

GEOPAK – Plan 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 defined reference files and sheet border cells.

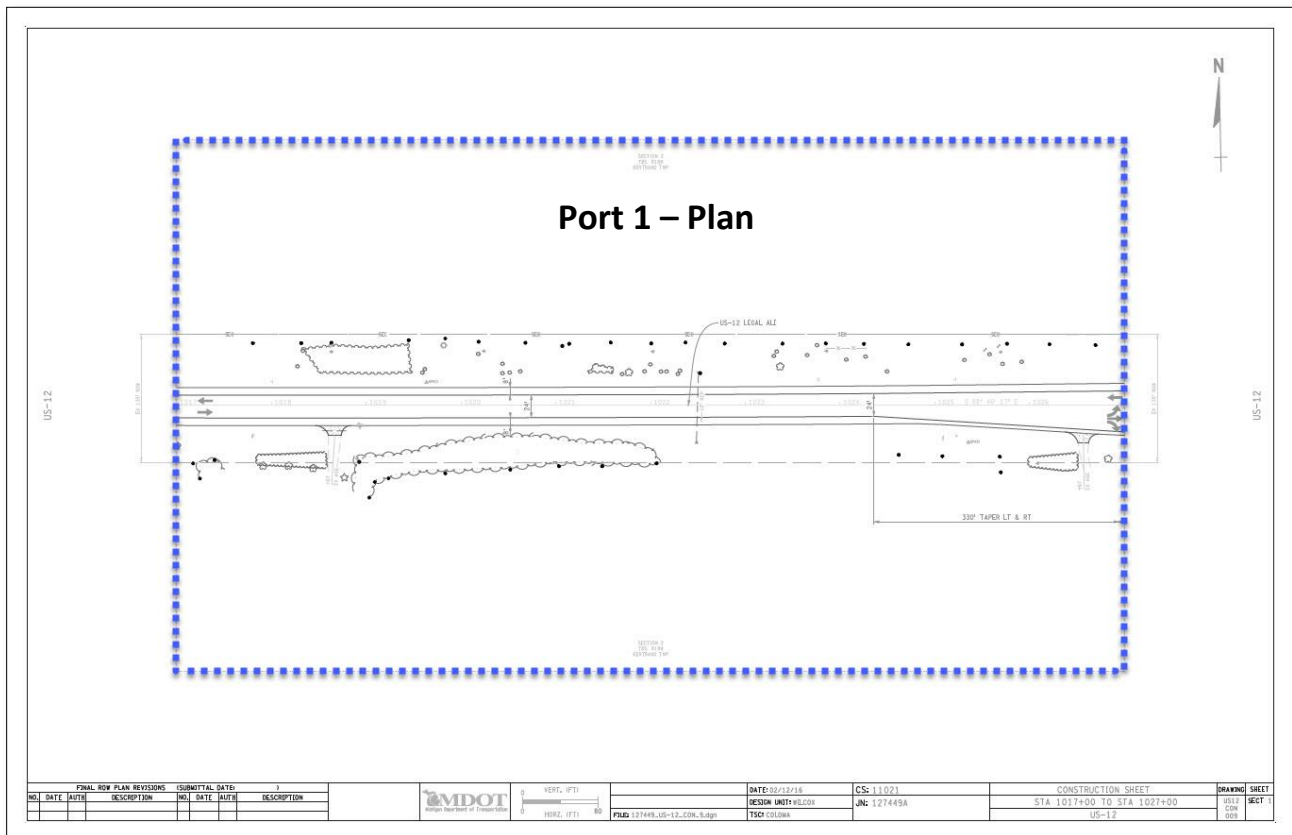
The plan and profile sheet definitions are stored in a sheet library named **MDOT_P&P_Sheet_Lib.psl**. It is automatically attached to the Plan Sheet Layout tool and supports plan sheets, profile sheets, combined plan and profile sheets at 40x scales (40 scale, 80 scale) and 50x scales (50 scale, 100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

Plan Sheets

This workflow details the process of creating plan sheets (removal, construction, etc.) for a desired project. To utilize the following tool, a project must be set up for the desired project in the Project Manager and an alignment must be stored in the project GPK. For information regarding setting up the Project Manager and importing horizontal alignments into the project GPK, see [Workflow – GEOPAK 1 – Project Manager](#) and [Workflow – GEOPAK 3 – Horizontal Geometry](#).

