GEOPAK – Profile Sheets

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General

The automated Plan and Profile Sheet tools provide a flexible, yet productive method of generating plan and profile sheets. Based on user-defined parameters and sheet sizes, the software places sheet borders into the master design file based on the geometrics of a specified alignment or profile. Then the designer has the option to modify the sheets by adjusting the size, or moving them to a new location. Once the sheets are in the desired location, the designer may generate separate sheet files. The application automatically attaches all reference files and sheet border cells.

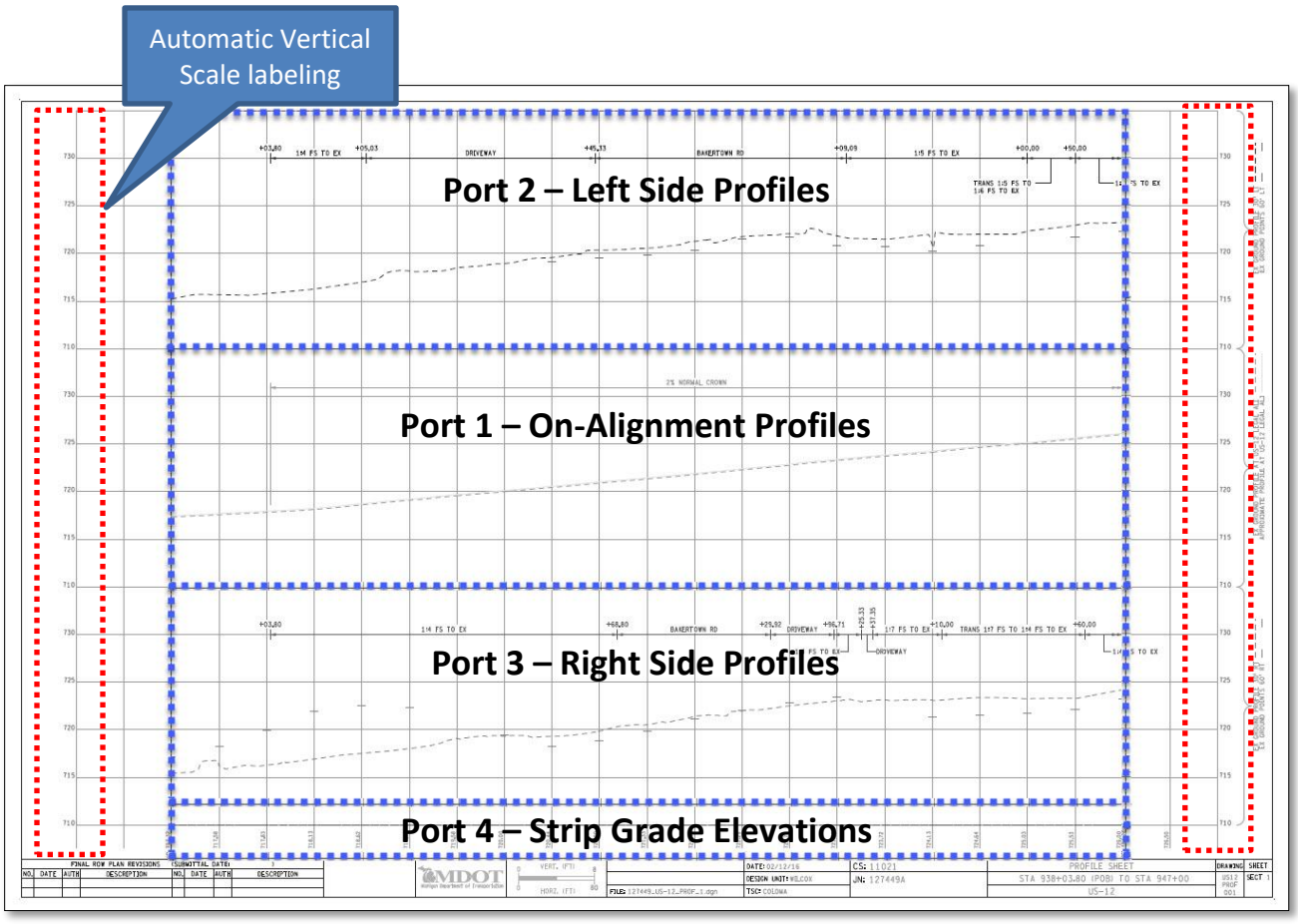
The plan and profile sheet definitions are stored in a sheet library named **MDOT_P&P_Sheet_Lib.psl**. It is automatically attached to the Plan Sheet Layout tool and supports plan sheets, profile sheets, combined plan and profile sheets at 40x scales (40 scale, 80 scale) and 50x scales (50 scale, 100 scale, etc).

Profile Sheets

This workflow details the process of creating profile sheets for a desired project. To utilize the following tool, a project must be set up in the Project Manager and a profile must be stored and displayed utilizing the **Draw Profile** tool. For information regarding setting up Project Manager, see Workflow – GEOPAK_1 – Project Manager. For information regarding displaying existing and proposed profile information, see Workflow – GEOPAK_4 – Vertical Geometry.

Profile sheets are created from the profile base file that includes the full limits of the vertical geometry as well as all offset profiles that will be displayed on the sheets. The MDOT standard profile sheets split the sheet into three main sections – Left Side Profiles, Centerline (On-Alignment) Profiles and Right Side profiles. In addition, strip grades for the existing and proposed elevations at the centerline (or alignment location) are shown at the bottom of the sheet. In the profile base file, each of the offset profiles and profile on alignment are drawn in the same cell, so to accomplish the split the base file is attached to each profile sheet multiple times, and level controls determine what is shown in each portion of the sheet.

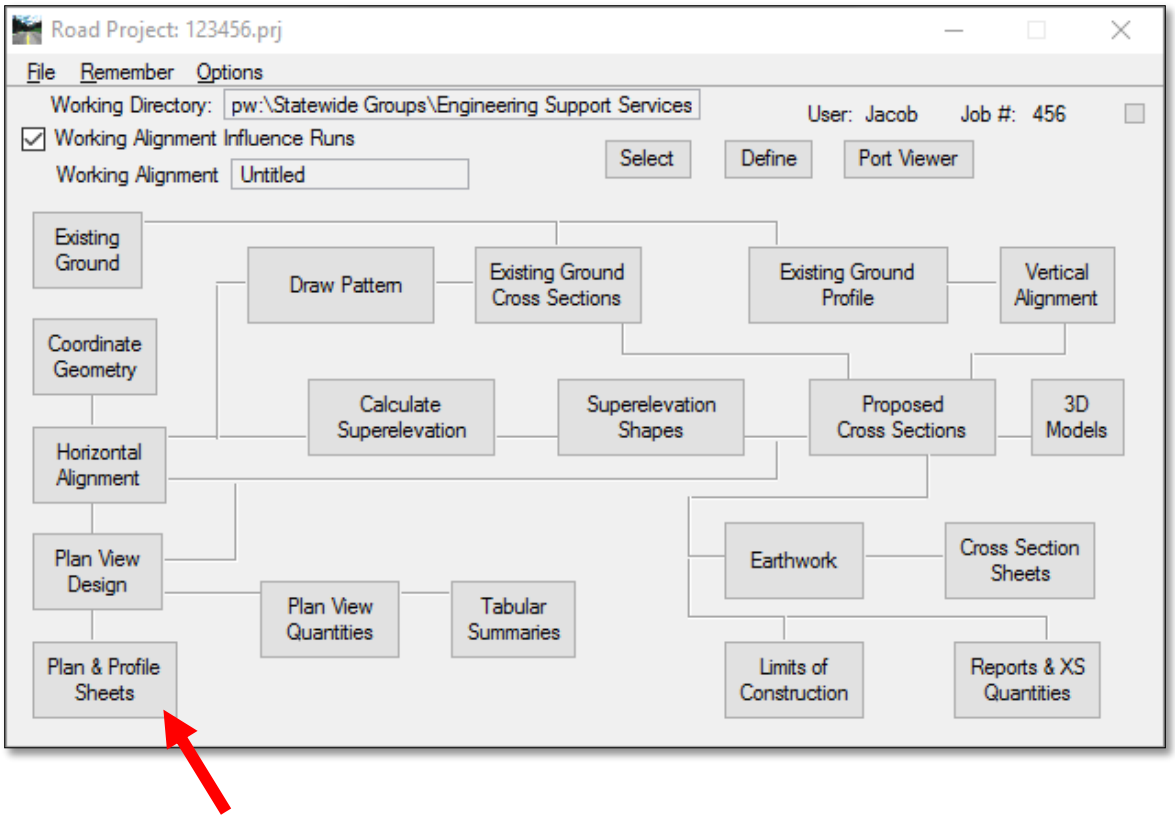
Sheets are created by first generating sheet clip boundary shapes within the profile base file, which then are clipped into MDOT Sheet Borders. Utilizing this process will automatically reference the profile base file into the ports noted below, as well as label the sheets with the correct elevations on the vertical axis.



