Earthwork - E	ARTH 📃 🗆 🔀				
<u>F</u> ile					
XS DGN File	Soil Type Items				
Soil Types	Existing Ground				
Earthwork Shapes	Proposed Finish Grade				
Output Format Add/Subtract Volume	Proposed Undercut1				
Centroid Adjustment	Proposed Undercut3				
Skip Areas	Proposed Undercut4				
Ignore Areas	0				
Sheet Quantity	Search Criteria				
	Use Working Alignment Definition				
Class Proposed Finish Gr	ad 💌				
Soil Type: earth	🔽 Lv Names: n_Alignment_Subgrade 🖄				
Multiplication Factors					
Deadure Everywier 1 000	Colors:				
Roadway Excavation: 1.000 Styles:					
Subsoil Excavation: 1.000					
Fill: 1.000					
Types:					
	Match Display Reset				
	Match Display Reset				
Add Delete Modify					

- 1) Select Proposed Finish Grade.
- 2) Soil type is "Earth"
- 3) Multi-Factor is 1.2 for Fill.
- 4) Uncheck "Use Working Alignment Definition"
- 5) Select level names P_Template_Design_Alignm ent_FinishedGrade & P_Template_Design_Alignm ent_SubGrade.
- 6) Select Styles 2.
- 7) Click Modify to update.

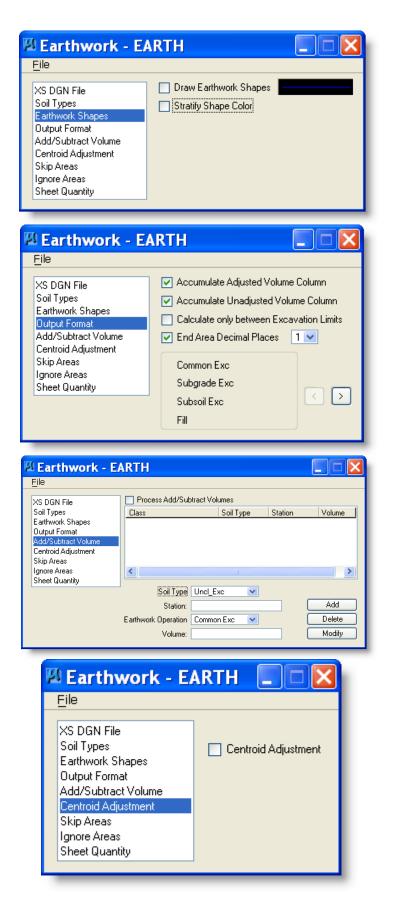
Using Proposed Undercuts may produce unpredictable results with the Cut/Fill of the Existing Ground and/or Proposed Finished Grade.

You can do pavement and aggregate manually. (See road manual) But, if you must, the above shows how to use Undercuts.

- 1) Select Proposed Undercut1.
- 2) Soil type is "Pavement"
- 3) Muli-Factors are all 1.
- 4) Check "Do Not Include in Mass Ordinate".
- 5) Set Search Criteria as shown, set level to P_Template_Design_Alignm ent_Subgrade.
- 6) Set weight to 1
- 7) Select Add for new or Modify to update

8) Select Proposed Undercut2.

- 9) Soil type is "AggSurf"
- 10) Multi-Factors are all 1.
- 11) Check "Do Not Include in Mass Ordinate".
- 12) Set Search Criteria as shown, set level to P_Template_Design_Alignm ent_Subgrade.
- 13) Set Style to 2
- 14) Select Add for new or Modify to update



If you copied this run from the Default project all of the Dialog will be Filled in.

If you want the shapes to show then check Draw Earthwork Shapes.

If you copied this run from the Default project all of the Dialog will be Filled in.

This dialog can be used to add additional quantities to the earthwork run. Select Process Add/Subtract Volumes for Topsoil, Digouts and/or Approaches. Make sure you add the stations where volumes are to be adjusted.

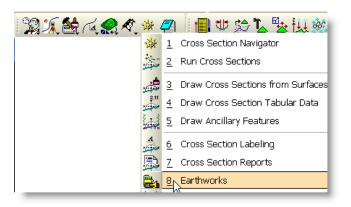
If you copied this run from the Default project all of the Dialog will be Filled in.

🖾 Earthwork - EARTH	
File         XS DGN File         Soil Types         Earthwork Shapes         Output Format         Add/Subtract Volume         Centroid Adjustment         Skip Areas         Ignore Areas         Sheet Quantity         Begin Station:         22+24.67 R 1         26+93.60 R 1         Begin Station:         22+24.67 R 1         End Station:         22+24.67 R 1         End Station:         26+93.60 R 1         Modify	If you copied this run from the Default project all of the Dialog will be Filled in. Skip Areas to be defined for the class project – this is the bridge area. Enter begin and end stations and click on Add. Click in the Process Skip Areas check box.
Learthwork - EARTH       Image: Constraint of the station         File       Image: Constraint of the station         Soil Types       Image: Constraint of the station         Earthwork Shapes       Image: Constraint of the station         Dutput Format       Add/Subtract Volume         Centroid Adjustment       Begin Station         Skip Areas       Image: Constraint of the station         Image: Sheet Quantity       Begin Station:         End Station:       Image: Constraint of the station         Add       Delete       Modify	If you copied this run from the Default project all of the Dialog will be Filled in. To be used for areas earthwork is to be ignored. Skip or Ignore – either works
Earthwork - EARTH         Elle         Sol Types         Eathwork Shapes         Output Format         Add/Subtract Volume         Central Places         Central Places         Sheet Duswitty         Sheet Duswitty	If you copied this run from the Default project all of the Dialog will be Filled in. Click the spy glass to find the correct earthwork text file. To combine quantities change the column #.
Utput       1234RDEWK001.log         Pause On Each Section       Interactive Error Checking         Disable View Update       Apply	From the <b>Earthwork</b> Dialog select Files > Run to process the earthwork run. Be sure to save a Log File. Pause on each section allows you to look at the earthwork on each cross section. If you do not wish to pause, turn the switch off

After the earthwork has run to completion, go to **EARTHWORKS**. Applications > Geopak Road > Cross Sections > Earthworks

switch off.

# **19.2 EarthWork Volumes**



🛛 Earthwork 📃 🗆 🔀			
File			
Load	Review Earthwork		
SaveAs	raw Mass Diagram		
Exit	rce Balance Table		
	Multi Factor Table		
Calculate Volumes			
Calculate Overhaul			
Add Subtract Volume			

**Open Earthworks** 

This dialog box will open empty. Go to **FILE-LOAD** and load the log file that was created from the Earthwork Run.

This will bring up the buttons.

The log file will let you draw the mass diagram. This can also be edited using the EARTHWORKS program.

You can draw the Mass Diagram to find out what the unadjusted volumes look like.

You can add & subtract volumes, vary multiplication factors, and force balances.

Calculating volumes will create a new .log file.

# **19.3 Drawing Mass Diagram**

📕 Draw Mass	Diagram 📃 🗆 🗙			
User				
🔽 Mass Diagram				
Horizontal Axis Lat	pels			
Vertical Axis Label	s			
Balance Point Lab	els			
Volume Summaries Between Balance Points				
Gap for Station Equation				
Earthwork Parameters				
Begin Station	: 10+00.00 R 1			
End Station	: 68+00.00 R 1			
Maximum Ordinate	: 14843.0000			
Minimum Ordinate	: -62141.0000			
Begin Station: 10+00.00 B 1				
Begin Station				
End Station				
Horizontal scale	: 5.00			
Vertical scale	: 100.00			
Starting Location				
DP Station	: 10+00.00 R 1			
DP Volume	: 0.0000			
DPX DPX	: 569301.8811			
DP DPY	: 1254387.7931			
	Apply			

USER > Preferences > Mass Diagram Preferences > More Displays this window.

🗵 Mass Diag	ram		3
CVertical Axis Labels		_	
Prefix:	Suffix:		
12	Increment:	1000.0000	
Angle:	0.0000		
Vertical Offset:	0.0000		
Horizontal Offset:	0.0000		
	More		
ОК		Cancel	

#### Click on DRAW MASS DIAGRAM button

Because to date we have no standards for how Mass Diagrams should be set up and Mass Diagrams are very individual by project, settings will be up to your discretion.

User - opens dialog boxes for the settings of the elements on the mass diagram.

The switches turn different elements on and off.

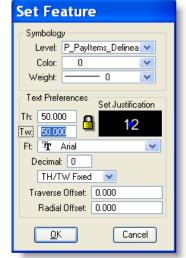
Parameters - lists information about the earthwork.

Stations and scale allows you to set the length and size of the diagram.

DP - allows you to set beginning station, volume, and coordinate.

12 D	raw Mass Diagram	
Use	r	
Pr	eferences	

<ul> <li>Double-click black box</li> </ul>
Symbology Text size $= 50$
Set Increment $= 1000.00$
Justification - right



# 19.4 Add & Subtract Volume

File						
sal	Begin Station	End	italian	Dperaturi	Wilinie	1
						10
						1.50
						3
						9.9
Degit S	ustary		End Station			2

# **19.5 Multifactor Table**

End Station	Commen	Excention	Subcoli	Subgrade	14	85
62-40.00 Ft (	1.00	0.00	1.01	1.00	1.00	
						100
				41 (1990) (1)		
🔗 degn Si	ation		Ent S	stars .		
Externation 0.00	Subuck 000	5.81	radic 0.00		81.11	
	ekandir (	Bieldtader (* 1.20) Cagn Stator	el-latad (f) 1.00 p.00	69-60.00(H) 1.00 1.00 1.00 	el-daudini 1,000 p.dr. (1.al. 1.dr.) Signification for the Statum	Edwaradh ( 100 100 ( 101 100 100 )

### **19.6 Calculating Volumes**

🛛 Calculate Volu 🔳 🗖 🔀					
Begin Station:	10+00.00 R 1				
End Station:	68+00.00 R 1				
Output:	1234RDETH002.LOG Q				
Apply					

This dialog box allows you to add positive or negative volumes.

If you make a mistake highlight the line and select delete.

When you are done close the window using X..

This dialog box will allow you to adjust multiplication factors by station.

Simply highlight a line, type in the new station range and multiplication factor and hit Add. This automatically adjusts the stations. Now exit by selecting the X.

When you are done adjusting the earthwork, click on **CALCULATING VOLUMES.** 

# Make sure the output file name is different from the original .log file name.

Click on calculate. Make sure you check the calculations from this process, as Bentley has logged a defect associated with this 10/29/10.

When this is finished running, go back to **FILE-LOAD** and load this new file.

Go back to previous step desired such as drawing Mass Diagram.

# 20 Limits of Construction

	<b>⊵</b> ₁ 4	2	॑॑॑॑॓∰₩龄፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟፟
•	*	<u>1</u>	Cross Section Navigator
20	\$	2	Run Cross Sections
2	#	3	Draw Cross Sections from Surfaces
2	2.11	<u>4</u>	Draw Cross Section Tabular Data
2		5	Draw Ancillary Features
2	A 	<u>6</u>	Cross Section Labeling
ļ	2	Ζ	Cross Section Reports
Ę		<u>8</u>	Earthworks
1	4	9	Limits of Construction 🔓
		0	Draw Cross Section Cells

🛛 Limits of Constructio 🔳 🗖 🔀							
Job:	234	Q	Tole	rance: 0.0	1000(		
Chain:	DESIGN	*					
Current Station:	10+00.00 R	1	]				
Begin Station:	10+00.00 R	1	10	10+00.00 R 1			
End Station:	68+00.00 R	1	68	68+00.00 R 1			
Plan DGN File:	C:\dgn\123	84RDMA	P001.DGN 🔍				
Existi	ng Ground Lii	ne: 📈	Ō,	Dis	play		
Propose	Proposed Finish Grade			Dis	play		
Plot Paran	Plot Parameters			lay: 5.000	000		
Tie Down Option: Outer Tie Downs 💌							
Apply							

🗵 Plot Paramete	🔳 🗖 🔀
Cut Fill Fill	Transition
Place Construction Limit	Offset from CL 💌
La	bel Plot Parameters
ОК	Cancel

**The cross section (XSF) file must be open.** In Project manager Select **Limits of** 



### Construction.

OR Select Limits of Construct

Select Limits of Construction from the menu. Rename or create a new run (see <u>page 6-1</u>).

If you are using the Define Alignment this will fill-in all of this dialog. See Define Cross Section View <u>page 5-3</u> Set Tolerance to .01 Set Symbology: **Existing Ground Line** :

E_Ground_XS_Delineation,

### **Proposed Finish Grade**:

P_Template_Design_Alignment_FinishedGrade, P_Template_Design_Alignment_BackSlopeRoun ding

Note: You will need to set the Beg. And End Station to the limits of your proposed surfacing. Check Plot Parameters are set as needed below. Click Apply to process construction limits. The Limits of Construction will be drawn on the plan map file and MicroStation shows that.

Set the following:

- Cut Symbology
  - a) Level = see below
  - b) Style = 2
  - c) Weight = 2

Fill Symbology

- a) Level = see below
- b) Style = 0
- c) Weight = 2

Transition Symbology

- a) Level = see below
- b) Style = 1
- c) Weight = 2

US Customary - LV=P_Construction_Limits_Approach

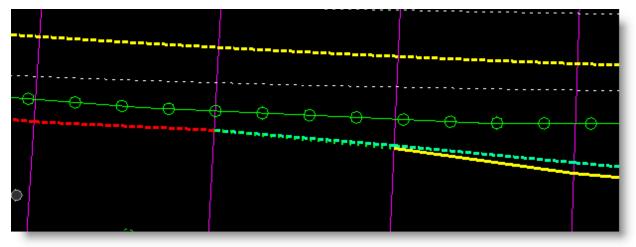
and/or LV=P_Construction_Limits_Design (normal alignment)

and/or	LV=P_Construction_Limits_Detour
and/or	LV=P_Construction_Limits_FrontRd
and/or	LV=P_Construction_Limits_Ramp
and/or	LV=P_Template_Approach_Alignment_BackSlopeRounding

Color is at your discretion.

Tie Down Option = Outer Tie Downs

Click Apply – Geopak scans the cross section file to find the construction limits and draws them, according to the symbology defined, into the map design file. The map file is then opened. An example appears below:



Cut

Transition

Fill

🛚 Cross Section Error Message 🛛 🗖 🕅					
Error Message					
XS-DANGLT Proposed elements do not tie to the existing ground on the left-hand side of the cross-section at station: 305+00.00 R 1 at the point 7138.0000 8004.4300					
X-Value         7138.000000         Y-Value         8004.430013           Redo         Skip         Abort         DP					
3.00% 0 5.00%					

Skip over approaches is standard operating procedure.

NOTE: Double check the symbology drawn as a defect has been found that shows Fill wherever backslope rounding occurs – these should show as Cut. This problem existed 5/23/2011-10/14/2011.

# 21 Cross Sections Sheets

ىرىكى كى يەركە	2	▋⋓ゐ⊾ኴऄ≆	This Method will require that the Geopak Project Manager be used.
*	1	Cross Section Navigator	1 5 6
- Second Se	2	Run Cross Sections	In Project manager Select Cross
	3	Draw Cross Sections from Surfaces	Section Sheets.
2.11 2.11	4	Draw Cross Section Tabular Data	
Land Land	5	Draw Ancillary Features	Cross Section Sheets
A	6	Cross Section Labeling	
<b>_</b>	Ζ	Cross Section Reports	OR
	8	Earthworks	Select Cross Section Sheet
	9	Limits of Construction	Composition from the menu.
	₫	Draw Cross Section Cells	
	Q	Shape Manager	
×245	W	Draw Patterns by Station Range	
×	Ē	Draw Patterns from Cross Sections	
	R	Cross Section Sheet Composition 🔓	

 $\label{eq:HINT: Because most of the information within these dialogs is standard, Select File > Sheet Library > Attach and Select W:\GEOPAK\MDTXSEC.XSSL.$ 

Create a .dgn file name 1234RDLAY001.DGN - use the Macro > ROAD DESIGN > Create DGN(S) > click Layout X-sections and English > Create DGN (See *CADD Standards Manual*)

Select English and appropriate scale. You may need to set the Begin and End Station to the limits of your proposed surfacing.

If you select MDTXSEC.XSSL, all of the Dialog will be Filled in.

Cross Section Sheet Composition: mdtxs 🗐 🗖 🔀	Cross Section Sheet Composition: MDTXS
Active Class Section Sheet English No. Layout Sheets	Active Cross Section Sheet: English
SS DGN File Sheet Dimensions / Cell Sheet Dimensions / Cell Sheet Stack Columns Sheet Stack Columns Sheet Stack Columns Sheet Stack Columns Sheet Stack Columns Sheet Placement Point Lower Left X (mult Scole) Diffset Labels Diffset Labels Detach Existing Sheets before Processing Mischment: Al Sheets In Alchre Model	XS DGN File       Sheet Dimensions         Sheet DGN File       Width: 340.00         Height: 220.00       Yester Stack Columns         Sheet Stack Columns       Place Sheet Cell         Sheet Stack Columns       Width: 340.00         Height: 220.00       Place Sheet Cell         Width: 340.00       Height: 220.00         Yester Stack Columns       Place Sheet Cell         Margins and Spacing       Station Labels         Offset Labels       Yester Sheet Cell Offset In XS Lay         Scale: 1.00       Place as Shared Cell         Sheet Offset from Cell Origin       X Offset: 0.00         Y Offset: 0.00       Y Offset: 0.00         Yester Sheet Cell In XS Sheet File       Yester Sheet Cell In XS Sheet File

**Option**: Select Detach Existing if you are replacing all the existing sheets.

🛛 Cross Section Sheet Composition: mdtxs 🔲 🗖 🔀	🖾 Cross Section Sheet Composition: mdtxs 📃 🗆 🔀
Eile	Eile
Active Cross Section Sheet: English	Active Cross Section Sheet: English  Layout Sheets
XS DGN File         Sheet DGN File         Sheet Dimensions / Cell         Sheet Stack Orientation         Sheet Stack Columns         Margins and Spacing         Station Labels         Offset Labels         Vettical Range         Lower Limit:         Lower Limit:         0.00         Right Offset:         OOD	XS DGN File       Sheet DIM File         Sheet Dimensions / Cell       Horizontal Spacing;         Sheet Stack Orientation       Vertical Vertical Vertical Vertical Vertical Spacing;         Sheet Stack Columns       Number of Sheets per Column:         Margins and Spacing       Vertical Spacing;         Station Labels       Vertical Spacing;         Offset Labels       Vertical Spacing;         Image: Station Labels <td< th=""></td<>

Include existing ground, finish & sub grade, backslope rounding and alignment annotation displayed. Note: This information is used to define the limits of the Reference File clip bounds, so you may need to select other levels as well in order to get what is needed in each cross section.

Setting these levels off (cell, seeding, and alignment annotation undisplayed) in the working cross section file makes the others easier to select.

🛛 Cross Section Sheet Composition: mdtxs 🔲 🗖 🔀	🗵 Cross Section Sheet Composition: mdtxs 💷 🗖 🔀
Eile	Eile
Active Cross Section Sheet: English	Active Cross Section Sheet: English
XS DGN File Sheet DGN File Sheet Dimensions / Cell XS Search Criteria Sheet Stack Columns Sheet Stack Columns Margins and Spacing Station Labels Offset Labels	XS DGN File Sheet DGN File Sheet Dimensions / Cell XS Search Criteria Sheet Stack Columns Margins and Spacing Station Labels Offset Labels Minimum Top Sofore Minimum Spacing Between Sections: 10.00 Maximum Vertical Size: 300.00

With Sheet Stack Columns you can offset the cross sections within the sheet cell. If you select MDTXSEC.XSSL, all of the Dialog will be Filled in.