Plan sheets are created from a project base file or container file that include the full limits of the proposed work. When the sheets are created, they will contain the same references as the file that the sheets were cut from, so care must be taken in choosing which file is the basis for cutting the sheets. Cutting the sheets from a container file allows the designer to designate the desired levels that are to be displayed for all the sheets at once.

Sheets are created by first generating sheet clip boundary shapes within a project base file, which then are then clipped into MDOT Sheet Borders. The standard MDOT plan sheet contains one port (view window) that is dependent upon the roadway horizontal alignment.

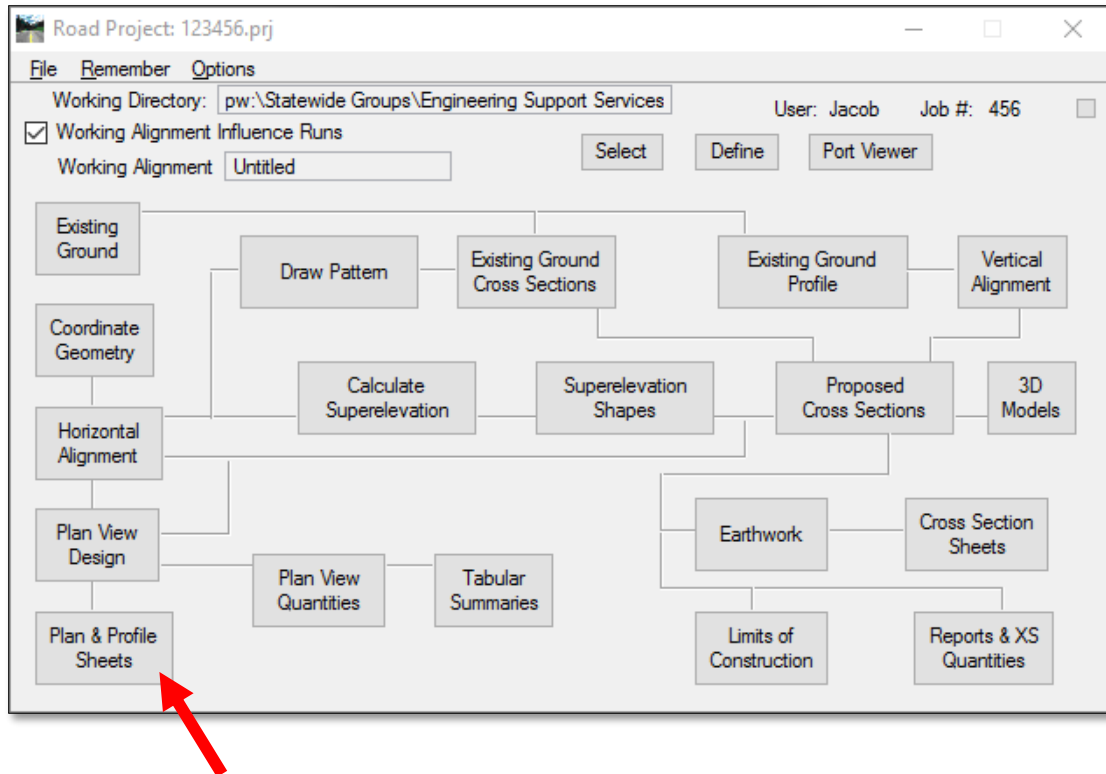




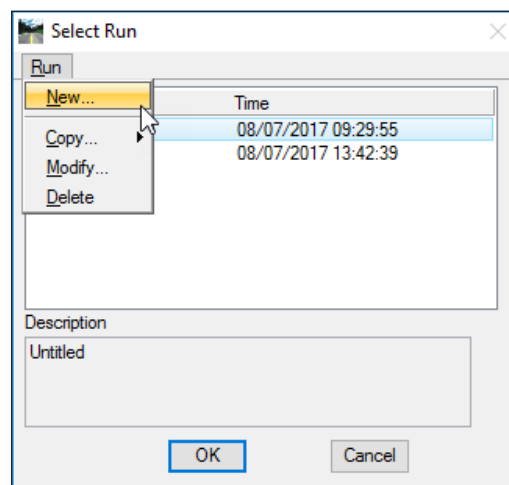
Creating Sheet Clip Boundary Shapes

The plan sheet layout tool utilizes boundary shapes that are created in a project base file to determine the limits shown on each sheet.

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



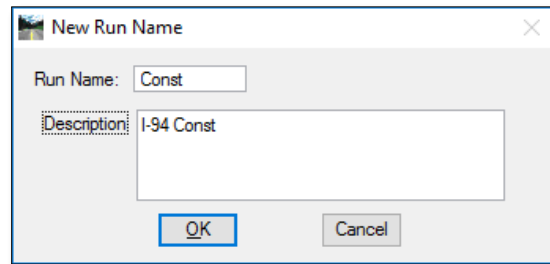
2. In the **Select Run** dialog, create a new run by selecting **Run → New**.



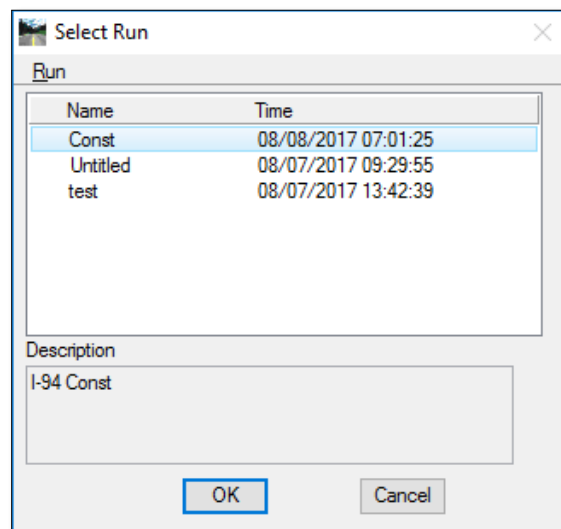
NOTE: Do not select or edit the default Untitled run. Create a new run or edit an existing run for this process.



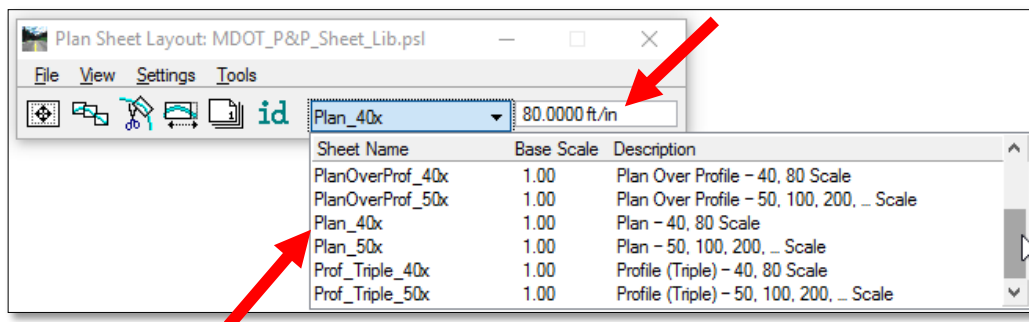
3. Enter a **Run Name** in the dialog with no spaces. If desired, enter a description for the run then select **OK**.



