
Chapter 6

Cross Section Navigator and Sheets

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6.1 Objectives

To learn how to use the **Cross Section Navigator** tools and to learn the procedures for laying out cross-section sheets.

6.2 Definitions

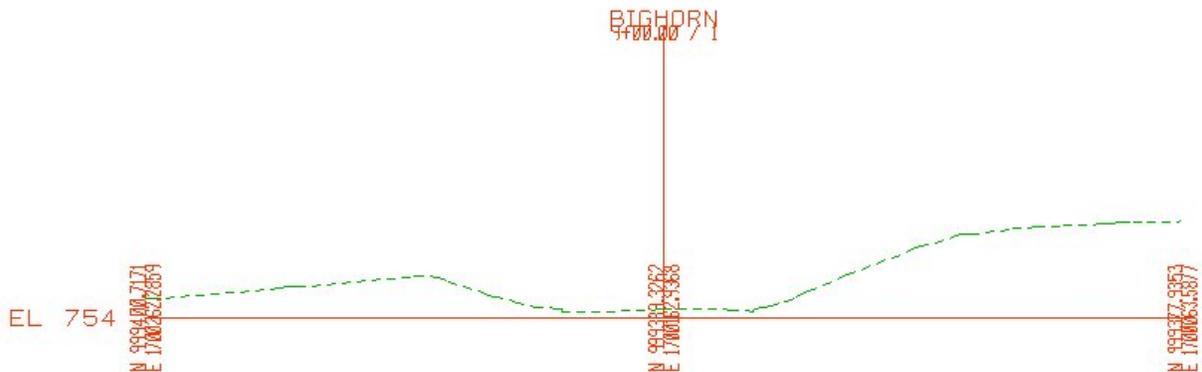
Geopak uses topographic elements to generate original cross sections. These include breaklines and spot elevations. GEOPAK can access and read this data from several basic data formats:

- Field Notes
- RDS cross sections
- DTMs based on Photogrammetric Mapping
- DTMs based on survey information

Of these basic formats, MoDOT primarily uses data from DTM's for generating existing ground cross sections.

6.3 Cross Section

The cross sections consist of mostly Microstation elements. These elements can be modified using Microstation tools. New elements can also be added using Microstation or Geopak drawing tools.



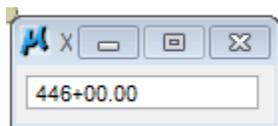
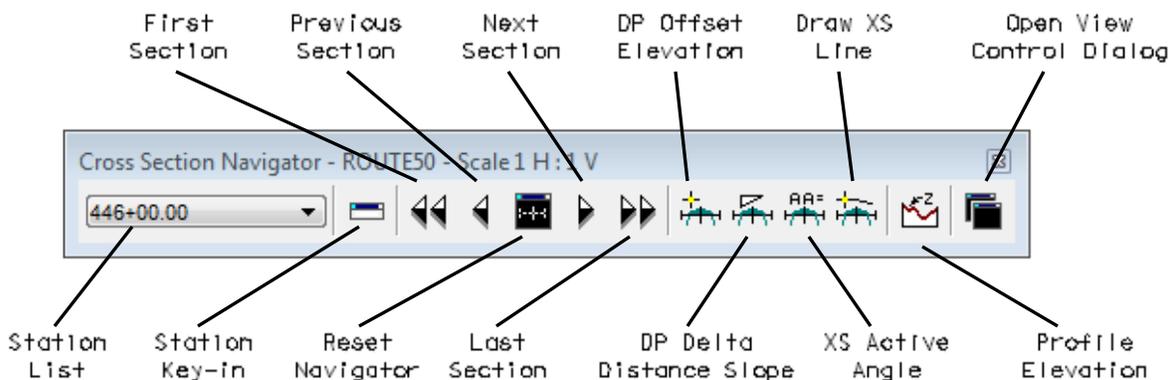
The intelligence of the cross section is built into the cross section cell. This cell is located on level 63. The cell consists of the baseline name, the station and region, the end coordinates for the cross section location, and the coordinates for the location at which the cross section intersects the baseline.

Warning: Do not delete or modify the cross section cells. If the cell is deleted or modified, the intelligence for this cross section will be lost.

6.4 Cross Section Navigator

The **Cross Section Navigator** is a tool used to view and move between cross-sections. It can also be used to draw cross-section information.

The user can access **Cross Section Navigator** by the **Cross Section Navigator** icon.  When the icon is chosen, the following dialog appears.

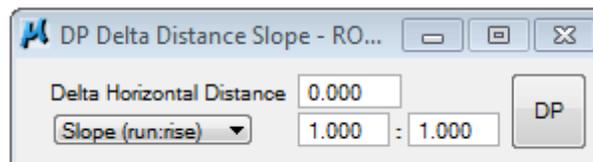


The user can move through the cross-sections by either choosing the station from the pull-down list, by typing the station value into the **Station Key-in** dialog, or by using the **First Section**, **Previous Section**, **Next Section**, or **Last Section** icons. The **Reset Navigator** icon will center the first station to the view, and reset the navigator to the first station value. Cross-section elements can be added or modified using Microstation tools, and/or the cross-section drawing tools.

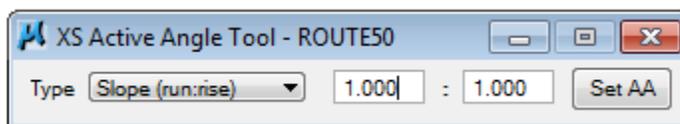
DP Offset Elevation – data points at a given offset/elevation, or find the offset/elevation of the cursor location.



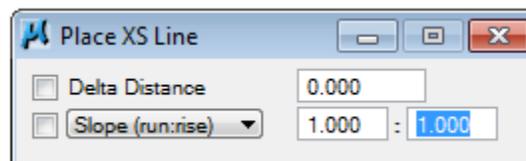
DP Delta Distance Slope – draws a line at a given horizontal distance and slope.



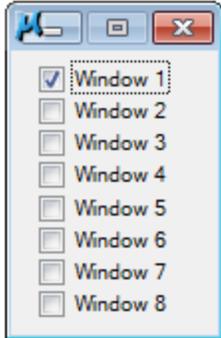
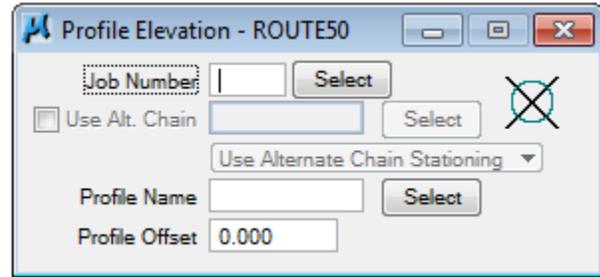
XS Active Angle Tool – sets the active angle to the given value. If a Microstation tool is used with the active angle option, this value will be used.



Draw XS Line – draws a cross-section line. An offset or a slope can be specified.



Profile Elevation – issues a data point at the elevation of a specified profile. An alternate chain location can also be specified.



Open View Control Dialog – allows the user to open and navigate through several windows to view different portions of the cross-section at the same time. (i.e. The user can view the whole cross-section in view 1, the left side in view 2, and the right side in view 3.)

6.5 Summary

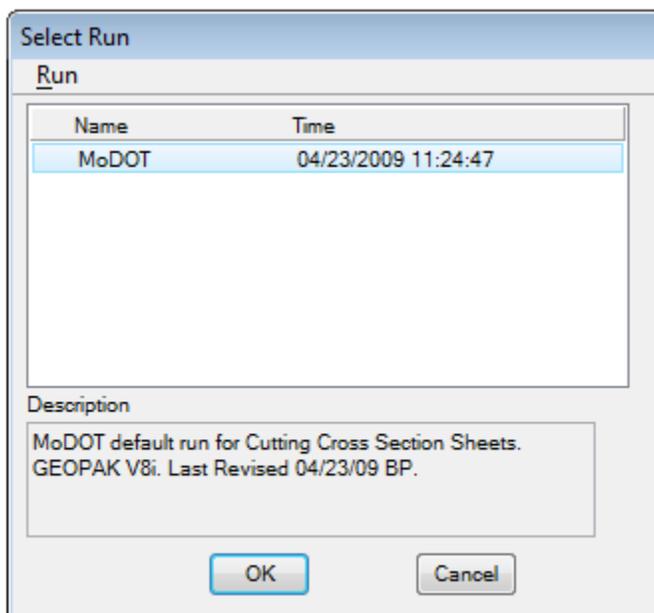
Basic Steps to Creating Original Ground Cross Sections from a DTM

1. Have an existing triangle file (.tin).
2. Open a 2D Microstation design file for the pattern lines.
3. Draw the pattern lines.
4. Open a 2D Microstation design file for the cross sections.
5. Draw cross sections through GEOPAK.
6. Review and modify (if necessary).

