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Chapter 18: Cross Sections

Overview

Proposed Cross sections are used to determine the limits of construction, earthwork, construction staking reports, and 3D modeling. It is very important that they are drawn consistently and to the standards outlined in this chapter. Federal Lands Highway (FLH) has developed a new generation of criteria files know as the X30 Criteria files. With the development of the X30 criteria, creating the proposed cross sections no longer requires the traditional input files and exception data files. With X30 criteria files, Proposed Cross Sections are created through the Project Manager using the Typical Section Generator. Proper setup and use of the Project Manager is crucial in running the Typical Section Generator to create the proposed cross sections. ***All cross section slopes are labeled 1V:1H as per the FP03.***

Prior to running Proposed Cross Section the Project Manager need to be setup as outlined in Chapter 13 of the Geopak 2004 - X30 CADD Standards Manual.

Federal Lands Highway have developed **6 Typical Sections** for the use of developing proposed cross sections. The 6 Typical Sections are ***Divided New Pavement, Existing Features, Existing and Proposed Right of Way, Rehabilitation Typical Section (3R), Undivided New Pavement and Cross Section Labeling.***

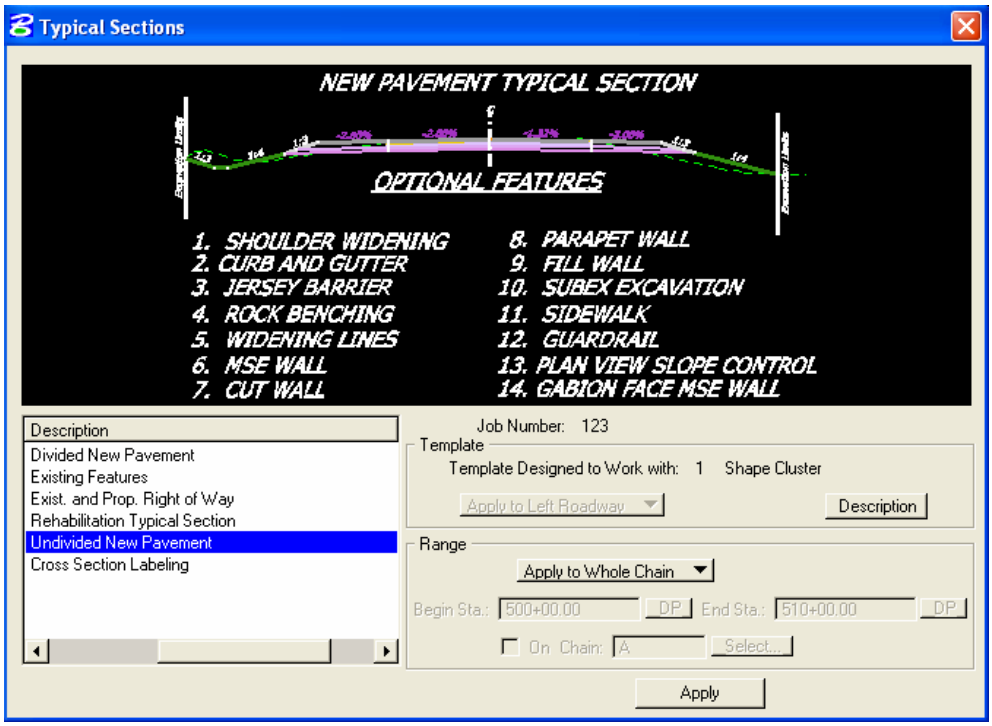

Figure 18-1: FLH Typical Sections

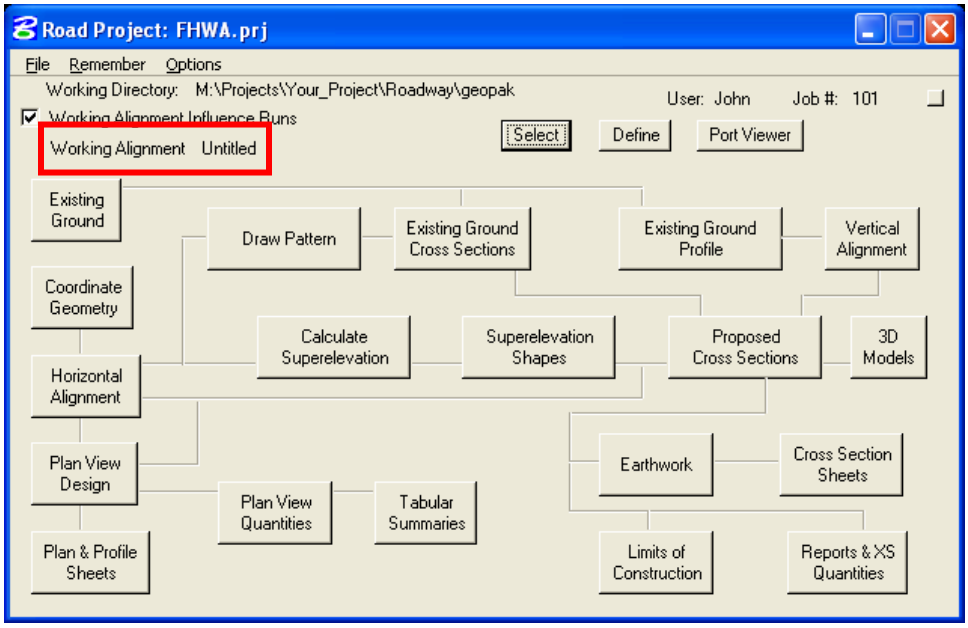

Figure 18-2: Project Manager Dialog

Once the working alignment has been selected and defined, proposed cross sections can be run through the Project Manager Dialog. Follow Workflow 1 below to setup the Working alignment Definition. An example Working Alignment called MAIN will be used to outline the Workflows in this Chapter. The Project Manager was setup in Chapter 13, but the working alignment definition will be explained in detail in Workflow 1.