Active Cross Section Sheet	English Nayout Sheets	Active Cross Section Sheet	English Not Layout Shee
Sheet Stack Divertiation Sheet Stack Columns Majons and Spacing Offset Labels Elevation Labels Elevation Labels Earthwork: Quantity Labels Sheet Labels Digital InterPlot	Label Stations Plot Parameter: Score Statue Label X Office 1 (1000) Statue Label X Office 2 (000) Statue Label X Office (5 (3))	Sheet Stack Orientation Sheet Stack Column Margins and Spacing Station Labels Environ Labels Earthwork Quantity Labels Sheet Labels Digital InterPlot	Clase Differs  Plot Parameter: Some Offset Label Y Diffset 1: 15.50  Clase Label Y Offset 1: 10.00  Offset Increment Inul; 10.00

If you select MDTXSEC.XSSL, all of the Dialog will be Filled in.

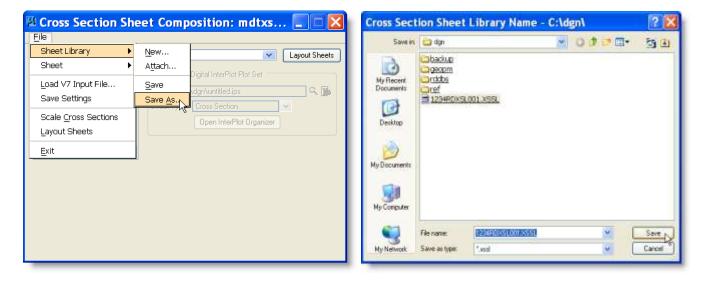
Elle				Ð	e						
Active Cross Section 5	eet English		Layout Shee		Active Cross Section	on Sheet	English	ć.			Layout Sheets
Sheet Stack Direntation	Label Elev	ations			wet Stack Orientation wet Stack Columns		1	el Earthwari	Quantities		
Maigins and Spacing		Plot Parameters:	Sauger	M	argins and Spacing		ID	X Offset	Y Offset	Duplay	Plot
Station Labels Offset Labels Elevation Labels	Elevation	Label X Offset 1:	6.00	.01	ation Labels foet Labels evation Labels		1 2 3	330 320 0.00	0 0 0.00	Sample Sample Sample	
Earthwork Quantity Labels Shoet Labels Digital InterPlot		Increment (mu): 4		SP	athweik Quantity Labels eet Labels gkal InterPlot		Ă	0.00	0.00	Sample	ä
	Add Top E	levation Label					Eathwa	ork Quantity I	ile:		
	🗖 Add Botto	n Elevation Label					C \dg	\1234RDE1	H001,TXT		]a

If you select MDTXSEC.XSSL, all of the Dialog will be Filled in. Reference in earthwork file.

#### 2/19/2015

🛛 Cross Section Sheet Composition: mdtxs 🔳 🗖 🔀	🛛 Cross Section Sheet Composition: mdtxs 🗐 🗆 🗙
Eile	File
Active Cross Section Sheet: English	Active Cross Section Sheet: English
Sheet Stack Orientation       Image: Sheet Stack Columns         Margins and Spacing       Image: Station Labels         Offset Labels       Image: Sheet Labels         Digital InterPlot       Image: Sheet Labels	Sheet Stack Orientation Sheet Stack Columns Margins and Spacing Station Labels Offset Labels Elevation Labels Elevation Labels Sheet Type: Cross Section Open InterPlot Organizer Digital InterPlot Digital InterPlot
Name:       Type:       Sheet Numbe          X Offset:       0.000000       Y Offset:       0.000000         DP Origin       Label:       Display:       Sample	

If you select MDTXSEC.XSSL, all of the Dialog will be Filled in.



To save the input data you must create a xssl file for your project. File > Sheet Library > Save As > Name the file what you want and insure it is saved to C:\dgn with file type of xssl. You can then reference it in next time you initiate this dialog box.

Open XXXXRDLAY001.dgn then click Layout Sheets on the dialog box.

	WDT Road Design	Macros 2.	0 Units	(ENGLISH	0		? 🔀
	Create DGN(S)	Reference	<u>Plan Labler</u>	<u>Sheets</u>	Design Block	MDT CADD	Help
	Project:					UPN 5555	
l	Title/Notes Summ	nary   Typical	Map   Plan/i	Pro   XS File	XS Sheets	Geopak   Misc	Metric
	XS Sheets	Layout Nav	vagator				
	NEW XS	SHEET MACR	0!				

Run MACRO to rename all XS references: Road Design > XS Sheets > XS Sheets > Fix XS Reference Attachments

<b>Cross Section</b>	Layout Sheets 🛛 🔀					
Project\Sheet 1	Project\Sheet Information					
Place Project Information						
Project File:	c:\dgn\1234RDPRJ001.DAT					
Designed By:						
Reviewed By:						
Checked By:						
Prelim Stamp:						
XS Description:						
First Sheet #: 1 Last Sheet #: 47						
Update EarthWork Quantity File Sheet Attachment Options						
Fix XS Reference L						
Scale XS for Urban	Too scale					
Turn Datarields Of						
HELP	Apply Exit					

🖾 Cross Section Shee	et Composition: mdtxs 🔳 🗖 🗙
<u>F</u> ile	
Active Cross Section Sheet	English
XS DGN File	XS Element Search Criteria
Sheet DGN File	🔽 🛛 Lv Names: 🛛 lignment_FinishedGrade_Text 🛛 🎦
Sheet Dimensions / Cell 🛛 🖉	Lv Numbers: 1-63
Sheet Stack Orientation	Colors:
Sheet Stack Columns — Margins and Spacing	Styles:
Station Labels	🗖 Weights:
Offset Labels 🔛	Types:
	Match Display Reset
	Vertical Range Horizontal Search
Level and the second	Lower Limit: 0.00 Left Offset: 0.00
	Upper Limit: 0.00 Right Offset: 0.00

Check Fix XS Ref Logical Prefix

Click Apply.

This will update all of the attachments to insure they are associated with MTRD.

If you need to do the other functions on this dialog box, **run each function separately;** otherwise, unpredictable results may occur.

What if items are missing from your cross sections?

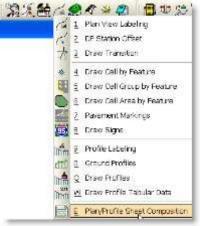
- 1. Insure the levels are turned on in the cross section file for ALL elements you want shown.
- 2. Insure XS Element Search Criteria will cover all elements you want shown this determines height of each cross section drawn too.

Plan & Profile

Sheets

# 22 Plan & Profile Sheets

# 22.1 Setting up Plan & Profile sheets



In Project manager Select **Plan & Profile Sheets**. OR Select Plan\Profile Sheet Composition from menu

After the Select Run Dialog opens rename or create a run. For more information see <u>page 6-1</u>. Open RDMAP file.

Below settings are for ENG Plan and Profile Sheets 100 ft./in. only. Other selections will have different settings...

🗑 🖦 🏠 🚍 🛄 id	PLANPROFILE	-	100.00 ft/in
	Sheet Name	Base Scale	Description
	DUALPLAN	1.00	Two Plans/Sheet
	PLANDETAIL	1.00	Plan Detail Sheet
	PLANPROFILE	1.00	Plan & Profile Sheet
Neet Lay	out: She	et	

TATION RAMS

Cilo Vertica

By Station Range: Outside In 🔽

Maximum Drawing Area: 3000.00 x 1075.00

Active Drawing Area: variable 3000.00 x 1075.00

0.00

Horizontal:

Station Range: 3000.00

Clip

 Select File > Sheet Library and attach MDTPLANSHEETS-E.PSL.
 (w:\geopak\mdtplansheets-e.psl)

- Select the type of sheets and enter the Scale for your plan – Full-size enter 100 ft/in.
- Select Sheet Composition (1st Icon)
- 2) Set "By Station Range: Outside In"
- 3) Set Horizontal to 0
- 4) Set Vertical to 0
- 5) Station Range should read 3000 for 100ft./in.
- 6) Close the window

0.00

Vertical:

ii olliee	· Layour	, Lajoat o		
234 Q	Multiple She	ets 🔽		
Туре	Dependency	Alignment	Offset	Motif File
Plan	Alignment	DESIGN	0.00	Current
Profile	Alignment	PPROF	0.00	Current
				>
egin Station:	10+00.00 R 1	Extend:	-200.00	* <del>\$</del> >
End Station:	68+00.00 R 1	Extend	0.00	+++ Layout 2 Sheets
	34 Q Type Plan Profile	34     Q     Multiple She       Type     Dependency       Plan     Alignment       Profile     Alignment       agin Station:     10+00.00 R 1	34     Q.     Multiple Sheets ▼       Type     Dependency     Alignment       Plan     Alignment     DESIGN       Profile     Alignment     PPRDF	Type         Dependency         Alignment         Offset           Plan         Alignment         DESIGN         0.00           Profile         Alignment         PPROF         0.00           gin Station:         10+00.00 R 1         Extend:         -200.00

- Select Plan Sheet Layout: Layout Settings (second icon from the left).
- 2) The appropriate ports will be filled in. Double-click Alignment and fill in the appropriate chain or profile.
- 3) When selecting Profile:
- Either select the profile name from the drop-down box OR
- Click Identify Cell button then select the required profile cell on the design file.
- Click OK
- The Begin and End Stations will fill in. You can use the Extend boxes to add length to the project for notes.
- 5) Select Layout # Sheets. This will place the sheet boxes in the map file. Drawn on P_Geopak_SheetClips..
- 6) Close the window.

1) Select Plan Sheet Layout: Clip Sheets

(third icon from the left).
A Company of the second s
_
2) Set c: $dgn$ for the Directory.
3) Set Sheet Name Prefix to proj. #
RDPLP[001]. Brackets cause
incremental files to be created. <b>NOTE:</b>
Use PLP for PlanProfile. PLN for
PlanDetail or DualPlan.
1) Set Orientation to Detate Deference
4) Set Orientation to Rotate Reference.
5) Set Sheets per File to 3.
5) Set sheets per the to 5.
6) Set Model to Active.
of Service to Active.
7) Sheet Range Begin and End should fill
in automatically.
8) Check Auxiliary Sheet Annotations
9) Double-click symbology
y Double click symbology
10)Set Justification to upper Right.
11)Set Th. & Tw. To 20.00.
12)Set Ft to Arial.
tion is 13) Check Vertical to insure it has 0.000.
right
14) Select OK on the Plot Parameters
dialog.
dimog.
15) Select Process Sheets on the Clip
15) beleet i loeebb blieetb on the enp
Sheets dialog box. This will make the

16) Close the dialog windows.

- NOTE: If referenced files do not appear in the PLP area as expected then:
  - 1. Detach the reference file and reattach using the Reference macro, OR
  - 2. Copy a reference and change the properties to the reference that needs to be reattached.

MDT GPK Plans Fixer 1.	0 Units:(ENGLISH) 🔀			
Sheet Attachment Options	File(s) Selection			
Plan - Profile	C:\dgn\4339DIMAP001.DGN			
C Plan - Plan (2 Plans Per Sht)	C:\dqn\4339RDLAY001.DGN C:\dqn\4339RDLAY010.DGN			
🔘 Plan - Detail (1 Plan Per Sht)	C:\dan\4339RDMAP003.DGN C:\dan\4339rdplp001.dan C:\dan\4339RDPLP010.dan			
Sheet Scales	C:\dgn\4339RDX5F001.DGN C:\dgn\4339RDX5F002.DGN			
• 100 Scale Sheets	C:\dqn\4474DIMAP005.DGN C:\dqn\4474RDLAY001.DGN			
C 50 Scale Sheets	C:\dgn\4474RDMAP002.DGN C:\dqn\4474RDXSF001.DGN			
C 20 Scale Sheets	C:\dgn\4474ROMAP001.DGN C:\dgn\4483RDMAP001.DGN			
C 10 Scale Sheets	C:\dgn\4854RDLAY001.DGN C:\dgn\4854RDMAP001.DGN			
Sheet scales shown refer to full size plans	Apply Exit			

Use the MDT Macro to attach the sheet borders.

NOTE: If the references do not show for the plan area as expected, then open the reference window, detach the references not showing and then use the REFERENCE macro to reattach those references. They should show as expected.

If the grid comes in grey scaled then do the following for each referenced file:

- Settings > Level Manager > Highlight all the levels
- Click on one of the colors
- Click override OFF

- File > Open > Select the new file(s) just created. Remember s/b PLN for plans only, PLP for plan/profile.
- 2. Turn off the following levels:
  - Geopak profile cell
  - Pattern Lines
  - Super Shapes
  - P_Geopak_SheetClips sheet border
  - Profile cell text
  - Any other levels you do not want to show in the plan & profile
- 3. MDT > Road Design > Plan/Pro > GPK Attach Sheet.
- 4. Sheet Options and Scale should be set according to your project.
- 5. Select current Plan and Profile .dgn file and click on Apply. The sheet borders will be drawn onto the plan.

#### WARNING: IF THIS MACRO DOES NOT WORK, THERE IS SOMETHING WRONG WITH THE DGN FILE AND/OR YOUR DGN FOLDER. PLEASE CHECK THE CADD INTRANET TROUBLESHOOTING PAGE.

### 22.2 Sheet Clips Labeling

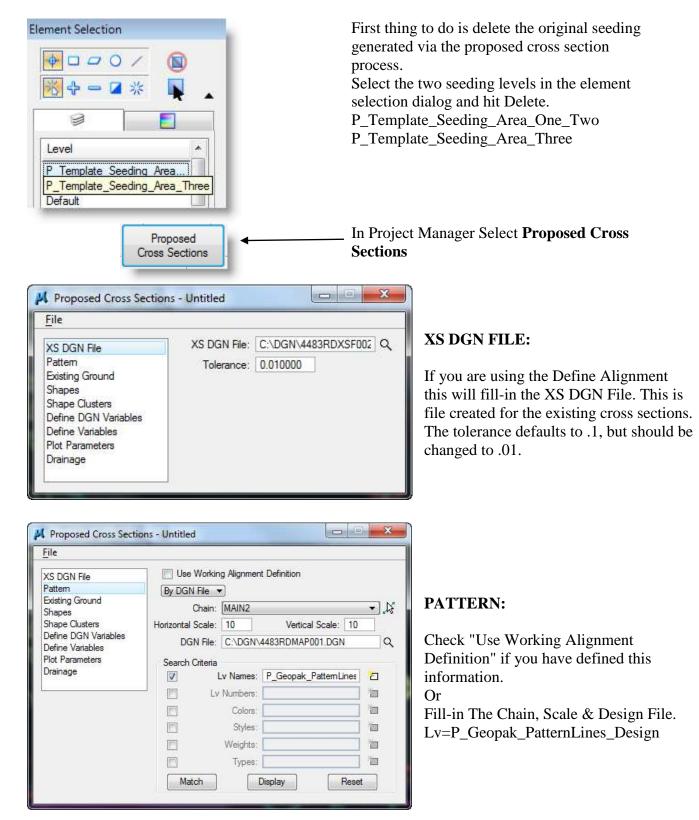
Design Blocks XS She	ets		
Label	Name	Date	Sheet Placement
DESIGNED BY	RWM	1/26/2009	Sheet 3
REVIEWED BY			Sheet 2
CHECKED BY		[	Sheet 1
REVISED BY			C All Sheets
			C Pave Pres Sheets
Begin Sheet Number:	1 Number of	Sheets: 0	C Cross Sections
Help			Apply Exit

Use the MDT Macros to label Cross Section Sheets or Plan and Profile Sheets.

- 1. MDT > Road Design > Design Block.
- 2. Enter Name or Initials.
- 3. Select Sheets to label.
- 4. Click on Apply.

# 23 Topsoil & Seeding

### 23.1 Drawing Topsoil and Seeding onto Cross Sections



File		
XS DGN File	Use Working Alignment Definition	
Pattern	DGN File: C:\DGN\4483RDXSF002.DGN	
Existing Ground Shapes	Search Criteria	
Shape Clusters	Lv Names: E_Ground_XS_Delineati	
Define DGN Variables Define Variables	Lv Numbers:	盲
Plot Parameters	Colors:	省
Drainage	Styles:	1
I T	Weights:	首
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	Match Display Reset	

File		
XS DGN File Pattern Existing Ground Shapes Shape Clusters Define DGN Variables Define Variables Plot Parameters Drainage	Use Working Alignment Definition          All in DGN         DGN File:         C:\DGN\4483RDMAP001.DGN	]Q

### **EXISTING GROUND:**

Check "Use Working Alignment Definition" if you have defined this information.

Or

Fill-in the Design File where cross sections are located.

 $LV{=}E_Ground_XS_Delineation$ 

### SHAPES:

Check "Use Working Alignment Definition" if you have defined this information.

Or

Fill-in Design File where the Super Elevation shapes were drawn.

XS DGN File	Chain	Tie/PGL	Profile	
Pattern Existing Ground	MAIN2	0.000000	MAIN2A	Typical
Shapes				Thick
Shape Clusters				Scan
Define DGN Variables				
Define Variables	Chain: MAIN	2 💌 ] 🕹	🕉 Profile: MAII	V2A 🔫
Plot Parameters		Apply Profile at:	22	0000
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RT	Modify [	Delete	Up [	Down
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RT Define	Modify Description	Delete ]	Up (	Down
RT Define I	Description	Delete	Up .	Down
RT Define I	Description		Up .	Down

### SHAPE CLUSTERS:

See Following Pages for 2 steps on filling out this dialog.

Note: Steps 1 & 2 can be done manually without the help of the Dialogs.

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#### **Shape Clusters Step 1**

- Select the Scan button and the List of Clusters dialog box will open.
- 2) Then select a shape cluster from the **List of Cluster** dialog.
- 3) Select **Add** and the shape cluster will be added to the list to the left.
- 4) Close The List of Clusters Dialog.

Repeat for each Cluster until all clusters have been added.

### **Shape Cluster Step 2**

- 1) Select one of the Clusters from the list
- 2) Select Typical Button
- 3) Within the **Typical Section** Dialog Select **x10-Topsoil and Seeding**
- 4) Select range of application
- 5) Select the **Apply** button
- 6) For HELP click Description

<u>F</u> ile			
XS DGN File Pattern Existing Ground Shapes Shape Clusters	Variable	A.	DGN
Define DGN Variables			
Define Variables Plot Parameters		III	•
Drainage	Bv file	e: (All	▼ Q
			- •
Variable Name:			Level Symbology
DGN File:			
Search Criteria	e P	1.20	
Lv Number			
Colon	£. [	<u> </u>	
Style	300	1	
		1	
Weight:	2.		
			Add

### **DEFINE DGN VARIABLES:**

Bypass Define DGN Variables.

