



# Table of Contents

<b>CHAPTER 21: REPORTS</b>	<b>1</b>
Introduction .....	1
Subgrade Template Report .....	1
<b>WORKFLOW 1: SUBGRADE TEMPLATE REPORT</b>	<b>2</b>
Cross Section Reports .....	11
<b>WORKFLOW 2: ACCESS CROSS SECTION REPORTS</b>	<b>11</b>
Report Headers .....	13
Staking Detail Report.....	14
Blue Tops Reports .....	16
Printing Staking Reports.....	19



## Chapter 21: Reports

### Introduction

GEOPAK uses the cross section files to produce staking reports in the format required by CFLHD. The creations of staking reports are required on all CFLHD projects with proposed cross sections. These staking reports include Subgrade Template Report, Staking Detail Report and Blue Top Report.

With the development of FLH standard files and the x30 criteria, CFL has developed a Microsoft Visual Basic Application (MVBA) to generate a Subgrade Template Report. This new cross section report replaces the previously generated FHWA Slope Stake Report and the Red Top Report. Staking Detail Report and Blue Top Report are generated from cross section file through accessing the cross section reports. This chapter will describe the processes used to create the Subgrade Template Report, as well as the Staking Detail Report and Blue Top Report.

### Subgrade Template Report

The Subgrade Template Report VBA evaluates text elements within GEOPAK cross sections and produces a report based on the text elements found that match the user-specified search criteria. The Subgrade Template Report includes the red top stake locations plus points at all breaks in the roadway prism cross-section (i.e. ditch lines, hinge points, curb lines, sidewalks, benches, walls, etc.), plus the slope stake catch point and the reference hub point.

GEOPAK progresses from left to right across each cross section while preparing each report. To do this, the user will need to provide the level symbology of the existing ground and all the proposed elements required to progress through the points and lines, to be reported on, completely across the cross section.

The new Subgrade Template Report provides a better format for presenting staking data to contractors, is easier to understand, provide ease for quality control check, and the new report allows for unlimited number of template points.

Subgrade Template Point Identification Sheets were developed to help clarify the information contained in the Subgrade Template Reports. Subgrade Template Point Identification Sheets are used to identify template points along each typical cross section. Subgrade Template Point Identification Sheets should be downloaded from the CFLHD Website (CFLHD Template Drawings and Files) and modified with project specific information. Project specific Subgrade Template Point Identification Sheets should be included with the Subgrade Template Reports. [Click here](#) to download Subgrade Template Point Identification Sheets.

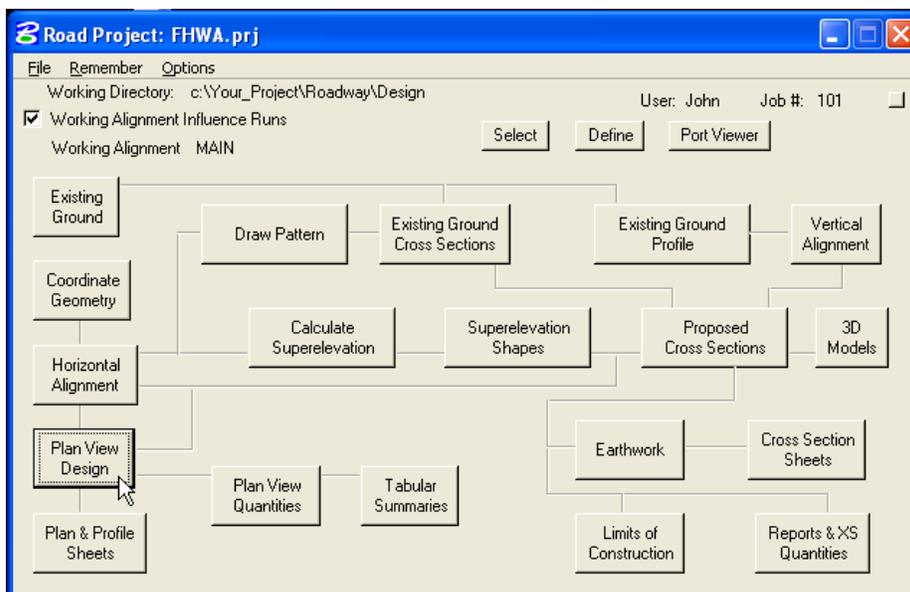


The Subgrade Template Report MVBA is available through the V8\_Resource.zip download on the CFLHD Website.

On the CFLHD network, this MVBA can be found at N:\Standards\V8\_RESOURCE\X\_30\Standards\MVBA directory.

## Workflow 1: Subgrade Template Report

1. *While in the cross section file, open the Project Manager Workflow Dialog Box. Select Plan View Design.*



**Figure 21-1: Accessing D& C Manager from Project Manager Workflow Dialog**

2. *The following dialog box will appear. Select the Design and Computation Manager Icon.*



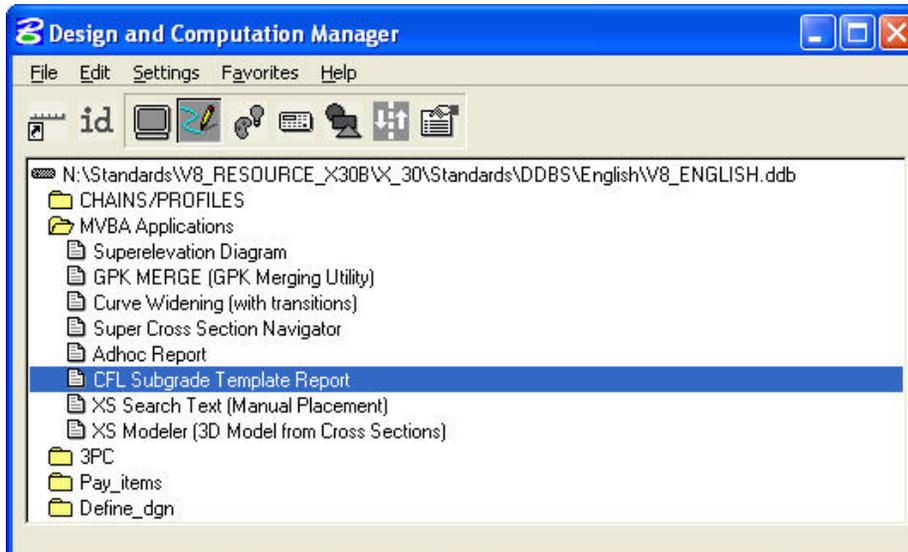
**Figure 21-2: Accessing D& C Manager Icon**

D & C Manager can also be accessed through **Applications > GEOPAK ROAD>Design & Computation Manager** or from the Main Geopak Road Tools dialog box. Any method can be used to activate the D& C Manager, but make sure the project manager dialog is activated prior to accessing the Subgrade Template Report MVBA; this will allow the MVBA to access project related settings.