Workflow 1: Working Alignment Definition

1. ***Select Define button from the Project Manager Dialog as shown below.***

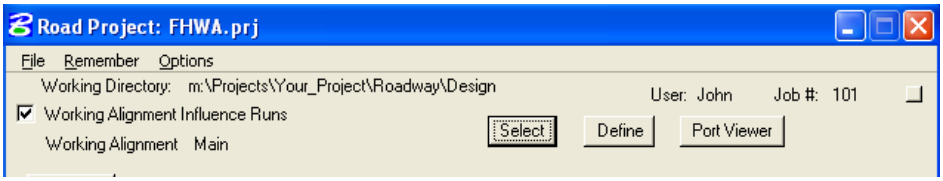

Figure 18-3: Define Working Alignment

2. ***The Working Alignment Definition Dialog Box for the Chain MAIN will appear. In the Plan View category select the proposed design file and select the Geopak alignment chain.***

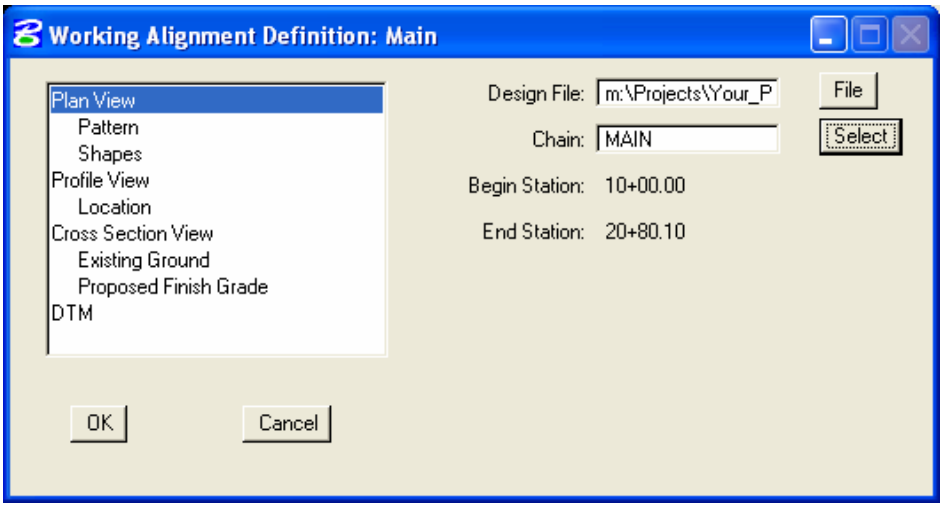

Figure 18-4: Plan View Definition

3. ***In the Pattern category populate the dialog By Station or By Design File. Use named levels P_GPK_Pattern_01 to P_GPK_Pattern_10 to place pattern lines in a design file. Horizontal Scale and Vertical Scale should be set to 1.***

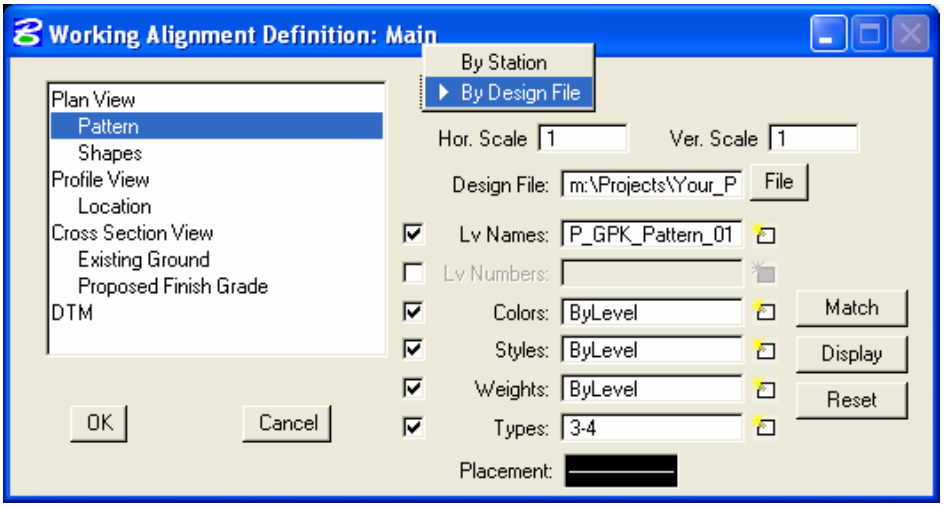

Figure 18-5: Pattern Definition

4. ***In the Shapes category populate the dialog By Search Criteria. Search Criteria will process the cross sections faster than the All in DGN mode. Use named level P_RDW_Super_Shapes to draw superelevation shapes in the Shapes dgn file.***

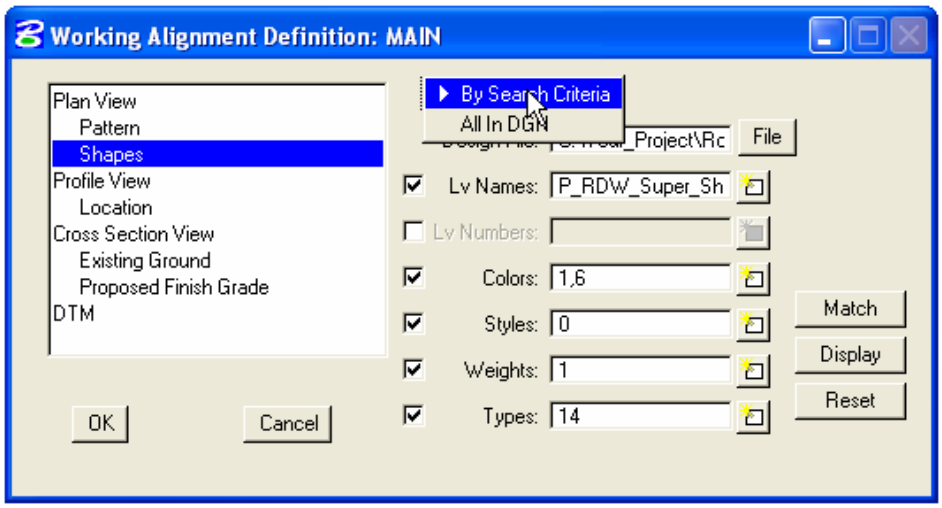

Figure 18-6: Shapes Definition

5. ***In the Profile View and Location category populate the dialogs defining your design profile file, existing profile and proposed profiles. Profile Location can be populated by selecting the Identify Cell button and selecting the profile cell. Profile View and Location are not required to be populated to run Proposed Cross Sections.***
6. ***In the Cross Section View category populate the dialogs defining your XS DGN file.***

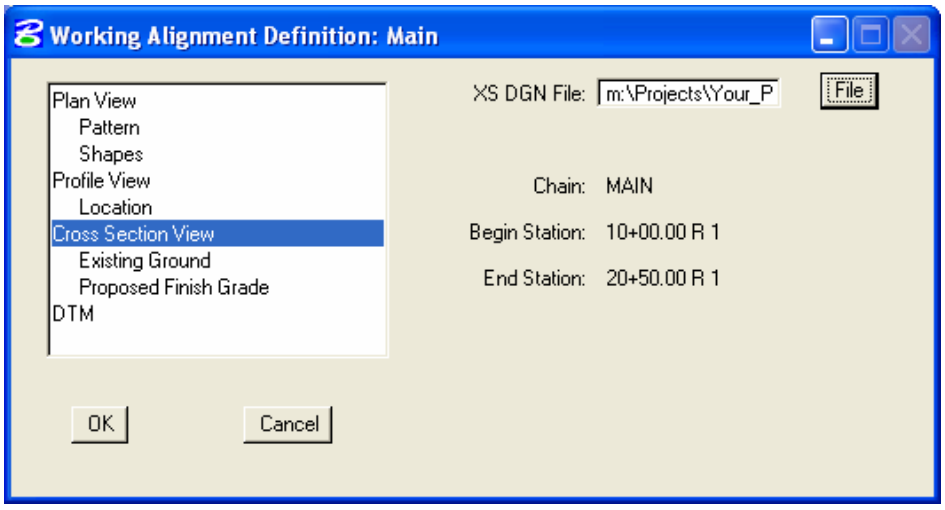

Figure 18-7: Cross Section Definition

7. *In the Existing Ground category populate the dialogs defining the parameters of your existing ground.*