File			
XS DGN File		Variable	Value
Pattern		Working XS File	4483RDXSF0
Existing Ground		ROW Map File	\4483ROMA
Shapes		Proposed Features Dgn	4483RDMAP0
Shape Clusters		Area 3 Width	15
Define DGN Va		Topsoil Thickness	0.33
Define Variables	3	English XS Text Size	1.0
Plot Parameters Drainage		By file: [All	• Q
Variable Name:	Proposed	Features Dgn	
Value:	4483RDM	IAP001.DGN	a
1	Add	Modif	v

#### **DEFINE VARIABLES:**

- 1) Select the variable to change.
- 2) Type the new Value.
- 3) Select **Modify** to change **Value**
- 4) Enter all dgn files you have available for the project.
- 5) Change English XS Text Size to 1.0 or something that looks good with all of the text generated. An example of all the text generated is on page 16-7.

File	
XS DGN File Pattern Existing Ground Shapes Shape Clusters Define DGN Variables Define Variables Plot Parameters Drainage	Cross Section Lines:
Plot Plot Pavement Thickness Fill Gaps between Cl Transition Definition Intersect between Cl Process Clusters as Remove Skewed Eff Process Only Section Pavement Shapes	Apply Shape Transition Codes  Usters Usters Indicated

N Proposed Cross Section

Pause On Each Section

Disable View Update

To Log File 🔻

Criteria Viewer

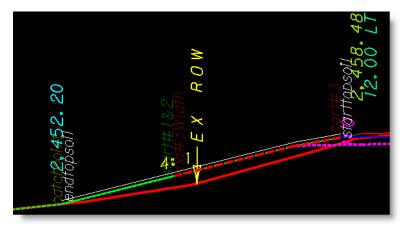
Output

#### **PLOT PARAMETERS:**

- 1) Remove all the checks from the Plot area.
- 2) File > Save Settings
- 3) File > Run

Output to log file and Pause on each section.

Check the first station and, if OK, remove pause check and continue.



temp.log

Completed Process Example: This shows the seeding and topsoil elements drawn into the design file.

P_Template_Seeding_Area_One_Two P_Template_Seeding_Area_Three P_Template_Topsoil

X

Apply

# 23.2 Calculating Topsoil from Proposed Surfacing

	Within the Project manager dialog select
Reports & XS	Reports & XS Quantities.
Quantities	Must be in the cross section file (XSF) to use
~	cross section reports.
User Bike & Red Top Clearing Closure DTM Input DTM Proposed 30 HEC-2 HEC RAS MultiLine Prolie Grade Rediel Staking Stope Stake Staking Detail WSPRD XS List Helle	Select Seeding.
	1) If you are using Project Manager the
🛿 Seeding Report 📃 🗆 🔀	following will be filled-in
Job: 234 Q Current Station: 10+00.00 R 1	a) Job Number
Chain: DESIGN	b) Chain
Begin Station: 10+00.00 R 1 10+00.00 R 1	c) Begin & End Station
End Station: 68+00.00 R 1 68+00.00 R 1	d) Existing Ground Line Symbology
Search Criteria Existing Ground Line: Display	Level = E_Ground_XS_Delineation
	<ul> <li>e) Proposed Finish Grade Symbology Level =</li> </ul>
	P_Template_Design_Alignment_FinishedGrade
Candidate Seeding Elements: Display	
Max Allowable Slope: 1.0000 : 2.0000 Rise:Run 💌	2) Set Candidate Seeding Elements:
Subtotal Split Slope: 0.0000 : 0.0000	a) Level =
Increi 🕑 Sub Every: 3000.00( First Sub at: 20+00	P_Template_Design_Alignment_FinishedGrade
Scale Factor: 1.00000 Label: SF	b) $Color = 2,3, 10-253$
ByPass Segments Additional Distance via Station	
Report Decimal: 2 💌 Additional Distance	This will pick up the Proposed Surfacing with
Pause on Each XS	the exception of the elements under the finish
ASCII File: 1234RDSED001.LOG	surfacing.
Apply	3) Check Max. Allowable slope and set it to
	<b>1:2</b> for topsoil reports

- 3) Set Sub Every to 3000.
- 4) Set First Sub At to a station of your preference. This is where the 1st subtotal is to appear.
- 5) Enter a ASCII file name.
- 6) Select Apply.

See Geopak Help Online – Command Reference > Plans Preparations Optional direct link to Help press F1 when dialog is active

### 23.3 Calculating Seeding to Right of Way

The new way of calculating Seeding areas according to the memo from Carl S. Peil dated December 2, 1998 is to figure the total area within the NEW right-of-way limits and the total area within the construction permits and applicable easements. In order to allow Geopak to calculate the Area 1, 2 and 3 an element will need to be placed on the cross section then use the seeding report to calculate the quantities.

What is needed to accomplish this are:

- 1) Right of Way Strip map file with the New right-of-way drawn in it. Make note of the symbology where the right-of-way is drawn in this file.
- 2) The working cross section files with the existing and proposed surface and subgrade draw on the cross sections. Make note of the symbology of the existing ground, proposed surface and subgrade surface.
- 3) Geopak Project Manager.

The seeding criteria file will start at the centerline at the finish grade elevation. Then trace down to the Proposed Finish Grade to the end of the top lift. At this point it will trace down the surfacing inslope to the bottom of the Bituminous Material. Then it will go down another 2 feet according to the Seeding Standards. At this point it will start drawing a line that represents the Area 3 Seeding. It will draw this line until the Horizontal distance is equal to 15 feet. Then it will end the area 3 Seeding and start Area 1 & 2 seeding. It will trace the Proposed Subgrade then trace this line to the Construction Limit. At this point it will trace the Existing Ground until it intercepts the New or Existing Right of Way.

# 23.4 Seeding Report

Run this process from Project Manager > Reports & XS Quantities > Seeding to calculate the quantities you need.

🖾 Seedii	ng Report	
Job:	234 Q Current Station: 10	)+00.00 R 1
Chain:	DESIGN 💌	
Begin Station:	10+00.00 R 1 10	)+00.00 R 1
End Station:	68+00.00 R 1 68	3+00.00 R 1
C Search Crite	ria	
Existi	ng Ground Line:	Display
Propose	ed Finish Grade:	Display
Candidate Se	eding Elements:	Display
💌 Max Allov	wable Slope: 1.0000 : 2.0000	D Rise:Run 💌
🔽 Subtotal	Split Slope: 1.0000 : 3.0000	0
Increi 🔽 9	ub Every: 1000.00( First Sub-	at: 20+00
Sca	ale Factor: 1.00000 Lab	el: SF
ByPass Se	gments Additional Distanc	ce via Station
Report Decima	al: 🛛 🔽 🚺 🛛 🛛 Additional Di:	stance
	Pause on Each XS	
ASCII File:	1234RDSED003.LOG	۹.
	Apply	

- Proposed Finish Grade =
   P_Template_Design_Alignment_FinishedGrade
   AND E_Ground_XS_Delineation.
   This causes the process to search the entire
   XS width. See NOTE below.
- Set Candidate Seeding Elements Level = P_Template_Seeding_Area_One_Two use only level name.
- 3) Change the ASCII File name
- 4) Select Apply
- 5) Repeat above steps: Set Candidate Seeding Elements Level = P_Template_Seeding_Area_Three.

You can also calculate the Area 3 using the following formula. Length of the job X 30' = area 3 seeding (e.g. 2800 X 30 = 84000) either number will be close enough for the plans.

**NOTE:** The Proposed Finish Grade search needs to include **E_Ground_XS_Delineation** for Seeding report in order to search the entire XS width.



You can edit the file created in the previous step, changing "topsoil" to "seeding", if desired.

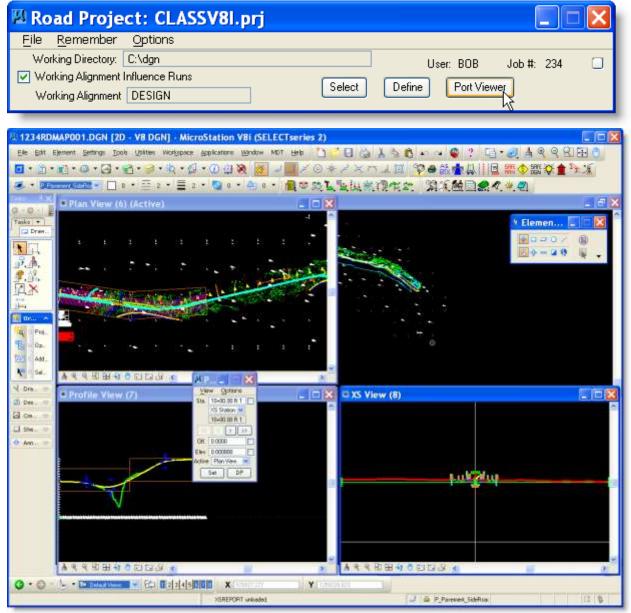
NOTE: If attempting to use Additional Distance and Subtotal Split Slope on the same run – the **additional distance** shows on each station but the **calculated area does not include it** because Geopak cannot determine if it is within the split slope criteria or not. The additional calculated area does show in the subtotals and final total.

## 24 Port Viewer

The Port Viewer is a tool which enables the user to view all three major aspects of a road design simultaneously, even though they are located in different files. In addition, the user can draw into any of the views, by a simple data point to identify the active field, therefore the active file. The three views include:

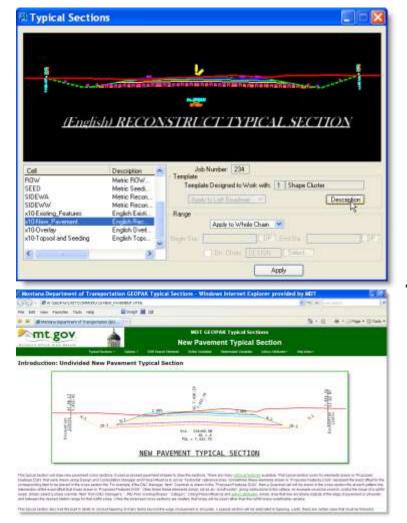
plan view layout profile cross sections

As a prerequisite to invoking the Port Viewer, a working alignment must be defined and populated as outlined in <u>section 5</u>.



The Port Viewer Navigator is the tool used to keep all views in sync. And show current positions.

## **25 Help Description Files**



#### From Typical Sections, in the Proposed Cross Sections Process, - Click DESCRIPTION button to access NEW TYPICAL CRITERIA INFORMATION on the Intranet.

Expvt1 Existing Pavt 1 Depth...

Expyril - Existing Pavt 1 Depth Override:

Overrides the existing pavement layer one thickness redefinable variable d ExistPavtIThick. This plan view override line will be able to override a specific value or perform a taper over the distance of the actual drawn override line. - Exact horizontal position (of this plan view element) is arbitrary as long as it lies between the two existing edges of pavement and drawn in the Proposed Features DGN file. Only ONE line is supported per existing pavement.

Link to GEOPAK Help files in CADDSTD Link to GEOPAK instruction videos in CADDTESTV8 From the Adhoc Attribute Dialog Box, used with the D&C Manager, - Click question mark to access adhoc descriptions and graphics pertaining to that specific adhoc item.

#### \GEOPAK\CRIT\COMMON\HTML \DOCUMENTATION\GEOPAKCRITERIA

## 26 Modifying Design and Computation Drawing Standards

**Important:** If you are using the Project manager the location of the profile can be defined first so that when this dialog is opened the location information is already filled in. It is a good idea to have this information defined in project manager so that it will always be the same for all profiles and will make it easier to draw your plan and profile sheets

🛛 Design and Computatio 🔳 🗖	×
<u>File E</u> dit <u>S</u> ettings F <u>a</u> vorites <u>H</u> elp	
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English Rural     (DESIGN) Alignment Annotation     (DESIGN) Profile Finish Grade Annotation     (EXISTING) Profile Existing Grade Annotation     (EXISTING) Profile Existing Grade Annotation     Alternate Alignments     Alternate Profiles     (APPROACH) Profile Existing Grade Annotation	
<ul> <li>(APPROACH) Profile Finish Grade Annotation</li> <li>(DETOUR) Profile Existing Grade Annotation</li> <li>(DETOUR) Profile Finish Grade Annotation</li> <li>(FRONT RD) Profile Existing Grade Annotation</li> <li>(FRONT RD) Profile Finish Grade Annotation</li> <li>(RAMP) Profile Existing Grade Annotation</li> <li>(RAMP) Profile Finish Grade Annotation</li> <li>(BAMP) Profile Finish Grade Annotation</li> <li>(BAMP) Profile Finish Grade Annotation</li> </ul>	

🖾 ltem M	odify 📃 🗆 🔀			
Item ID:	(APPROACH) Drafting Standards 💌			
Description: Profile Existing Grade Annotation				
Placement:	Attribute:			
Class:	Primary 💌			
Cell Name:	Set Scale 💌 1.000			
Supplemental				
Style:	Match			
Veight:	, <u></u>			
Key-in Comma Design: Set: Display:	ands vba load gpkalignments;vba run ApproachPr			
Drafting Prefe Points Lines Curves Spirals	Review ☐ Stationing Review Review ☐ Parcels Review Review ✔ Profiles Review Review			
	OK Cancel			

If you have exceptions to the standards layout you can set them by using *Preferences* (Box on upper right under Help, that says *Design*, click and drag to *Preference*).

You can use this box to create a new category, create an item, modify an item or review settings on an item.

In order to modify an item you will have to type in a password, **MDT1**. The password is case sensitive and must be typed in all caps.

The reason for the password is so you will realize that you are changing the standards. *Do not save on exit when modifying an item!* 

#### If you create new categories or items please send a copy to MDT CADD Administration so that it can be included in the standards for use by everyone.

When you select Modify Item this dialog box opens. Click on review of the item you wish to modify.

This will open dialog boxes containing the settings of each element item.

To return to Drawing change *Preference* back to *Design* 

#### **v** . <u>45</u> Simple Curve PI Station _ 17+43.47 $S = \frac{.03}{.3200}$ JOB# <u>.9999</u> CHAIN DESIGN OUT (TR) = _44 nt Runaut Distance (TR) = <u>44</u> nout Distance Tan Tana Runal ( Longin Distance ( L ) = 66 Runoff Length Distance (L) = 66 70% of L = $\frac{46}{20}$ 30% of L = $\frac{20}{20}$ 70% of L = $\frac{46}{20}$ 30% of L = $\frac{20}{20}$ $\infty$ ŝ 3+68. 82 Ì ω 20+49. Normal Tangen Section STA Normal Tangan Secilar ITR, IT R n Ř 82 Full A UPERELEVATION TRANSITION LENGTH TANGENT RUNOUT SUPERELEVATION RUNOFF LENGTH (L) FULL SUPER (e) NORMA (TR) PC OR PT 30% RUNOFF 70 % RUNOFF LENGTI PROFILE OUTSIDE EDGE OF TRAVEL 0 ര 72 72 mm 72 $\odot$ PROFILE INSIDE EDGE OF TRAVEL WAY ċ Ġ Ď É. E TV ETW 70% 70%e 0 ୭ C 3.6 m 3.6 m

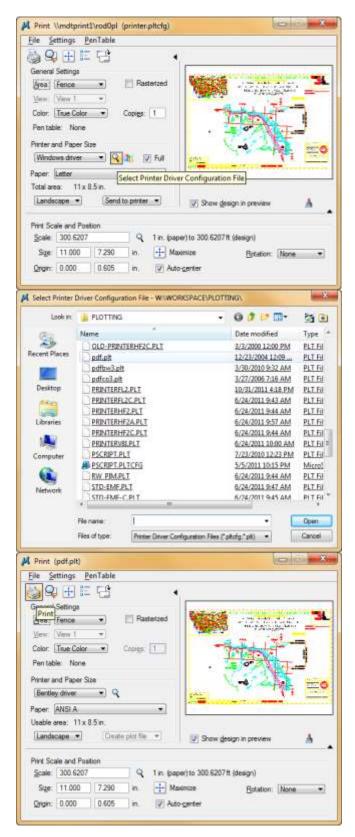
## 27 Super Elevation Simple Curve Diagram

A diagram is also available for a spiral curve.

# 28 GEOPAK Level Setup

Im file         P_Geopak_PatternLines_Approach         P_Geopak_PatternLines_Detour         P_Geopak_PatternLines_FrontRD         P_Geopak_PatternLines_Ramp         P_Geopak_SuperShapes_Approach         P_Geopak_SuperShapes_Detour         P_Geopak_SuperShapes_Detour         P_Geopak_SuperShapes_Detour         P_Geopak_SuperShapes_Detour         P_Geopak_SuperShapes_Frontage         P_Geopak_SuperShapes_Ramp         ile         E_Ground_XS_Delineation         nplate_Design_Alignment_Annotation_Displayed         nplate_Design_Alignment_Annotation_Displayed         nplate_Design_Alignment_Annotation_Displayed         mplate_Design_Alignment_FinishedGrade_Text         Template_Design_Alignment_FinishedGrade         P_Template_Design_Alignment_Subgrade         P_Template_Design_Alignment_Subgrade         P_Template_Design_Alignment_Subgrade         P_Template_Design_Alignment_Subgrade	5 * 2 * 13 * 14 * 14 * # 0-9 10 11-19	0 3 2 1 0 0 0 0 3 3 3	0 0 0 2 2	16 16 16 16 16	1 1 1 1 1 1 1
P_Geopak_PatternLines_Design P_Geopak_PatternLines_Detour P_Geopak_PatternLines_FrontRD P_Geopak_SuperShapes_Approach P_Geopak_SuperShapes_Design P_Geopak_SuperShapes_Detour P_Geopak_SuperShapes_Detour P_Geopak_SuperShapes_Frontage P_Geopak_SuperShapes_Ramp ite E_Ground_XS_Delineation mplate_Design_Alignment_Annotation_Displayed mplate_Design_Alignment_Annotation_Displayed mplate_Design_Alignment_Annotation_Displayed mplate_Design_Alignment_FinishedGrade_Text Template_Design_Alignment_FinishedGrade P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade	2 * 13 * 14 * 14 * # 0-9 10 11-19	3 2 1 0 0 0 0 3 3 3	0	16 16 16	1 1 1
P_Geopak_SuperShapes_Approach P_Geopak_SuperShapes_Design P_Geopak_SuperShapes_Detour P_Geopak_SuperShapes_Frontage P_Geopak_SuperShapes_Frontage P_Geopak_SuperShapes_Ramp ile E_Ground_XS_Delineation nplate_Design_Alignment_Annotation_Displayed nplate_Design_Alignment_Annotation_Displayed nplate_Design_Alignment_Annotation_Displayed nplate_Design_Alignment_Annotation_Displayed mplate_Design_Alignment_FinishedGrade_Text Template_Design_Alignment_FinishedGrade P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade	2 * 13 * 14 * 14 * # 0-9 10 11-19	2 1 0 0 0 0 3 3 3	0 2	16 16 16	1 1 1
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P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade	0-9 10 11-19	3	2		
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P_Template_Design_Alignment_Subgrade P_Template_Design_Alignment_Subgrade	11-19	_	2		
P_Template_Design_Alignment_Subgrade					
		3	2		
plate_Design_Alignment_Annotation_UnDisplayed	21-29	3	2		
	12 *	0*		16	2
plate_Design_Alignment_Annotation_UnDisplayed	30 *	0*		16	.25
ross section file					
mplate_Design_Alignment_BackslopeRounding		3	2		
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E_DRAINAGE_Delineation		1		16	1
E_ROW_Delineation				16	1
P_UTILITES_*				16	1
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	1	1	I		
P_XSection_Layout_Text	4 *	3		16	3
P_XSection_Layout_Text	5 *	3		16	2
P_XSection_Layout_Text	3 *	3		16	2
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## **29 PDF from MICROSTATION**



There are actually multiple ways to go about it. Defined here is the easiest method.