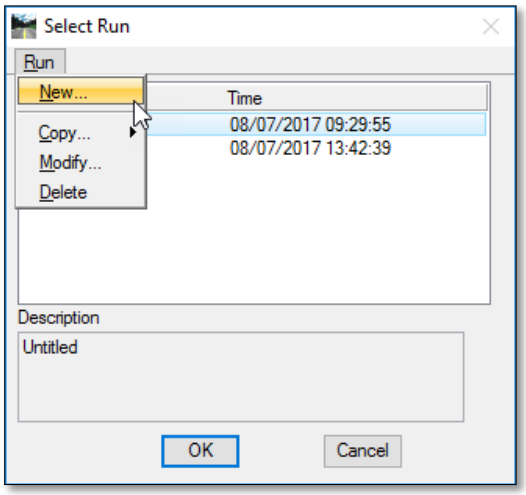
Creating Sheet Clip Boundary Shapes

The profile sheet layout tool utilizes boundary shapes that are created in the profile base file to determine the limits shown on each sheet. Profile sheets must coincide with the plan sheets that were created for the project. Make note of the sheet scale, station limits and any modifications made to the plan sheets to ensure that the profile sheets share the same limits during creation.

1. In the profile base file, open the **Project Manager** (**GEOPAK → ROAD → Project Manager)** and select **Plan & Profile Sheets**

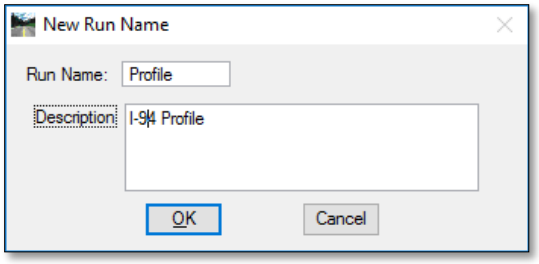


2. In the Select Run dialog, create a new run by selecting **Run > New.**

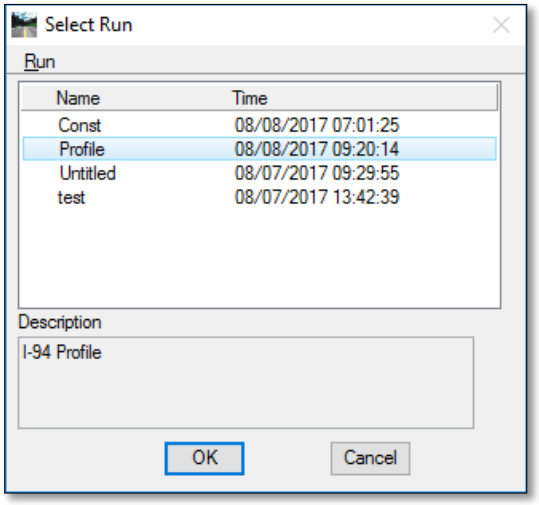


NOTE: Do not select or edit the default Untitled run. Create a new run or edit an existing run for this process.

3. Enter a **Run Name** in the dialog with no spaces. If desired, enter a description for the run then select **OK.**

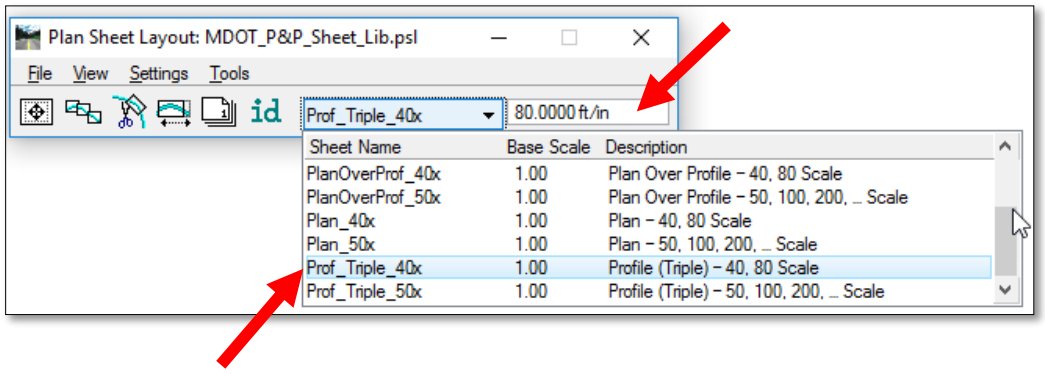


4. Select the **New Run Name** created in the previous step and select **OK.**



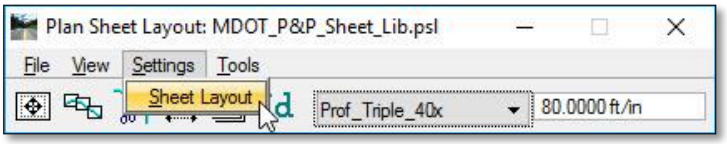
5. In the **Plan Sheet Layout: MDOT_ P&P_Sheet_Lib.psl** dialog box select the profile sheet that corresponds to the sheet scale desired for the project.

6. Enter the sheet scale in the input box next to the profile sheet selection.

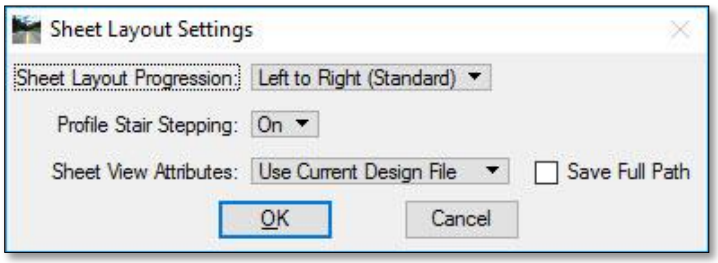


NOTE: The profile sheets must be set to the same scale as the corresponding plan sheets for the project.

7. Open the **Sheet Layout Settings** by selecting **Settings → Sheet Layout**.



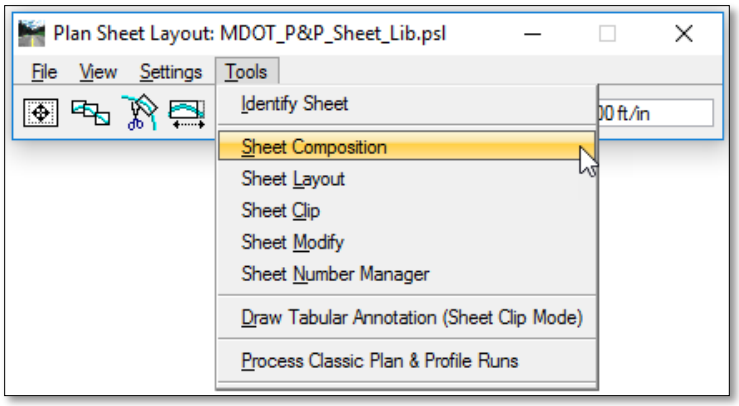
8. In the **Sheet Layout Settings** dialog verify according to the following information and close the dialog by selecting the red X in the top right corner.