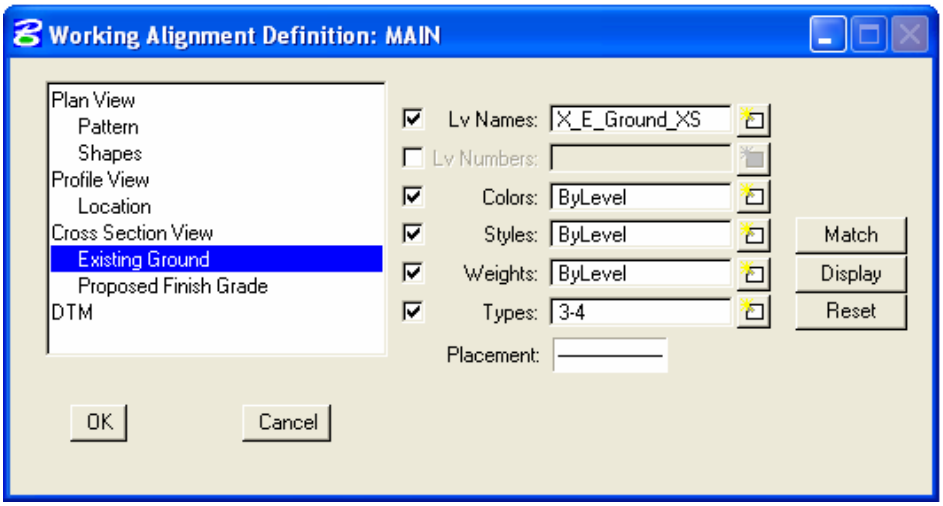

Figure 18-8: Existing Ground Definition

8. *The Proposed Finished Grade and DTM categories should be completed, but they are not required to be populated to run Proposed Cross Sections. Once all the categories in the dialog box are completed, Select OK to save and close the Working Alignment Definition for the working alignment (example: MAIN).*

Once the working alignment definitions are set for a working alignment, Proposed Cross Sections can invoked from the Project Manager Dialog Box. The Proposed Cross Section can be run for the 6 FLH Typical Sections. Follow Workflow 1 below to process the proposed cross sections:

Workflow 2: Proposed Cross Sections

1. *Select Proposed Cross Sections button from the Project Manager Dialog.*

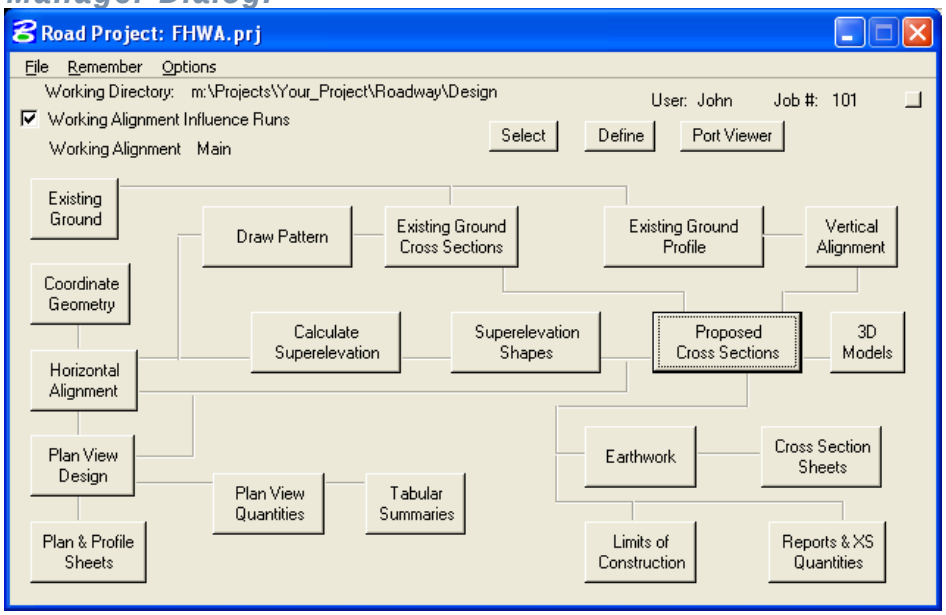

Figure 18-9: Invoking Proposed Cross Sections

2. *The following dialog will be activated, since no run exist for the example Select New to create a Run.*

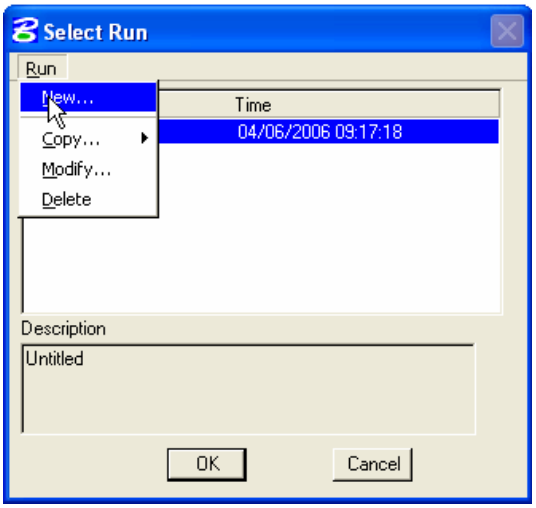

Figure 18-10: Create a New Run

3. *Create a New Run by entering the run name and description and select OK.*

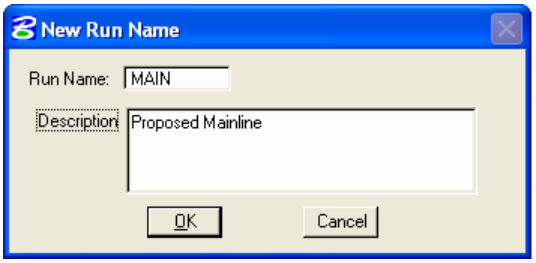

Figure 18-11: New Run

4. *From the Select Run dialog, select the newly created run MAIN and select OK.*