6.6 Accessing

Prior to beginning the cross-section sheet layout process, the user will need to create a cross-section sheet file. There are three seed files the user can choose from when setting up the cross-section sheet file: `i_xs_shts_5.dgn`, `i_xs_shts_10.dgn`, `i_xs_shts_20.dgn`. The user should choose the seed file that represents the scale the cross-sections will be plotted at.

To access the necessary dialogs needed to process the cross-section sheet layout, select **Project Manager >> Cross Section Sheets**. There is one MoDOT default run set up that users can copy. The wanted sheet scale will be chosen once entering the run.



6.7 Sheet Library

A sheet library must be attached to the current session. CADD Support has set up the runs so the MoDOT sheet library is automatically attached when selecting/copying any MoDOT default runs.

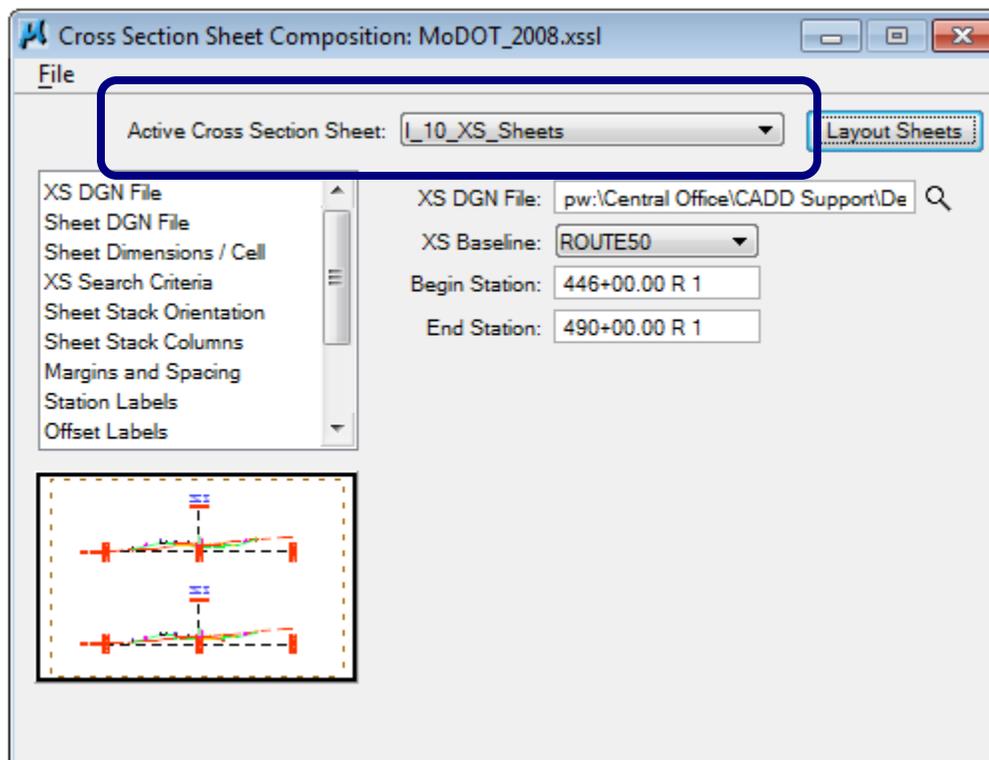
The sheet library supports the following scales:

- 1"=10'
- 1"=20'
- 1"=5'

Only CADD Support is authorized to edit the MoDOT sheet library. Any other sheet libraries will not be supported.

6.8 Dialog

Once entering a run, the dialog below appears.



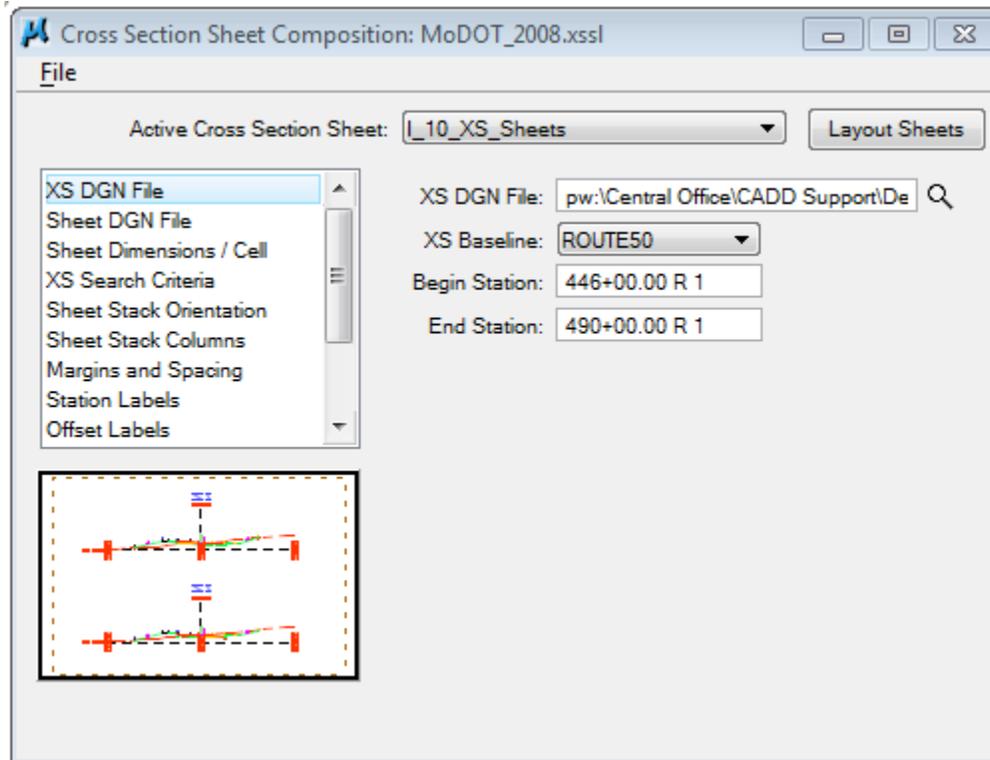
The sheet library contains all the parameters required to set up and cut sheets for the common sheet scales used for MoDOT projects. The user will need to select the sheet scale wanted from the **Active Cross Section Sheet** pull down menu.

The left side of the dialog contains the list of parameters required to draw the cross section sheets. When each parameter is selected, the dialog changes the key-in fields to reflect the selection.

Most of the parameters should be left alone. They are setup by the CADD Support Center, and are correct for the given scales. Listed below are the items the user will need to change.

6.8.1 XS DGN

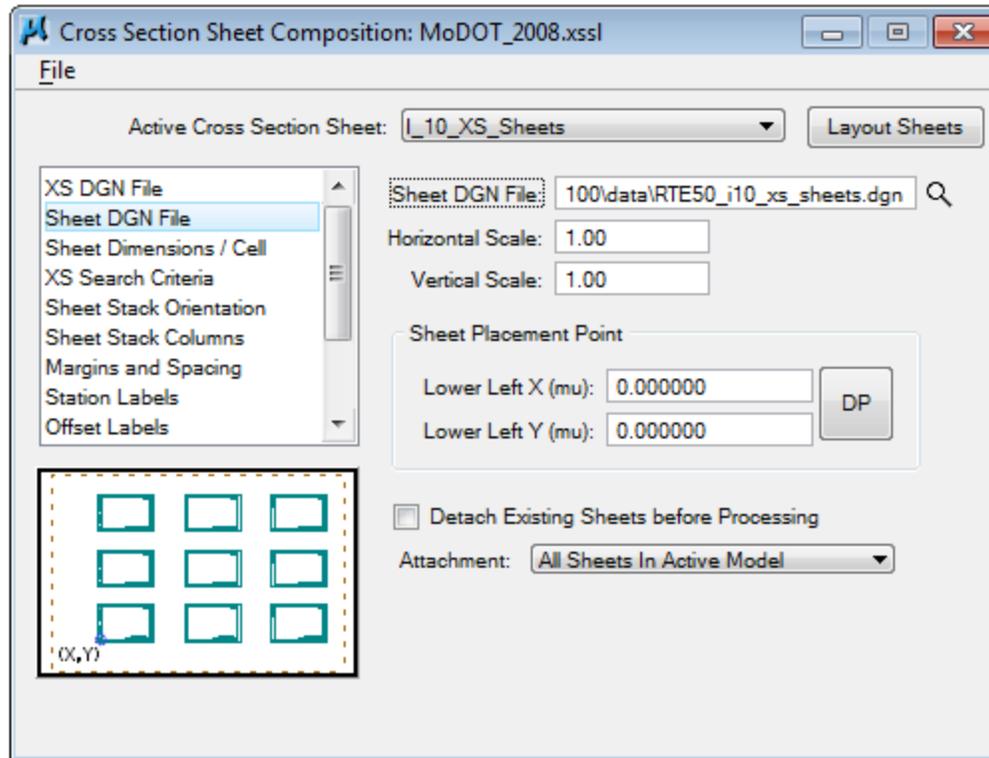
XS DGN defines the file in which the cross-sections are located, the baseline chain, and the station limits.