3. *Highlight and Select the CFL Subgrade Template Report from the MVBA Applications category in the V8\_English.ddb or*

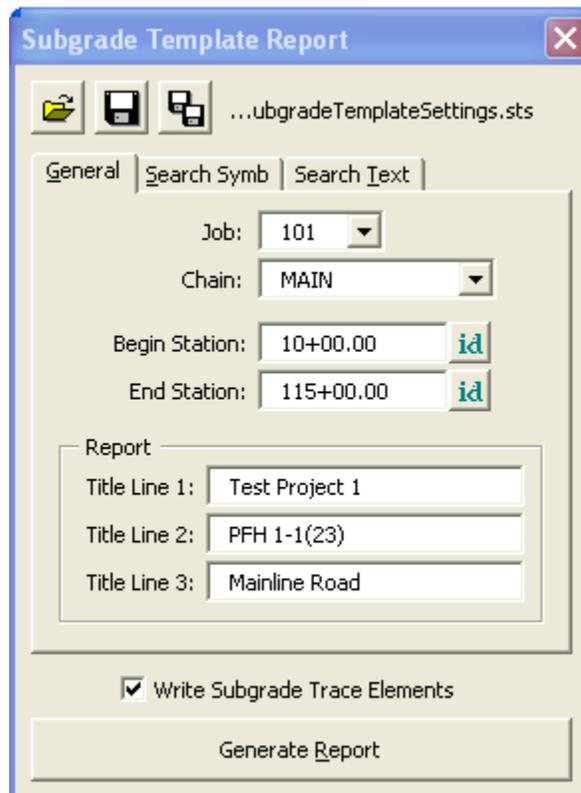


*V8\_Metric.ddb file. Double click to invoke the Subgrade Template Report MVBA.*



**Figure 21-3: Accessing CFL Subgrade Template Report**

*The following Subgrade Template Report dialog box will appear.*



**Figure 21-4: General Tab**



The Subgrade Template Report MVBA has three tabs that must be filled in prior to generating the Subgrade Template Report. The first tab entitled “General” contains general information including, Job #, Chain, Begin and End Station and the headers for the report.

4. *Enter in project information as shown above. Toggle on Write Subgrade Trace Elements, while the report is generated, a trace line is drawn to spot check the text points selected for the report. The trace line is drawn to a level named X\_P\_Subgrade\_Trace. The trace line can be visually reviewed to ensure the correct path was used.*



When the Subgrade Template Report MVBA is invoked, the VBA will also load a default Subgrade Template Settings (.sts) file and automatically places into the working directory. User can modify the settings as appropriate for their project and save this file or rename the file and save it to the Working Directory.

5. *Select “Search Symb” tab. Under this tab, symbologies for Text, Existing Ground, and Proposed Grade needs to be defined. Symbology can be defined by matching or by selecting levels, colors, weights and styles.*

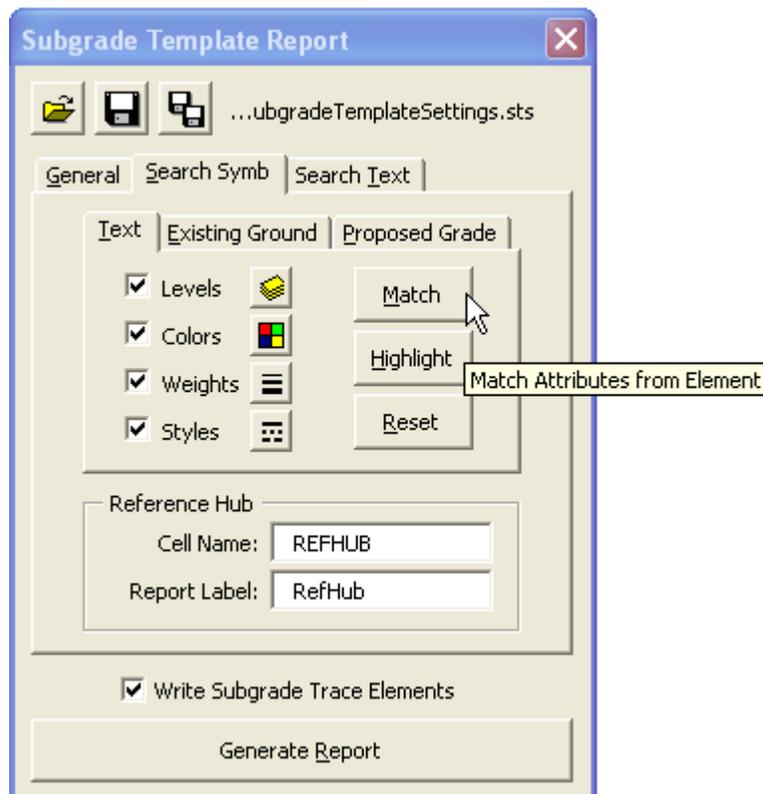


Figure 21-5: Search Symbology Tab



The Match button on each of the Search Symbology tabs allows the user to identify existing elements in the design file to match those symbology attributes that is turned on (checked). The Highlight button allows the user to display elements in the design file with the standard MicroStation highlight color. This provides a means to check that the symbology has been set correctly for the element type designated by the active tab by visually evaluating the highlighted elements. The Reset button allows the user to clear all the currently selected symbology attributes for the element type designated by the active tab.

6. *Select the “Text” tab. Select the level X\_Text\_Search, X\_Text\_Wall\_Points and X\_Text\_Subgrade, associated colors, weights and styles. Use the Match button to select the symbology.*
7. *Select the “Existing Ground” tab. Select the level X\_E\_Ground\_XS, associated color, weight and style. Use the Match button to select the symbology.*
8. *Select the “Proposed Grade” tab. Select the proposed grade symbology from Reference Hub to Reference Hub; define the path to search for the text to generate the report. Use match button to select the symbology and use highlight button to view selection. Use the Subgrade Template Point Identification Sheets as a guide to select the path for the report .*

Subgrade Template Point Identification Sheets are created with project specific information and included with the project specific Subgrade Template Report. Template points on the Subgrade Template report correlates with the points on the Subgrade Template Point Identification Sheets.



Any cell with the name “ REFHUB” found in the cross section and lying on the existing ground will be listed in the report. When the Reference hub cells have been found the report will use “Refhub” to label the point in the report.