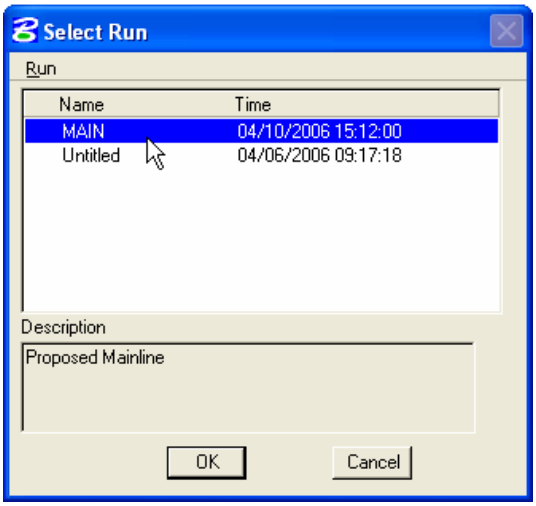

Figure 18-12: Select New Run

5. *Selecting a Run will access the Proposed Cross Section Dialog.*

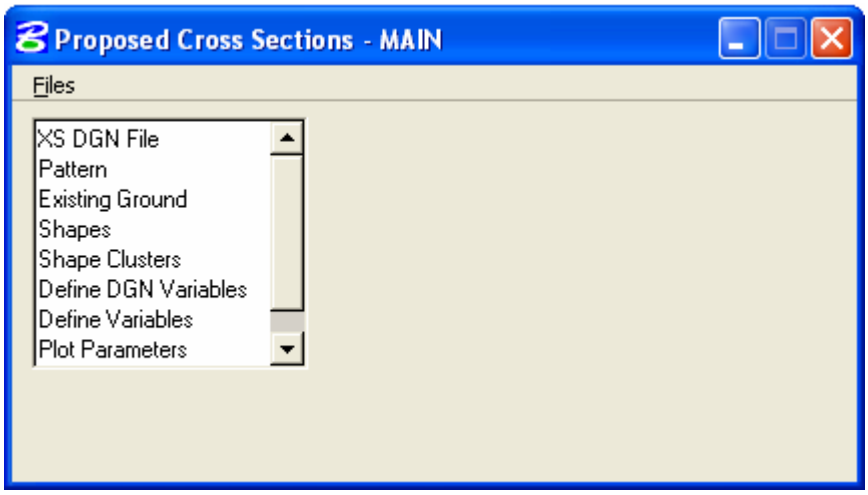

Figure 18-13: Proposed Cross Sections

The Proposed Cross Section run shown in the workflow is for an Undivided New Pavement Typical Section.

The proposed Cross section run holds the same information as the old Proposed Cross Section Input File and Exception Data File combined.

6. Select the XS DGN File from the Proposed Cross Section dialog. Note that the dialog box is already filled in by the Working Alignment definition.

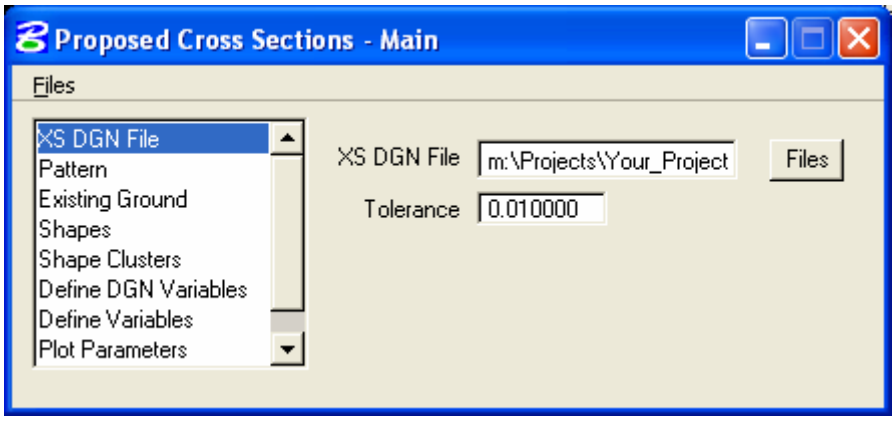

Figure 18-14: Selecting XS DGN File

The tolerance should always be set to 0.010 for English projects and 0.003 for Metric projects. The tolerance setting is very important and the proposed cross section will not process without setting this value.