Built in to basic MicroStation is a PDF plot driver that lets you create a PDF file from the standard File > Print option. You just need to select the Bentley PDF.PLT plot driver and you will create a PDF document instead of printing to paper.

Select File > Print which brings up this dialog box.

Click the spy glass on the Printer and Paper Size entry.

Select the PDF plot driver from the directory: W:\workspace\plotting\

There is one for black & white and one for color also.

The Bentley driver is selected which changes the Dialog Box Heading and the Printer and Paper Size entries

Fill out dialog box as needed. Click on Print icon or Click File > Print

A PDF file will be generated.

## 30 Geopak Project Manager

This is a process used to save, restore and/or delete a project's Geopm files. The archive process should be used on a monthly basis and at the end of a project. The others will be used as needed.

Deate DGN(S) R	eference Plan L	abler Sheets	Design Block	MDT.CADD	ticle
🕼 Projecti				UPN 1234	
Title/Notes   Surre		Plan/Pro   X5 Pl	e   XS Sheets	Geopak   Myst	Metric
Artitive GPK Prol	Marga GPK Files	GPK Elements			

Archive GEOPM Proj 🔀
Archive Restore Clean up
Projects
CLASSV8I
Users
BOB
Files to Archive
CLASSV8I.000 CLASSV8I.003 CLASSV8I.004 CLASSV8I.005 CLASSV8I.008 CLASSV8I.009 CLASSV8I.00A CLASSV8I.00A CLASSV8I.00C CLASSV8I.00E
Zip File Name
1234, DPR J001. ZIP
Archive Files Exit
MicroStation 🔀
File C:\DGN\1234RDPRJ001.ZIP Created
ОК

### **30.1** Archive the Geopak Project Manager Files located in the GEOPM directory

- 1) Select MDT > Road Design
- 2 ) Select Geopak > Archive GPK Proj
- 1) Select the Project to archive

This program will search the *GEOPM* directory to find the **Projects**. *

2) Select the user associated with the project

This program will search the *GEOPM**PROJDBS* directory for the folders to find the **Users**.

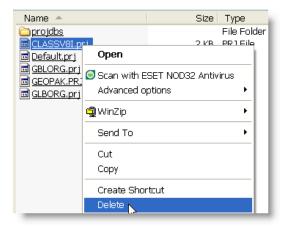
This will archive all the files shown in the "Files to Archive" list.

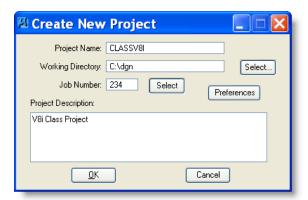
- Change the "Zip File Name" to correspond to your project.
- 4) Select Archive Files.

* This directory is defined by the System Configuration Variable "GPK_PROJMGR_PROJECTDIR"

Successful completion creates the Zip file in the same directory as your DGN file. **Check-in this file to DMS.** This completes the archive process.

Archive GEOPM Proj 🔀
Help Archive Restore Clean up
Zip Files
1234RDPRJ001.ZIP
Users
вов
Warning: The Restore option will replace the existing files.
RestoreExit





## **30.2 Restore the Project manager** files to GEOPM Directory.

- 1) Select existing **Zip file**
- 2) Select the User to copy
- 3) Select Restore

This process will copy the files to the correct directory based on the System Configuration Variable "GPK_PROJMGR_PROJECTDIR"

estored.
1

- 1. Locate the .prj file you just restored in C:\dgn\geopm.
- 2. Remember the exact name, then delete the file.
- 3. Create a new project using the **exact same name** as the one you just deleted.
- 4. You should now be able to access the project's Geopak information.

This completes the restore process.

Archive GEOPM Proj 🔀
Help Archive Restore Clean up
Archive   Restore Clean up
Projects
CLASSV8I
Users
BOB
Files to Delete
CLASSV8I.000 CLASSV8I.003
CLASSV8I.004 CLASSV8I.005
CLASSV8I.008 CLASSV8I.009
CLASSV8I.00A CLASSV8I.00C
CLASSV8I.00E
Warning: This will Delete all project
files listed above.
Delete Files

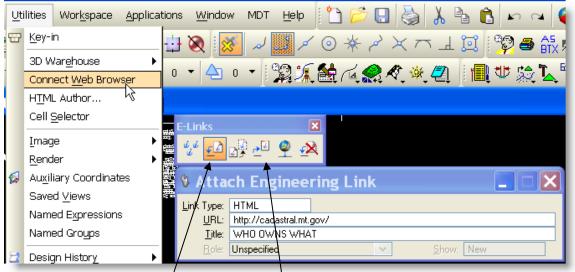
### **30.3 Delete the Project manager files from GEOPM Directory.**

- Select the Project to archive.
   This program will search the *GEOPM* directory to find the **Projects**. *
- 2) Select the user associated with the project.
  This program will search the *GEOPM\PROJDBS* directory for the folders to find the **Users**.
- Select Delete Files.
   This process will Delete the files from the directory based on the System Configuration Variable
   "GPK_PROJMGR_PROJECTDIR" The files are no longer available.

This completes the delete process.

## 30.4 Attach a link to your design file:

How about adding a web link to your design file? That might be cool...



- 1. Draw an element or attach a link to an existing element.
- 2. Utilities > Connect Web Browser this opens the browser and E-Links dialog box.
- 3. Click on the  $2^{nd}$  icon in the E-Links Attach Engineering Link dialog box opens.
- 4. In the browser find the web page, file or whatever it is you wish to show in the browser.
- 5. Copy the URL (address line) from the browser and paste into the URL of Attach Engineering Link. Tentative and select the element this link is to relate to.
- 6. Click Follow an Engineering Link 4th icon on the E-Links dialog box and close all boxes.
- 7. Whenever you select the related element the browser will open and display what was defined at that time.

## 31 Storing Equations on a Chain

🖾 Coordi	nate Geometr	ry Job: 234 Operato
<u>File E</u> dit	Element <u>View T</u> o	ools
Temporary Vis	<u>P</u> oint Line <u>C</u> urve Spiral	★ (
	Chai <u>n</u>	▶ <u>U</u> tility
	P <u>a</u> rcel	Layout Offset
	Pro <u>f</u> ile	▶ <u>S</u> tation
	Ne <u>x</u> t Available Sett	tings Station Equation
		<u>St</u> ore →

🛙 Station Equ 🔳 🗖 🔀
Chain: DESIGN 🛛 🖌
Back Station 💌 30
Ahead Station: 50
Tangent Point 45
Station to Next Equation
Insert Station Equation

Open Coordinate Geometry (COGO)

Go to ELEMENT-CHAIN-STATION EQUATION

This opens the Chain > Station Equation dialog box.

The first box can be set to either Label Point or Back Station.

1. Label Point or Back Station

For Label Point you can type in the point you wish to equate with the ahead station or you can hit equate and choose the point (i.e. st c4a).

For Back Station simply type in the back station you wish the equation at.

#### 2. Ahead Station

Type in the ahead station in the equation.

#### 3. Tangent Point

It is required that you name the point with a number. *Make sure the number has not already been used or you may change your chain.* 

If you wish to have the rest of the chain restationed to the next equation turn the switch on.

If there is no other equation present leave the switch off and the rest of the chain will be restationed.

4. Choose the chain you wish to put the equation on.

5. Click on Insert Station Equation.

Note: Remember that for spirals the ST is always on 'curvename'A and the TS is always on 'curvename'B.

## 32 Store Existing Alignment from Graphics

°Q 🕽		S <del>¢</del>	ra 🧶 🦧 👾 💋 📗 😈
	鳫	<u>1</u>	COGO
	<u>.</u>	2	Graphical COGO
7	- BN	3	Horizontal Alignment Generator
1	V.	<u>4</u>	Design Multicenter Curve
l I		5	Store Graphics
	-	2	Auto Ctoro Crophica

Open Store Graphics dialog box

**Important:** When using this option be sure the Bearing's are rounded to the nearest Second  $(00^{0}00'')$  and the Length's are rounded to the nearest tenth (0.01). You may need to modify the alignment in Coordinate Geometry. This dialog box will allow you to store points, curves, chains or parcels.

🖾 Store 🔳 🗖 🔀				
<u>S</u> ettings				
Job: 234 Q				
Operator Code: oc				
Chain 💌 DESIGN				
Beginning Point: 45				
Beginning Station: 35+00				
Mode: Complex Chain 💌				
ID Element Store				

 Fill in the Job Number (limit 3 characters)
 Operator Code (limit 2 characters) Chain Name Beginning Point Beginning Station

 Click on **ID Element**

3. Tentative to the end of the alignment you wish to store and accept.

This may be easier if you turn off all the levels except for the one with the alignment.

4. Continue to accept the pieces of the alignment until the whole chain is highlighted and the **STORE** button is highlighted in dialog box.

5. Click on **STORE** to store the alignment in the .gpk file.

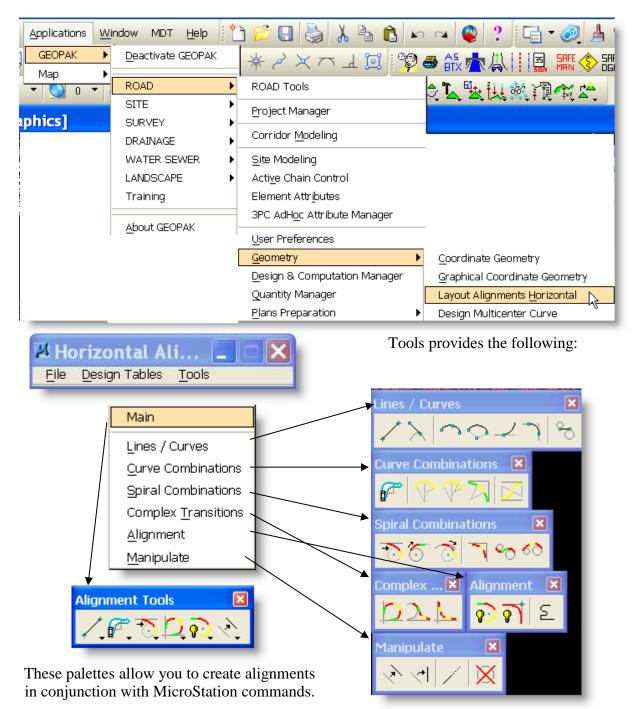
Note: This will give you a message telling you the chain was stored in the .gpk file and the commands were saved in an .inp file. Keep this .inp file so that you can recreate the .gpk file if it becomes corrupt or lost.

#### If you need to store equations on your alignment go to section 30.

6. Once your alignment is stored in a .gpk file go to the **SURVEY** section of this manual to put your ground line into Geopak.

## 33 Drawing and Storing an Alignment

Open LAYOUT ALIGNMENTS HORIZONTAL dialog box



Important: When using this option be sure the Bearing's are rounded to the nearest Second  $(00^{0}00'')$  and the Length's are rounded to the nearest tenth (0.01). You may need to modify the alignment in Coordinate Geometry.

### To create the alignment:

1. Draw tangents using MicroStation Place Line command.

2. Curves can then be placed by choosing the command from the right on the bottom of the Lines/Curves palette or the first icon on the Spiral Combinations palette.

§ Store Tang	ent Curv	
Radius:	0.0000	
Length:	0.0000	
Truncate:	None	*

Choosing the third command opens this dialog box.

You can create simple curves by radius or degree.

- a. Key-in radius or degree of curve and/or Length.
- b. Data point on first tangent.
- c. Data point on second tangent.
- d. Accept if the curve is correct or reject if you need to try another curve.

Repeat this process until all the simple curves have been created. Note: Always choose tangents in increasing station order or you will have to transpose your curves when you create your chain.

Place SC Tar	1 🔳 🗖	X
Tangent Length :		•
Entry Spiral Length :	0.000000	<b>2</b>
Exit Radius :	0.000000	<b>\$</b>
🔲 Curve Length 💌		<b>\$</b>
Truncate Back Eleme	ent	

Choosing the first icon opens this dialog box to create curves with spirals by radius or degree.

The various combinations available are SC, SCS, CS, SCSCS, and CSC.

- a. Key-in length of spiral
- b. Key-in radius or degree of simple curve portion
- c. Data point on first tangent.
- d. Data point on second tangent.
- e. Accept if the curve is correct or reject if you need to try another curve.

Repeat this process until all the spiral curves combinations have been created. Note: Always choose tangents in increasing station order or you will have to transpose your curves when you create your chain.

3. When the alignment has been completely drawn go to section 31 for storing an alignment graphically.

If you need to store equations on your alignment go to section 30.

### See Horizontal Alignment Generator Document in CADD Help Information

## 34 Convert English GPK to Metric GPK

The information about this process is contained in Geopak Help Online- Command Reference > DTM Tools.

This method will only be used to soft convert points such as PI's. It will not be used by MDT to convert a surveyed alignment. Surveyed ground line points can be put into the .gpk file and converted by this method, also, to obtain a digital terrain model.

Image: Second state sta	en English/Metric Conversion (GPK Database)
Conver	Select GPK File
English<->Metric GPK   Source Job:   234   Carget Job:   Target Job:   Conversion Factor:   Int'l Feet to Meters   Translation   Delta X:   0.0   Delta Y:   0.0   Delta Z:   0.0   Original Origin X:   0.0   Original Origin Y:   0.0   Convert	<ol> <li>Set the Source Job Number to the English GPK file</li> <li>Set the Target Job Number to a new GPK file.</li> <li>Select Convert</li> <li>Metric to English: This uses 0.3048 as a conversion factor. You can set Conversion Factor to Custom and Enter 0.3048 if needed. You will now have a new GPK file converted to metric.</li> <li>English to Metric: Use a factor of 3.28</li> </ol>

## 35 Fix Corrupt GPK

Dealing with corrupt GPK or basic maintenance - From the Coordinate Geometry dialogue at the COGO key-in enter REBUILD DATABASE.

🛛 Coordinate Geometry Job: 234 Operator: oc	
<u>File Edit Element View Tools</u>	
🔍 🧱 💥 놓 +* 🛵 🥕 🌊 🌈 🌾 🌾 🌾 🚓 👌 🛣 🔆 🎋 🔧 🖓 🖉 🗷 Bed	lefine
Temporary Visualization 💌 OFF (Feature) 💌 📴rowse 99.1234 💌 9^9'9.12'' 💌 << < >>>>	
COGO Key-in: REBUILD DATABASE	✓
k⊈	

#### Press Enter

It may take several minutes to process the GPK. When complete the rebuilt statistics will be displayed.

File Edit Element	View Tools		
		- de la de de de .	
😪 🔠 📈 🗽 🕂	/x / (x (* (*	/* 🦧 🚎 🥕 🗅 🚔 🗳	🖌 🌿 🕐 🎾 🗹 <u>R</u> edefine
	OFF (Feature) V Browse		
		33.1234 3 33.12	
OGO Key-in: REBUILD DAT	[ABASE		~
<* I PRBIITLI	DATABASE		
I KEDOIM	/ DATADADE		
Debuild Detebase: c	)dom)joh234 omk		
Rebuild Database: c: Record Type			
	\dgn\job234.gpk Count 		
Record Type	Count		
Record Type  Points	Count		
Record Type  Points Chains	Count		
Record Type  Points Chains Curves	Count  5 1 3		
Record Type  Points Chains Curves Profile Header	Count  5 1 3 3		
Record Type  Points Chains Curves Profile Header	Count  5 1 3 3		

This should be done occasionally and definitely before zipping for the archive or posting to DMS.

## 36 Existing Ground - DTM



Go to **Applications-GEOPAK ROAD > DTM Tools**, or **DTM on the Road Tools Dialog** or Click on **Existing Ground** button in *Road Project* dialog box.

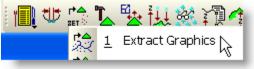


Normally this process will not need to be done, as Photogrammetry will have already generated a TIN file for the project.

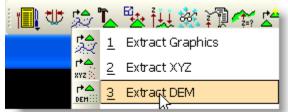
This will open the following the DTM main menu. Then you will need to select Extract Graphics from one of the following menus.

There are three options under the Extract option.

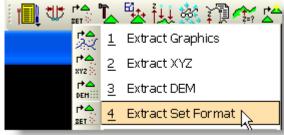
1. **Extract Graphics** - this option will extract XYZ points to create a DTM from a design file. Photogrammetry 3D file <u>page 34-2</u>. Survey 2D file <u>page 34-9</u>.



2. Extract DEM Data – this option use specialized Digital Elevation Models.



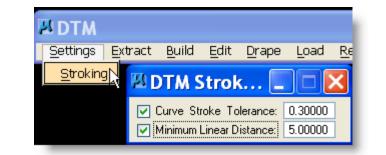
3. Extract ASCII - this option will process and XYZ ASCII files into GEOPAK DTM



Format. (See page 34-13)

DTM Menu option will open the following dialog box.

A DTM								
Settings	Extract	Build	Edit	Drape	Load	<u>R</u> eports	<u>A</u> nalysis	Utilities

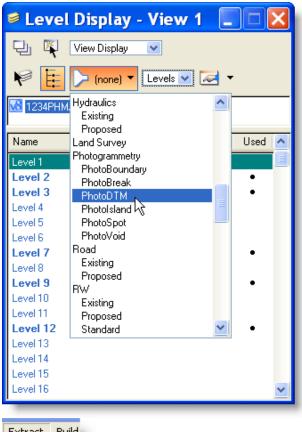


### 36.1 Photogrammetry 3D file

Set Curve Stroke Tolerance to 0.3 and

Minimum Linear Distance to 5.0

Start by opening a 3D Photogrammetry file. ####PHDTPF01.DGN



Extract	Build
<u>G</u> raphi	cs
<u>X</u> YZ	
<u>D</u> EM	
<u>S</u> et Fo	rmat
	_

**Step 2** Open Extract Graphics dialog

#### Make sure the file is 3D for this process. Otherwise, go to page 34-9 for 2D files.

#### Step 1

Open level display and set filter to PhotoDTM. Leave the Level Display open for use during the extract process.

**Hints**: be sure that the **whole map** can be seen in the MicroStation Window (View 1) and after setting the **Select Criteria** be sure to select the apply button.