9. *Select the “Search Text” tab. Identify all the text to search for in the cross sections that define the path along the subgrade to generate the report. Default Subgrade Template Settings (.sts) file contains the text to generate report for a standard project. Modify, delete or add text values based the typical section of your project. Use the Subgrade Template Point Identification Sheets as a guide in identifying text points.*

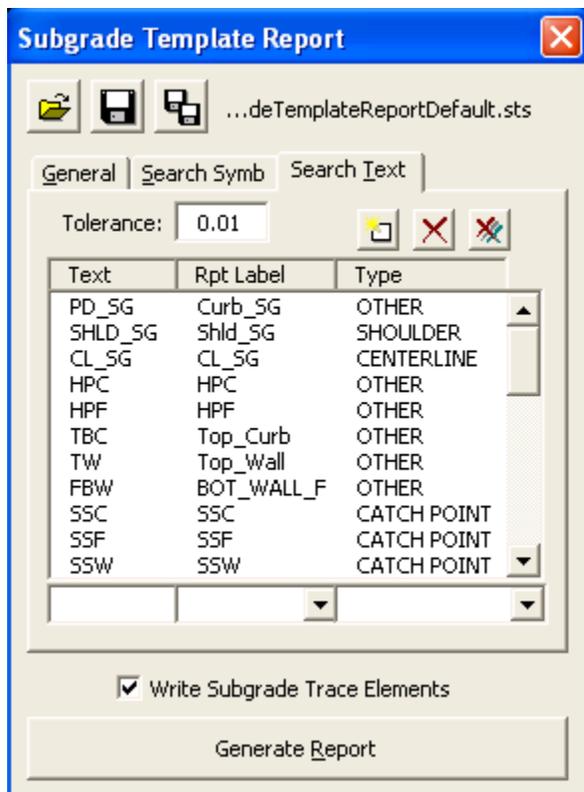


Figure 21-6: Search Text Tab



Text must be entered as it appears in the cross sections. This MVBA is case sensitive. The tolerance value defines the distance the application will search for text in relationship to a proposed subgrade element vertex. The tolerance value should be around the value as shown for both metric and English projects.

The “Text” is the text string to search for in the cross section. The “Rpt Label” is the label to use in the report to represent the text string found. The “Type” is the type of point this text string represents which must be either centerline, shoulder, catch point or other. Use the following icons to manipulate the search text list.

 Add To List

 Delete From List

 Delete All



- Once all the settings have been defined, Select Save Settings Icon to save the project settings. The project modified Subgrade Template Report settings are saved to your working directory as Subgrade Template Settings.sts file. Select Save Settings to Another File Icon to save your project settings to a different setting file name.

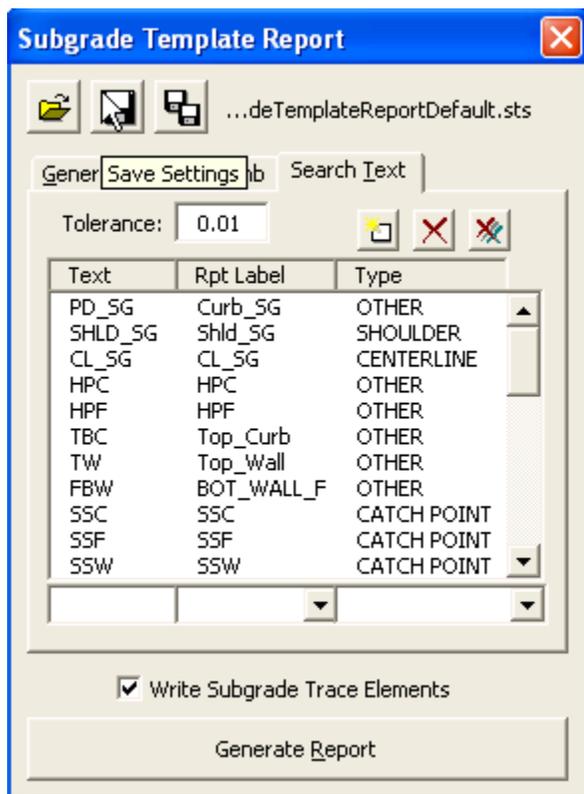


Figure 21-7: Save Settings

- Select Generate Report to create the report with the defined parameters.

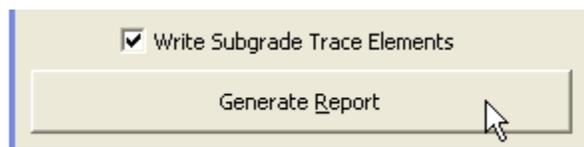


Figure 21-8: Generate Report



12. The following dialog will appear asking to provide the name of the subgrade report file to be created. Provide a name and Select Save.

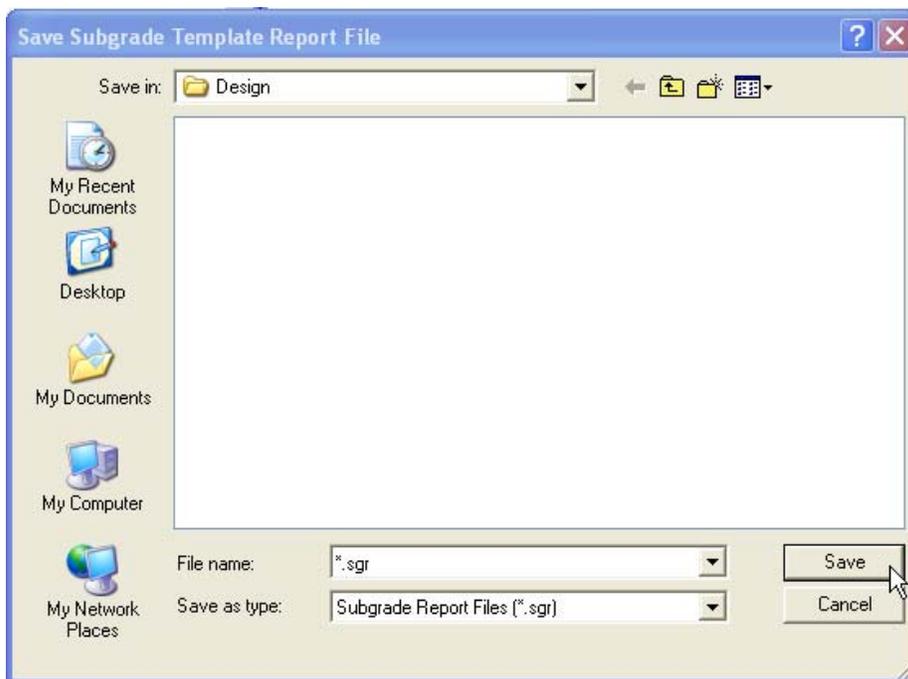


Figure 21-9: Save Subgrade Template Report File

Occasionally errors are found in the cross sections. These may be caused by incorrect symbology (either in the cross sections or that specified in the dialog) or by search text not specified correctly. When an error occurs on any given cross section the user will be presented with a dialog similar to the following:

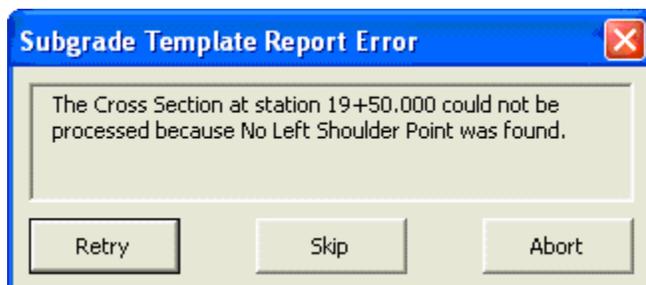


Figure 21-10: Subgrade Template Report Error

The description of the error in the dialog will indicate the location and type of error that was found. The user is given the following options:

- **Retry** – The user has the opportunity to fix the problem and try processing the cross section again. The error message dialog will continue to be displayed as long as an error is found or the user selects one of the other two options.