6.8.2 Sheet DGN File

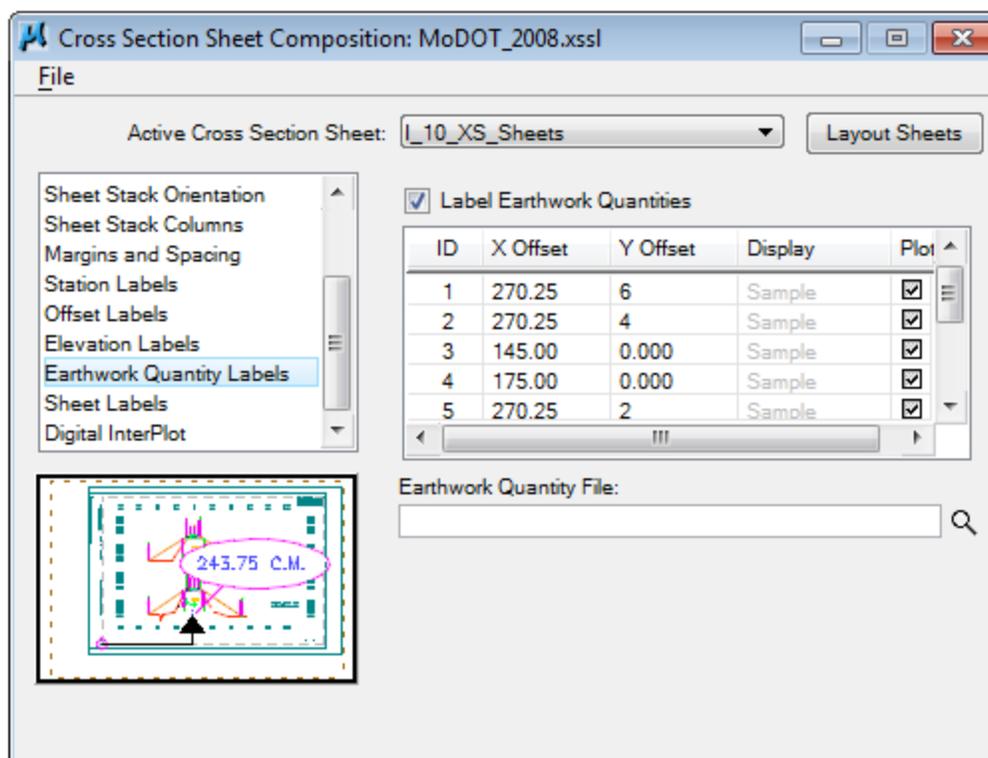
The **Sheet DGN File** specifies which file the cross-section sheets will be placed in. (Currently, the path to the Sheet DGN File including the file name is limited to 40 characters. By using the working directory, the user can specify only the file name in the Sheet DGN File field to increase the length of the file name.)

The Horizontal and Vertical Scales should be left at 1.0 regardless of what scale is being plotted. The Reference Data Point coordinate should be left at 0, 0.



6.8.3 Earthwork Quantity Labels

Earthwork Quantity Labels allows the user define the ASCII file that contains the earthwork quantity information, as well as toggle on/off the plotting of the earthwork quantities. All the parameters are set, the user can type in the name of the Earthwork Quantity File in the field or browse by selecting the  icon.

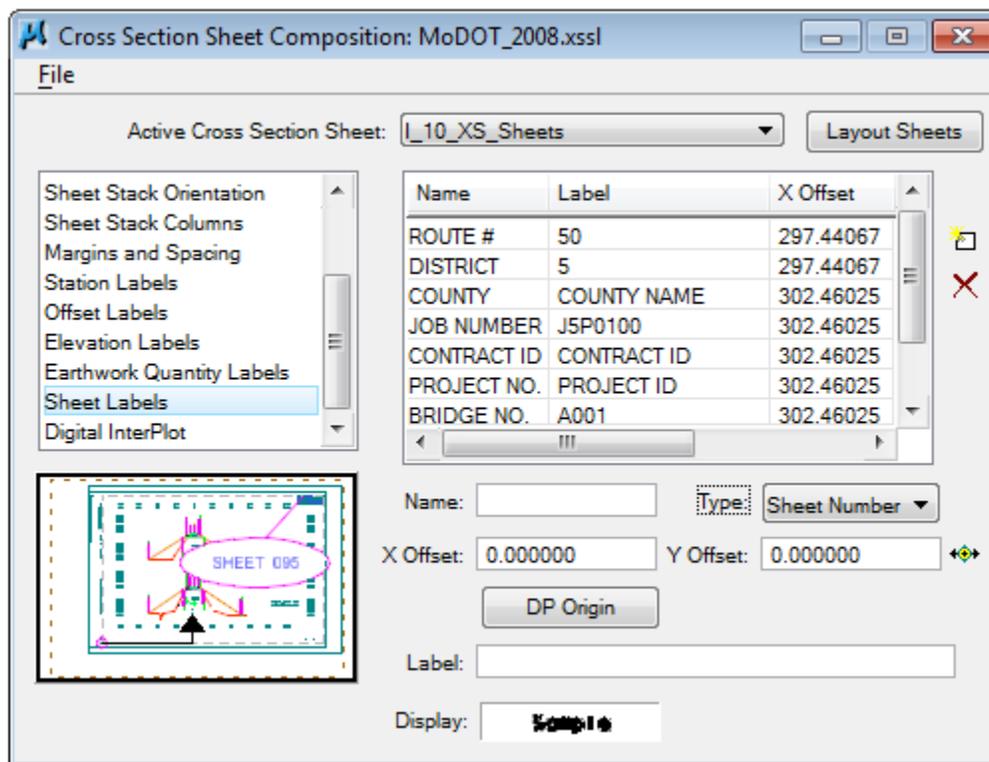


6.8.4 Sheet Labels

Sheet Labels allow the user place specific labels in the cross section sheet. CADD Support has set up six labels for placing text in the sheet title block. The pre-defined labels include:

- Route No.
- District No.
- Sheet No.
- Job No.
- Contract ID
- County

The user is responsible for entering the appropriate text for each label. To enter text for the pre-defined labels, the user needs to double click in the **Label** field and do a **File >> Save Settings**. The pre-defined label must contain text in the label field, therefore, design users should leave the Contract ID as pre-defined so construction can easily replace the text with the appropriate contract number using the **MicroStation Find/Replace** tool.