🛛 Extra	act Graphics 📃 🗆 🔀
File Name:	1234RDMAP001.dat
File type:	Ascii 🔽 Decimal: 4 🗸
File open:	Create
Feature:	Boundary 🗸
Mode:	Extraction 💙
Search Cr	
- D	v Names: 👘 👘
Lvi	Numbers:
	Colors:
	Styles:
	Weights:
	Weights.
	Types:
Mato	h Display Reset
Extract —	
View 1	
VIEW I	
<mark>≶ Level</mark> 및 ≰	Display - View 1 🔲 🗆 🔀 View Display 💌
P 🗄	🏳 Photog 🔻 🛛 Levels 💌 📈 👻
1 1234РНМ/	APZF1.DGN
Name	Used
E_Drainage_N	
E_Road_RR_	Road_Gutter
	Road_Gutter _Boundary
E_Road_RR_ E_Misc_DTM	Road_Gutter _Boundary _GradeBreak
E_Road_RR_ E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM	Road_Gutter _Boundary _GradeBreak _GroundShot _Island
E_Road_RR_ E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM	Road_Gutter _Boundary _GradeBreak _GroundShot _Island _Obscure
E_Road_RR E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Natural_W-	Road_Gutter _Boundary _GradeBreak _GroundShot _Island _Obscure ater_EdgeofWater
E_Road_RR_ E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Nisc_DTM E_Natural_W- E_Natural_W-	Road_Gutter _Boundary _GradeBreak _GroundShot _Island _Obscure ater_EdgeofWater ater_FlowLineWithFlow
E_Road_RR E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Natural_W- E_Natural_W- E_Road_RR_	Road_Gutter _Boundary _GradeBreak _GroundShot _Island _Obscure ater_EdgeofWater
E_Road_RR E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Natural_W- E_Natural_W- E_Road_RR_ E_Road_RR_	Road_Gutter _Boundary _GradeBreak _GroundShot _Island _Obscure ater_EdgeofWater ater_FlowLineWithFlow _Road_Concrete
E_Road_RR E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Natural_WA E_Natural_WA E_Road_RR_ E_Road_RR_ E_Road_RR_ E_Road_RR_	Road_Gutter _Boundary _GradeBreak _GroundShot _Island _Obscure ater_EdgeofWater ater_FlowLineWithFlow _Road_Concrete _Road_EdgeofRoadGravel _Road_EdgeofRoadGravel _Road_EdgeofRoadTrail
E_Road_RR_ E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Natural_W4 E_Natural_W4 E_Road_RR_ E_Road_RR_ E_Road_RR_ E_Road_RR_ E_Road_RR_	Road_Gutter _Boundary _GradeBreak _GroundShot _Island _Obscure ater_EdgeofWater ater_FlowLineWithFlow _Road_Concrete _Road_EdgeofRoadGravel _Road_EdgeofRoadPavement

#### Step 3

- Choose from Files or type in ####RDDTN001.DAT for file name. This will create a file you can use to create a DTM.
- 2) Set Decimal to 4 or greater
- 3) File Type can be either *ASCII* or *Binary*.
- 4) Set File Open to Create. The first extract should have *Create* set. Additional points will be Added to this file by changing from *Create* to *Append*.
- 5) Set Feature Type to *Boundary*. This is the line that is around the outside of all the information.
- 6) Set Mode to Extraction
- 7) In Level Display set all levels OFF except for E_Misc_DTM_Boundary
- 8) Set Extract View 1. Be sure you can see the whole drawing in view 1
- 9) Click on Apply.

의 Extr	act Gi	raphics	;	
File Name:	1234RD1	MAP001.dat		۹
File type:	Ascii	~	Decim	al: 🛛 🔽
File open:	Append	~		
Feature:	Void	~		
Mode:	Extraction	n 🔽	•	
C Search Cr	iteria —		_	
E L	v Names:			1
Ly I	Numbers:			1
	Colors:			1
	Styles:			*
	Weights:			*
	Types:			*
	турса.			
Mato	h [	Display	R	eset
Extract -				
View 1	~	1		Apply
		<u> </u>		112
<mark>≶ Level</mark> ₽ ¥	<b>Displa</b> View Displ		w 1 [	
	View Displ			<u> </u>
	View Displ	ay 💌 g 🔻 Levels		<b>_  \</b>
₽ı ¤ ♥ <mark>E</mark>	View Displ	ay 💌 g 🔻 Levels		- I X
₽」 ♥ ₩ 1234PHM.	View Displ	ay 💌 g 🔻 Levels		■ ■ X
Image: state sta	View Displ	ay V g V Levels		Used
Image: Constraint of the second	View Displ Photo APZF1.DGN Misc_Ditch Road_Gutte	ay V g V Levels		■ ■ X
Image       Name       E_Drainage_t       E_Road_RR_       E_Misc_DTM	View Displ Photo APZF1.DGN Misc_Ditch Road_Guttu _Boundary	ay V g V Levels		Used
	View Displ Photos APZF1.DGN Misc_Ditch Road_Gutto _Boundary _GradeBrea	ay V g V Levels I er		■ ■ X
Image       Name       E_Drainage_t       E_Road_RR_       E_Misc_DTM	View Displ Photos APZF1.DGN Misc_Ditch Road_Guttu _Boundary _GradeBrea _GroundShu	ay V g V Levels I er		Used
Name E_Drainage_t E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM	View Displ Photo APZF1.DGN Misc_Ditch Road_Gutti _Boundary _GradeBrea _GroundShi _Island	ay V g V Levels I er		Used
	View Displ Photos APZF1.DGN Misc_Ditch Road_Guttu _GradeBrea _GroundShu _Island _Obscure ater_Edgeol	ay V g V Levels 1 er er k ot		■ ■ X
	View Displ Photos APZF1.DGN Misc_Ditch Road_Guttu _Boundary _GradeBrea _GroundShu _Island _Obscure ater_Elogeol ater_FlowLin	ay ♥ g ♥ Levels 1 er k ot Water neWithFlow		■ ■ X
	View Displ Photos APZF1.DGN Misc_Ditch Road_Guttu _Boundary _GradeBrea _GroundShu _Island _Obscure ater_Elogeol ater_FlowLin _Road_Cond	ay ♥ g ♥ Levels 1 er k ot Water neWithFlow crete		Used
	View Displ Photos APZF1.DGN Misc_Ditch Road_Guttu _Boundary _GradeBrea _GroundShu _Island _Obscure ater_Elogeol ater_FlowLin _Road_Cono _Road_Edge	ay ♥ g ♥ Levels g ♥ Levels g er k t t t w/ater neW/thFlow crete eofRoadGrave		Used
	View Displ Photos APZF1.DGN Misc_Ditch Road_Guttu _Boundary _GradeBrea _GroundShu _Island _Obscure ater_Edgeol ater_FlowLin _Road_Cono _Road_Edge _Road_Edge	ay Y g Y Levels g V Levels g er k ot Water neWithFlow crete eofRoadGrave eofRoadGrave		Used
	View Displ Photos APZF1.DGN Misc_Ditch Road_Gutt _GradeBrea _GroundShi _Island _Obscure ater_Elogeol ater_FlowLin Road_Cono Road_Eldge Road_Eldge Road_Eldge	ay Y g Y Levels g V Levels g Vater k ot Water heWithFlow crete eofRoadGrave eofRoadGrave eofRoadTrail		Used

### Step 4

- 1) Change File Open to Append. This will add the voids to the existing .dat file that was created in the previous step.
- 2) Change Feature Type to Voids. These are the lines around the outside of buildings and areas that have heavy trees or brush where the ground information cannot be seen by the Photogrammetry unit.
- 3) In Level Display turn all levels off except E_Misc_DTM_Obscure.
- 4) Select Apply. This will add the void information to the existing dat file.

의 Extra	act Graphics 📃 🗆 🔀
File Name:	1234RDMAP001.dat
File type:	Ascii 🔽 Decimal: 4 🔽
File open:	Append 🗸
Feature:	Island 🗸
Mode:	Extraction
C Search Cr	iteria
E L	v Names: 👘 👘
Lv I	Numbers: 🎽 👘
	Colors:
	Styles:
	Weights:
	Types:
Mato	h Display Reset
Extract -	
View 1	
<mark>≶ Level</mark> 및 K	Display - View 1
1234PHM	<u> </u>
Name	Used
E_Drainage_N	
E_Road_RR_	Boad butter
E_Misc_DTM	_Boundary
	_Boundary _GradeBreak
E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM	_Boundary _GradeBreak _GroundShot _Island
E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM	_Boundary _GradeBreak _GroundShot _Island _Obscure
E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Natural_W	_Boundary _GradeBreak _GroundShot _Island _Obscure ater_EdgeofWater
E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Natural_W E_Natural_W	_Boundary _GradeBreak _GroundShot _Island _Obscure ater_EdgeofWater ater_FlowLineWithFlow
E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Natural_W E_Natural_W E_Road_RR_	_Boundary _GradeBreak _GroundShot _Island _Obscure ater_EdgeofWater
E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Nisc_DTM E_Natural_W/ E_Natural_W/ E_Road_RR_ E_Road_RR_	_Boundary _GradeBreak _GroundShot _Island _Dbscure ater_EdgeofWater ater_FlowLineWithFlow _Road_Concrete
E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Natural_W E_Natural_W E_Road_RR_ E_Road_RR_ E_Road_RR_ E_Road_RR_	_Boundary _GradeBreak _GroundShot _Island _Obscure ater_ElgeofWater ater_FlowLineWithFlow _Road_Concrete _Road_EdgeofRoadGravel _Road_EdgeofRoadPavement _Road_EdgeofRoadTrail
E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Natural_W E_Natural_W E_Road_RR_ E_Road_RR_ E_Road_RR_ E_Road_RR_ E_Road_RR_	_Boundary _GradeBreak _GroundShot _Island _Obscure ater_EdgeofWater ater_FlowLineWithFlow _Road_Concrete _Road_EdgeofRoadGravel _Road_EdgeofRoadPavement

#### Step 5 (Optional)

- 1) Perform this step only if elements exist on E_Misc_DTM_Island level.
- 2) Change Feature Type to Island. These are actual islands in the middle of rivers and/or meadow areas in heavy timber as seen by the Photogrammetry unit.
- 3) In Level Display turn all levels off except E_Misc_DTM_Island.
- 4) Select Apply. This will add the void information to the existing dat file.

📕 Extra	act Graphics	
File Name:	1234RDMAP001.dat	٩
File type:	Ascii 💽 Decin	nal: 🛛 🔽 👘
File open:	Append 🔽	
Feature:	Breaks 💌 🔽	troking
Mode:	Extraction 🔽 🛄	
C Search Cr	iteria	
L'	v Names:	
Ly I	Numbers:	
	Colors:	1
	Styles:	1
	Weights:	1
	Types:	1
		_
Mato	h Display I	Reset
Extract View 1	<b>v</b>	Apply
View I		Abbia
_		
🦻 Level	Display - View 1	
	Display - View 1	
Sevel	Display - View 1 View Display	
		🗙
	View Display	
₽ı ¤ ♥ <mark>E</mark>	View Display	X
₽ı ¤ ♥ <mark>E</mark>	View Display	Used
₽ ₹ 1234PHM. Name	View Display	
Image: state sta	View Display	
Image       Image       Image       Image	View Display	
Image: state sta	View Display	
	View Display Photog ▼ Levels ▼ APZF1.DGN Misc_Ditch Road_Gutter _Boundary _GradeBreak _GroundShot	
	View Display  Photog  Levels  APZF1.DGN  Misc_Ditch Road_Gutter Boundary GradeBreak GroundShot Lisland	
	View Display  Photog  Levels  APZF1.DGN  APZF1.DGN  Visc_Ditch Road_Gutter _Boundary _GradeBreak _GroundShot _Island _Obscure	
	View Display  Photog  Levels  APZF1.DGN  Misc_Ditch Road_Gutter Boundary GradeBreak GroundShot Lisland	
	View Display	



### Step 6

- 1) Change Feature Type to Breaks. These are the lines that show the edge of roads and ditches. These are needed to get a better tin of what the ground really looks like.
- Check stroking are Curve Stroke Tolerance to 0.3 and Minimum Linear Distance to 5.0.
- 3) In Level Display turn ALL levels ON except E_Misc_DTM_GroundShot.
- 4) Select Apply. This will add the break information to the existing dat file.

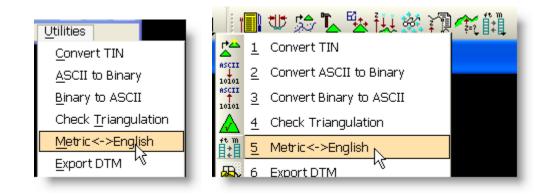
📕 Extr	act Grap	hics		
File Name:	1234RDMAP0	01.dat		۹
File type:	Ascii	~	Decimal:	4 💌
File open:	Append	~		
Feature:	Spots	~		
Mode:	Extraction	~		
- Search Cr	iteria			
- L	v Names:			1 🛍 📗
Lv Lv	Numbers:			1 🍅 📗
	Colors:			1*
	Styles:			1
	Weights:			*
	Types:			
C	ell Name:		Origin	~
Mato	:h Disp	olay	Res	et
Extract -				
View 1	~		Ap	ply
	_	<b>v</b>		
	View Display	<b>v</b>		
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	View Display	<b>v</b>		
₽. ¥ ¥ <mark>E</mark>	View Display	<b>v</b>		Used
<ul> <li>↓ ↓</li> <li>↓ ↓</li></ul>	View Display	<b>v</b>		Used
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	View Display	<b>v</b>		Used
Image: state	View Display Photog  Photog  ( APZF1.DGN  Visc_Ditch Road_Gutter	<b>v</b>		Used
	View Display  Photog  Photog  ( APZF1.DGN  Misc_Ditch Road_Gutter Boundary GradeBreak	<b>v</b>		Used
	View Display	<b>v</b>		Used
	View Display	<b>v</b>		Used
Name E_Drainage_t E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM E_Misc_DTM	View Display	<b>v</b>		Used
	View Display	Levels		Used
	View Display Photog ▼ APZF1.DGN Arc.Ditch Road_Gutter Boundary GradeBreak GroundShot Jsland Obscure ater_EdgeofWater	Levels		Used
	View Display	Levels		Used
	View Display	Flow dGravel dPaveme		Used
	View Display	Flow dGravel dPaveme dTrail		Used
	View Display	Flow dGravel dPaveme dTrail Curb	• • • • • • • • • • • • • • • • • • •	Used

### Step 7

- Change Feature Type to Spots. These are the mass points defined by the Photogrammetry unit.
- 2) In Level Display turn ALL levels OFF except E_Misc_DTM_GroundShot.
- 3) Select Apply. This will add the spot information to the existing dat file.

### 36.2 Convert DTM to English

#### For information only. Be sure to follow conversion procedures if converting your own DTM.



🛛 English <-> Metric TIN 📃 🗖 🔀			
Source TIN File: 1234RDDTM007.TIN Q			
Target TIN File: 1234RDDTM002.TIN			
Conversion Factor: Custom 💌 3.280839895			
Translation           X:         0.00000000           Y:         0.00000000           Z:         0.00000000			
Rotation         X: 0.00000000           Center (Original Coordinates)         X: 0.00000000           Y: 0.00000000         Y: 0.00000000           Angle (Decimal Degrees): 0.00000000         0.00000000			
Convert			

- 1) Select Metric<->English from the DTM menu or the Icon from the Menus
- 2) Set Source to existing DTM
- 3) Set Target to new DTM
- 4) Set Conversion Factor to Custom and 3.280839895
- 5) Press Convert

### 36.3 Survey file 2D

🛙 Extract Graphics 🛛 🗖 🔀					
File Name:	1234RDI	MAP001.dat			ર
File type:	Ascii	~	Dec	cimal: [	4 🐱
File open:	Create	~	•		
Feature:	Spots	~	•		
Mode:	Extraction	າ 💌	·		
C Search Cr	iteria —				
🔽 🛛 Lv Names: E_Misc_DTM_Ground 🔁					2
🗌 Lv Numbers: 🔤 🎽					
	Colors:				1
	Styles:				1
	Weights:				*
	Types:	7,17			2
Cell Name: Contenl 💙					
Match Display Reset					
Extract View 1  Apply					

Тур	oe Search Filter		
-	Cell Line Line String Shape Text Node Curve Complex String Complex Shape Bllipse Arc Text B-Spline Surface Shared Cell		
<u>D</u> K Cancel			

#### Step 1

- Choose from Files or type in 1234RDDTM001.dat for file name. This will create a file you can use to create a DTM.
- 2) Set Decimal to 4 or greater
- 3) File Type can be either *ASCII* or *Binary*.
- 4) Set File Open to Create. The first extract should have *Create* set. Additional points can be Added to this file by changing from *Create* to *Append*.
- 5) Set Feature to *Spots*. This will extract the mass point from the design file. In most cases they look like green dots.
- 6) Set Mode to *Extraction*
- Select Criteria to match your elements to be extracted. A quick method of matching is to use the match button and select your element. E_MISC_DTM_GROUNDSHOT
- 8) Select Types to Text and Text Nodes and Set toggle to Content. This will read the Elevation text to get the Z information. Select OK
- 9) Set Extract View 1. Be sure you can see the whole drawing in view 1
- 10) Click on Apply. This will create the text file containing Spot elevation information.

File Name:       1234RDMAP001.dat       ♀         File type:       Ascii       ♥ Decimal:       4 ♥         File open:       Append       ♥         Feature:       Breaks       ♥       Stroking         Mode:       Interpolation       ♥       Stroking         Mode:       Interpolation       ♥       Stroking         Voltor       Lv Names:       Level 58       ♥         Voltor       Lv Numbers:       58       ♥         Oclors:       ●       ♥       Styles:       ♥         Veights:       ●       ●       ♥       Yeset         Match       Display       Reset       ♥         Longitudinal Reference       Criteria       ♥       ↓       ♥         Voltable       Level 19,Level 20,Lev       ♥       ●					
File open:       Append         Feature:       Breaks         Mode:       Interpolation         Spots Criteria       Stroking         Image: Lv Names:       Level 58         Lv Numbers:       58         Colors:       Image: Content         Styles:       Image: Content         Weights:       Image: Content         Match       Display         Longitudinal Reference       Criteria         Image: Level 19,Level 20,Lev       Image: Content	1				
Feature:       Breaks       Stroking         Mode:       Interpolation       Stroking         Spots Criteria       Image: Level 58       Image: Level 58         Image: Level 58       Image: Level 58       Image: Level 58         Image: Level 58       Image: Level 58       Image: Level 58         Image: Level 58       Image: Level 58       Image: Level 58         Image: Level 58       Image: Level 58       Image: Level 58         Image: Level 58       Image: Level 58       Image: Level 58         Image: Level 58       Image: Level 58       Image: Level 58         Image: Level 19, Level 20, Lev       Image: Level 19, Level 20, Lev       Image: Level 19, Level 20, Lev					
Mode: Interpolation   Spots Criteria   Image: Lv Names:   Lv Numbers:   58   Colors:   Styles:   Styles:   Weights:   Image: Veights:   Image: Veights: <td>1</td>	1				
Spots Criteria	h				
✓       Lv Names:       Level 58         ✓       Lv Numbers:       58         ✓       Colors:       1         ✓       Styles:       1         ✓       Types:       7,17         ✓       Types:       7,17         ✓       Content       ✓         Match       Display       Reset         ✓       Lv Names:       Level 19,Level 20,Lev	n I				
✓       Lv Numbers:       58       ✓         Colors:       ✓       Styles:       ✓         Styles:       ✓       Yeights:       ✓         Weights:       ✓       Types:       7,17         Cell Name:       Content       ✓         Match       Display       Reset         Longitudinal Reference Criteria       ✓       Lv Names:         Lv Names:       Level 19,Level 20,Lev       ✓					
Colors: Styles: Veights: Vitypes: 7,17 Cell Name: Content Vitypes: Match Display Reset Longitudinal Reference Criteria Vitypes: Lv Names: Level 19,Level 20,Lev					
Styles:       **         Weights:       **         ✓       Types:       7.17         Cell Name:       Content       *         Match       Display       Reset         Longitudinal Reference Criteria       *       *         ✓       Lv Names:       Level 19,Level 20,Lev       *					
Weights:       ★         ✓       Types:       7,17         Cell Name:       Contenl ♥         Match       Display       Reset         Longitudinal Reference Criteria       ♥       Lv Names:       Level 19,Level 20,Lev       ★					
✓       Types:       7,17         Cell Name:       Content ▼         Match       Display       Reset         Longitudinal Reference Criteria       ✓       Lv Names:       Level 19,Level 20,Lev					
Cell Name: Content V Match Display Reset Longitudinal Reference Criteria					
Match Display Reset Longitudinal Reference Criteria V Lv Names: Level 19,Level 20,Lev					
Longitudinal Reference Criteria	Cell Name: Contenl 💌				
Lv Names: Level 19,Level 20,Lev	Match Display Reset				
	5				
🔽 L. N					
V Lv Numbers: 19,21-22					
Colors:					
Styles:					
📃 Weights:					
Types:					
Match Display Reset					
Extract View 1  Tolerance: 0.010000 Apply					

### Step 2

- 1) Change the File Open to Append
- 2) Change **Feature** to **Breaks.** Make sure stroking values have been set.
- 3) Change Mode to Interpolation
- 4) Select Criteria to match your elements to be extracted. English levels below.
- 5) Set Spot Criteria Type to **Text** and **Text Node**, Set Toggle to **Content.** In order to get the elevation of break line from a 2d file Geopak must read the Content of the elevation text. Geopak will only read the elevation text that is near the break lines
- 6) Set Longitudinal Reference Criteria Level Mask to match your elements.
- 7) Set tolerance to 0.01
- 8) Select Apply. At this point Geopak will add the Break lines to the existing dat file.