- **Sheet Layout Progression:** Selection to layout sheets from Left to Right or Right to Left. MDOT standard is **Left to Right**.
- **Profile Pair Stepping:** Applies to profile sheets only, if **ON**, allows the profile to be stepped with multiple elevation ranges on a sheet.
- **Sheet View Attributes:** determines how the sheet view will be designated during the creation process. Select **Use Current Design File**. This will retain the references and level displays of the file the sheets are created from.

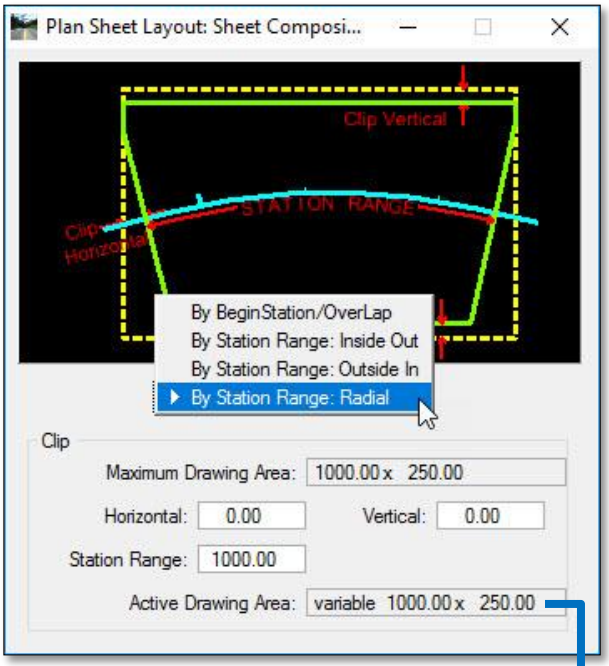
NOTE: Motif files are no longer utilized for sheet layout purposes, do not select this option for the Sheet View Attributes.

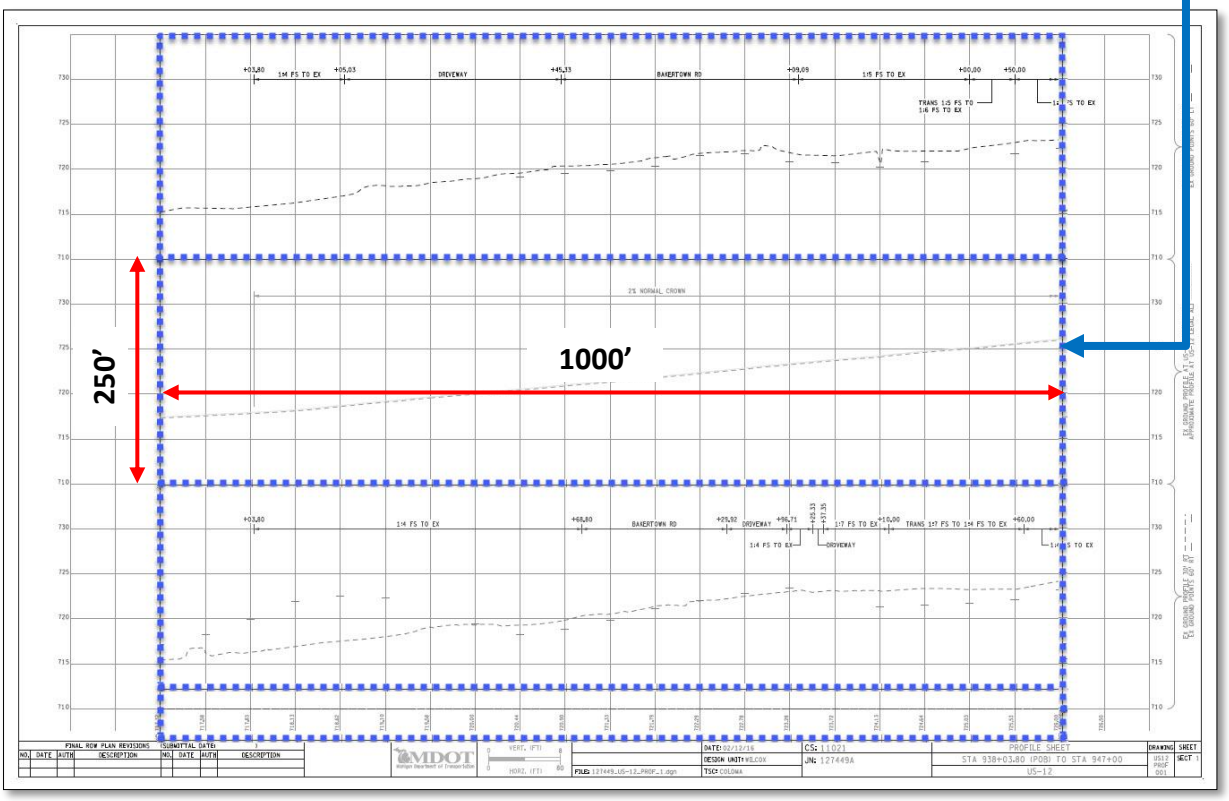
9. Open **Sheet Composition** by either going to **Tools>Sheet Composition** or select the **Sheet Composition** icon ( ) on the **Plan Sheet Layout** dialog box.



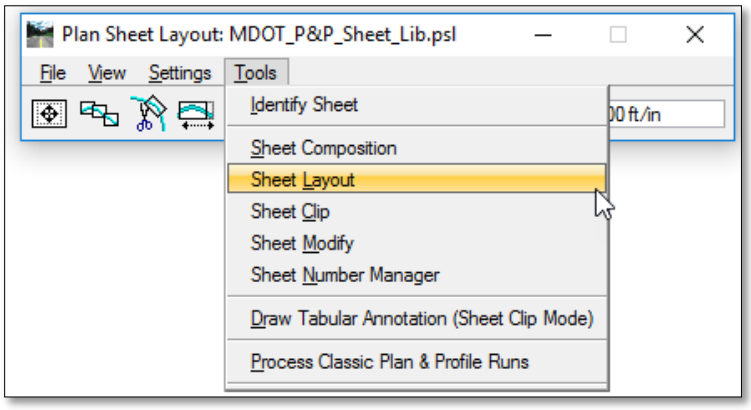
10. In the **Plan Sheet Layout: Sheet Composition** dialog box modify the selections based on the following information, close the dialog by selecting the red X in the top right corner.

- **Clip Options:** Select **By Station Range: Radial**.
- **Maximum Drawing Area:** Notes the maximum area of the sheet based on the identified sheet scale per port.
- **Horizontal:** Determines the outside spacing of the sheet clip from the sheet border horizontally allowing space for labeling on the sheet. This will automatically adjust based on the input in the **Station Range** option.
- **Vertical:** Determines the spacing of the sheet clip from the sheet border vertically. For Profile sheets set to 0.
- **Station Range:** Enter the preferred station range for the selected sheet scale. This value must match the station range utilized for the plan sheets.
- **Active Drawing Area:** Notes the size of the clip that will be created per port.



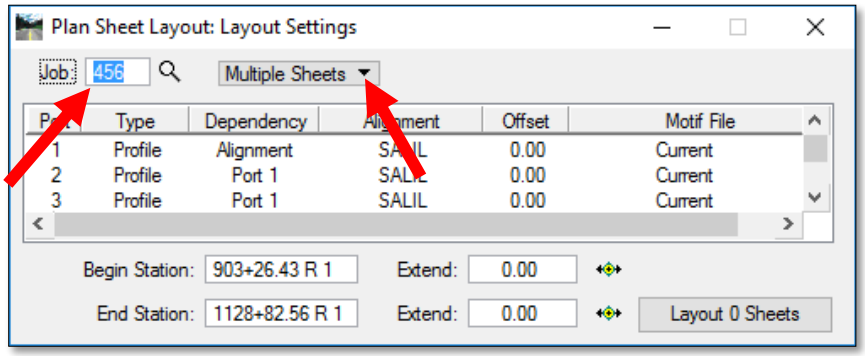


11. Open **Sheet Layout** by either going to **Tools>Sheet Layout** or select the **Sheet Layout** icon ( ) on the **Plan Sheet Layout** dialog box

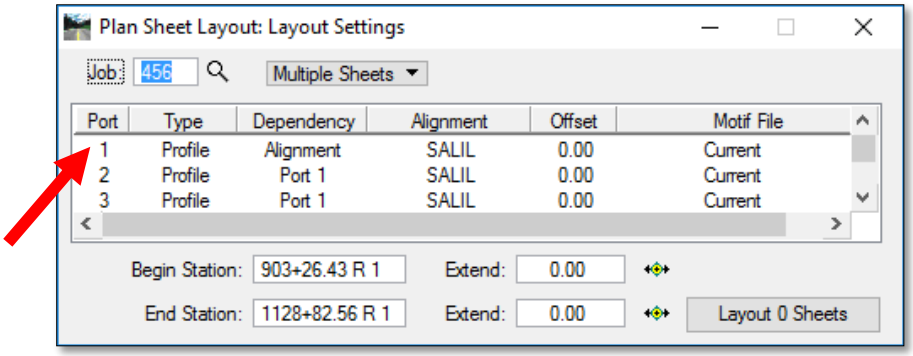


12. In the **Plan Sheet Layout: Layout Settings** dialog box verify the correct GPK number is noted in the **Job:** field.