4. In the **Select Run** dialog, select a run (other than the Untitled run), and select **OK**.



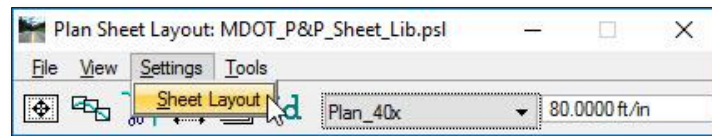
5. In the **Plan Sheet Layout: MDOT_P&P_Sheet_Lib.psl** dialog box select the plan sheet name that corresponds to the sheet scale desired for the project.
6. Enter the sheet scale in the input box next to the plan sheet selection.



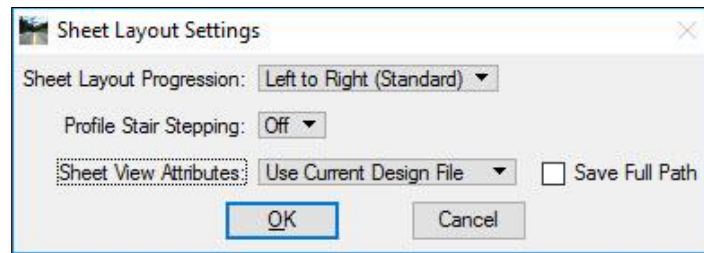
NOTE: Refer to Section 1.02.12C of the [Michigan Road Design Manual](#) for guidelines on selecting the correct sheet scale for the project.



- Open **Sheet Layout Settings** by going to **Settings → Sheet Layout**.




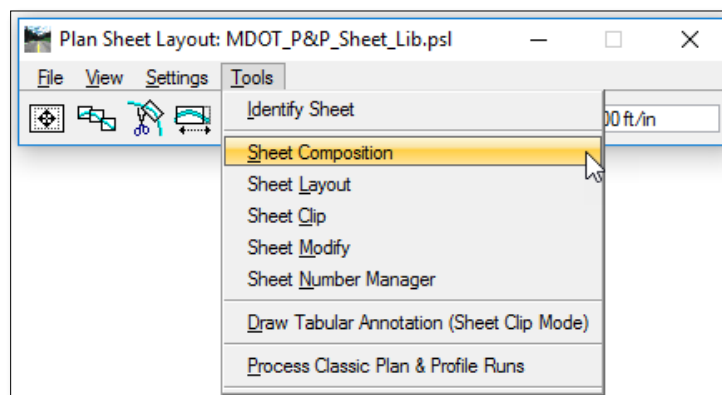
- In the **Sheet Layout Settings** dialog modify the settings based on the following information and close the dialog by selecting the red X in the top right corner.



- **Sheet Layout Progression:** 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.

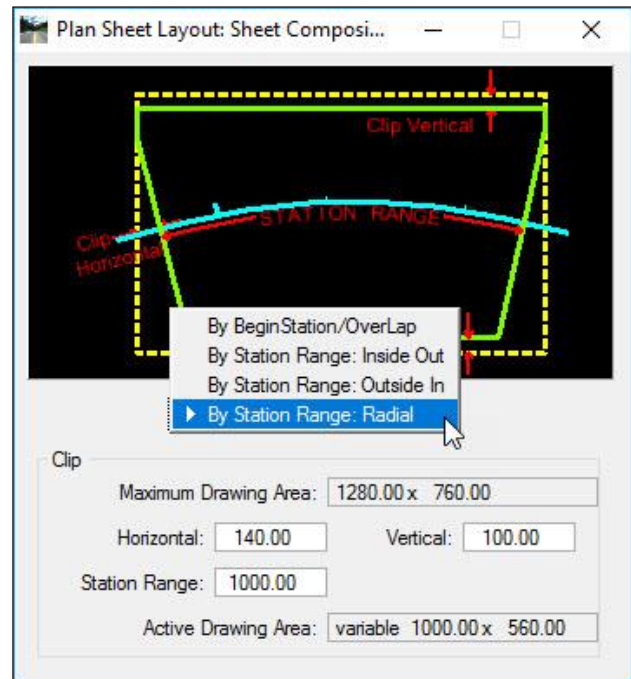
- Open **Sheet Composition** by either going to **Tools → Sheet Composition** or select the **Sheet Composition** icon () on the **Plan Sheet Layout** dialog box.