<u>Be sure all criteria are set before you apply.</u> Levels to be used for English: E_MISC_DTM_GROUNDSHOT, E_MISC_DTM_BOUNDRY, E_MISC_DTM_GRADEBREAK, E_MISC_DTM_ISLAND, E_MISC_DTM_OBSCURE

### 36.4 3D Survey file from CAICE

File name will be similar to this naming convention 1234DIDTM001.dgn

File Name:	1234RDI				ີ 🔼 ຊ
File type:	Ascii		~	Decimal:	4 💌
	Create		¥		
Feature:	Graphic 1	Friangle	~		
Mode:	Mode: Extraction				
Search Criteria					
Lv Names: Level 50					
🔽 Lvi	Numbers:	50			2
	Colors:				1
Styles:			1		
🗌 Weights:					
Types:					
Match Display Reset Extract View 1 💌 Apply					

🖾 Extr	act Gi	aphics		
File Name:	1234RDI	/AP001.dat	٩	
File type:	Ascii	~	Decimal: 🛛 🔽	
File open:	Append	~		
Feature:	Boundary	· ·		
Mode:	Extraction	າ 🔽		
C Search Cr	iteria —			
🔽 L'	v Names:	Level 15	2	
🔽 Lvi	Numbers:	15	2	
	Colors:		1	
	Styles:		*	
	Weights:		1	
	Types:		1	
Match Display Reset Extract View 1  Apply				

Step 1

- Choose from Files or type in 1234RDDTM001.dat for file name. This will create a file you can use to create a DTM.
- 2) File Type can be either *ASCII* or *Binary*. For *ASCII* set Decimal to 4 or greater.
- 3) Set File Open to Create. The first extract should have *Create* set. Additional points can be Added to this file by changing from *Create* to *Append*.
- 4) Set Feature to *Graphic Triangles*. This will extract the triangles from the design file. In most cases they look like existing TIN.
- 5) Set Mode to Extraction
- 6) Set **Levels** for CASIE 3D file. Select Criteria to match your elements to be extracted. A quick method of matching is to use the match button and select your element. Select OK
- 7) Set Extract View 1. Be sure you can see the whole drawing in view 1.
- 8) Click on Apply. This will create the text file with the graphic triangle information.

### Step 2

- 1) Change the File Open to Append
- 2) Change Feature to Boundary
- Set Levels to match your elements to be extracted. A quick method of matching is to use the match button and select your element.
- 4) Select Apply. At this point Geopak will add the boundaries to the existing dat file.

📕 DTM

Settings Extract Build Graphics

## **36.5 Extract XYZ ASCII**

Extract ASCII Format option will open the following dialog box.

This dialog will reformat the existing XYZ data file to a format that Geopak can create a DTM from. GEOPAK requires the following information for each data point: **Point Code, X-coordinate, Y-coordinate and Z-coordinate**. Other informational items include **Point Number, Linking Code, Chain, DTM, Zone**, and combination **Linking Code Point Code.** For more information see the Geopak Help Online – Command Reference > DTM Tools

🖾 Extract XYZ					
Input File C:\dgn\1234CTRLXYZ					
Output File 1234RDDTM001.DAT File Create 💌					
Delimiter Space 💌 Comment Delimiter None 💌					
Contents of File					
1234ctrl.xyz       12:20:99       Image: Constraint of the state of the s					
K V V Z None	Reset				
Apply Best Match Feature Code     Feature Setting     Display Alert Box for Errors     Output File Format : Binary					
Process					

- 1) Set the Input file name to the file that contains the XYZ data. An example of the first few lines of the data file will show in the **Contents of File.**
- Set the Output file to the file you wish to create. Use this format 1234GRND.dat
- 3) Set the Delimiter to space. If you have commas or some other delimiter you will need to set it to that.
- 4) Select one line of data within the Contents of File area and the information from that line will appear below.
- 5) At this point you will need to set the button below each number or text to the correct setting as shown in the example. In some cases you will not have a column for PCODE, this is ok but you will get a message that you have not defined the PCODE. Just Select OK if you get this message and Geopak will create the DTM input file.
- 6) Select Process. This will convert the data file to a DTM input file that Geopak can create a DTM from.

### **36.6 Create Digital Terrain Model**

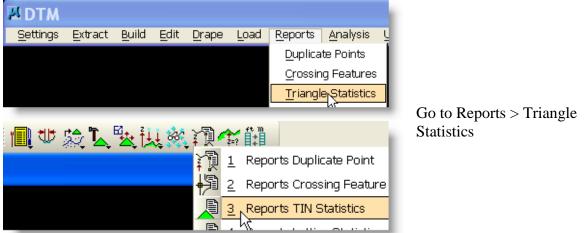


a Build	l Triangles	
Data File:	1234RDDTM001.DAT	٩
TIN File 1234RDDTM001.TIN Q		
Dissolve	e Option: 🛛 None 💌	
	Process	

To create the .tin file go to **BUILD-TRIANGLES**.

- 1) Choose or Type in the name of the xyz data file created above.
- 2) Choose or Type in the name of the tin file (triangle file). You are building or replacing this file.
- 3) Choose None for Dissolve Option. Note: For RDS cross sections set Dissolve Option to Side and set distance slightly larger than your surveyed distance between cross sections or you will get improper triangles.
- 4) Select on Process.

You have now created the file necessary to create your cross-sections. To check this file you can do the following two steps.



### 36.6.1 Triangle Statistics

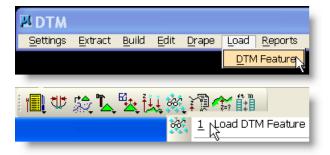
This will open a dialog box that gives information about triangulated file.

🛿 Report Tin St 📃 🗆 🔀					
TIN: 1234RDDTM001.TIN					
Decimal Points: 🛛 🔽					
TIN Statistics					
Number of Data Points: 1536					
Number Of Lines: 4602					
Number Of Triangles: 3067					
Number Of Breaks: 0					
Number Of Contours: 0 Number Of Voids: 0					
Number Of Voids: 0 Number Of Islands: 0					
Number Of Holes: 0					
Minimum Maximum Range North 0.00 40602318.0040602318.00					
East 0.00 40617.86 40617.86					
Elev -999999999.00 3758.91 )0003757.91					
Process					

This allows you to check and make sure that all your points are not at the same spot or any other mistakes that are obvious such as 1000foot difference in elevations when you only have a max. 100 foot difference.

I believe the report at left shows a file built in error. A rerun is required.

### 36.6.2Display DTM Features



4	Load DTM Features\DTME	×			
	ile				
	Dad File: TIN 💌 1234RDDTM007.TIN 🔍 Load				
1	Display Preferences	5			
	oad: 🛛 Extent 🛛 🔽 Display Only 🔄 Graphic Group				
	Feature Level Color Weight Style Display 🔨				
	Triangles E_Misc_DTM 122 0 0 OFF 📃 💡	4			
	TIN Hull E_BORDER 9 1 0 OFF	t I			
	Contours ON				
	Major Lines E_Contours_Ma 3 3 0 0FF	2			
	Major Label E_Contours_Ma 4 0 0 OFF 1	1			
	Minor Lines E_Contours_Mi 5 0 0 OFF 👱				
	Minor Interval: 0.200 Major Interval: 1.000				
Smooth: None 💌 Registration: 0.000 Minimum Area: 0.000					
	Range 💌 Minimum Z: 2391.198 Maximum Z: 3107.185 Read				
		~ I			
1		-			

Go to LOAD > DTM Feature This will open the Load DTM Feature dialog.

Select File > Open and select DTMEXISTING or DTMPROPOSED file that sets symbology for loaded features.

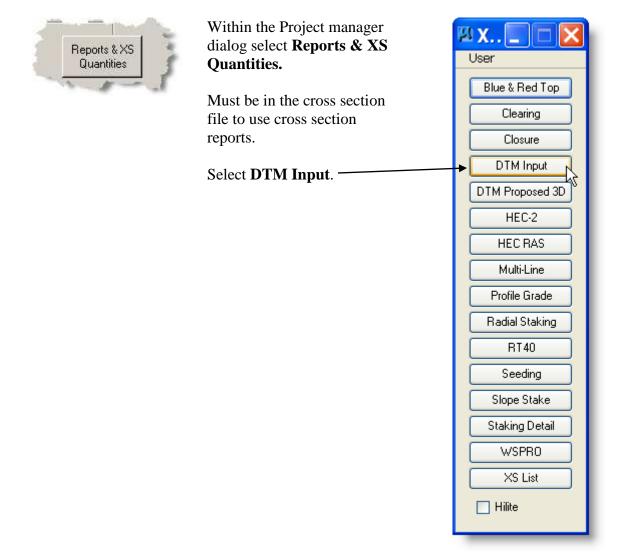
- 1) Set Load File to TIN and use Files button to select the Tin file.
- 2) Set the Feature to the feature you wish to display.
- 3) Select Load button

Hint: To set up the feature setting for Erosion control contours use the FILE menu from this dialog and OPEN the file w:\geopak\erosion.lpf. This will set the features

w:\geopak\erosion.ipf. This will set the features as shown to the left.

The triangles should now be displayed on the screen laid over your alignment. Now you can visually inspect the triangle file for any gaps that should not exist or if there are extra triangles that should not be there. If there are go back to Build-Triangles and adjust the side length until it looks right. A contour map may be created by using the **macro**: RD > Create DGNs > select Contour Map File, English and use the PH file as the Base Map > Create DGN'S - creates 1234RDCMA001.dgn.

### 36.7 Creating DTM input from existing cross section file



📕 Creat	ing DTM Input Fi	ile 📃 🗆 🗙		
Job:	234 Q Current Station:	10+00.00 R 1		
Chain:	DESIGN	▼		
Begin Station:	10+00.00 R 1	10+00.00 R 1		
End Station:	68+00.00 R 1	68+00.00 R 1		
Search Criteria XS Elements: Display				
	Pause on Each XS	ames: Level 2		
ASCII File:	1234RDSED003.LOG LV N	umbers: Q		
	Apply Weig	rs: ghts: 2		

1) If you are using Project Manager the following will be filled-in

- a) Job Number
- b) Chain
- c) Begin & End Station
- d) XS Element Symbology
- 2) or Set the Following for XS Elements
  - a) Level = 2
  - b) Weight = 2
  - c) Style = 0
- 3) Enter a ASCII file name
- 4) Select Apply

You have now created an XYZ file you can create a .tin file with. Go to section 5.6. See Geopak Help Online – Command Reference > Cross Sections *Optional direct link to Help press F1 when dialog is active.* 

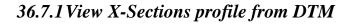


Image: Section of the section of th	Select <b>Analysis &gt; Profile</b> from either the menu or icon ribbon.
Image: Selection       Level       Color Weight Style       Extract         Two Charact Selection       Level       Color Weight Style       Extract         Two Charact Selection       Level       Color Weight Style       Extract         Two Charact Selection       Level       Color Weight Style       Extract         Two T234RDDTM001       P_Becqual_XS_Cell       0       0       On         Two File       1234RDDTM001 Tin       Image: Cevie Legend       Image: Cevie Legend	<ul> <li>Selection <ol> <li>Select TIN file</li> </ol> </li> <li>You can set the symbology for the element Right click on the line symbol</li> <li>Select Add</li> <li>Go to Profile tab</li> </ul>



Profile	
Eile	
Scale	Elevations Misimum: 0.000 Pound Doornmaa (20) Maximum: 0.000 Planet Upptia Planet Vertical
Hotizontal 10.000 Vertical 1.000 Boundary Symb:	Stationing Minimum: 0.000 Mastmum: 0.000 Reset Stations
Horizontal Gild Major Interval 100.0 Minor Interval 25.00 Major Symbology Minor Symbology Major Text. 12.5	

#### Profile

- 1) Select the Select Element or Place Element button.
- 2) Select the Element or place the line on the screen.
- 3) The profile will appear in the dialog
- You can place this image on the design file if you wish. You may wish to set the preferences before placing this on the design file.

Preference At this time there is not a standard.

#### 36.8 Creating DTM input from Existing & Proposed Cross section file



Select **Reports & XS Quantities** or From **Road Tools Menu > XS Reports** 

Must be in the cross section file to use cross section reports



User Blue & Red Top Clearing Closure DTM Input DTM Proposed 3D, HED₂ HEC RAS **Multi-Line** Profile Grade Radial Staking **RT40** Seeding Slope Stake Staking Detail WSPRO XS List Hille

A X.. _

Select DTM Prop. 3D.

🗵 DTM Proposed 3D Report 🔳 🗖 🔀				
Job:	234 Q Current Station:	10+00.00 R 1		
Chain:	DESIGN	¥		
Begin Station:	10+00.00 R 1	10+00.00 R 1		
End Station:	68+00.00 R 1	68+00.00 R 1		
Search Criteria Existing Ground Line: Display				
Proposed Finish Grade: Display				
Pause on Each XS				
ASCII File: 1234RDDTM001.DAT]				
Apply				
_				

1) If you are using Project Manager the

- following will be filled-in
  - a) Job Number
  - b) Chain
  - c) Begin & End Station
  - d) Existing Ground Line
  - e) Proposed Finish Grade
- 2) Set Search Criteria: Existing Ground Line Level = E_Ground_XS_Delineation Proposed Finish Grade Level = P_Template_Design_Alignment_Finished_Grade
- 3) Enter a ASCII file name
- 4) Select Apply

You have now created a DTM file to be used to create a .tin file. See Geopak Help Online – Command Reference > Cross Sections Optional direct link to Help press F1 when dialog is active

## 37 Create Patterns from Existing Ground Cross Sections



In Project manager Select **Existing Ground Cross-Sections**. You will need to Create or Rename a run.

Or

Select Ground Cross Sections From DTM from the Geopak Road Tools Menu

🛙 Draw Pattern Lin 🔳 🗆 🔀		
XS DGN File:	C:\dgn\1234RDXSF001.DGN	
XS Baseline:	DESIGN	
Symbology:		
Draw Pattern Lines		

- 1) Select the cross section file needed
- 2) Select the chain (baseline).
- 3) Set the symbology of the pattern lines.
- 4) Make sure the map file is open.
- 5) Click Draw Pattern Lines. The new pattern lines will be drawn according to the cross sections.

## 38 Topography or Signing

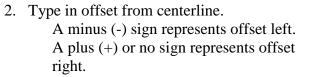
#### **Placing Point Data**



## Open DP Station/Offset dialog

If you are using Project manager the Job # and Chain will be filled-in. Topo & Signing is done on the strip map file.

1. Type in station location of point data.



3. Choose MicroStation command for placing your specific type of point data. (For most topography and signs, this will be PLACE ACTIVE CELL. Make sure to attach Cell Library before trying to place cells.)

4. Click on **DP**.

The point data you were placing should appear on your screen at the correct location. (You must have this part of your alignment on the screen to see the element.)

5. Repeat steps 1-4 to continue placing point data.

Job: 234 Q Lob: 234 Q Chain: DESIGN V K Station: 10+00.00 Offset: Tangent + 180 Auto Angle DP AA

## 39 Ancillary 39.1 GEOPAK Ancillary Process (LINES)

This process handles the lines from the design file – to process cells go to section 39.2. NOTE: There are standard files defined in CADDSTD\GEOPAK*.afd. In order to use these copy and paste the required file into C:\dgn and rename to your project - nnnnRDADF001.afd



Draw Cross Sections from

Draw Cross Section Tabula

Draw Ancillary Features

Draw Ancillary Features get the window.

This is used to draw features such as underground utilities and Row on the working cross sections.

📕 Draw Ancillary Features			
<u>File Edit</u> Update Option	15		
Job: 322 Q Chain: B View: Cross Section V Offset: 0.00	Label Scale: 0.60 Draw ✓ "K" Station Range Begin: 10+00.00 ↔ End: 124+95.26 ↔		
Element Type	Elevation Display Settings Drav		
DGN File: c:\dgn\ref\982900 Extract Elevation Feature Feature: XS-EGF	Feature = XS Text = <		
Display Settings       Text       Semple       Angle:       90° 0' 0.00       Image: Semple       Angle:       Semple       Image:			

3

5

- If you copied a .afd file from CADDSTD, then File > Load > Select the file you copied.
- 2) Select Job
- 3) Select Chain
- 4) Set View to Cross Section
- 5) Select Intersecting Element Level Symbology or Feature. Match symbology from the actual file.
- 6) Select the SPECIFIC file that contains the level symbology or feature you wish to look for.

Draw Ancillary Features			X
File Edit Update Options			
Job: 322 Q		abel Scale: 0.60	Draw
Chain: B		Station Range	
View: Cross Section 💌		Begin: 10+00.00	
Offset: 0.00		End: 124+95.2	26 +⊕+
	Elevation	Display Settings	Drav 🔺 🔭
		Text = <e< td=""><td></td></e<>	
Feature = Proposed Easem	Feature = XS	Text = <	
Feature = Proposed Const	Feature = XS	Text = <	
Intersecting Elements			
	ng RW Lines	<u>+</u>	
DGN File: c:\dgn\ref\5829000F	ROMAP001.DO		٩
Extract Elevation Feature		Vertical Offset:	0.00
Feature: XS-EGRM	ND		
Display Settings			
Text 🔻 Sampla	Angle: 90°	0' 0.00' 🚔  💡	•
Label: <exro< td=""><td>w</td><td></td><td></td></exro<>	w		
K Extract Element E	lev Sy		<u>x</u>
Lv Names:	E_Ground_	XS_Delir 街	
Lv Numbers:		*1	
Colors:			
Styles:		<u>~</u>	
Weights:		~	
Types:		*	
Match	Display	Reset	
	Diopidy	Hobbit	,
Ancillary Features:	IX-SECT	ONS CELL	
File	Notell		
Name Description	Tup 🔊 📕		
E_RWER XSF_ROW_EXIST		SE	
P_RWEA XSF_ROW_EAS P_RWPM XSF_ROW_PERM		A S	
P_RWR0 XSF_ROW_NEW E_TREE_XS XSF_NATURAL	Grp		
E THEE AS ASE NATURAL .	Gro	ևլ	
E_ANC_XS XSF_UTILITY_A	Grp		
	Grp		
E_ANC_XS XSF_UTILITY_A E_ECB_XS XSF_DRAINAGE	Grp Grp		

- 7) Check on Extract Elevation. Use the existing Ground Cross sections.
- 8) Set to Level Symbology or Feature. If looking at the cross section file with standard settings then Feature & XS-EGRND can be used as shown. Otherwise, use symbology and match as below.