13. Set the dropdown to **Multiple Sheets.**



14. Double click **Port 1** to open the **Plan Sheet Layout: Profile()** dialog box.



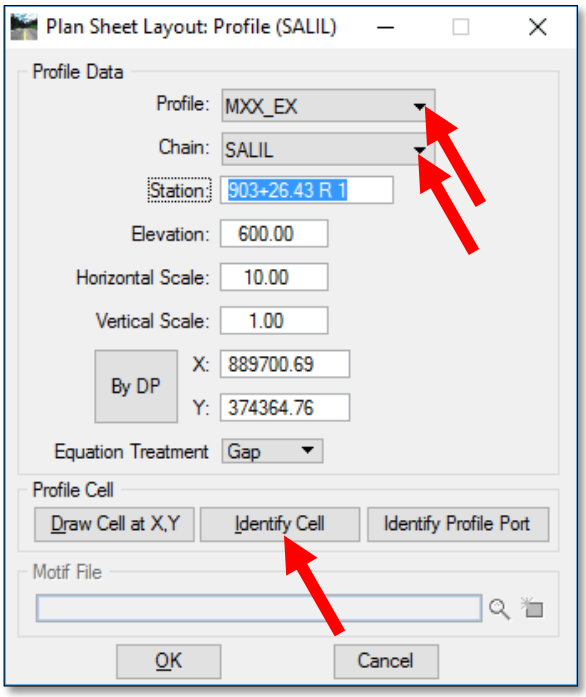
15. In the Plan Sheet Layout dialog, select the appropriate proposed profile and alignment that corresponds to the profile cell in the **Profile** and **Chain** selections, respectively.

16. In the **Profile Cell** portion of the dialog, select **Identify Cell**. Select the appropriate profile cell in the DGN view, then click in the window to accept.

17. The Station, Elevation, Horizontal Scale, Vertical Scale, X:, Y: and Equation treatment will automatically be populated after the profile cell has been identified.

18. Select **OK** when complete.

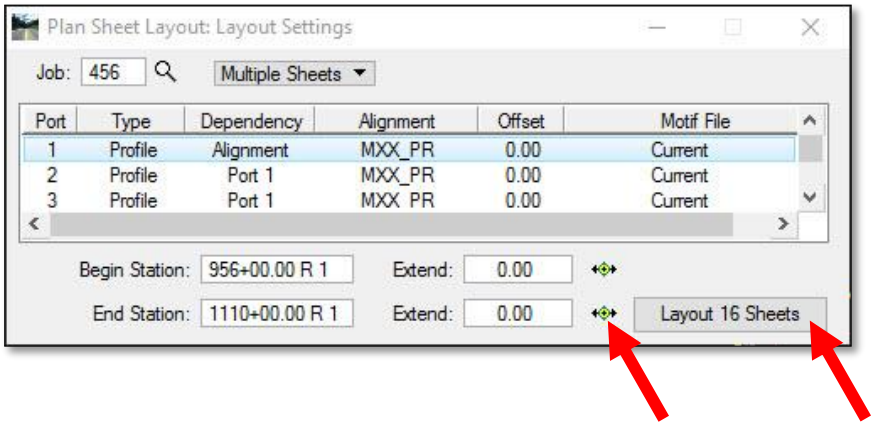
19. Repeat steps **14** through **18** for the remaining three ports listed in the **Plan Sheet Layout: Layout Settings** dialog.



NOTE: All ports 1 through 4 must be filled with the correct profile, chain and cell for the sheet layout tool to accurately place the sheet clip boundary shapes.

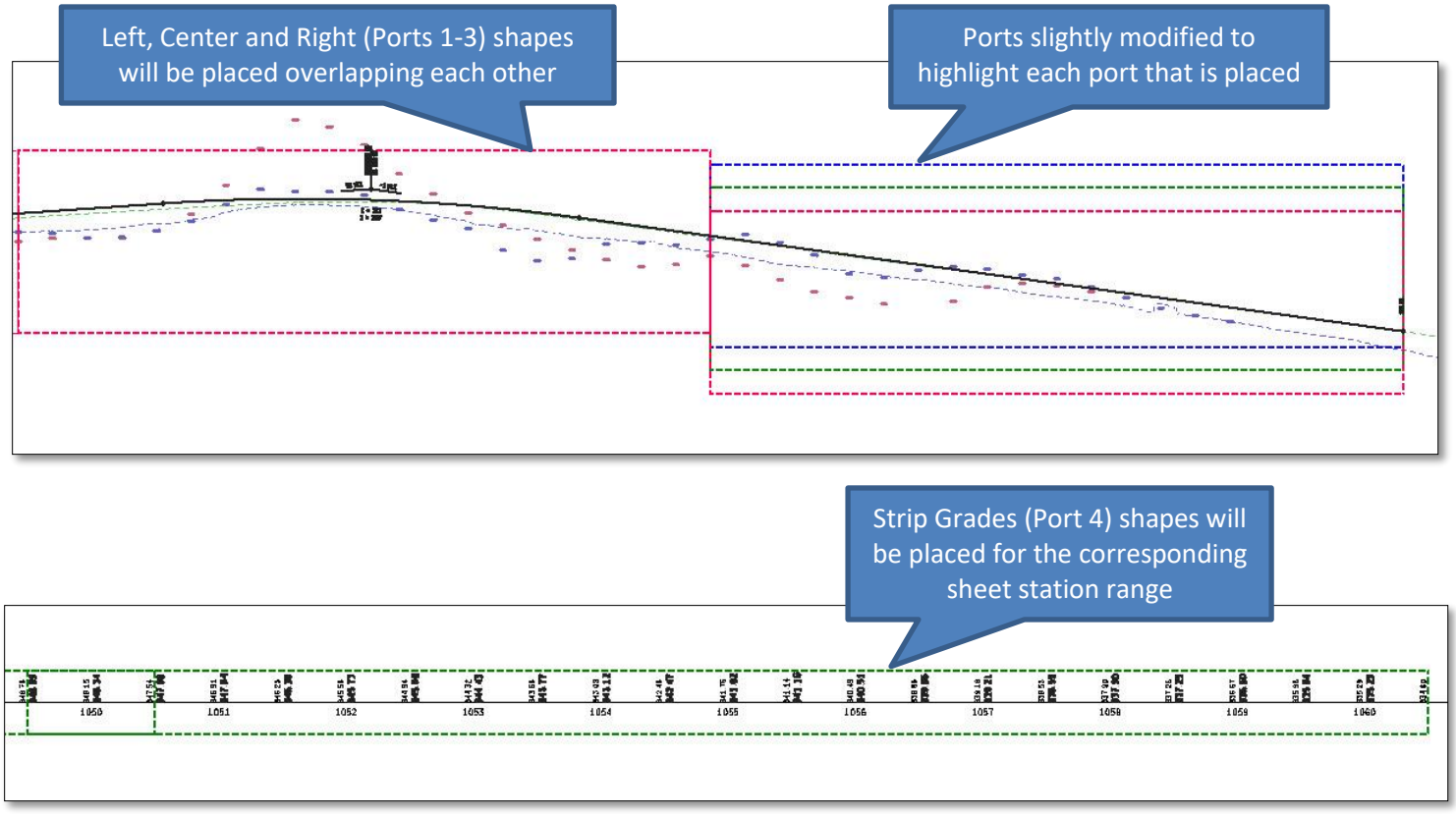
20. Enter the station range for the profile sheets either by manually typing in the **Begin Station** and the **End Station** or by selecting the corresponding **Select Begin Station** or **Select End Station Icon**. Using the icon will allow snapping to the alignment to select the associated station range.