7. Select the Pattern and toggle on Use Working Alignment Definition.

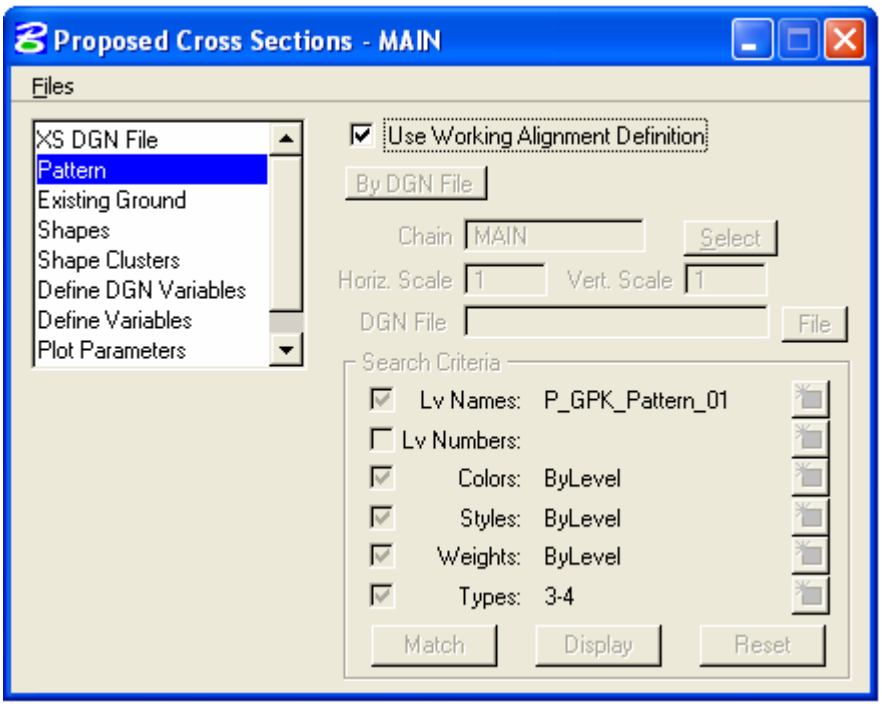

Figure 18-15 Selecting Pattern

8. Select the Existing Ground and toggle on Use Working Alignment Definition.

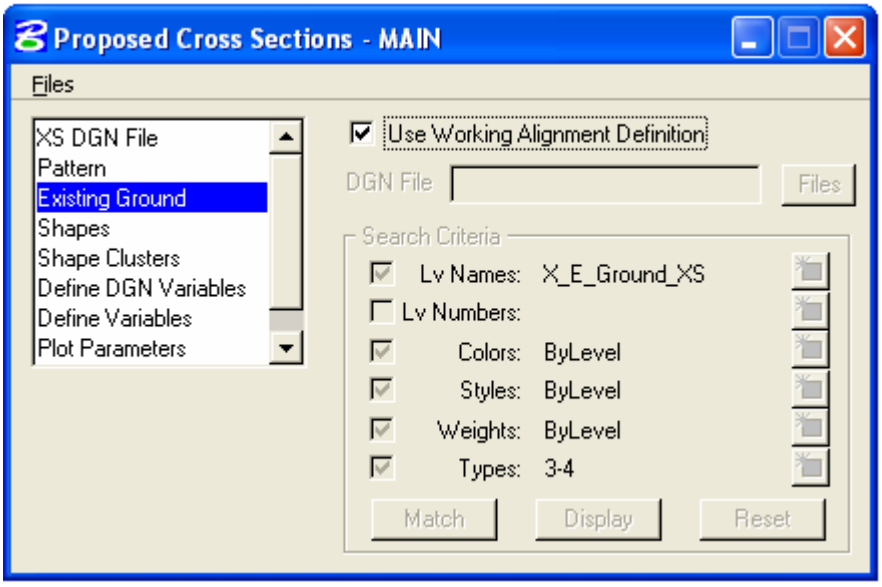

Figure 18-16 Selecting Existing Ground

9. Select the Shapes and toggle on Use Working Alignment Definition.

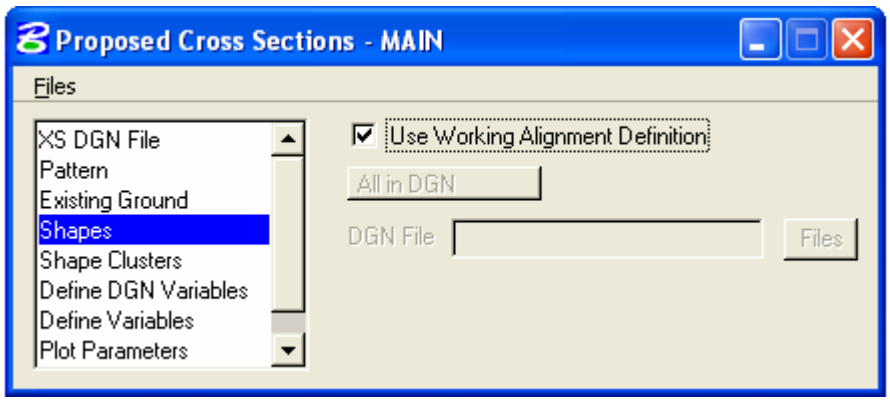

Figure 18-17: Selecting Shapes

The Working Alignment Definition toggle can be used for Pattern, Existing Ground and Shapes; these were previously defined for the working alignment.

10. Select Shape Clusters from the Proposed Cross Section dialog. The following dialog box will appear. Select Scan.

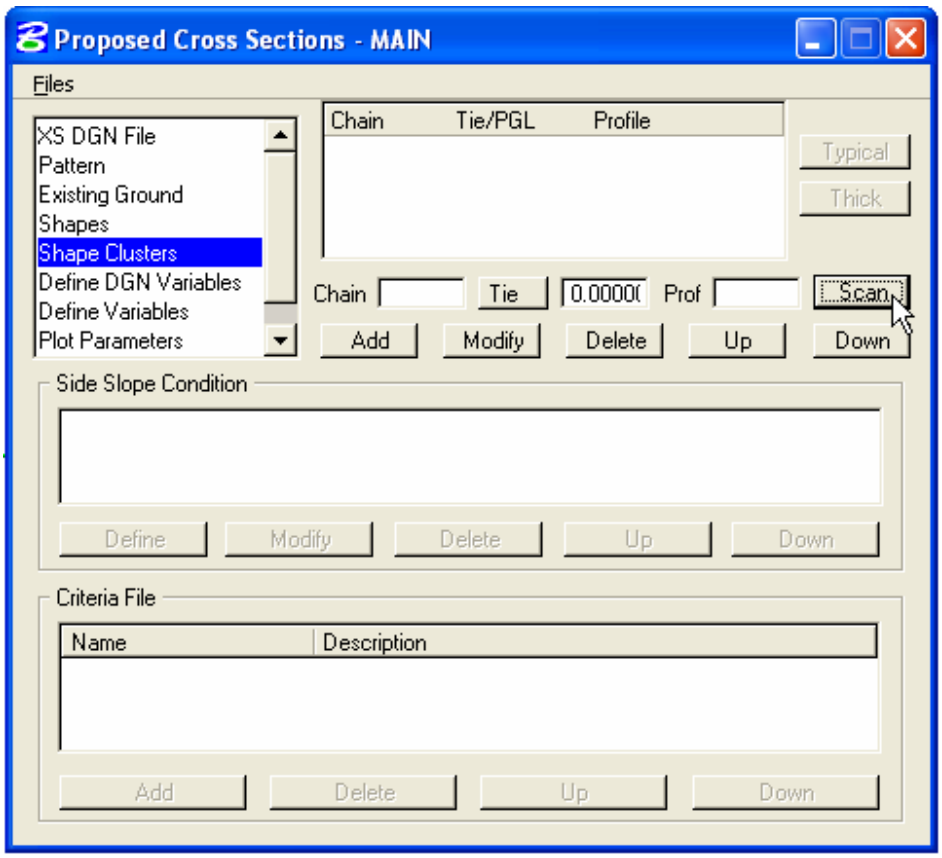

Figure 18-18: Selecting Shape Clusters

11. *Selecting Scan button will access the List of Clusters dialog box. Select the shape cluster and close the dialog box.*

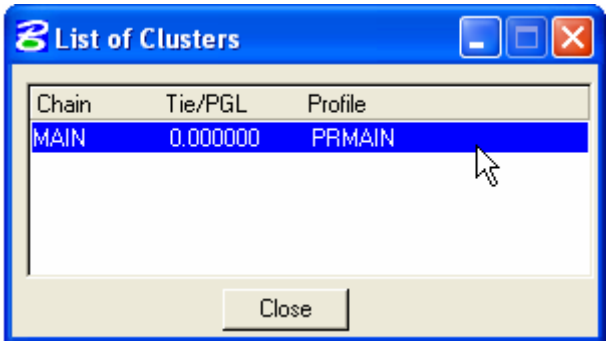

Figure 18-19: List of Clusters

12. *Select the add button from the main shape cluster dialog box to add the shape cluster to the list box as shown.*