- Skip – The user can skip processing the cross section in which case the application will write to the report that the cross section has been skipped and will proceed with the next cross section.
- Abort – The user can abort processing altogether which closes the report file and processes no further cross sections.

13. When the application has finished processing the final cross section in the specified range a message will be displayed indicating it is done. Select OK.



Figure 21-11: Notification Icon

Use Cross Section Navigator to view your cross sections with the subgrade traced elements.

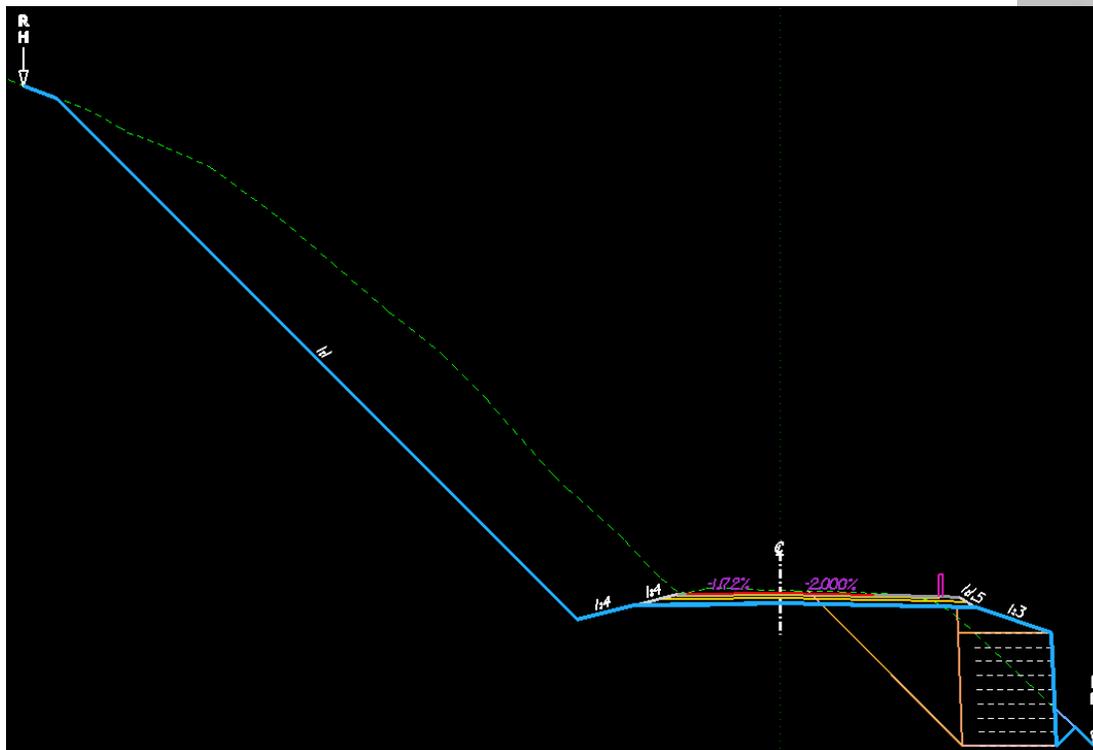


Figure 21-12: Subgrade Traced Element



The CFL Subgrade Template Report MVBA will produce the following report. The report will be saved in the location specified and can be viewed and printed using any text editor application. UltraEdit is preferred for viewing and printing the CFL Subgrade Template Report.

11/27/2006

Test Project 1  
PFH 1-1(23)  
Mainline Road

Page# 1

SUBGRADE TEMPLATE REPORT (ft)										
Station	Left Side					Right Side				
	Cut/Fill	Slope	Distance	Elevation	Super	Super	Elevation	Distance	Slope	Cut/Fill
20+00.00	C 18.39	1:1.00	25.57	794.53						
	F 0.50	-1:4.00	7.17	776.13						
			5.17	776.63	-1.172%	-2.000%	776.55	6.94		
							775.66	9.60	-1:3.00	F 0.88
						771.66	9.77	24.00:-1	F 4.00	
						772.32	10.42	1:1.00	C 0.65	
Station	Easting	Northing	Elevation	Offset	Id	Slope	Horiz. Diff.	Vertical Diff.		
20+00.00	1888456.31	644253.59	794.96	-26.73	RefHub					
	1888455.42	644254.33	794.53	-25.57	SSC		-1.16	0.428		
	1888441.30	644266.13	776.13	-7.17	HPC	1:1.00	-18.39	18.39		
	1888439.76	644267.41	776.63	-5.17	Shld_SG	-1:4.00	-2.00	-0.50		
	1888438.32	644268.61	776.65	-3.30	Travelway	-0.012	-1.87	-0.02		
	1888435.79	644270.73	776.69	0.00	CL_SG	-0.012	-3.30	-0.03		
	1888433.26	644272.84	776.62	3.30	Travelway	-0.020	3.30	-0.06		
	1888430.46	644275.17	776.55	6.94	Shld_SG	-0.020	3.64	-0.07		
	1888428.41	644276.88	775.66	9.60	Top_Wall	-1:3.00	2.66	-0.88		
	1888428.29	644276.99	771.66	9.77	BOT_WALL_F	24.00:-1	0.16	-4.00		
	1888427.79	644277.41	772.32	10.42	SSW	1:1.00	0.65	0.65		
	1888427.22	644277.88	771.61	11.16	RefHub		0.74	-0.70		

Figure 21-13: Subgrade Template Report

The Subgrade Template Reports generated for construction should be accompanied with typical Subgrade Template Point Identification Sheets for the project. Subgrade Template Point Identification Sheet shown below identifies the template points in the Subgrade Template Report along a typical cross section.