21. Select **Layout Sheets** to place the sheet clip boundary shapes in the design file.

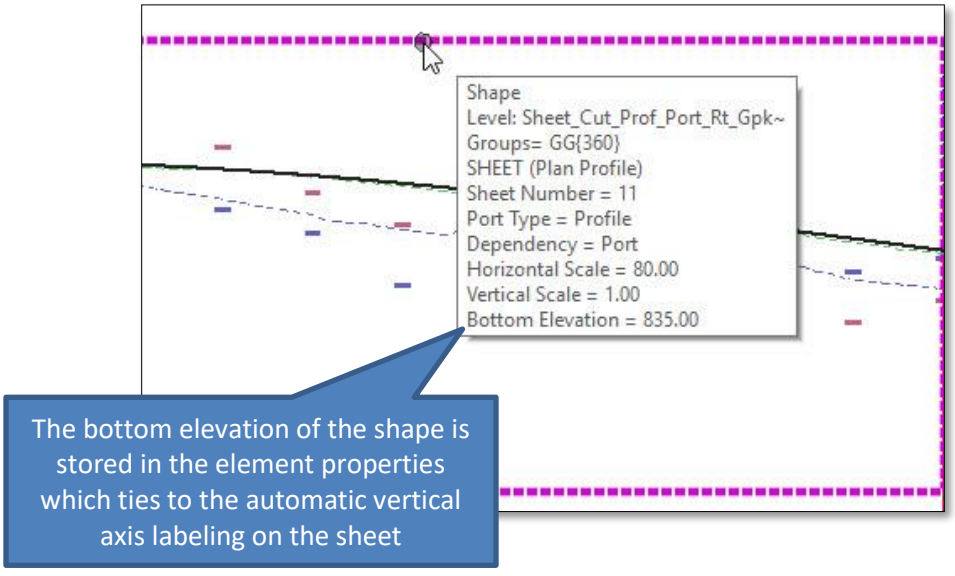


NOTE: Profile sheets must coincide with the plan sheets created for the project. Ensure the station ranges entered matches what was used to create the plan sheets.

22. Sheet clip boundary shapes will be placed along the profile cell for each port identified. A visual representation of the ports is shown below, Ports 1-3 correspond to the sheet clips for Left, Center and Right profiles and Port 4 corresponds to the strip grades that will be shown on the sheet.



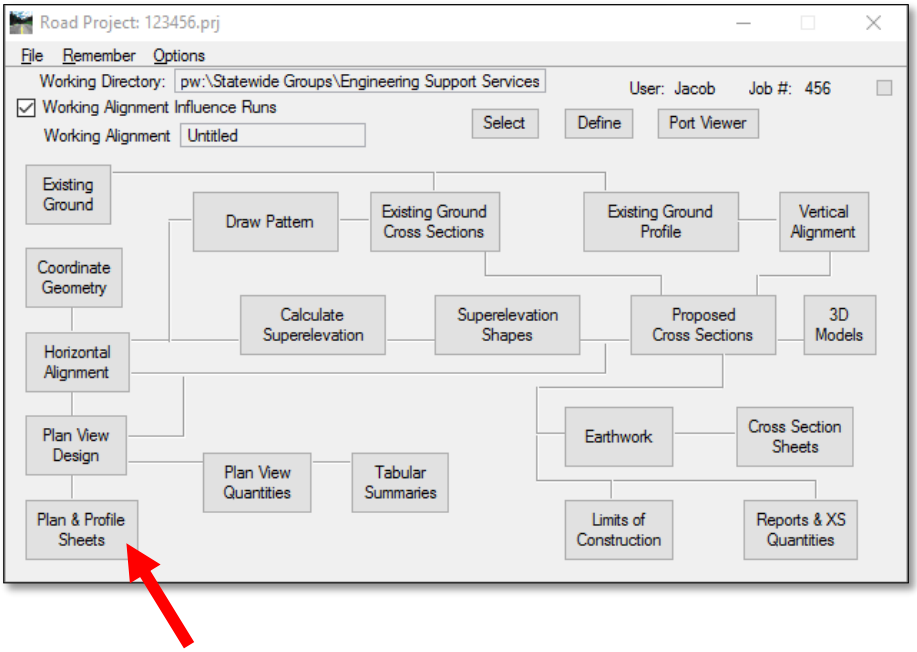
23. Clicking on the sheet port will open an information window with specific information regarding the boundary shape. This information determines how the clip is placed and how the vertical elevation labeling is created on the sheet.



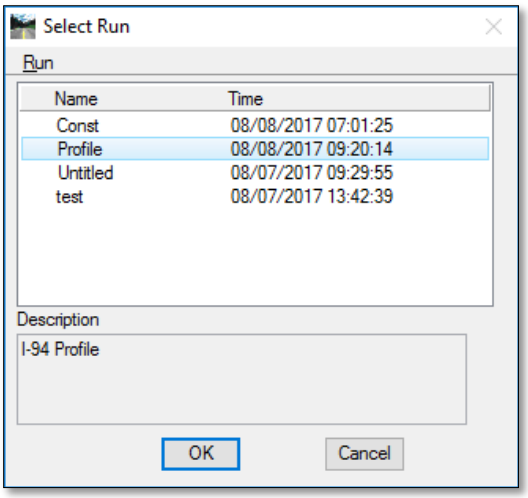
Modifying Sheet Clip Boundary Shapes

The Plan Sheet Layout tool has a modification tool that can be utilized to change the characteristics of individual sheets that will dynamically update the remaining boundary shapes. If the designer would like to shift the station range shown on a single sheet, or modify the elevation of the port, for example, the **Modify Sheets** tool will adjust the remaining shapes to account for the changes. All modifications to the sheet clip boundary shapes must occur prior to creating the profile sheets. The boundary shapes are not dynamically linked to the profile sheets, so care must be taken to determine the correct sheet layout prior to creating the profile sheets.

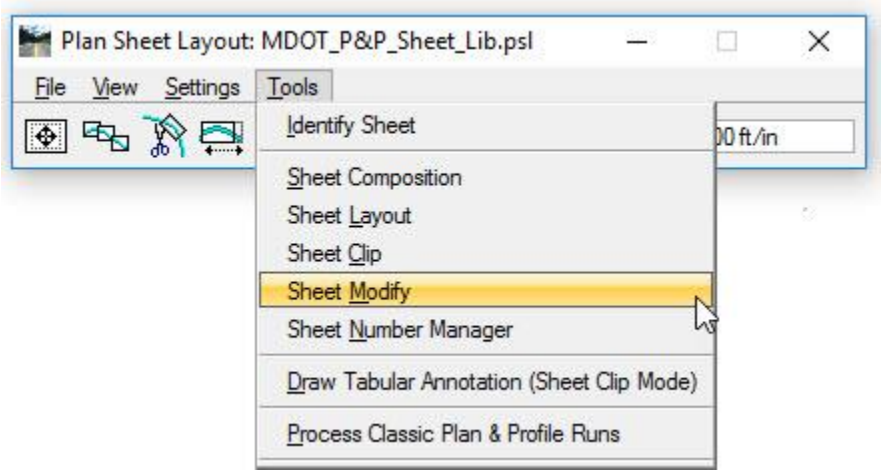
1. In the profile base file, open the **Project Manager** (**GEOPAK → ROAD → Project Manager)** and select **Plan & Profile Sheets.**



2. In the **Select Run** dialog, select the run that was utilized to create the profile boundary shapes, then select **OK**.