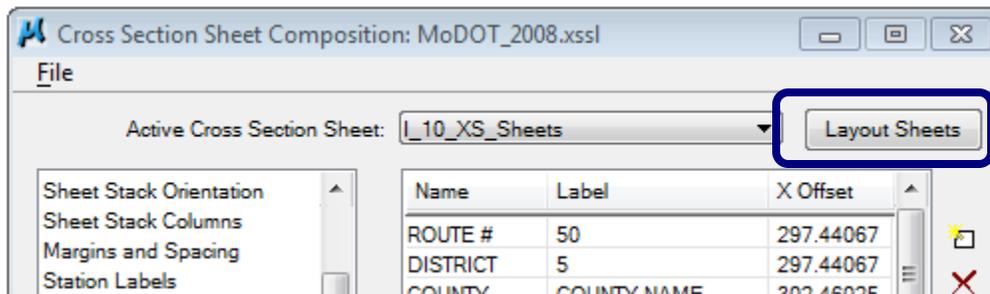
6.8.5 Files Menu

From the **Files** menu, the user can attach a **Sheet Library**. CADD Support has set up the runs so the MoDOT default sheet library is automatically attached when entering the run. Only the MoDOT default sheet library will be supported. **The Sheet** option is used to create, delete or update any sheets to the library. Any changes to the Sheet Library must be requested through CADD Support. **The Save Settings** will save all information in the **Cross Sections Sheets** dialog box. **The Layout Sheets** option will process all parameters that have been set in the **Cross Section Sheets** dialog box. **The Exit** option will exit the **Cross Sections Sheets** dialog box.

6.8.6 Layout Sheets

In the cross section sheet generator, each cross section is referenced into the sheets, thus eliminating the need to layout sheets after making changes to the original cross sections.

The user can layout new sheets either by selecting the **Layout Sheets** option from the **File** menu or by selecting the **Layout Sheet** button in the cross section sheet composition dialog box.



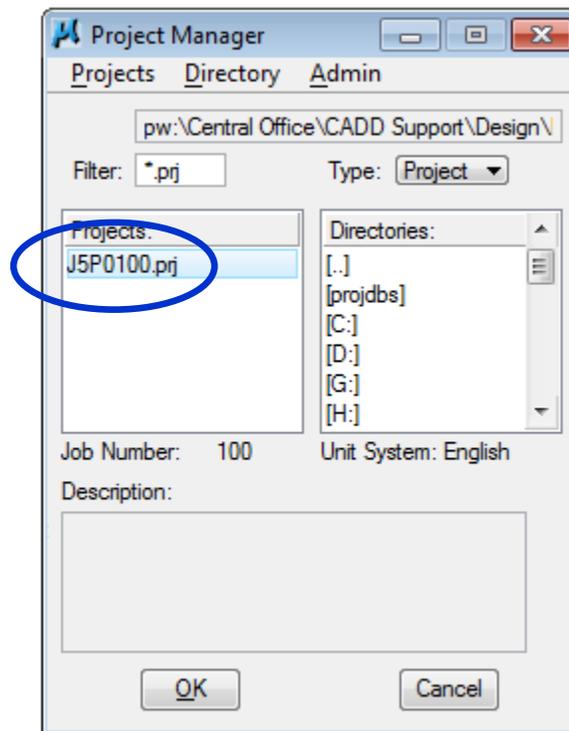
6.9 Example 6-1

1. Open the MicroStation file

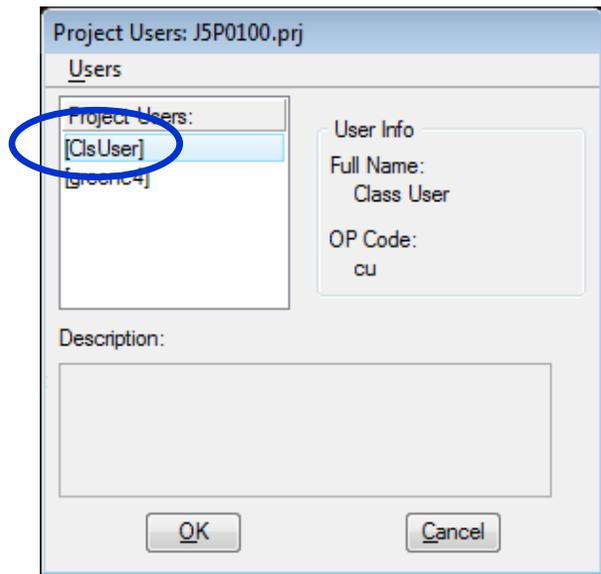
pw:\\ghpwise10:MoDOT\Documents\District
CADD\Design\Miller##\J5P0100\data\RTE50_xs_j5p0100.dgn.

2. Click on the **Project Manager** icon and open the following GEOPAK project:

pwname:\\MoDOT\Documents\District CADD\Design\Miller##\J5P0100\project\j5p0100.prj



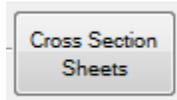
3. Enter the project as **ClUser** for this exercise.



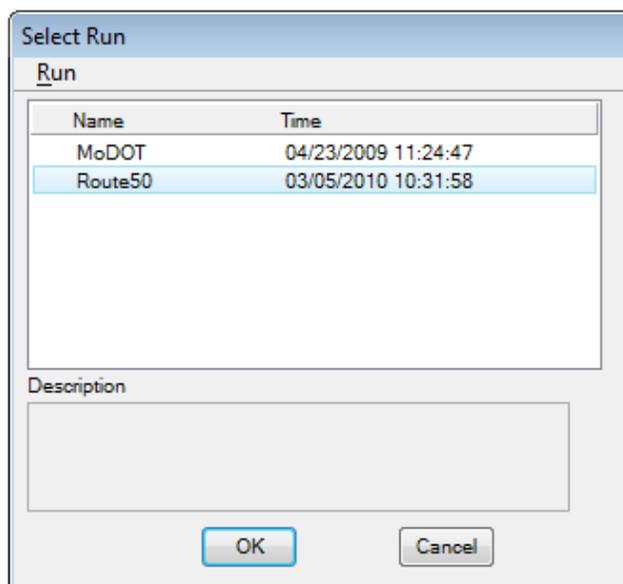
4. Create a new MicroStation file in **pw:\\ghpwise10:MoDOT\Documents\District CADD\Design\Miller##\J5P0100\data** using the seed file:

pw:\\ghpwise10:MoDOT\Documents\CADD-Standards\Seed Files\Design - English\i_10_xs_100_sheets.dgn

5. Choose **Cross Section Sheets** from the **Road Project** dialog.

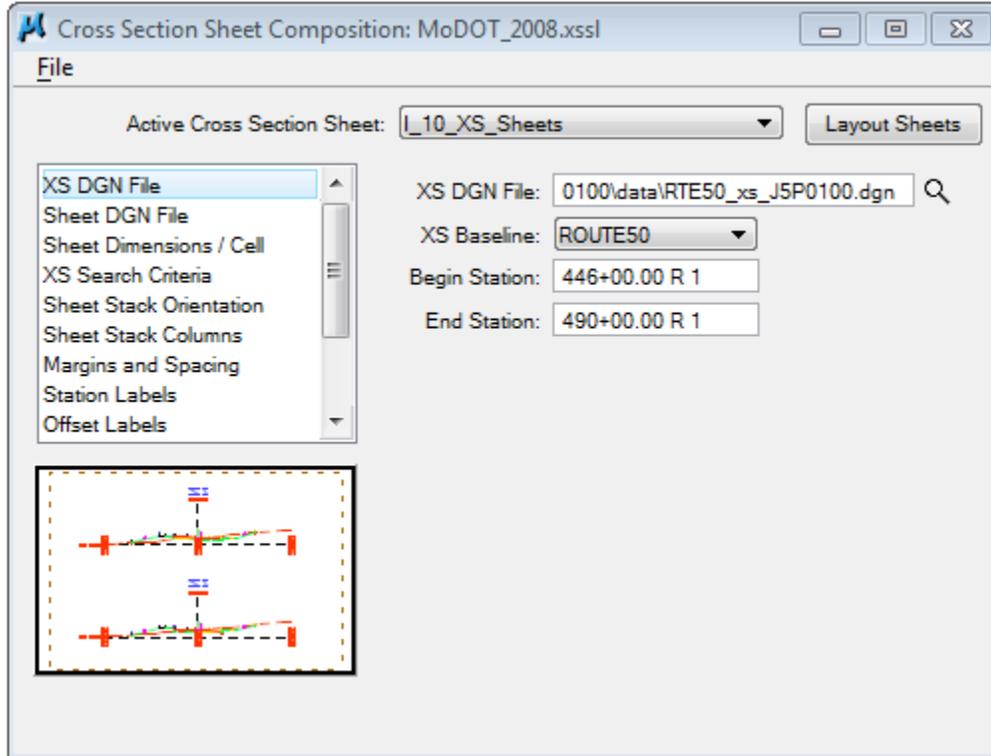


Copy the **MoDOT** run to **Route50** and open the **Route50** run.