10. In the **Plan Sheet Layout: Sheet Composition** dialog box modify the dialog based on the following information and 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.
- **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 allowing space for labeling on the sheet and can be adjusted after the sheets have been clipped.
- **Station Range:** Enter the preferred station range for the selected sheet scale as noted in the [Michigan Road Design Manual](#) (excerpt noted below). For example, enter 1000' for an 80-scale sheet.
- **Active Drawing Area:** Notes the size of the clip that will be shown on a single sheet based on the station range and vertical spacing entered.



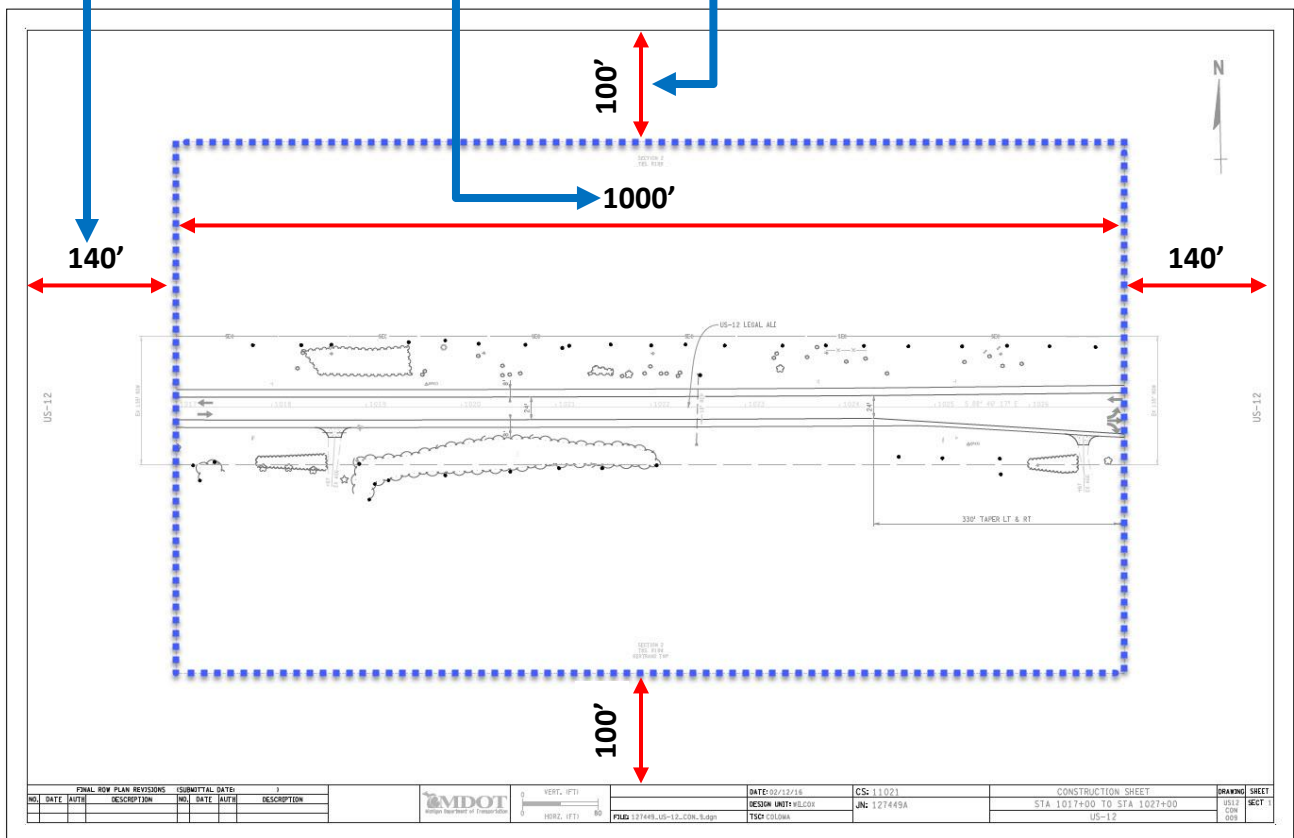
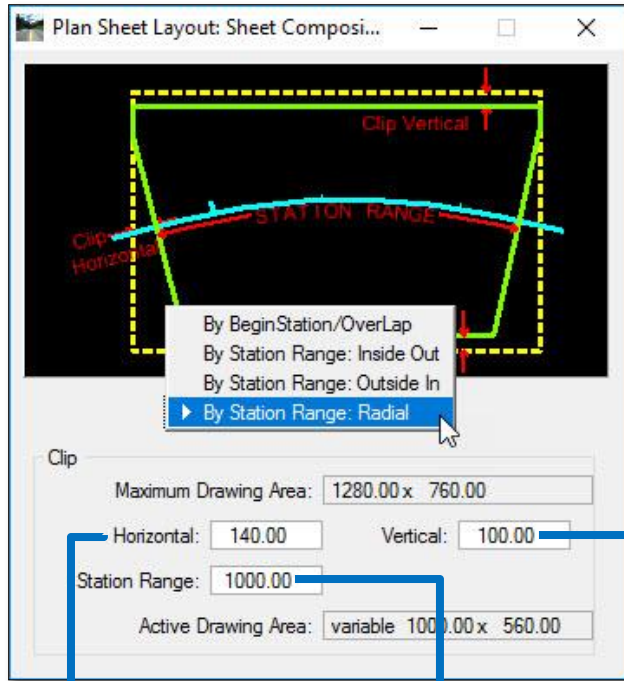
NOTE: Refer to Section 1.02.12C of the [Michigan Road Design Manual](#) for information regarding the preferred station range represented per sheet at a given scale. An excerpt of the section is provided below:

2. Sheet Breaks

Preferred sheet breaks are as follows:

200 Scale: 2400' per sheet (24 stations)
 100 Scale: 1200' per sheet (12 stations)
 80 Scale: 1000' per sheet (10 stations)
 50 Scale: 600' per sheet (6 stations)
 40 Scale: 500' per sheet (5 stations)

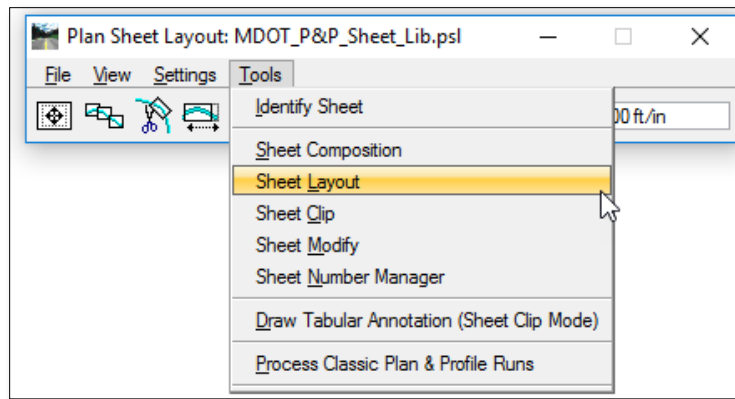
NOTE: The following figures identify how the inputs in the **Sheet Composition** reflect how the sheet will be created. An 80-scale sheet was utilized for this example.