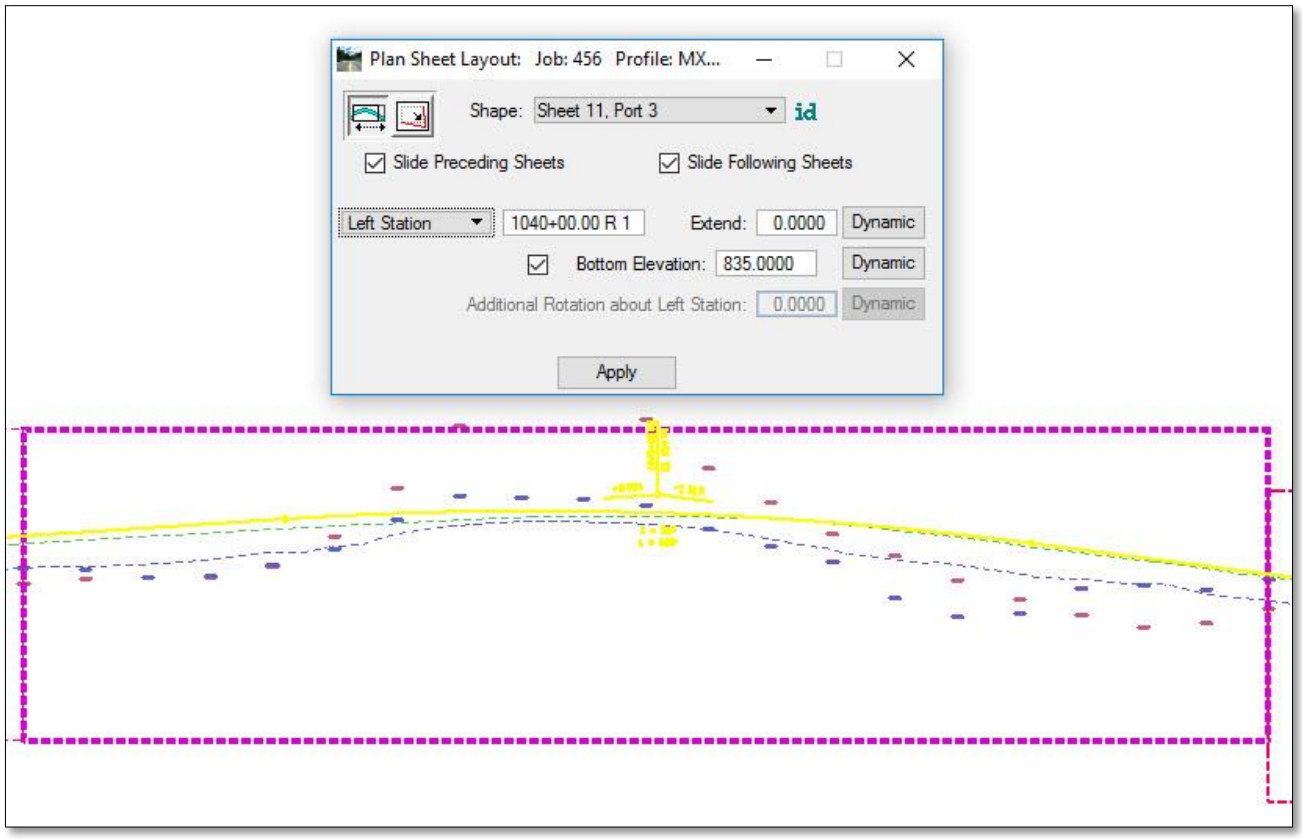


3. In the **Plan Sheet Layout** tool, select the Sheet Modify tool by selecting **Tools → Sheet Modify**.



4. In the **Sheet Modify** dialog, select the **Slide Sheets** Icon.

5. Select the **Shape** dropdown to identify the sheet to modify by either selecting the sheet number from the dropdown or selecting the **id** icon, which allows the user to select a shape in the window to identify the sheet. The selected sheet will be highlighted in the DGN view.

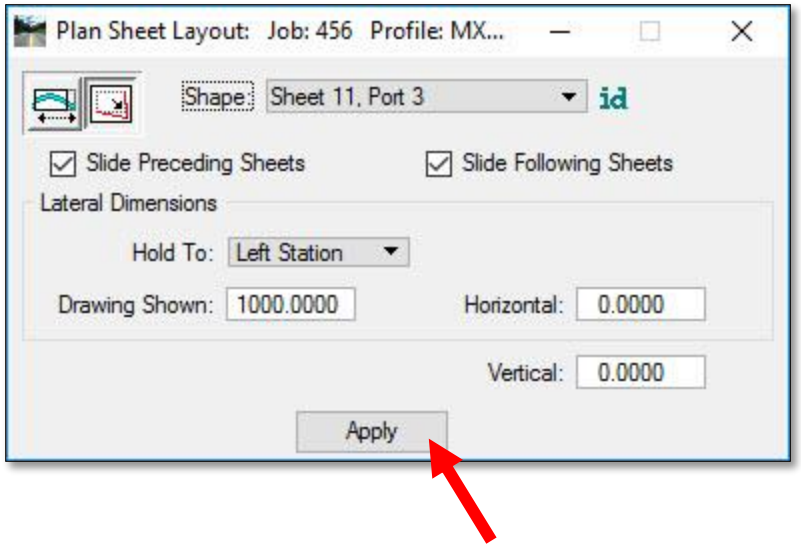


NOTE: The following describes the available sheet modification settings:

- **Shape:** Desired boundary shape to modify.
- **Slide Preceding/Following Sheets**: When checked, any modifications to the selected sheet will update the remaining sheets.
- **Left/Center/Right Station:** Defaulted values show the current sheet station at Left/Center/Right. Enter a new station in the selection to modify.
- **Extend:** Entering a value will slide all sheets up-station by that value.
- **Bottom Elevation:** Sets the bottom elevation of the shape. Modifying the bottom elevation from this tool will ensure that the correct value is noted in the shape which ties to the automatic elevation labeling on the sheet.
- To modify the sheet characteristics graphically, select the **Dynamic** button after the desired tool and click in the MicroStation window. The user will then be able to modify the sheet by moving the mouse within the window.

6. In the **Sheet Modify** dialog, select the **Modify Drawing Area** icon. The user can then modify the drawing area and station range of the selected shape.

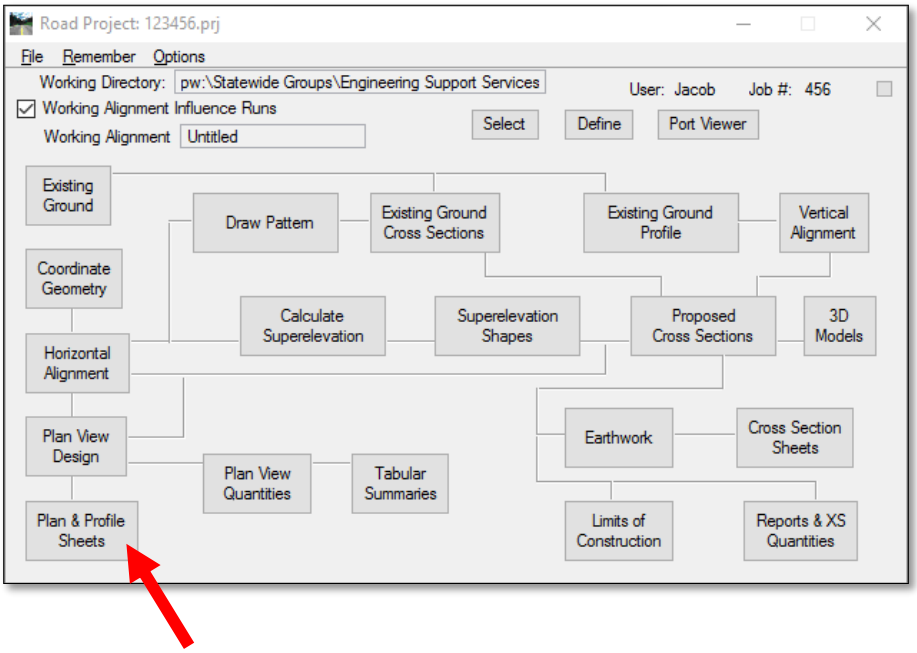
7. Once all changes have been completed to the clip boundary shapes, select **Apply**.