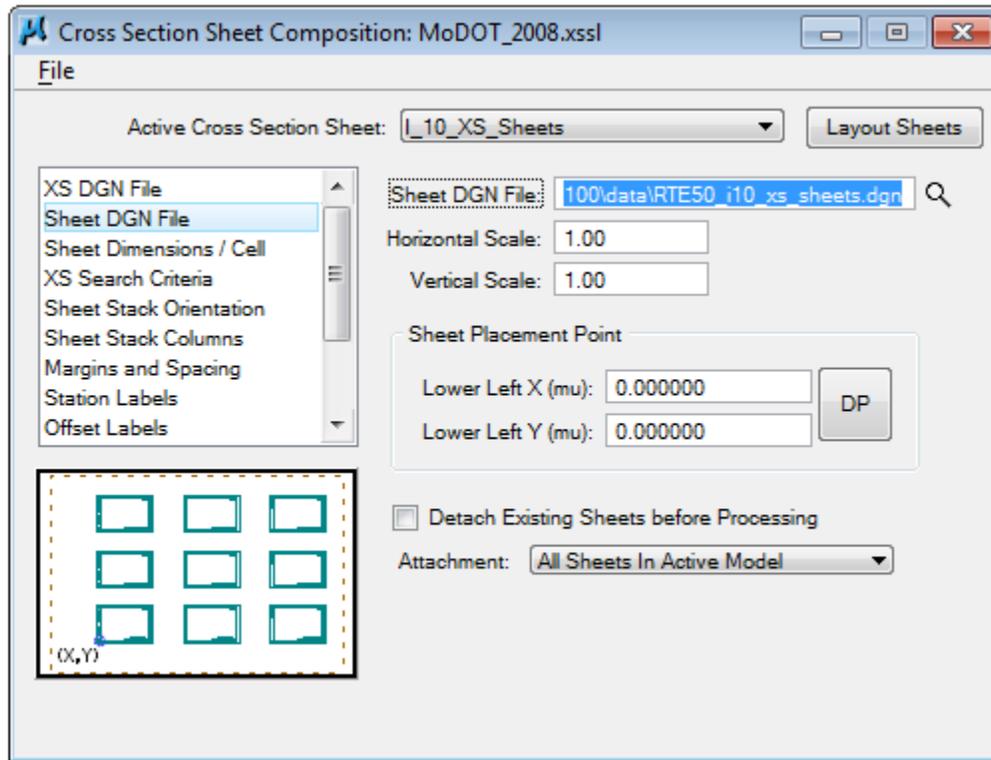


6. Be sure the following items are set in the **XS DGN File** sections of the dialog:

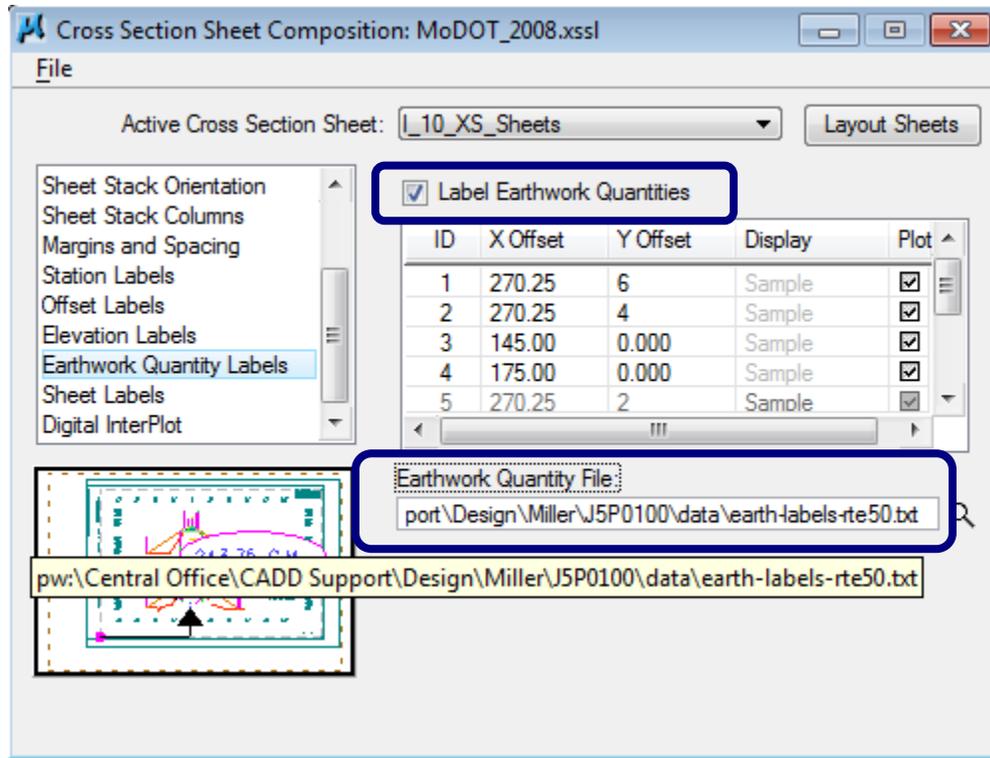
XS DGN File: **RTE50_xs_j5p0100.dgn**
Baseline: **ROUTE50**



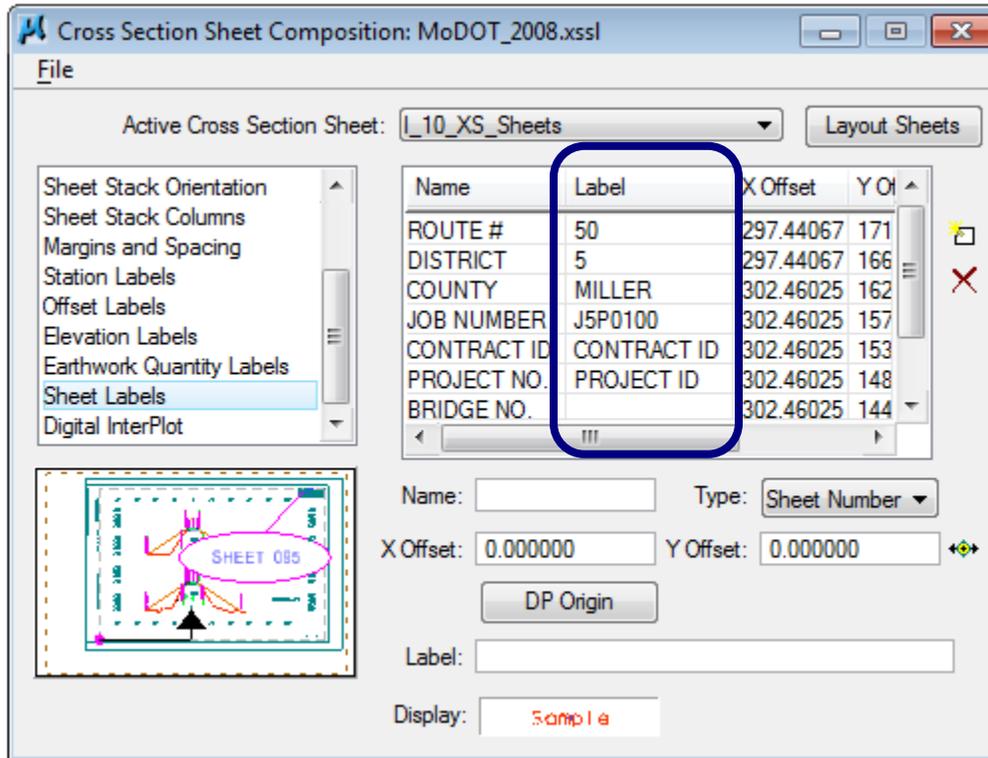
7. Select the **Sheet DGN File** to be the file **RTE50_i10_xs_sheets.dgn** created in step 4.



- In the **Earthwork Quantity Labels** section, turn on the **Label Earthwork Quantities** option, and choose the Earthwork Quantity File **EARTH-LABELS-RTE50.TXT**.