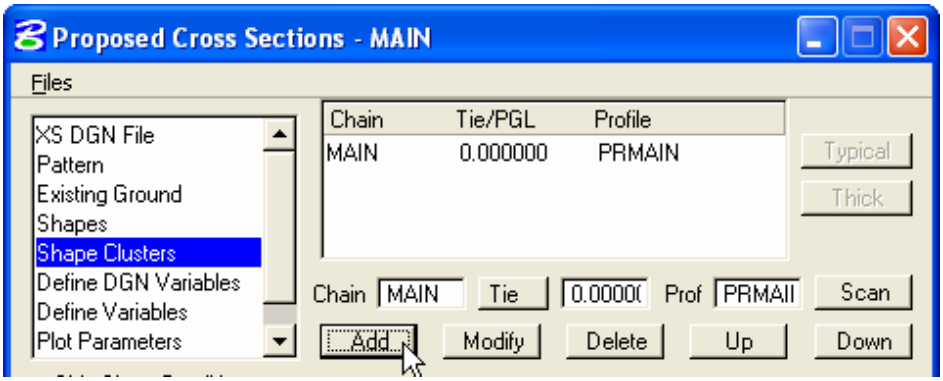

Figure 18-20: Add List of Clusters

13. *Once the shape cluster is added to the list box, highlight the information in list box shown and the Typical button will become active. Select the Typical button to access the Typical Section Generator.*

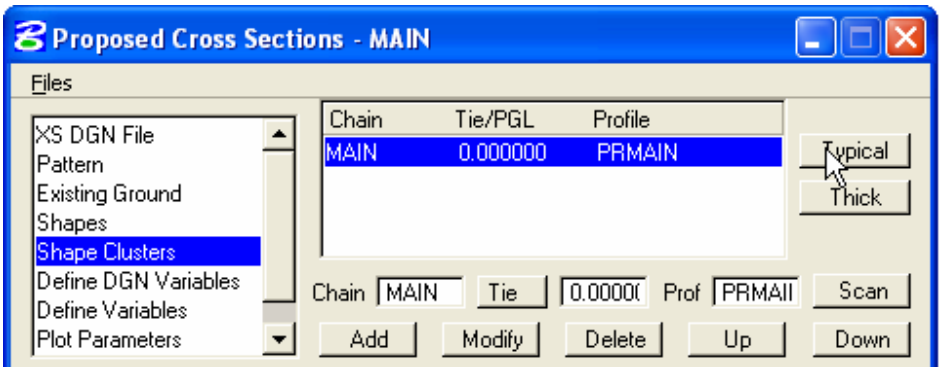

Figure 18-21: Select Typical Section

14. In the Typical Section Generator, 6 typical are available. Select UNPAVT for undivided new pavement. In the Range window, select Apply to Whole Chain. Apply to Station Range to process by station range. Select Apply.

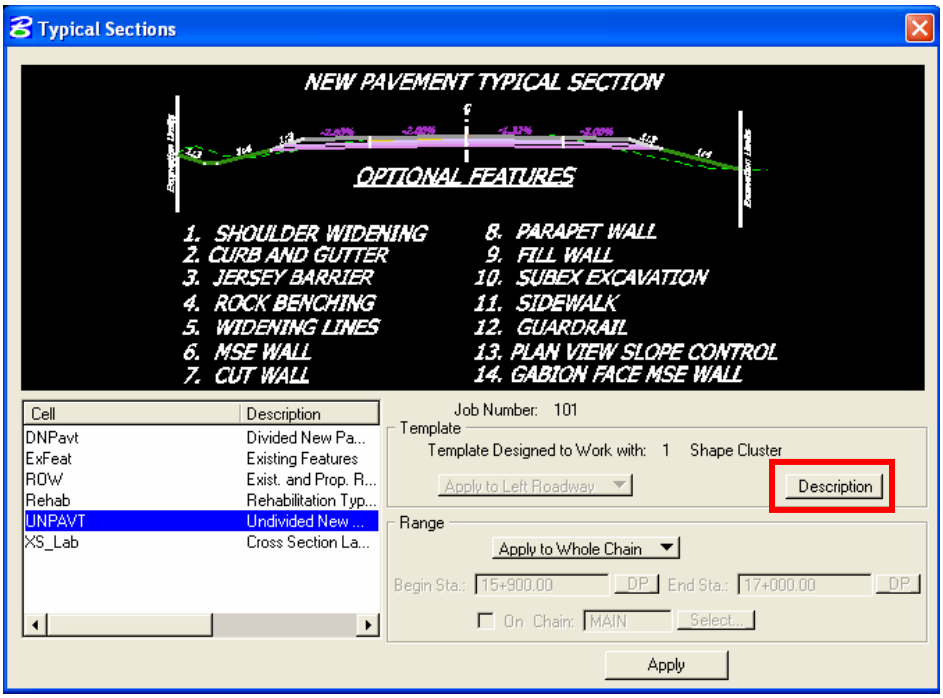

Figure 18-22: Choose Typical Section

Select the Description button in the Typical Section dialog box to access the online help for the selected typical section. Online help document provides detailed drawings and information on how each of the typicals work.

The help files can also be accessed outside the Typical Sections Dialog Box. For Consultants, **Help** documentations are available through the **CADD_Resource_v8.zip** download on EFLHD Website. Help files (*.wri files) are available in the *M:\Cadd_resource_v8\X_30\Standards\Bin\ English or Metric directory.*

The **Help** documentations can be found on the EFLHD network at: *M:\Cadd_resource_v8\X_30\Standards\Bin\English or Metric directory.*