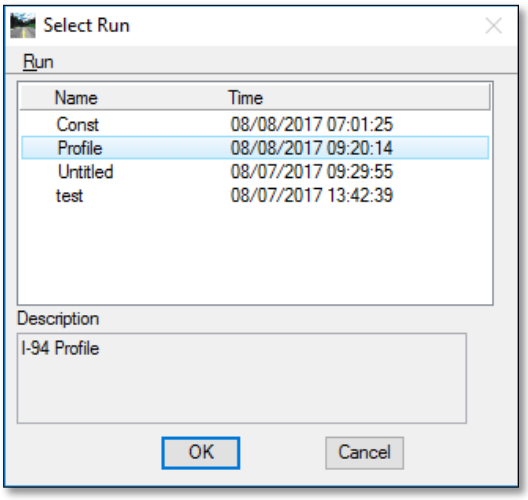
Creating Profile Sheets

Once the Sheet Clip Boundary Shapes have been created and modified to the chosen layout, the profile sheets can be created. Verify that the profile sheet limits match the plan sheet limits prior to clipping the sheets, as modifications to the boundary shapes will not automatically update the sheet files once this operation is complete.

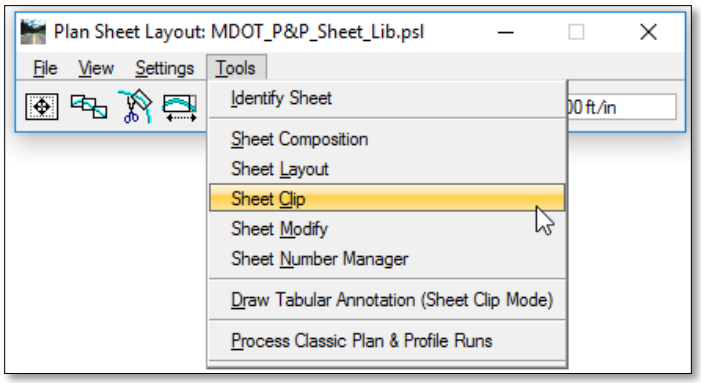
1. In the profile base file, open the **Project Manager** (**GEOPAK → ROAD → Project Manager)** and select **Plan & Profile Sheets.**



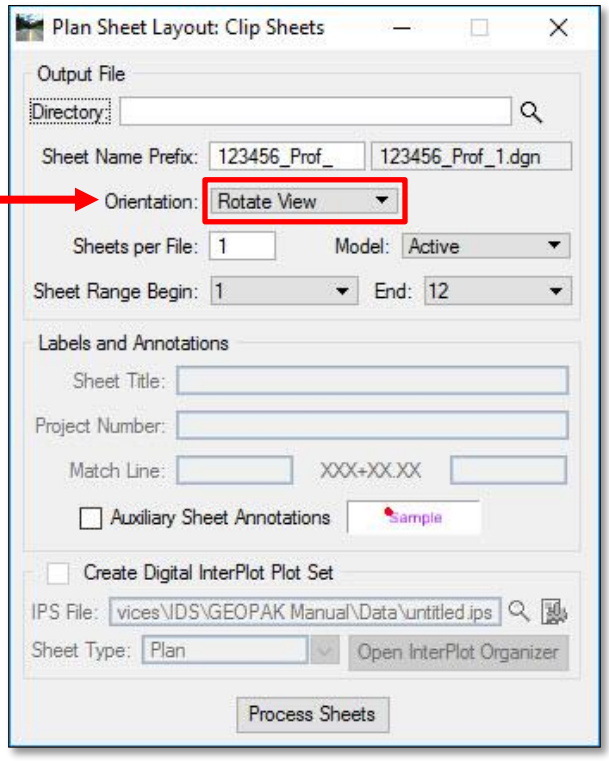
2. In the **Select Run** dialog, select the run that was utilized to create the profile boundary shapes, then select **OK**.



3. In the **Plan Sheet** Layout dialog box, open **Sheet Clip** by either going to **Tools>Sheet Clip** or select the **Sheet Clip** icon ( ) on the **Plan Sheet Layout** dialog box



4. The **Plan Sheet Layout: Clip Sheets** dialog box will appear. Populate the dialog based on the following, then select **Process Sheets**.



- **Directory:** Enter the desired folder to store the sheets by selecting the magnifying glass icon.
- **Sheet Name Prefix:** The tool will automatically number the sheets. Enter the sheet name prefix based on MDOT standard naming conventions.
- **Orientation:** Enter Rotate View.

  Do NOT select Rotate Reference. Rotating the reference will break the Geo-Referencing of the base files.
- **Sheets per File:** Enter 1.
- **Model:** Set to Active.
- **Sheet Range Begin/End:** Select the range of sheets to create.
- **Labels and Annotations:** Leave blank.

5. After selecting **Process Sheets**, the sheets will be created and stored in the selected directory.

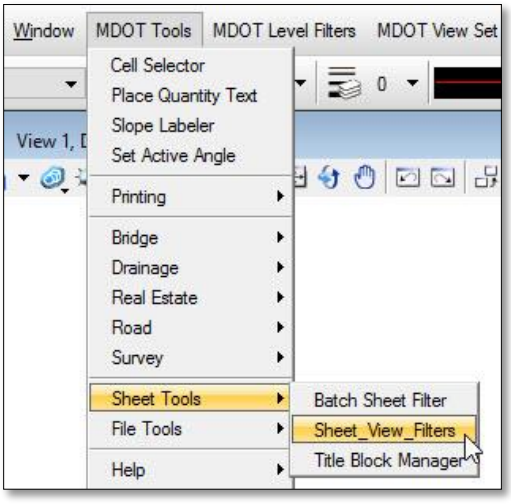
Sheet View Filters

Sheets that are created utilizing the previous process will be stored in the selected directory and will have the selected MDOT sheet border placed in the file. When the sheet border is placed, all levels in the sheet border cell are on by default. The **Sheet View Filters** provide a process to quickly update the levels based on the sheet type.

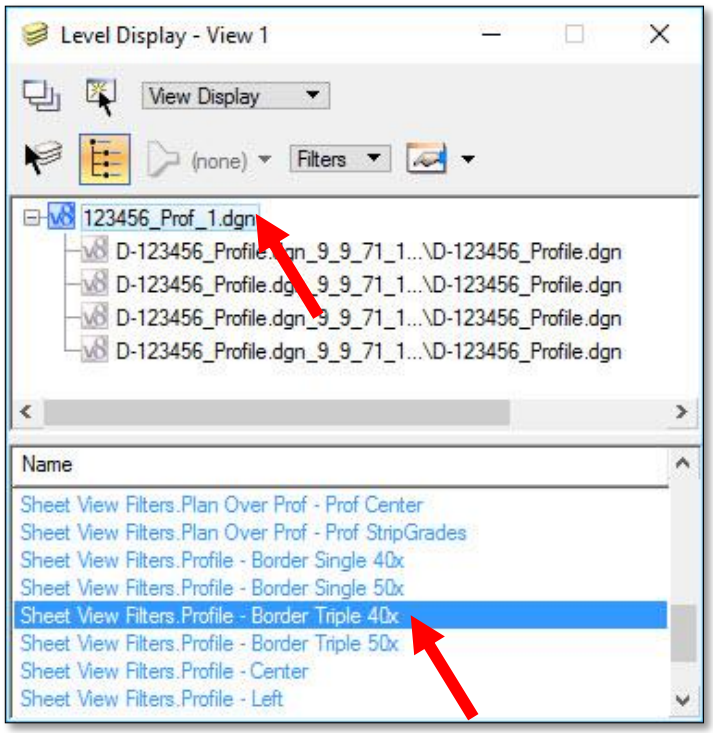
In addition, the profile base file is referenced into the sheet multiple times to show the Left, Center and Right side profiles. The **Sheet View Filters** can be utilized to update the levels for section of the profile sheet.

1. Open a profile sheet that was created using the **Plan and Profile** GEOPAK process. All levels in the sheet border cell will be on.