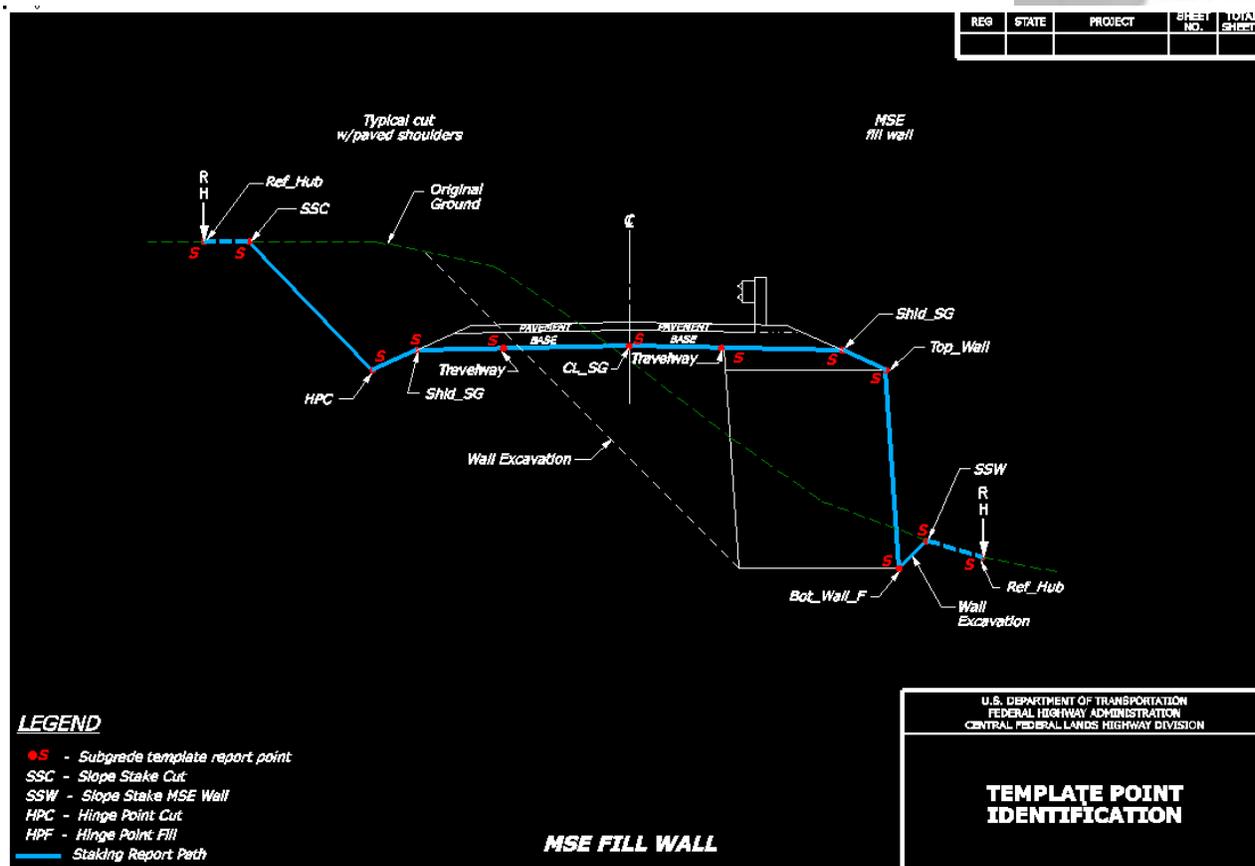


Figure 21-14: Subgrade Template Point Identification Sheet

## Cross Section Reports

Staking Detail Reports and Blue top reports are generated from cross section files by accessing the cross section reports. Workflow 2 will outline the steps involved in accessing cross section reports.

## Workflow 2: Access Cross Section Reports

1. While in the cross section file, open the Project Manager Workflow Dialog Box.
2. The Reports & XS Quantities button is located at the bottom right.

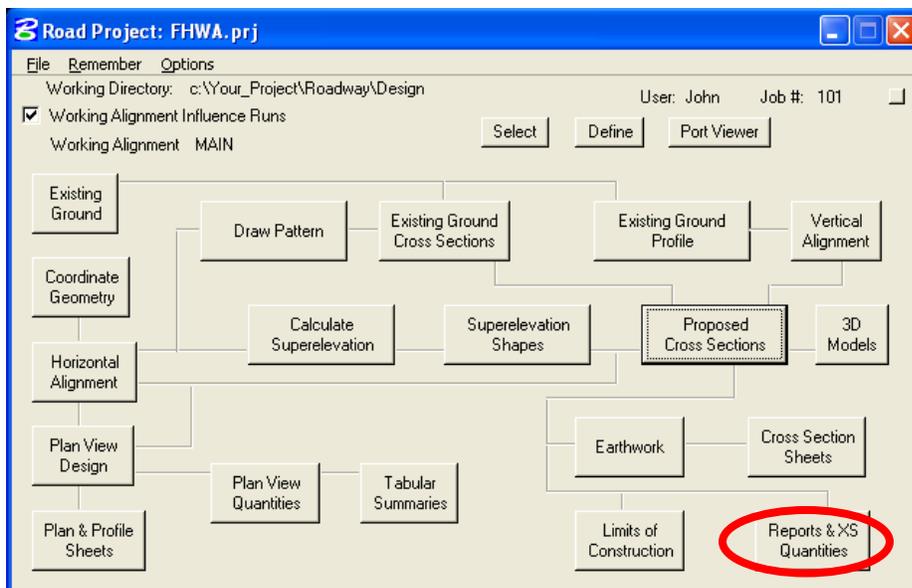


Figure 21-15: Accessing Reports from Project Manager Workflow Dialog

3. The XS Reports dialog box will appear.

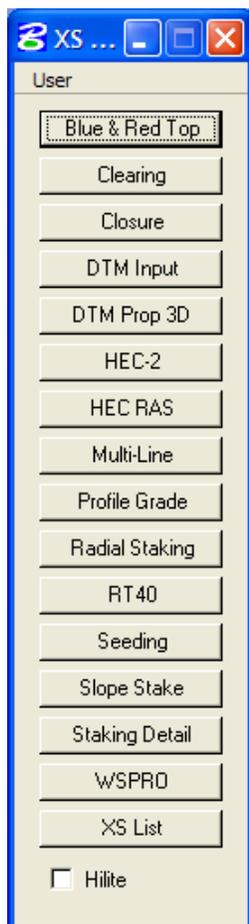


Figure 21-16: Reports Dialog Box



Alternatively, reports may be accessed outside of Project Manager Workflow Dialog Box by selecting **Applications>GEOPAK ROAD>Cross Sections>Reports**.

## Report Headers

All reports will require a header to describe the project and report type. The header can be modified by picking the **User>Preferences** button at the top of the XS Report dialog box. This will bring up the Report Header dialog box.

Figure 21-17: Reports Settings

The date, first two master headers and page number should be marked. The first master header should have the complete project name and number, i.e. ***Nevada Forest Highway Project FH 24-1(1)***.

The second master header should have the name of the road. The tolerance should be around the values shown. If GEOPAK stops at many cross sections these values can be adjusted.



The File pull down menu will allow you to save this information to a text file. If you are working on more than one project, you can easily import the correct information on subsequent runs.



Keep in mind that the Radius of Display Circle needs to be less than the smallest line segment on the proposed cross section. If the smallest line segment is the top of curb and it is .15 m (6 in.) then the Radius of Display Circle needs to be .1 (.25 ft.).



## Staking Detail Report

The Staking Detail Report is used to locate the catch points at each section. The Staking Detail button is located third from the bottom on the XS Report dialog box. When selected, you will get the following dialog box.