15. The criteria files associated with the Typical Section are populated into the main Proposed Cross Section dialog.

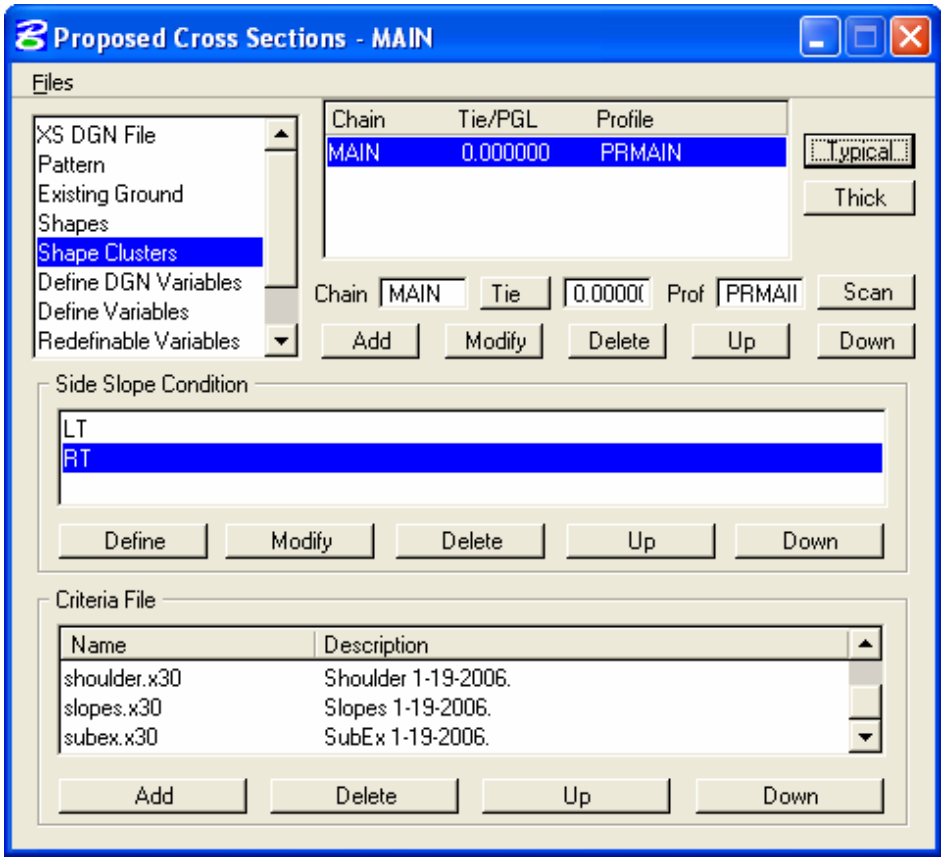

Figure 18-23: Populated Shape Cluster

16. The Define DGN Variables should be left blank for Undivided New Pavement Typical. This variable is used only with Automated Cross Section Labeling Typical.

17. Select Define Variables and edit Cross Section dgn, Proposed Plan Dgn and Geopak Lines Dgn values. Edit the default value of the variable and select Modify to accept.

If any of the dgn files are not in the working directory, the full path must be specified.

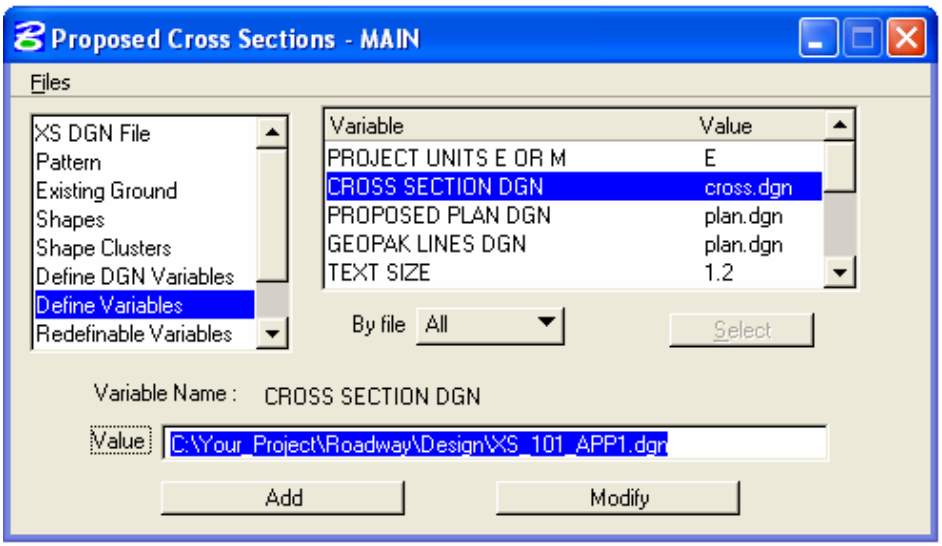

Figure 18-24: Populated Shape Cluster

18. Select Re-Definable Variables as shown below. Select the Edit button to modify the default variables and to set project specific values.