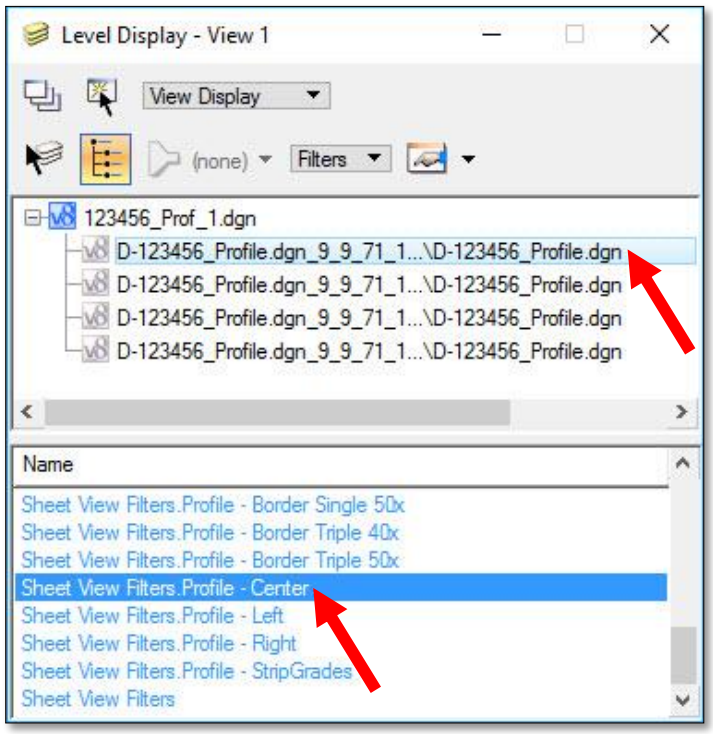
2. Open the **Sheet View Filters** from MDOT Tools. **(MDOT Tools → Sheet Tools→ Sheet_View_Filters)**



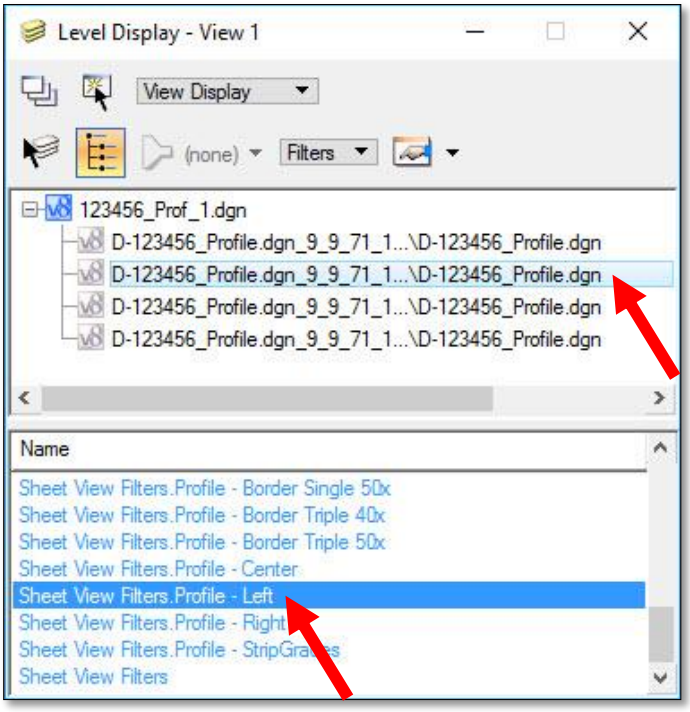
3. The **Level Display** window will open with the available sheet view filters. First, the sheet border levels will be updated by selecting the sheet name in the target tree, then selecting the applicable sheet view filter.



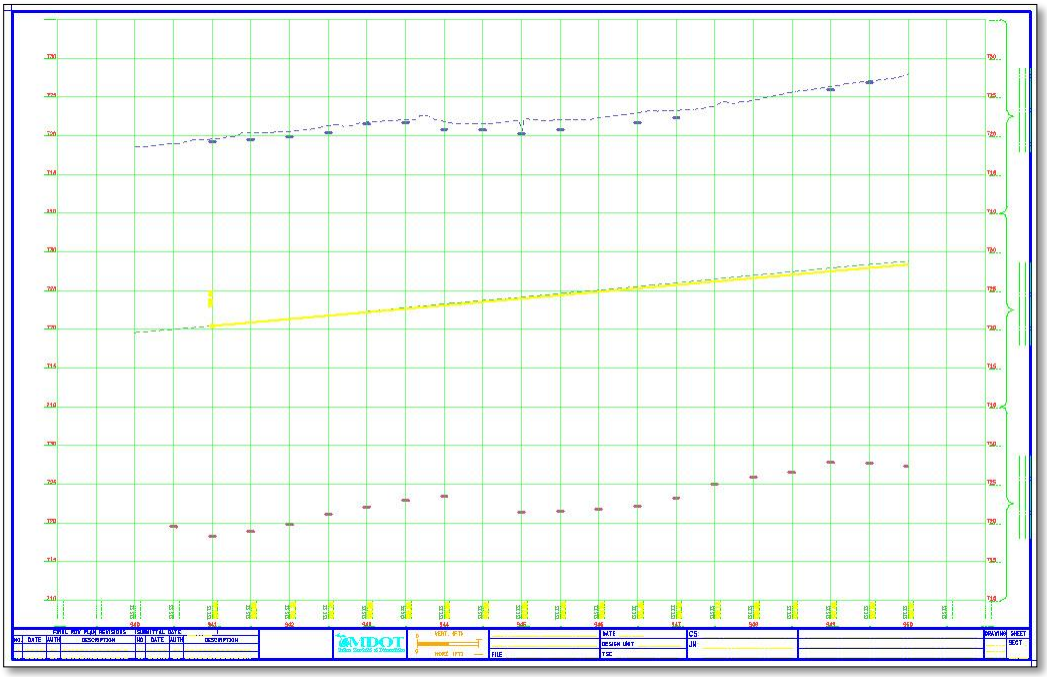
4. The center port will be updated next, select the first reference under the target tree, then select the **Profile – Center** sheet filter.



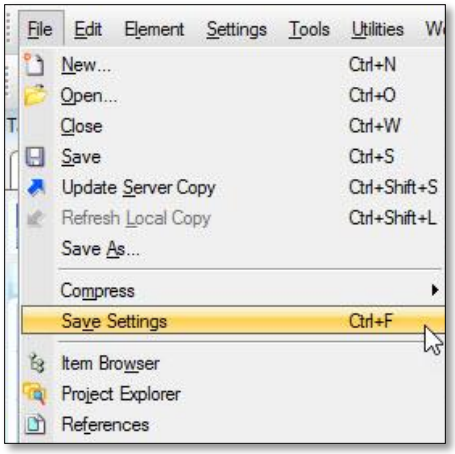
5. The left port will be updated next, select the second reference under the target tree, then select the **Profile – Left** sheet filter.



6. Repeat this process for the Third and Fourth reference in the target tree. The third corresponds to the Right profile and the fourth corresponds to the Strip Grades. Verify the sheet levels have been set accordingly.



7. Once the desired levels are visible, select **Save Settings** from the **File** dropdown to save the view characteristics.



8. Repeat this process for the remaining sheets.

Technical Support

Please email any questions, issues or problems associated with this document to:

MDOT-EngineeringSupportTraining@Michigan.gov

Additional Design Services Help and Support can also be obtained through the following email resources:

MDOT-BridgeDesignSupport@Michigan.gov – For help with bridge design software, cells, levels, and workspace tools.
MDOT-Drainage-Utility@Michigan.gov – For help with GEOPAK Drainage, drainage cells and other subsurface utility modeling tools.
MDOT-CaddSupport@Michigan.gov – For help with cells, levels, line styles, dimensions, and other CADD and workspace tools.
MDOT-RoadwayModelingSupport@Michigan.gov – For help with roadway modeling, modeling templates, civil cells and workspace tools.
MDOT-Survey_Support@Michigan.gov – For help with survey data, workflows and processes.