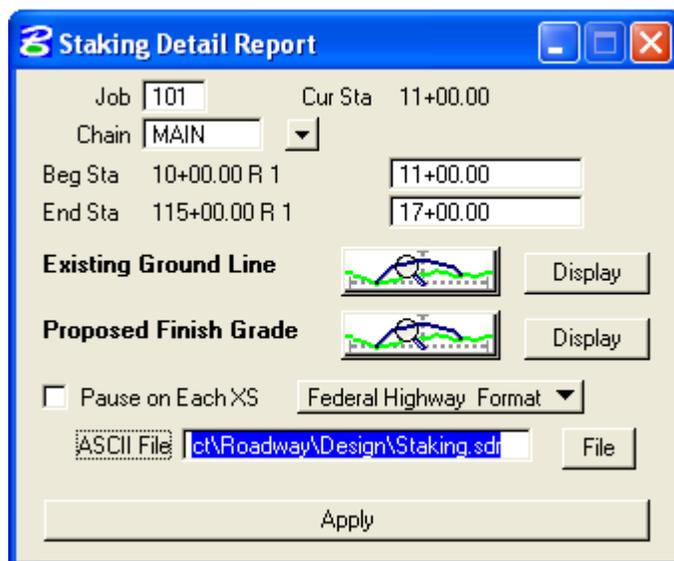


Figure 21-18: Staking Report Dialog

Select the Begin Station and End Station to run your report. To set the symbology values for the Existing Ground Line and Proposed Finish Grade, pick the symbology button  to get the following dialog boxes:



Figure 21-19: Existing Ground Line

Set the existing ground line symbology as shown above. GEOPAK progresses from left to right across each cross section while preparing each report. Proposed finished grade for standard ditch or fill section select the bottom of the pavement layer, ditch slope, cut slope and fill slope.



Figure 21-20: Proposed Finish Grade



If the working alignment definitions are setup in the project manager for existing ground and proposed finish grade, the symbology values will be shown when the symbology button is selected.

The values shown in the Existing Ground Line and Proposed Finish Grade sections will allow GEOPAK to progress through the top of subgrade. This is the path needed to get the correct report. The buttons to the right of the data field allow the user to select the values to populate the data field. The Reset button clears the values that populate the fields, Display highlights the elements that meet the criteria, and Match allows the user to pick the elements to include in the selection set.



The values shown in the Proposed Finish Grade are only for a standard ditch or fill section. There will need to be additional symbology added to the Proposed Finish Grade section if retaining walls and other elements are added to the cross sections.

Once the existing and proposed symbology has been selected, provide a name for the report and select Apply to process the Staking Detail Report.

05/04/2006

Project Number  
Road Name  
STAKING DETAIL REPORT(Ft)

Page# 1

STATION	Slope	Left Stake			Right Stake					Slope	
		C/F	DIST	ELEV	SUPER	ADJ.	SUPER	ELEV.	DIST		C/F
11+00.00 R 1	4.00:1.	C 2.14	24.00	7416.86	-0.020	7416.41	-0.020	7415.99	23.06	C 1.27	6.00:1.
12+00.00 R 1	4.00:1.	C 2.15	24.05	7420.00	-0.020	7419.54	0.001	7419.45	23.38	C 1.41	6.00:1.
13+00.00 R 1	4.00:1.	C 2.53	25.91	7423.38	-0.032	7422.66	0.032	7422.97	23.54	C 1.54	6.00:1.
14+00.00 R 1	4.00:1.	C 2.22	24.67	7426.20	-0.032	7425.79	0.032	7426.01	23.03	C 1.45	6.00:1.
15+00.00 R 1	4.00:1.	C 2.07	24.06	7429.17	-0.032	7428.92	0.032	7429.84	22.95	C 2.16	4.00:1.
16+00.00 R 1	6.00:1.	C 1.94	27.42	7432.17	-0.032	7432.04	0.032	7432.91	22.73	C 2.10	4.00:1.
17+00.00 R 1	6.00:1.	C 1.10	22.40	7434.46	-0.032	7435.17	0.032	7436.19	23.34	C 2.25	4.00:1.

Figure 21-21: Staking Detail Report



## Blue Tops Reports

Blue Tops reports indicate all breakpoints at the top of base course. There are two reports that are needed, the standard Blue Top Report and the XYZ Blue Top Report. The Blue & Red Top button is at the top of the XS Report dialog box. When selected, you will get the following dialog box.

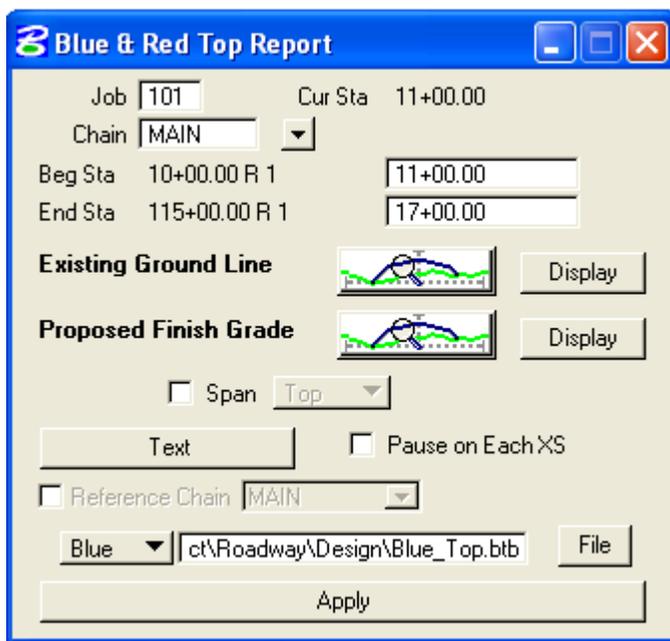


Figure 21-22: Blue Top Report Dialog

The values defined in the Existing Ground Line and Proposed Finish Grade sections will allow GEOPAK to progress through the top of base course. This path is needed to get the correct report. For the Blue Tops, in the proposed finished grade, use the level symbology for the top of base course. You may need to include the top of pavement symbology if the foreslope has the same symbology along the base course as the pavement section. The only other information that is needed is in the Text button. Select the Text button to bring up the following dialog box:

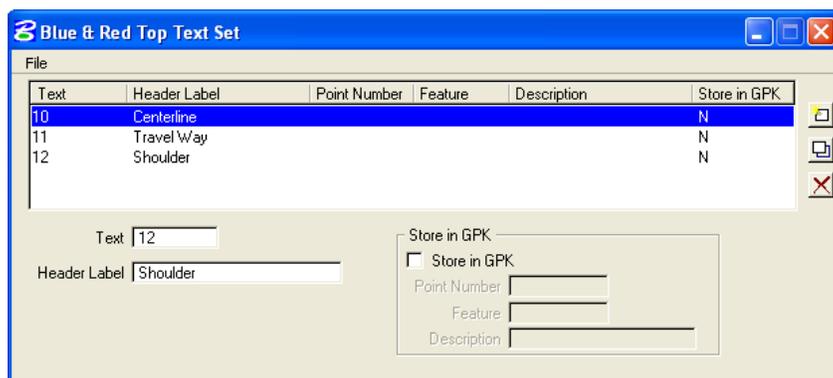


Figure 21-23: Report Text Set



Review the cross section to select text at the points that you want reported. The text is placed in your cross sections on a level named X\_Text\_Search. The Header label is how the report will label that point. To add a point to the list simply type in the text you want reported on and the label for that text and hit the add button. If you want to change the header or text, highlight the line you want changed, make your modifications and hit modify. To delete a label, highlight the line to delete and pick the Delete button. The text set for your project can be saved as a \*.lis file by selecting File>save.