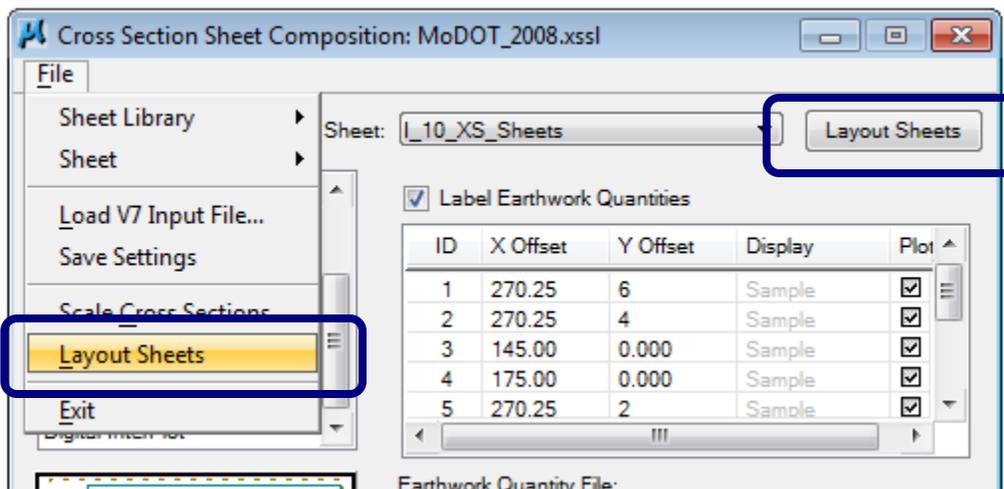


- In the **Sheet Labels** section, fill out the label information to be placed in the title block area as highlighted in the image below.



- Save settings **File >> Save Settings**.

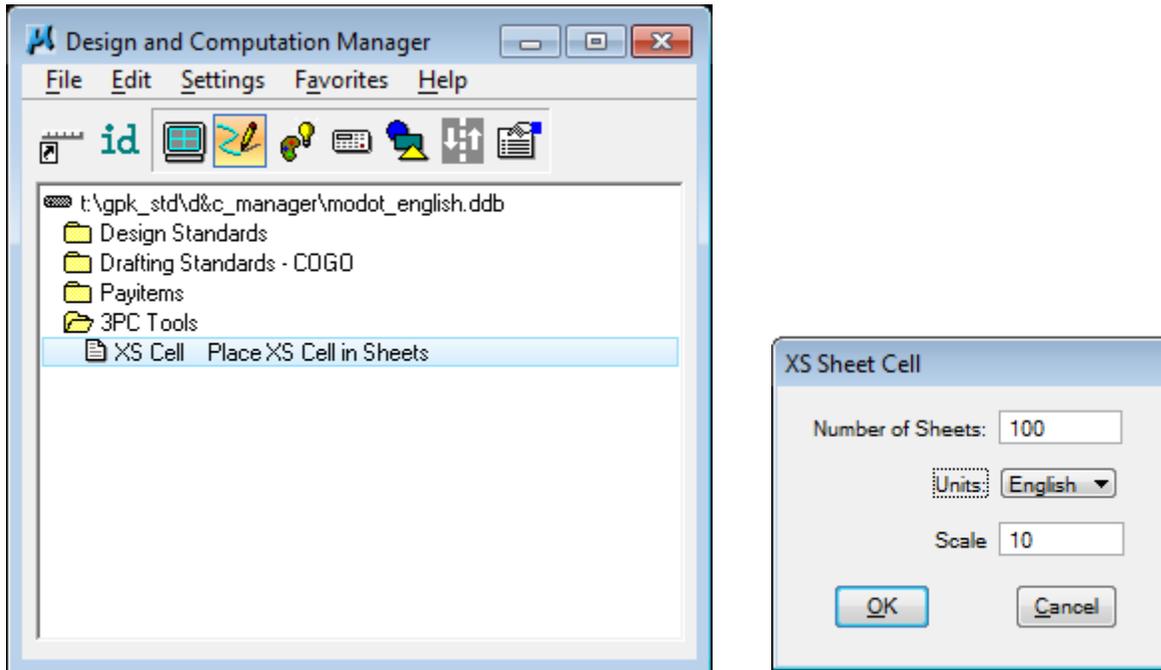
Then select **Layout Sheets** to process your cross section sheets.



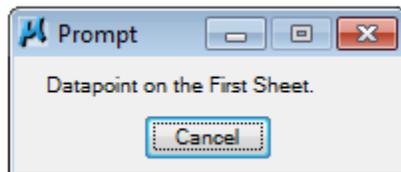
11. To add scale symbol, open **Design and Computation Manager** and navigate to the **3PC Tools**.

Double click on **XS Cell Place XS Cell in Sheets** option.

Enter the scale wanted and the number of sheets requiring the scale cell.



Click **OK** and data point inside the border for the first sheet as indicated in the **Prompt** dialog shown below:



12. In the Level Manager, turn off the level called **GeoPak-Cross Section Cells** in all of cross sections referenced into the sheets file.

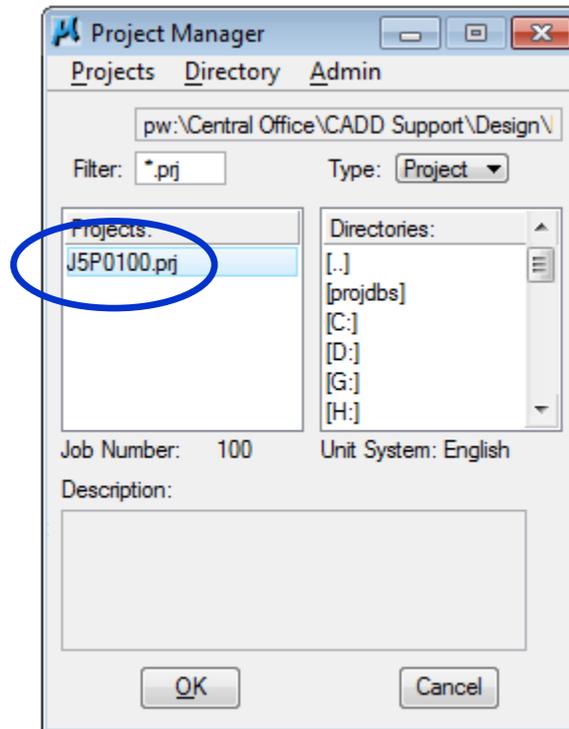
Also, **detach** all borders not being used in the file.

6.10 Exercise 6-1

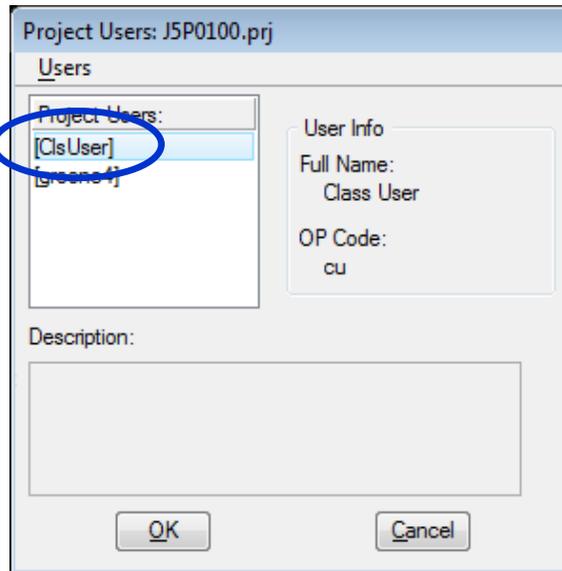
1. Open the MicroStation file
**pw:\\ghpwise10:MoDOT\Documents\District
 CADD\Design\Miller##\J5P0100\data\BH_xs_j5p0100.dgn.**

2. Click on the **Project Manager** icon and open the following GEOPAK project:

pwname:\\MoDOT\Documents\District CADD\Design\Miller##\J5P0100\project\j5p0100.prj



3. Enter the project as **ClsUser** for this exercise.

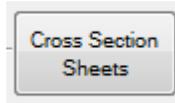


4. Create a new MicroStation file in **pw:\\ghpwise10:MoDOT\Documents\District CADD\Design\Miller##\J5P0100\data** using the seed file:

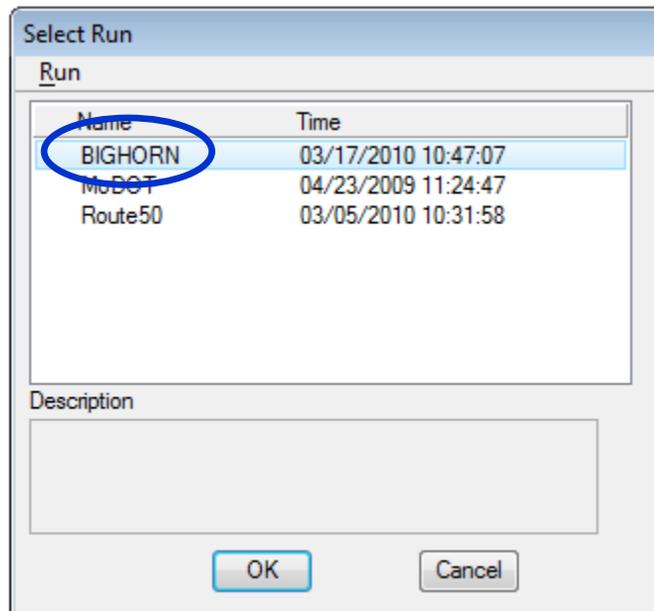
pw:\\ghpwise10:MoDOT\Documents\CADD-Standards\Seed Files\Design - English\i_10_xs_100_sheets.dgn

Name the file **BH_i10_xs_sheets.dgn**.