- 9) Set Search criteria to existing ground line on cross sections.
- 10) Reset & Match element symbology.

- 11) Change Display Settings to Cell
- 12) Click spyglass and select cell from ancillary features list. You may have to File > Open to find the correct cell library W:\workgroup\RDSTD\cell\X-SECTIONS.cell

	Cell Symbology	
	Symbology Level: E_RW_EX_RW_And Color: 4 Style: 2 Weight: 2 OK Cancel	
<mark>20 Draw</mark> File Ed	Ancillary Features	
	SIGN	Draw
Element T	Type Elevation Display Setting: Draw \ Lv:E_Gr\ Cell = P_R ⊠	
🗹 Extract		۹ ۵
Display Se Cell Scale: 1.0 Justification	P_RWEASE_XS     Q     Image: Constraint of the second seco	

- 13) Check drawing setting and set the Level, Color, and Weight you wish to place the cell on.
- 14) Set Justification to Origin.
- 15) ADD into dialog box. If changing an existing entry make sure to Modify that entry.
- 16) You may do a File > Save As if you desire to save all this work.
- 17) Click Draw button.

The process should draw the selected cell into the designated file everywhere it finds matching intersecting elements in the designated design file.

You may do one element at a time or add multiple elements into the dialog and draw them all at the same run.

### **39.2 MDT GPK Ancillary (CELLS)**

This process handles cells from the design file – to process lines go to section 38.1.

MDT Road	Design /	Macros 2	.0	Units:(E	NGLISH)	? 🗙
Oreate DGN(5)	Reference	Plan Labler	Steets	Destan Block	MOTICADD	ttelp
Project:	1				UPN 1234	
Title/Notes   Sur	unery   Typica	Map   Plan	Pro XS FI	XS Sheets	Geopals   Misc	Metric
X5 Movie	GPK And	Bary Del3	S Elements			
		45				

XS Ancill	l <mark>ary Featu</mark>	res	×
500.	234 💌 DESIGN	• •	<u>Help</u> ] ]
Station R	lange		
Begin:	10+00.00	Ð	
End:	70+00	Ф	
	34PHMAPZF1.DGN 34RDDTM001.TIN		 
Cell Feature EX Search	UTILITY FEATURE	5	- 8
Maximum	Search Distance:	300	
🔽 RND S			₽

Open the **Road Design** > **XS File tab** > **GPK Ancillary** 

- 1. Enter Job and Chain
- 2. Select feature file
- 3. Select TIN file
- 4. Select cell feature from drop-down list
- 5. The following dialog box appears do step 7 & 8
- After performing the selection below, click on the road icon to perform the actual search. Go to step 9.



#### GEOPAK Users Manual

#### 2/19/2015

Ce	ll Search	List		×
Sea	arch Cell Feature	Description		5
* <b>INDINININININI</b>	FH GM GV GUY LP EMH EMH5D EMH5D EMH5S EMHT PP PB PPD	FIRE HYDRANT GAS METER GAS VALVE GUY ANC LIGHT POLE MANHOLE ELECTRICAL MANHOLE STORM DRAIN MANHOLE	E_EMHSE	S Ck
	TGP	TELEGRAPH POLE	E_TGP_X ▼	

UserForm1			×
Sort by Cell Feature Description	Sort by Stat	ion/Offset	_ <b></b>
POWER POLE	39+16.6	-138.36	
POWER POLE	45+97.3	218.29	T 📭 🗌
D POWER POLE	42+38.7	199.11	
D POWER POLE	44+82.5	209.58	
D POWER POLE	43+69.0	202.47	
D POWER POLE	22+11.0	-97.36 🛑	
D POWER POLE	38+45.7	275.11	
D POWER POLE	23+85.2	162.25	
D POWER POLE	26+65.9	-290.83	
D POWER POLE	20+77.5	-139.44	-
		•	_
Label Scale: 1	<u>39</u> 🍓	<b>2</b> _ B	Jack
c:\dqn\CellList.csv			

- 7. Select all or some features to search for. Use shift+click for a range or ctrl+click to select individual features.
  List of search selections for each feature shown below.
- 8. Click OK to lock in the search selection.
- 9. This dialog box shows all features selected.
- 10. You can do many things using this box:
  - a. Sort features
  - b. Select features and draw cells onto the XS view
  - c. Create a text table of the selected features
  - d. Save a text file of the feature information
- 11. Clicking the BACK button returns to the original dialog box.

NOTE: Shared cells will NOT be found with this process. Select shared cells to be dropped. Convert the cells- Drop Elements > check Complex, Shared Cells [to Normal Cell]

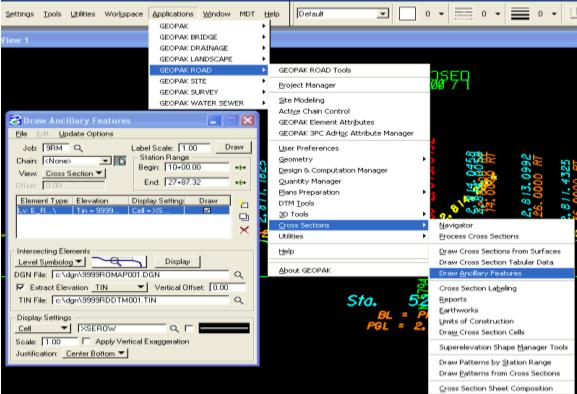
Select in the design area – all selected shared cells should be converted to normal and should now be found when performing the search above.

### MDT GPK Ancillary Features

		ANCILLARY FEATURES ENTRIES		
TYPE	CODE	DESCRIPTION	LEVEL	CELL
EX_UTILIT	Y_FEATURES			
	FH	FIRE HYDRANT	E_FH_XS	E_FH_XS
	GM	GAS METER	E_GM_XS	E_GM_XS
	GV	GAS VALVE	E_GV_XS	E_GV_XS
	GUY	GUY ANCHOR	E_GUY_XS	E_GUY_XS
	LP	LIGHT POLE	E_LP_XS	E_LP_3D
	EMH	MANHOLE	E_EMH	E_EMH_XS
	EMHE	ELECTRICAL MANHOLE	E_EMHE_XS	E_EMHE_XS
	EMHSD	STORM DRAIN MANHOLE	E_EMHSD_XS	E_EMHSD_XS
	EMHSS	SAN SEWER MANHOLE	E_EMHSS_XS	E_EMHSS_XS
	EMHT	TELEPHONE MANHOLE	E_EMHT_XS	E_EMHT_XS
	РР	POWER POLE	E_PP_XS	E_PP_3D
	РВ	PULL BOX	E_PB_XS	E_PB_XS
	PPD	POWER PEDASTAL	E_PPD_XS	E_PPD_XS
	ТВ	TELEPHONE BOOTH	E_TB_XS	E_TB_XS
	ТСР	TELEGRAPH POLE	E_TGP_XS	E_TGP_XS
	ТР	TELEPHONE POLE	E_TP_XS	E_TP_XS
	TPD	TELEPHONE PEDASTAL	E_TPD_XS	E_TPD_3D
	TOWER	TOWER	E_TOWER_XS	E_TOWER_XS
	TL	TRAFFIC SIGNAL	E_TL_XS	E_TL_XS
	CNTR	SIGNAL CONTROLLER	E_CNTR_XS	E_CNTR_XS
	тт	TRANSMISSION TOWER	E_TT_XS	E_TT_XS
	VALVE	VALVE	E_VALVE_XS	E_VALVE_XS
	WH	WATER HYDRANT	E_WH_XS	E_WH_XS
	WM	WATER METER	E_WM_XS	E_WM_XS
	WV	WATER VALVE	E_WV_XS	E_WV_XS
	WELL	WELL	E_WELL_XS	E_WELL_XS
EX_UTILIT	Y_X-INGS			
				E_UTXING_3
	UTXING	UTILITY CROSSINGS	E_UTXING_XS	D
EX_ROAD	WAY_FEATURES			
	MAIL	MAIL BOX	E_MAIL_XS	E_MAIL_3D
	MILE	MILE POST	E_MILE_XS	E_MILE_3D
EX_NATU	RAL_FEATURES			
	TREE	TREE	E_TREE_XS	E_TREE_3D
	SHRUB	SHRUB	E_SHRUB_XS	E_SHRUB_3D
EX_DRAIN	IAGE_FEATURES			
	EDI	DROP INLET	E_EDI_XS	E_EDI_3D

	EDIR	DROP INLET ROUND	E_EDIR_XS	E_EDIR_3D
PR_PAYITI	EM_FEATURES			
	P_REMIEMH	REMOVE MANHOLE	XS_DEFAULT	XS_DEFAULT
	P_REMWVB	REMOVE WATER VALVE BOXE	XS_DEFAULT	XS_DEFAULT
	P_REMIRR	REMOVE IRRIGATION STRUCTURE	XS_DEFAULT	XS_DEFAULT
	P_REMCONCWALL	REMOVE CONCRETE HEADWALL	XS_DEFAULT	XS_DEFAULT
	P_REMFH	REMOVE FIRE HYDRANT	XS_DEFAULT	XS_DEFAULT
	P_REMINLET	REMOVE INLET	XS_DEFAULT	XS_DEFAULT
	P_REMDI	REMOVE DROP INLET	XS_DEFAULT	XS_DEFAULT
	P_REMCI	REMOVE CURB INLET	XS_DEFAULT	XS_DEFAULT
	P_ABNEMH	ABANDON MANHOLE	XS_DEFAULT	XS_DEFAULT
	P_ABNSUMP	ABANDON SUMP	XS_DEFAULT	XS_DEFAULT
	P_ABNSEPTIC	ABANDON SEPTIC TANK	XS_DEFAULT	XS_DEFAULT
	P_ADJMON	ADJUST MONUMENT BOX	XS_DEFAULT	XS_DEFAULT
	P_ADJFH	ADJUST FIRE HYDRANT	XS_DEFAULT	XS_DEFAULT
	P_ADJEMH	ADJUST MANHOLES	XS_DEFAULT	XS_DEFAULT
	P_ADJDI	ADJUST DROP INLET	XS_DEFAULT	XS_DEFAULT
	P_ADJMEDINLET	ADJUST MEDIAN INLET	XS_DEFAULT	XS_DEFAULT
	P_ADJVALVE	ADJUST VALVE	XS_DEFAULT	XS_DEFAULT
	P_ADJAIR	ADJUST AIR RELIEF	XS_DEFAULT	XS_DEFAULT
	P_ADJCRBBOX	ADJUST CURB STOP & BOX	XS_DEFAULT	XS_DEFAULT
	P_ADJSUMP	ADJUST SUMP	XS_DEFAULT	XS_DEFAULT
	STREET	STREET LIGHT	P_STREET_XS	P_STREET_3D
	P_TREE	PROPOSED TREE	P_TREE_XS	P_TREE_3D
	P_SHRUB	PROPOSED SHRUB	P_SHRUB_XS	P_SHRUB_3D
	P_MH	PROPOSED SEWER NODE	P_MH_XS	P_MH_XS
LAYDOWN	I_CURB_FEATURE			
	LAYDOWN CURB	LAYDOWN CURB	LAYDOWN_CURB	
GPK_LABE	ELS			
	GPKLBL	GPK LABELS	GPKLBL	
CORE_HO	LE_FEATURES			
—	CORE	CORE HOLE	CORE	
CURB_RET	URN_LOCATORS			
—	P_CURBRTNLOC	CURB RETURN LOCATOR	P_CURBRTNLOC	
	—			

### 40 Draw Existing ROW on Cross Sections

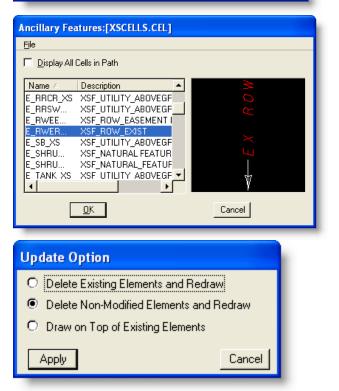


Fjer. FROW AFD	W:VGEDPAK\	
HITW AFD UTIL AFO		_
List Files of Jupe. *AFD	Driges:	Cancel Lieb

Pick the Job & Chain. Click View: Cross Section

Click File > Load and select ROW.AFD file from the W:\GEOPAK folder. This will load the level symbology used to search the ROW file.

名 Draw Ancillary Features
File Edit Update Options
Job:     SRM     Q     Label Scale:     1.00     Draw       Chain:     ORIGINAL     ↓     Station Range       View:     Cross Section ▼     Begin:     10+00.00     ↔       Offset:     0.00     ↔     End:     37+80.98     ↔
Element Type       Elevation       Display Setting:       Draw         Lv: E_R\       Tin = 5555       Cell = E_R       ☑         X       X       X       X
Intersecting Elements Level Symbolog ▼ Display DGN File: [c:\dgn\5555ROMAP001.DGN Q ▼ Extract Elevation TIN ▼ Vertical Offset: [0.00 TIN File: [c:\dgn\5555RDDTM001.TIN Q
Display Settings         Cell       Image: E_RWEROW_XS       Image: E_RWEROW_XS         Scale:       0.10       Image: Apply Vertical Exaggeration         Justification:       Center Bottom       Image: Apply Vertical Exaggeration



Use the DGN File spy glass 1. icon to select the ROW map file.

Check Extract Elevation and 2. select TIN and TIN file using spy glass.

3. In Display Settings select Cell drop-down box.

4. Click on spyglass icon to get cell (see entry below).

Set Scale to .1 and 5. Sustification to Center Bottom.

✓ After all entries are as 6. required, click the Add or Modify Element Set to place in the dialog box window.

Make sure a check is in the 7. element type you wish to draw & click Draw

#### **CELL SELECTION**

Click File > Open Locate the XSCELLS.CEL file in W:\RDSTD\CELL. Select the cell you wish to place on the cross sections – Here E RWEROW XS cell is selected and it populates the display settings cell entry.

This dialog provides options of what to do with previously drawn elements.

Chose one and click Apply.

The selected elements will be drawn onto the cross sections.

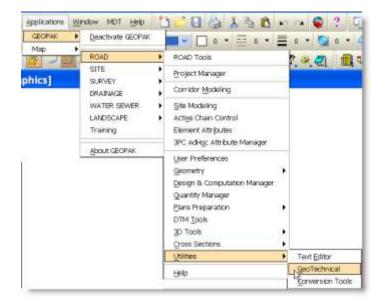
Use the Navigator to insure the requested elements are drawn on

the cross sections.

## 41 Boring Logs Process

This process is used to insert boring logs into design and cross section files. Files needed:

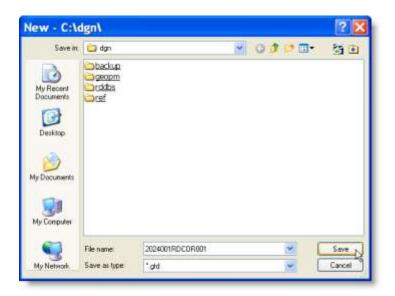
- Borehole location file (BHL), located on DMS in the GT directory, CSV format.
- Borehole material file (BHM), located on DMS in the GT directory, CSV format.
- GPK file
- MAP file
- XSF file



🖾 Borehole N	avi 💶 🗖 🔀
File Tools	
New	
Open ^N	EXÎ 🗩
Save	EXII 🖉
Save <u>A</u> s	X Offset / Y
Import 🕨	
Preferences	
Project Files	
Exit	Туре:
Description:	
Water Table El	evation 24 Hr:

- 1. Open the map file
- 2. Start GEOPAK
- 3. Load Project Manager
- 4. Applications > GEOPAK ROAD > Utilities > Geotechnical
- 5. The borehole navigator opens

1. Click File > New



GeoTechnical
Job: 202 Q
Ground Tin: C:\dgn\2024001RDDTM001.TII Q
Override user provided elevation using tin file.
<u>DK</u> Cancel

	A	S TAPPE								
A		ALC: No. Of Concession, Name								
montheout in	LEVE clear that i have	a touther mint i	a fecation panel y	envelop	3104	instant alter 24	when phis (1)	maker also facer	Maltie -	Citizet-
1810-041	-0104(2				continents;	:14.8	12		1281-08	
2034-041	0592				904H0	11.8	13	0	1211-10	
2634-942	05/12				33856	11.8	H	0	1207-13	
2030-045	1952				806.50	118	18		Distance.	

	397	+ 200 cm		20-0												
	1.1.4.1.1	+						41		1.00					68	
10	WHOLL WHEN	Internation of the local division of the loc	contract.	when	MORESH IN	171. A 10000	in post a	s'estion"	fare.	10001-0141-01	water, blav 3	statute adar.	New Stellers	other - box	10	1
8	194-949		0880	3.1	100-00		10000		tell laterage	11.4			0.0004444			
-	100-001		DAME:		1100-04		- 194		applying.	12.0	1.11		10 1100-09		6428	
ż	240.40		1016		101405		100		Riseas.	11.0			0.1207104	11520	100	
34	24.565		0550		2044		100		SORING.	13.0	15		0.1299-94	01229	1-04	
6	tad data		DIAL		10.00		144		SCHOOL	12.0			0.100740	44400	HG I	1.1

- Name a new .GTD file according to standards. Example: 4321RDCOR001
- 2. OR highlight existing file if available.
- 3. Click SAVE or OK
- 1. Select and find GPK file for project.
- 2. Click spyglass and select TIN file.
- 3. Check Override user provided elevation.
- 4. Click OK
- 1. Open the boring log location .csv file in Excel.
- 2. If x and y coordinates are provided delete the station and offset columns completely.
- If x and y coordinates are NOT provided – Cut/Paste station and offset data into the x & y columns, leaving the headers.
- 4. Save & close the location .csv file.



#### **Import Location & Material** CSV Information:

- 1. Insure the .csv files are closed.
- 2. File > Import > CSV > Borehole
- 3. Change file type list to All Files (*.*)
- 4. Select borehole (BHL) location .csv file > OK
- 5. Select borehole (BHM) material .csv file > OK

All borehole information is now loaded into the Geotechnical Process.

If the location file was imported using x and y coordinates the following is how you convert the x and y to station and offset. If alignments change just reimport the original location and material files, and convert to the new alignment. If station and offsets were provided skip the next frame.