The CFL Default.lis file is located at  
N:\Standards\V8\_RESOURCE\X\_30\Standards\  
Preferences

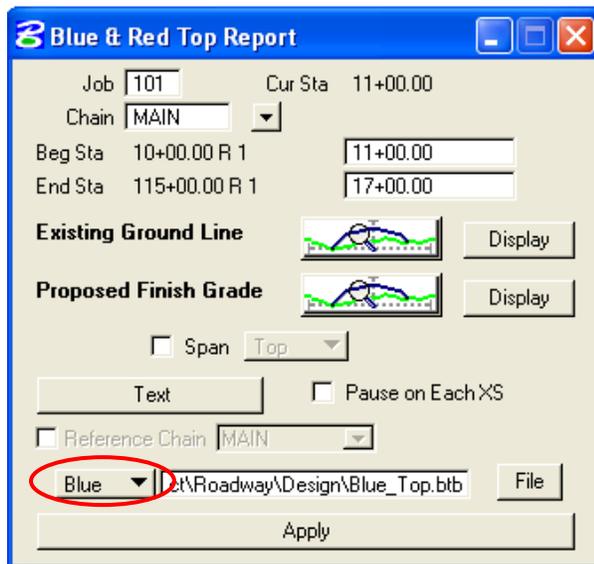


Figure 21-24: Blue Top Report Dialog

Prior to running the Blue Top Report, make sure the Blue button is shown in the Blue & Red Top report dialog box. Select Apply to process the report.



05/04/2006

Project Number  
Road Name  
BLUE TOPS REPORT(Ft)

Page# 1

STATION	Shoulder	Travel Way	Centerline	Travel Way	Shoulder
11+00.00R1 [MAIN]	7417.40 -12.00	7417.40 -11.81	7417.64 0.00	7417.40 11.81	7417.40 12.00
	-0.020	-0.020	-0.020	-0.020	
12+00.00R1 [MAIN]	7420.43 -12.00	7420.43 -11.81	7420.67 0.00	7420.72 11.81	7420.72 12.00
	-0.020	-0.020	0.005	0.005	
13+00.00R1 [MAIN]	7423.36 -12.00	7423.37 -11.81	7423.70 0.00	7424.03 11.81	7424.03 12.00
	-0.028	-0.028	0.028	0.028	
14+00.00R1 [MAIN]	7426.39 -12.00	7426.40 -11.81	7426.73 0.00	7427.06 11.81	7427.06 12.00
	-0.028	-0.028	0.028	0.028	
15+00.00R1 [MAIN]	7429.42 -12.00	7429.43 -11.81	7429.76 0.00	7430.09 11.81	7430.09 12.00
	-0.028	-0.028	0.028	0.028	

Figure 21-25: Blue Top Report

The XYZ Blue Top Report is the same as the Blue Top Report, just change the button that says **Blue to XYZ**. Provide a new name for the report and select Apply.

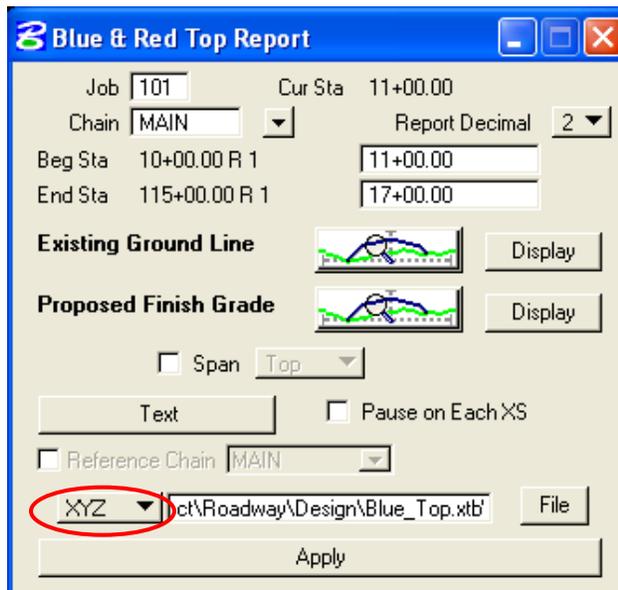


Figure 21-26: Blue Top Report Dialog



To differentiate the Blue Top Report and XYZ Blue Top Report, go back to the user button on the XS Report dialog box and add Blue Top XYZ Report to Master Header 3.



05/04/2006

Project Number  
Road Name  
Blue Top XYZ Report

Page# 1

Station	X	Y	Z	Offset	ID	SLOPE
11+00.00R1[MAIN]	522716.48	1832103.42	7417.40	-12.00	Shoulder	-0.020
	522716.61	1832103.29	7417.40	-11.81	Travel Way	-0.020
	522724.95	1832094.92	7417.64	0.00	Centerline	-0.020
	522733.29	1832086.56	7417.40	11.81	Travel Way	-0.020
	522733.42	1832086.42	7417.40	12.00	Shoulder	-0.020
12+00.00R1[MAIN]	522787.30	1832174.02	7420.43	-12.00	Shoulder	-0.020
	522787.43	1832173.88	7420.43	-11.81	Travel Way	-0.020
	522795.77	1832165.52	7420.67	0.00	Centerline	0.005
	522804.11	1832157.15	7420.72	11.81	Travel Way	0.005
	522804.24	1832157.02	7420.72	12.00	Shoulder	0.005
13+00.00R1[MAIN]	522857.22	1832244.95	7423.36	-12.00	Shoulder	-0.028
	522857.36	1832244.82	7423.37	-11.81	Travel Way	-0.028
	522865.96	1832236.74	7423.70	0.00	Centerline	0.028
	522874.57	1832228.65	7424.03	11.81	Travel Way	0.028
	522874.71	1832228.52	7424.03	12.00	Shoulder	0.028

Figure 21-27: Blue Top XYZ Report



CFLHD has developed a Geopak 3-port criteria file (chk\_xs\_report.3pc) that will allow the designer to do a visual quality check of the information in the Blue Top Report. To access directions for the 3-port criteria from CFLHD website [click here](#). The Geopak 3-port criteria file and input file is available through the V8\_Resource.zip download on the CFLHD Website.

On the CFLHD network, this 3-port criteria and input file can be found at  
N:\Standards\V8\_RESOURCE\X\_30\Standards\3PC directory.

For CFLHD projects, with the development of the Subgrade Template Report, the Red Top Reports will no longer be required.

### Printing Staking Reports

Open any of the staking reports using Ultra Edit. Change the printer to landscape orientation as shown below.