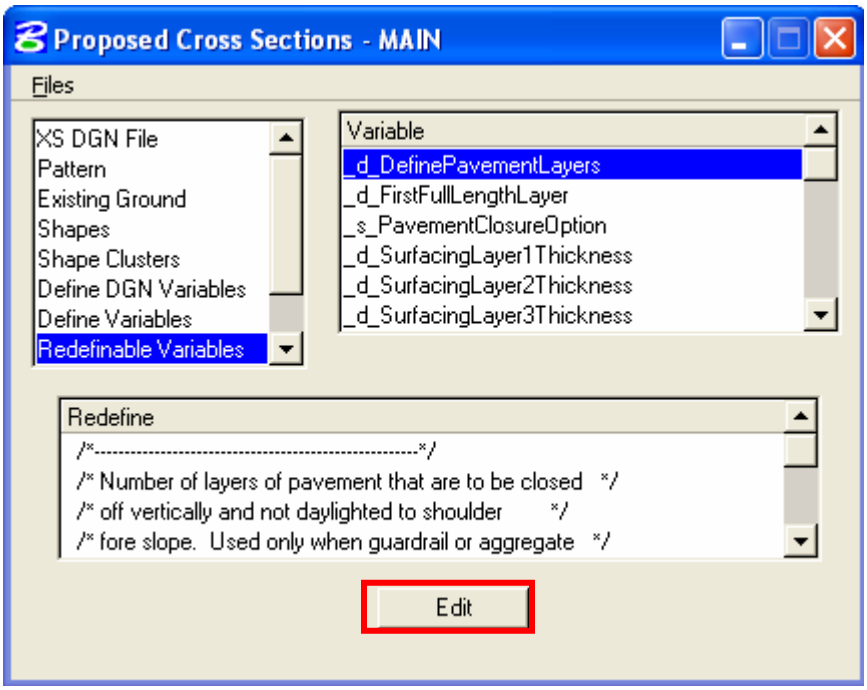

Figure 18-25: Re-Definable Variables

19. Select Plot Parameters and toggle off all the plot options.

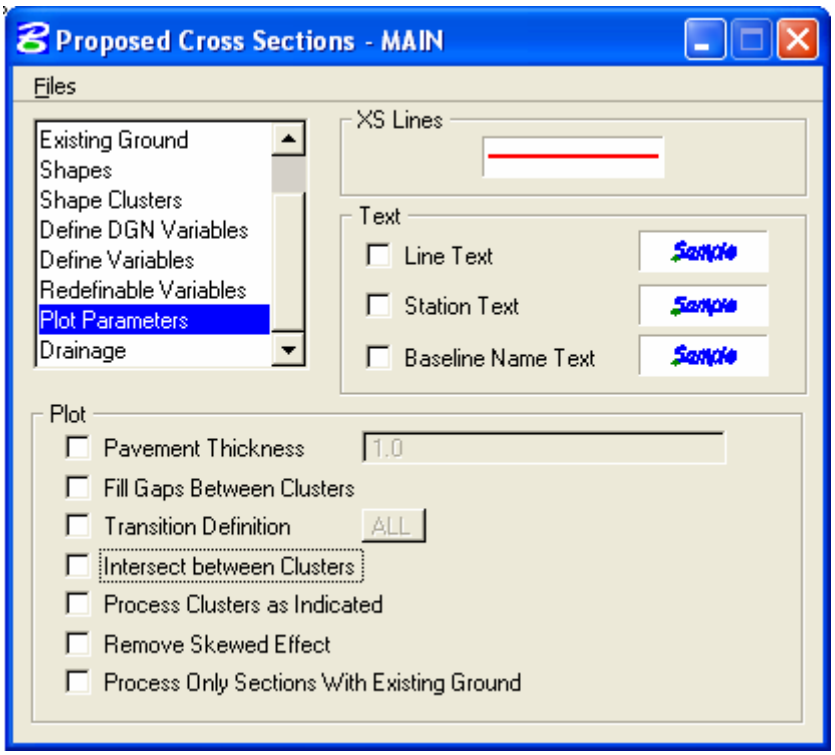

Figure 18-26: Plot options

20. Select the drainage, this should be left blank. This will not apply to the 6 Typical Sections. Once the run has been modified for the working alignment, Select Files >Save Settings to save your run.

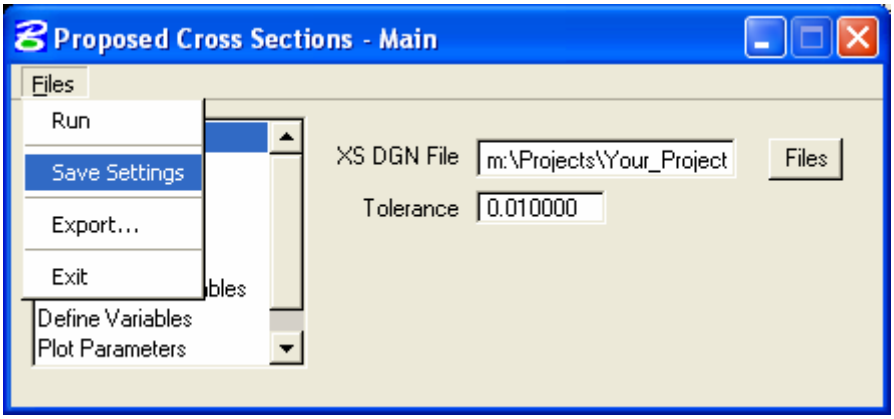

Figure 18-27: Save Settings

21. Select Files >Run to process your proposed cross sections.

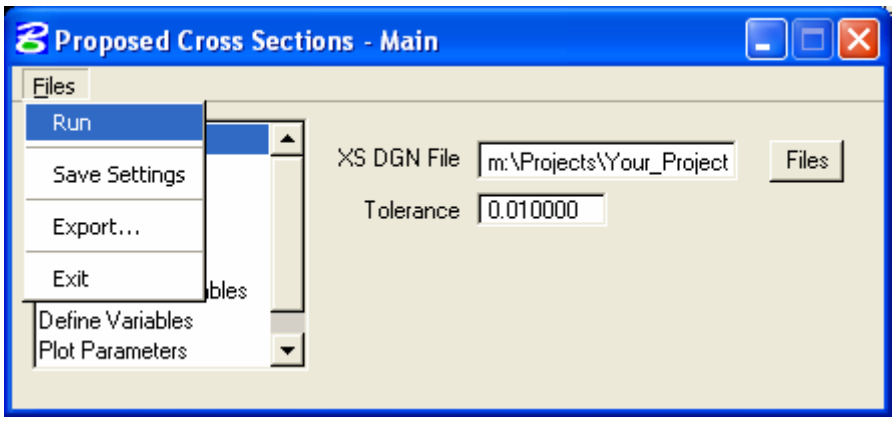

Figure 18-28: Run Proposed Cross Section

22. The following Proposed Cross Section Run dialog box will appear. Set the To Log File to To Screen, if no log file is desired. Select Apply process the Cross Sections.

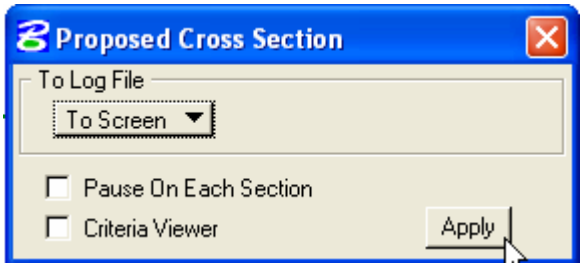

Figure 18-29: Process Proposed Cross Section

Cross Section Navigator

Now that you have completed the cross section run, you will want to view them. The cross section navigator is a tool that makes the viewing of cross sections much easier. Two types of Cross Section Navigators can be used to review the cross sections. A new tool for the Geopak 2004 Edition is the Super Cross section Navigator which allow you to view your cross section based on your profile. The new tool prevents drifting of the cross sections and provides speed controlled cross section movie navigation.

Workflow 3: Cross Section Navigator

1. Select Applications>GEOPAK ROAD>Cross Sections>Navigator, or Select the Cross Section Navigator icon from the GEOPAK Road toolbar.

Figure 18-30: Cross Section Navigator Icon

2. *The Cross Section Navigator dialog will appear.*

Figure 18-31: Cross Section Navigator

3. *Navigator will automatically center the first cross section found, using the station on the cross section cells.*

4. *Use the arrows*  *to move up or down station through the cross sections. You can also use the station pull down menu to go to a specific cross section.*

Workflow 4: Super Cross Section Navigator

5. *Select Applications>GEOPAK ROAD>Design & Computation Manager, or Select the Design & Computation Manager icon from the GEOPAK Road toolbar.*

Figure 18-32: Design & Computation Manager Icon

6. *In Design and Computation Manager dialog box, select MVBA Applications>Super Cross Section Navigator. Double Click on Super Cross Section Navigator. The following dialog box will appear.*

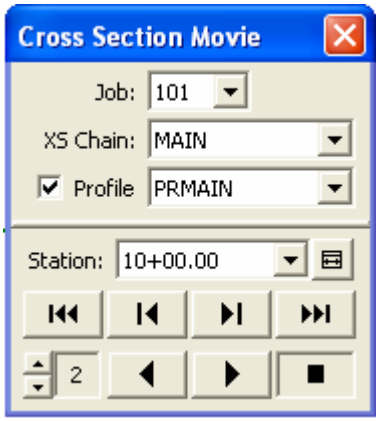

Figure 18-33: Super Cross Section Navigator

Related links: Setting up the Proposed Cross Section run for the 5 typical sections available through the Typical Section Generator, using Knucklehead's Guide for GEOPAK Road 2004 Edition.

Existing Features

Right of Way

Rehabilitation (3R)

Undivided New Construction

Automated Cross Section Labeling