E 20	24001	RDCC	) [.				
File	Tools						
4	Conve	rt Coord	To Sta/	′off			
6-1	Conve	rt Betwe	ยิ่งิ Chair	ns	_		
vî, - ⊂ Boreh	C-#**				2		
Boreh	Setting	js ion / X	0	ffset / `			
2024-0		10n 7 A		nset 7 0.00			
2024-0	41 129	5+26		-11.00	0		
2024-0 2024-0		7+13 8+64		-11.00 -18.00			
<	14.5 1.2.5	n+n4		-1610			
Chain:	DSN2	Tu	pe: DEF	AULT			
L r		2089.015		AUEI	- 1		
		×			_		
	cription: Water Tat		on 24.11c	11.5	000		
	wateriat	DIE Elevati	on 24 Hr:	11.5	000		
					-		
					_		
🖀 Con	vert C	oord		X	Chain	Sele	ctior
Borehole	×	Y			Available	Chains	
5734-12		20.4000 62			DES		
5734-13 5734-14		07.5000 62 28.2000 62					
5734-15 5734-16		80.3000 62 72.0000 62					
Chain:		Selec					
		Convert N					
							. 1
					<u>o</u> k	Ca	ncel
		_	_	_		-	-
	OPEN Geo	Technical	Preferen	ices fil	e - V:\GEO	PAK	?
<u>C</u> M	Look in	GEOPAK			2 0 1	100	23 3
Deliaplini Plan	MyRecent		ENCLE ENG IN				
Cell/Symbol Label Profile	Documents		EHOLE MET R				
Column Column Label Material Pattern	Desktop						
Material Label D Hr Water Elev							
Material Label D Hr Water Elev 24 Hr Water Elev Refusal	My Documents						
Material Label D Hr Water Elev 24 Hr Water Elev Refund SPT Label Doors Section	0						
Material Label D Hr Water Elev 24 Hr Water Ele Refusal SPT Label	0						
Material Label D Hr Water Elev 24 Hr Water Elev Refund SPT Label Doors Section	My Documents	File name	MD1_BORD	HOLE_ENG.	FURAL GTP		1. Open

# Convert Coordinates to Station & Offset.

- 1. Select Tools > Convert Coord to Sta/Off
- 2. Convert Coord Dialog Box is Displayed.
- 3. Highlight all boring entries, within the dialog box window, to be converted.
- Click Select button and select the correct chain from the Chain Selection Dialog Box.
- 5. Click OK
- 6. Click Convert
- 7. The station and offset data should now be in the borehole navigator.

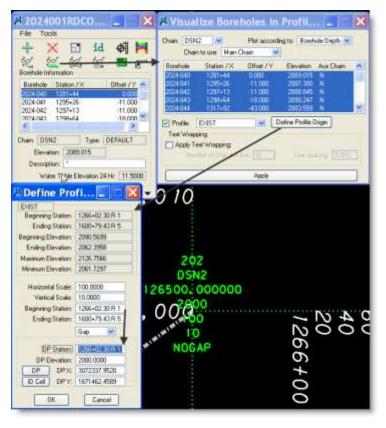
#### Set Preferences File.

- Click File > Preferences Displays Preferences Dialog.
- Click File and Select the preference file from W:\GEOPAK depending on the scale for the alignment and profile.
- 3. Click OK twice.

#### Place Soil Boring Data on Plan View.

File Tools		Borehole	Station / X	Offset / Y	Ava Chain	
+ X 🖸 id	0 1	3074-040	1281+44	0.000	11	
		2024-041	1295+26	-11.000	21	
14. 1 <u>4</u> 1 <u>4</u> 1 <u>4</u>	10 g	2024-042	1297+13	11.000	N	
lorehole Information	10000	2024-043	1298+64	-18.000	N	
Bombole Station /X	Diriet / Y	2024-044	1317+52	-43.000	N	1
2024-040 1291+44	0000	Mapping Scale	1.0000	Chain to use:	Man Chain 🛩	
2024-041 1295+26	-11.000		- An	ply N		
2024-042 1297+13	11.000			10		
2024-043 1298+64	-18 000					
han DSN2 Type	DEFAULT					
Elevation 2089.015	an comment					
Description   *						

#### Plotting stick logs in Profile view.



- 1. Click Visualize Boreholes in Plan View – 1st icon.
- 2. Insure Mapping Scale is set to 1.00.
- 3. Highlight all logs to be plotted onto the design file.
- 4. Click Apply.
- 5. All logs should be found on these levels: E_SoilData_Borehole E_SoilData_Borehole_Text
- 1. Click Visualize Boreholes in Profile View  $-2^{nd}$  icon.
- 2. Select the appropriate chain in the drop-down box.
- 3. Plot according to: Borehole Depth
- 4. Always use Main Chain.
- 5. Highlight all logs to be plotted onto profile.
- 6. Select appropriate Profile from drop-down box.
- Click Define Profile Origin – displays dialog to left.
- Click ID Cell > Tentative > Accept profile cell on design file.
- 9. Insure DP Station matches Beginning Station.
- 10. Click OK.
- 11. Click Apply All stick logs that were highlighted should populate in the specified profile on the same levels as described above.
- 12. Close the windows.

😤 4321DCOR001 💶 🔀	8 Visualize Bo	oreholes in	Cross	- 🗙
File Tools	(then)	• Chain	to use <u>Nain Chain</u>	•
Id         Id<	Bowhole Station 1979/6-1 0605 1973/6-10 80-04 1973/6-10 80-04 1973/6-10 80-04 1973/6-13 82-67 1973/6-13 82-67 1973/6-10 1973/6-10 1973/6-10 1973/6-10 1973/6-10 1973/6-10 1973/6-10	Control (Control (Contro) (Contro) (Contro) (Contro) (Contro) (Contro) (Contro) (Contro)	Elevation Aux Chair 4238 500 N 4239 7000 N 4239 7000 N 4239 7000 N 4248 700 N 4258 7	

Plotting stick logs in Cross Section view.

-	Display
<b>B</b> Existin	gr 💶 🗆 🗙
Lv Names	E_Ground_XS_Deline
Match	Display Reset

Information	
Unable to locate nearest XS for borehole> (5734-1) at station> (40+09,18)	

- 1. Open the XSF file, keeping geopak running, and the Borehole navigator open.
- Click Visualize Boreholes in Cross Section View – 3rd icon.
- 3. Select appropriate Chain from drop-down box.
- 4. Always use Main Chain.
- 5. Highlight all bore logs to be plotted in XS.
- 6. Station Range should be populated already.
- 7. Project onto Nearest XS.
- 8. Max projection distance is 200.00.
- 9. Always Project at Borehole Ground Elev.
- 10. Click Symbology button.
- 11. Match Lv Names only existing ground cross section line.
- 12. Close box.
- 13. Click Apply.

You may need to check out the information messages. These borings will not show on the design file.

All logs should be found on these levels: E_SoilData_Borehole E_SoilData_Borehole_Text

### 42 Delete Duplicate Elements

If you have duplicate elements in a design file and want to select or delete them you can do it by using the Utilities > Data Cleanup tool. You can Select or Delete elements and use Element Type criteria or Match Criteria to select specific element types. Apply it and it will process your choices. If you use select, it will tell you at the bottom of the screen how many duplicate elements it located.

<u>U</u> til	ities Wor <u>k</u> space <u>A</u> pplica	a.
Ŧ	<u>K</u> ey-in	
	3D Warehouse	
	Connect <u>W</u> eb Browser	
	H <u>T</u> ML Author	
	Cell <u>S</u> elector	
	Image 🕨 🕨	
	<u>R</u> ender •	
5	Au <u>x</u> iliary Coordinates	
	Saved <u>V</u> iews	
	Named Expressions	
	Named Groups	
2	Design History	
	Batch Converter	Design File Cleanup
	B <u>a</u> tch Process	General Duplicates Overlaps Gaps
	Standards Checker 🔹 🕨 🕨	
	<u>P</u> ackager	Action:  • - none -
	Arc <u>h</u> ive	Flement
	Generate Section	
	Install <u>F</u> onts	B-SplinMatch
	Data <u>C</u> leanup	Cell V Level Complex Shape
	Dimensi <u>o</u> n Audit [®]	Complex Chain
	DWG 🕨	Cone Style
	Lice <u>n</u> se Check Out/In	Dimension User Data
	Lice <u>n</u> se Management	
	Macro 🕨	
	MDL Applications	<u>Apply</u> <u>Done</u>

### 43 GEOPAK Problem Resolution Steps

The following suggestions are steps that may help when encountering a problem in Microstation or Geopak. These steps have proven helpful, in prior situations, for getting the software operational again and/or overcoming a non-responsive operation.

- 1. When the initial problem is encountered the following steps should be done in the order described.
  - a. Double check all dialog box entries to insure they are as expected.
  - b. Double check all symbology selected to insure it is exactly what you need for the function you are attempting.
- 2. If an error message is encountered:
  - a. If an error is displayed, read it before continuing. If you understand it and can fix the problem, then fix the problem and restart the attempted function.
  - b. If you do not understand the error or don't know how to fix it, seek out help from your fellow team mates one of them may have seen and/or resolved that error before.
- 3. Initialize Geopak/Microstation:
  - a. Run KILLTASK.BAT enter 'Y' and hit Enter when prompted. KILLTASK.bat should reside on your desktop. It is located on CADDSTD for copying.
  - b. Restart Microstation/Geopak
  - c. Reattempt the function that you were having problems with.
- 4. Recreate .upf file
  - a. Exit Microstation
  - b. Go to C:\mdoh folder
  - c. Highlight file U####V8i.upf (where # is your employee number) and rename it to SAVEU####V8i.upf. This file contains your preferences for Microstation.
  - d. Restart Microstation/Geopak this will recreate the U####V8i.upf file. You will notice that toolbars & menus may have changed from your preferred settings.
  - e. Reattempt the function that you were having problems with. If this works you should delete the saved .upf file.
  - 5. Still no resolution send an email to **MDT CADD Support** that contains the following:
    - Computer Number Eg. MDTHLNRODC164
    - Project Number
    - GPK File
    - Pxsprj.inp (Proposed Cross Section Input File)
    - Proposed DGN file containing Patterns, Shapes and Profiles
    - Cross Section Drawing where sections are processed and you give me a reference to the problem cross section, if applicable.
    - Existing topo drawing TIN file
    - A **DETAILED** description of the problem or situation that needs to be fixed.

# Appendix A: Storing a Spiral with Master PI

STORING A CHAIN WITH A SPIRAL TO INCLUDE MASTER PI First, store the spiral using the simple curve PI and Radius as shown below:

Spiral Name: STEST	Type: SCS 🔹 🥅	Station TS 👻
ack Tangent	Element	Ahead Tangent
	Entry Length 💌 210	
<u>~</u> +	Radius 🔹 2700	
Point Back:	Exit Length   210	Point Ahead
10		125
PI Point:		
11		

<* 1 Store SCS STEST PB 10 PI 11 LS1 210 LS2 210 Radius 2700 PA 125</p>

SCS STEST

	STEST N	1,004,194		1,875,76	56.406 STA	23+16.22
Total Ta	angent =	2,316.21	15			
Total Le	ength =	3,914.82	3			
Total De	elta = 78	° 37' 07.62	2" (LT)			
Back Ta	ngent = S	1° 35' 31.1	1" E			
Ahead T	Cangent $=$ S	80° 12' 38.	.73" E			
Spiral B	ack					
Spiral S	TESTB	Type 1	Spiral El	ement		
A	00 121 41 4	1 "/I TT) D	0	CO1 DV	G 10 251 21 1	1 !!
Angle	2° 13' 41.4	< <i>/</i>			S 1° 35' 31.1	
LS	210.000	K	104.995	AH S	3° 49' 12.52"	E
R	2,700.000	LT	140.01	1 CB S	2° 20' 04.88"	E
YS	2.722	ST	70.010	Defl	0° 44' 33.77"	,
XS	209.968	LC	209.98	6 Deg	2° 07' 19.4	14"

#### Spiral Coordinates

	*	*		
Point	North	East	Station	
TS	1,006,509.755	1,875	,702.058	0+00.00
PI	1,006,369.798	1,875,	705.948	1 + 40.01
SC	1,006,299.943	1,875	,710.612	2+10.00
CC	1,006,479.830	1,878	,404.613	
Circula	r Section			
	Curve	Data		
	*	*		

Curve STEST

P.I. Stati Delta Degree Tangent Length Radius	$ \begin{array}{rcl} = & 74^{\circ} \ 0 \\ = & 2^{\circ} \ 0 \\ = & 2 \\ = & 3 \end{array} $	0+40.60 N 9' 44.80" (L )7' 19.44" 2,040.603 ,494.823 ,700.000	, ,	E 1,875,846.567
	=			
0		3,255.911		
Mid. Ord		545.990		
P.C. Stat	ion	0+00.00 N	1,006,299.943	E 1,875,710.612
P.T. Stat	ion .	34+94.82 N	N 1,003,839.002	E 1,877,842.449
C.C.		N 1,	006,479.830 E	1,878,404.613
Back	$= S 3^{\circ} 49$	)' 12.52" E		
Ahead	$= S 77^{\circ} 5$	58' 57.32" E		
		° 54' 04.92"		
Spiral Ah	ead			
Spiral ST		Type 2	Spiral Element	
~ [ ~ -		- 7 F	~	
Angle	2° 13' 41.4	41" (LT) P	0.681 BK	S 77° 58' 57.32" E
LS	210.000	K	104.995 AH S	80° 12' 38.73" E
R	2,700.000	LT	140.011 CB S	79° 28' 04.96" E
YS	2.722	ST	70.010 Defl	0° 44' 33.77"
XS	209.968			2° 07' 19.44"
	2001000	20	200000000	

	Spiral Coord *			
Point	North	East	Station	
CS	1,003,839.002	1,877,	842.449	0+00.00
PI	1,003,824.425	1,877,9	910.925	0+70.01
ST	1,003,800.620	1,878,	048.897	2+10.00
CC	1,006,479.830	1,878	,404.613	
SCS ST	TEST stored			

When storing the chain with the spiral, the dialog box will show the spiral as STESTA &STESTB.

Chain Name: test Begin Station 💌 10+00	Element Selection Element Type: Spiral		
Element List: 10	< Add STESTA STESTB		
Store Chain			

.....and if you clicked on Add, it would display like below.

Chain Name: test Begin Station  10+00	Element Selection Element Type: Spiral
Element List: 10 SPI STESTA	<pre>Add STESTA STESTB</pre>
Store Chain	

Edit out the SPI and replace with SCS. Also, edit out the A so it looks like below:

Chain Name: test Begin Station  10+00 Bement List 10 SCS STEST CUR C12 125	Element Selection Element Type: Point Point Name: < Add 125
Store Chain	

<* 2 Store Chain test 10 SCS STEST CUR C12 125 Station 10+00</p>

Chain TEST redefined

#### Check to make sure the print out shows the Master PI for the chain, as show in bold below:

<* 3 Describe Chain TEST

Chain TEST contains: 10 SCS STEST CUR C12 125

Beginning chain TEST description

_____

_____

Point 10 N 1,008,886.911 E 1,875,635.991 Sta 10+00.00

Course from 10 to TS STESTB S 1° 35' 31.11" E Dist 2,378.074

SCS STEST found within chain TEST, contains: SPI STESTB CUR STEST SPI STESTA

**PISCS STEST** N1,004,194.433 E1,875,766.406 STA56+94.29Total Tangent =2,316.215Total Length =3,914.823Total Delta = $78^{\circ} 37' 07.62"$  (LT)Back Tangent =S1^{\circ} 35' 31.11" EAhead Tangent =S80^{\circ} 12' 38.73" E

Beginning SCS STEST description

-----

Spiral Back Spiral STESTB

Type 1 Spiral Element

Angle	2° 13' 41.41" (L	Г) Р 0.681 BK	S 1° 35' 31.11" E
LS	210.000 K	104.995 AH S	3° 49' 12.52" E
R	2,700.000 LT	Г 140.011 СВ S	2° 20' 04.88" E
YS	2.722 ST	70.010 Defl	0° 44' 33.77"
XS	209.968 L	C 209.986 Deg	2° 07' 19.44"

#### Spiral Coordinates

	不	*		
Point	North	East	Station	
TS	1,006,509.755	1,875,	702.058	33+78.07
PI	1,006,369.798	1,875,7	05.948	35 + 18.09
SC	1,006,299.943	1,875,	710.612	35+88.07
CC	1,006,479.830	1,878,	404.613	

**Circular Section** Curve Data *_____* Curve STEST P.I. Station 56+28.68 N 1,004,263.874 E 1,875,846.567 74° 09' 44.80" (LT) Delta = 2° 07' 19.44" Degree =Tangent 2,040.603 = Length 3,494.823 = Radius 2,700.000 = External = 684.385 Long Chord =3,255.911 Mid. Ord. = 545.990 P.C. Station 35+88.07 N 1,006,299.943 E 1,875,710.612 P.T. Station 70+82.90 N 1,003,839.002 E 1,877,842.449 C.C. 1,006,479.830 E 1,878,404.613 Ν Back = S 3° 49' 12.52" E Ahead = S 77° 58' 57.32" E Chord Bear = S  $40^{\circ} 54' 04.92'' E$ Spiral Ahead **Spiral STESTA** Type 2 Spiral Element Angle 2° 13' 41.41" (LT) P 0.681 BK S 77° 58' 57.32" E LS 210.000 Κ 104.995 AHS 80° 12' 38.73" E R 2,700.000 LT 140.011 CB S 79° 28' 04.96" E YS 2.722 ST 70.010 Defl 0° 44' 33.77" XS 209.968 LC 209.986 Deg 2° 07' 19.44" **Spiral Coordinates** *_____* Point North East Station ____ ----CS 1,003,839.002 1,877,842.449 70 + 82.90ΡI 1,003,824.425 1,877,910.925 71+52.91 ST 1,003,800.620 1,878,048.897 72 + 92.90CC 1,006,479.830 1,878,404.613

Ending SCS STEST description

Course from ST STESTA to PC C12 S 82° 22' 47.85" E Dist 15,399.251

Curve Data *____*

Curve C12

_____

P.I. Station 234+66.05 N 1,001,652.214 E 1,894,078.715 15° 23' 02.00" (RT) Delta = 0° 59' 59.73" Degree = Tangent = 773.906 Length = 1,538.502 Radius 5,730.000 = External = 52.027 Long Chord =1,533.885 Mid. Ord. = 51.558 S. E. = 0.040 P.C. Station 226+92.15 N 1,001,758.631 E 1,893,312.161 P.T. Station 242+30.65 N 1,001,346.254 E 1,894,789.573 C.C. Ν 996,083.062 E 1,892,524.246 Back = S 82° 05' 47.00" E = S 66° 42' 45.00" E Ahead Chord Bear = S  $74^{\circ} 24' 16.00'' E$ Course from PT C12 to 125 S 66° 42' 45.00" E Dist 1,832.329 Point 125 N 1,000,621.852 E 1,896,472.627 Sta 260+62.98

_____

Ending chain TEST description

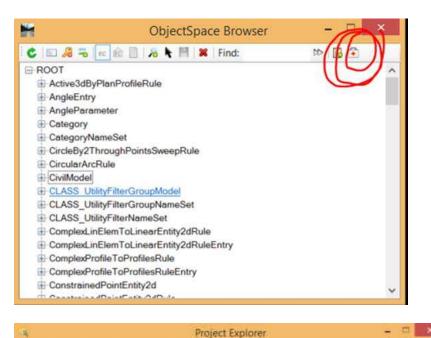
🐂 Loka 🙀 File 📓 Survey 🔾 Dul Model 🦉 Out Randards

0.X.12

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### Appendix B: Civil Alignment Fix

There are two things you can do that sometimes helps ...



In the Key In Browser, you can keyin "Civil Display Browser". It will take a few minutes to come up since it has to do some checking ... but eventually a dialog comes up that looks like this:

Click on the icon with the red cross ... this will try to clean up any issues.

Open the MicroStation Project Explorer dialog (File > Project Explorer)

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Select the LINKS tab, and set the option to Active Directory

4	Project Explore
🔁 Links	通 File 🔄 Survey 🔍 Civil Model 🧤 Civil Standards
🔁 Active	lirectory
	vings
	Сору
	Delete Rename
	Link Properties

Right-click on Views and select Validate.