5. Choose **Cross Section Sheets** from the **Road Project** dialog.



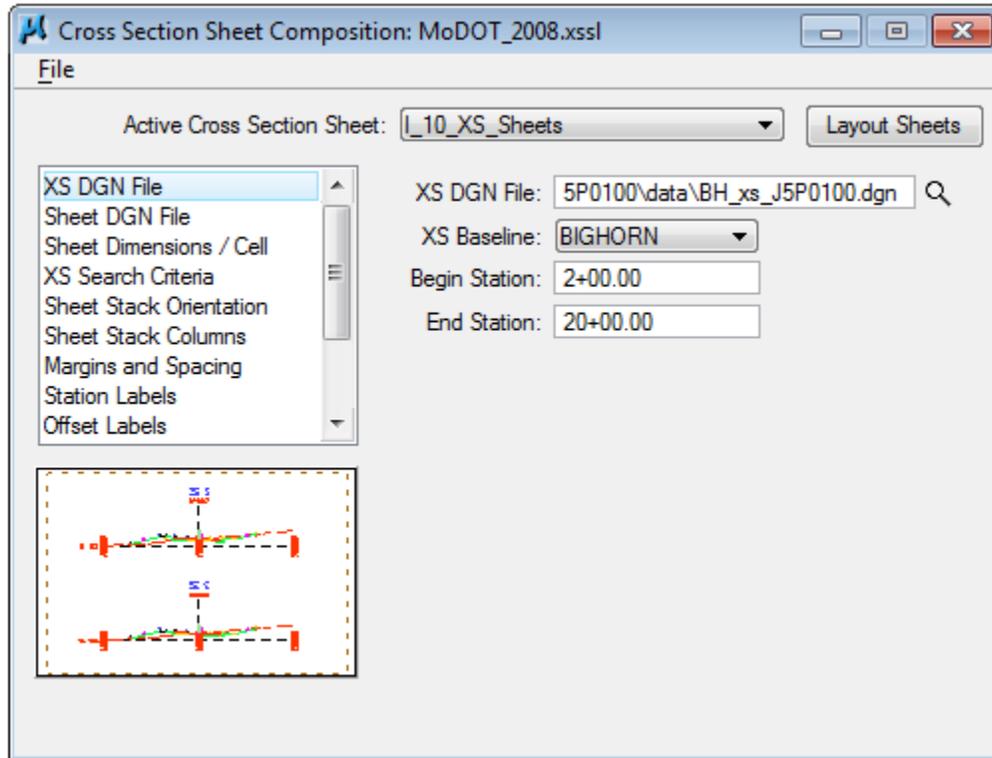
Copy the **MoDOT** run to **BIGHORN** and open the **BIGHORN** run.



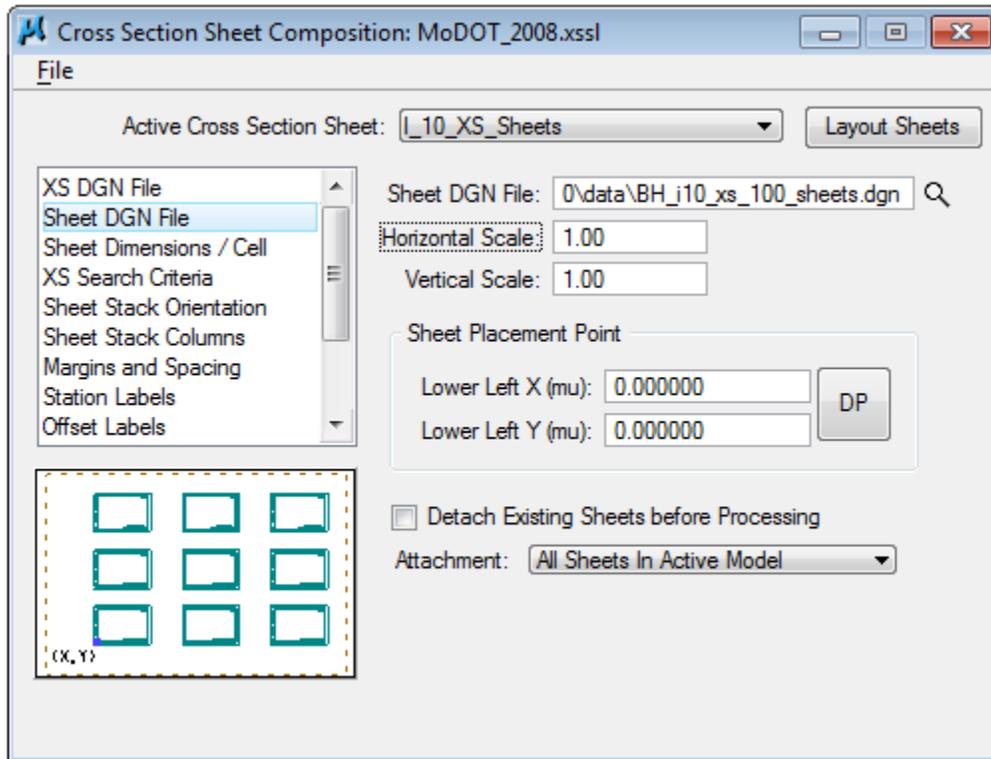
6. Be sure the following items are set in the **XS DGN File** sections of the dialog:

XS DGN File: **BH_xs_j5p0100.dgn**

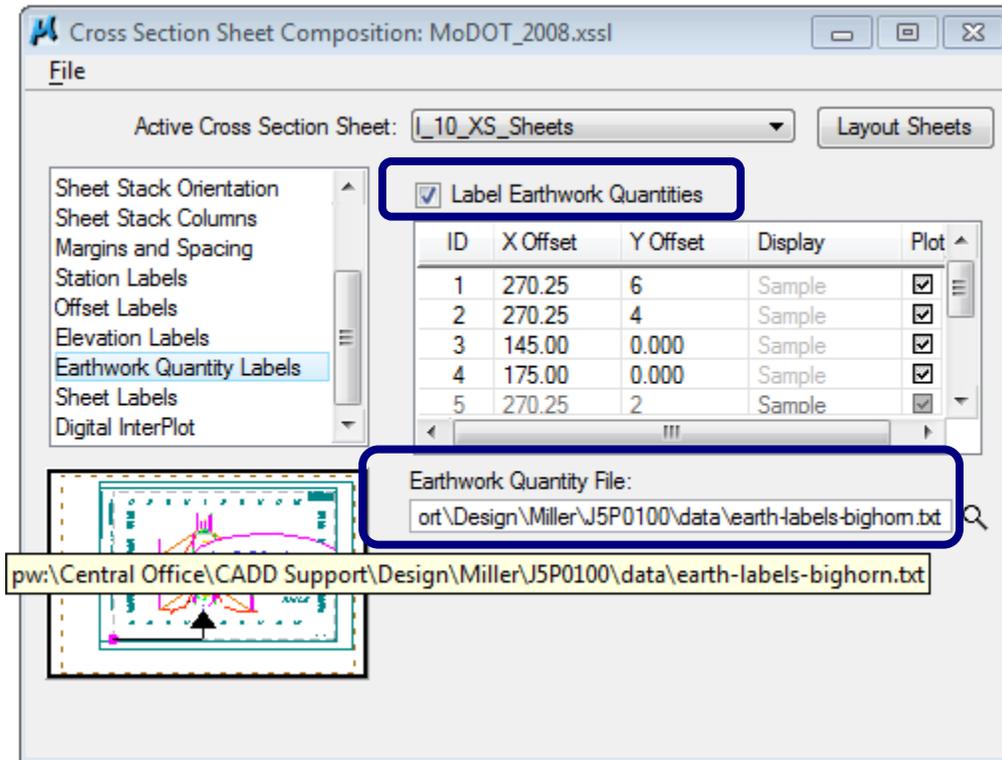
Baseline: **BIGHORN**



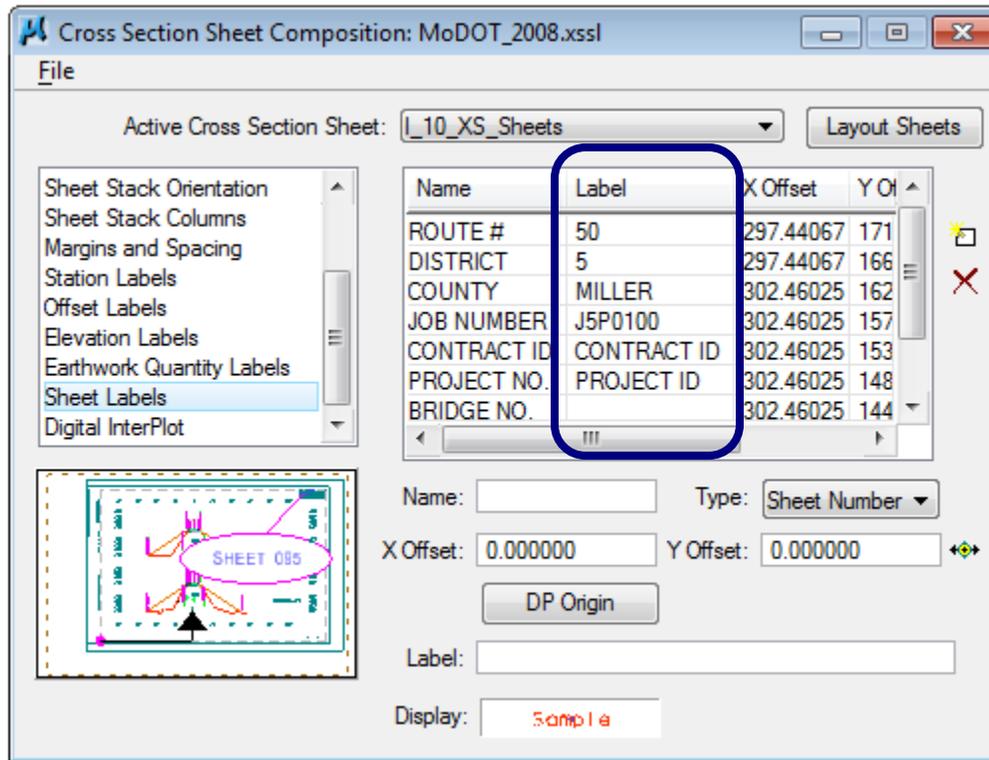
7. Select the **Sheet DGN File** to be the file **BH_i10_xs_sheets.dgn** created in step 4.



- In the **Earthwork Quantity Labels** section, turn on the **Label Earthwork Quantities** option, and choose the Earthwork Quantity File **EARTH-LABELS-BIGHORN.TXT**.

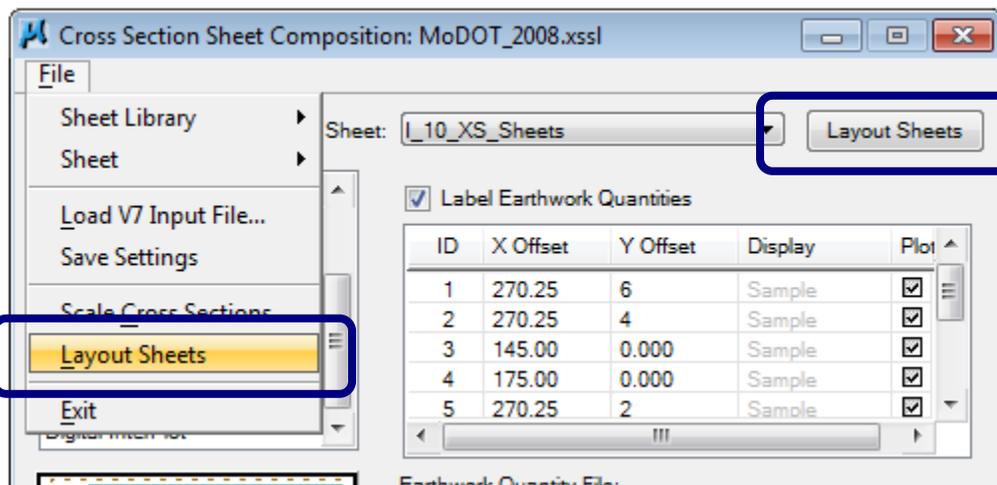


9. In the **Sheet Labels** section, fill out the label information to be placed in the title block area as highlighted in the image below.



10. Save settings **File >> Save Settings**.

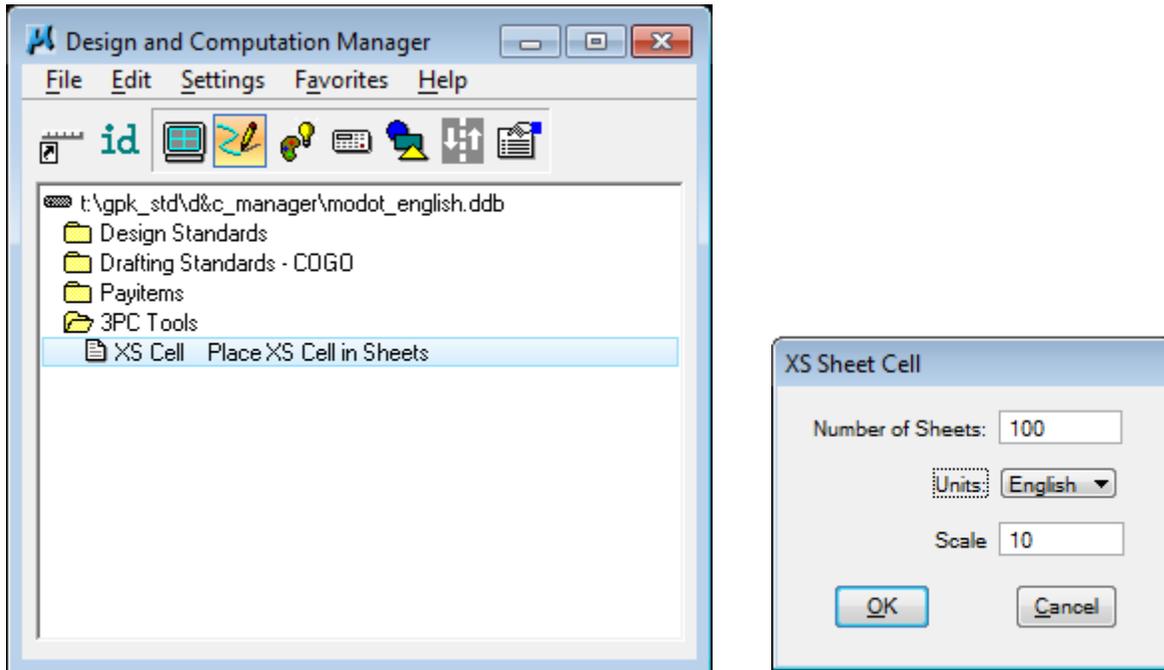
Then select **Layout Sheets** to process your cross section sheets.



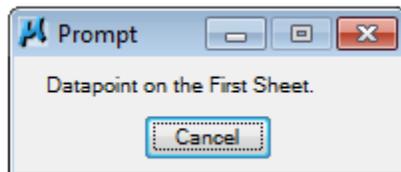
11. To add scale symbol, open **Design and Computation Manager** and navigate to the **3PC Tools**.

Double click on **XS Cell Place XS Cell in Sheets** option.

Enter the scale wanted and the number of sheets requiring the scale cell.



Click **OK** and data point inside the border for the first sheet as indicated in the **Prompt** dialog shown below:



12. In the Level Manager, turn off the level called **GeoPak-Cross Section Cells** in all of cross sections referenced into the sheets file.

Also, **detach** all borders not being used in the file.