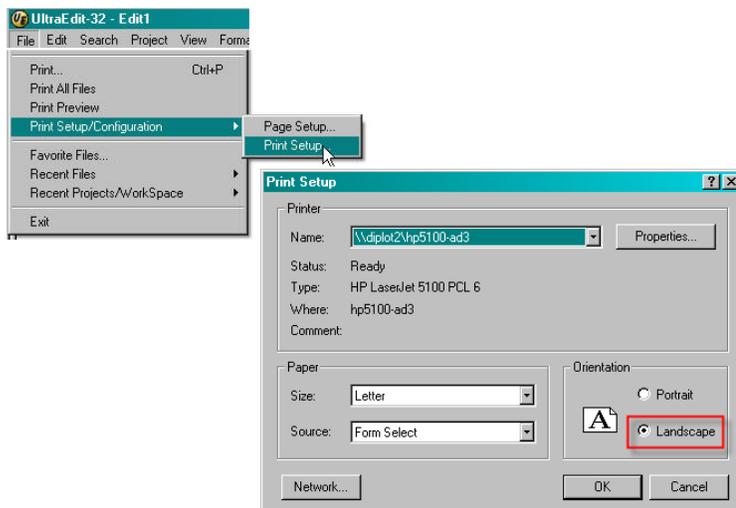


Figure 21-28: Landscape Orientation

Change the text size to 8 as shown below.

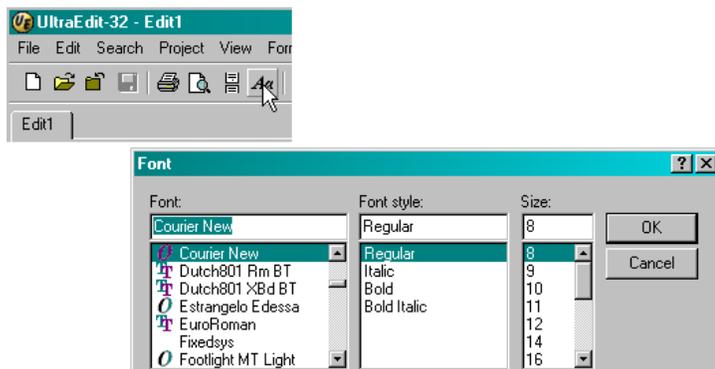


Figure 21-29: Change Font Size

Replace the date with a page break character. Go to Search, then Replace, and then enter the date shown in the staking report into the first data field as shown below.

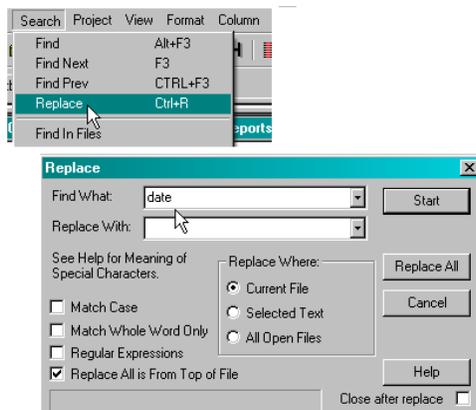


Figure 21-30: Replace the Date with a Page Break Character



Go to View, ASCII Table and select Dec# 12. Click on Insert Char and insert a page break character as shown below.

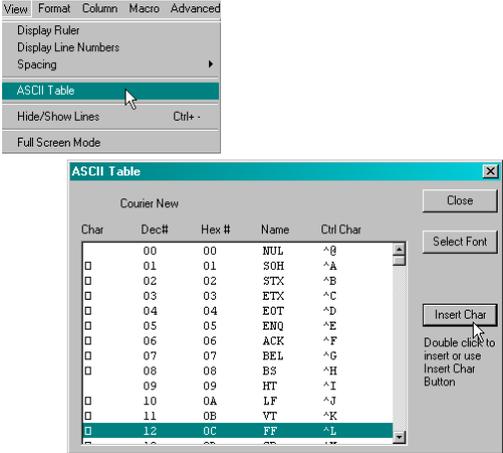


Figure 21-31: Insert Page Break Character

Cut and paste page break character into the second data field of the Replace dialog box and click on Replace All as shown below.

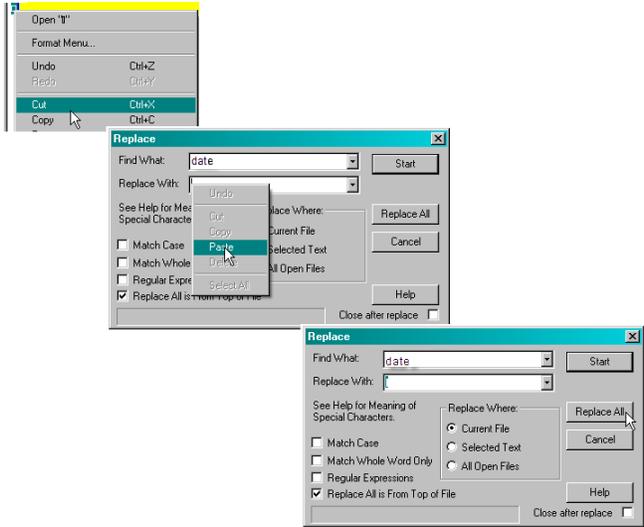


Figure 21-32: Cut and Past Page Break Character and Replace All

Go to the File pull down menu from the main menu at the top of the screen and select Print Preview to view your document. Click on close. Select Print from the File pull down menu and select your printer with the down arrow next to the first data field as shown below. Click on OK to print your staking report.

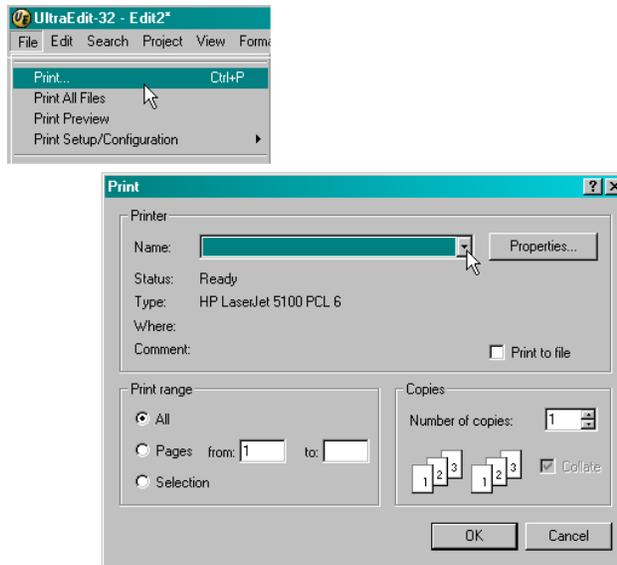


Figure 21-33: Print Staking Report

**Related links:** Using Knucklehead's Guide for GEOPAK Road 2004 Edition.

[Staking Detail Report](#)

[XYZ Reports](#)