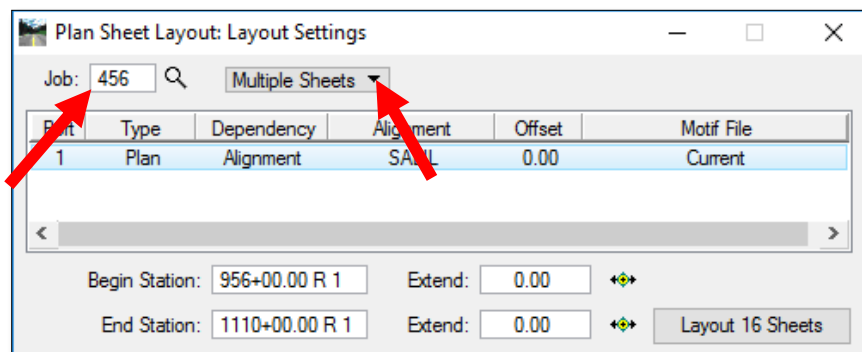
- Open **Sheet Layout** by either going to **Tools → Sheet Layout** or by selecting the **Sheet Layout** icon

() on the **Plan Sheet Layout** dialog box

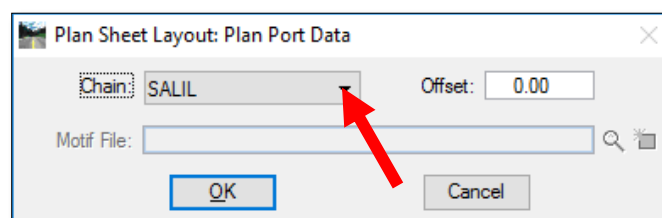


- In the **Plan Sheet Layout: Layout Settings** dialog box verify the correct GPK number is noted in the **Job:** field.

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

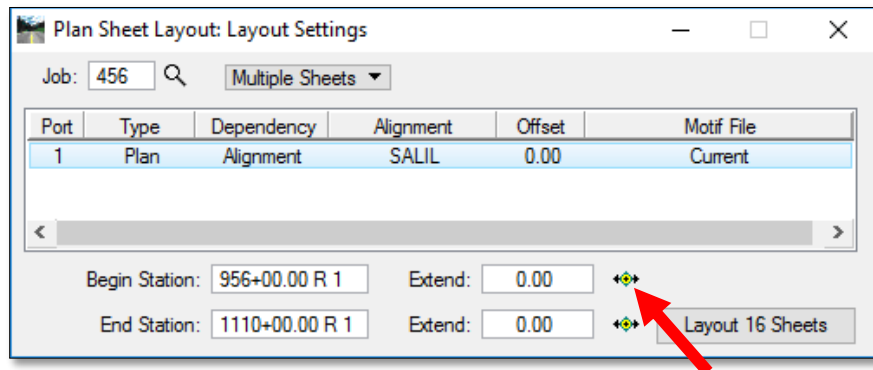


- Double click on **Port 1** and the **Plan Sheet Layout: Plan Port Data** and set the Chain to the desired horizontal alignment, verify the **Offset** is set to 0.00 and select **OK**.

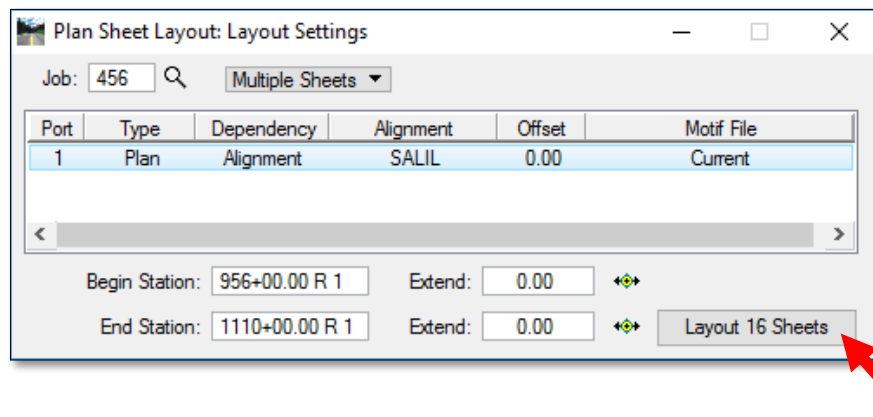




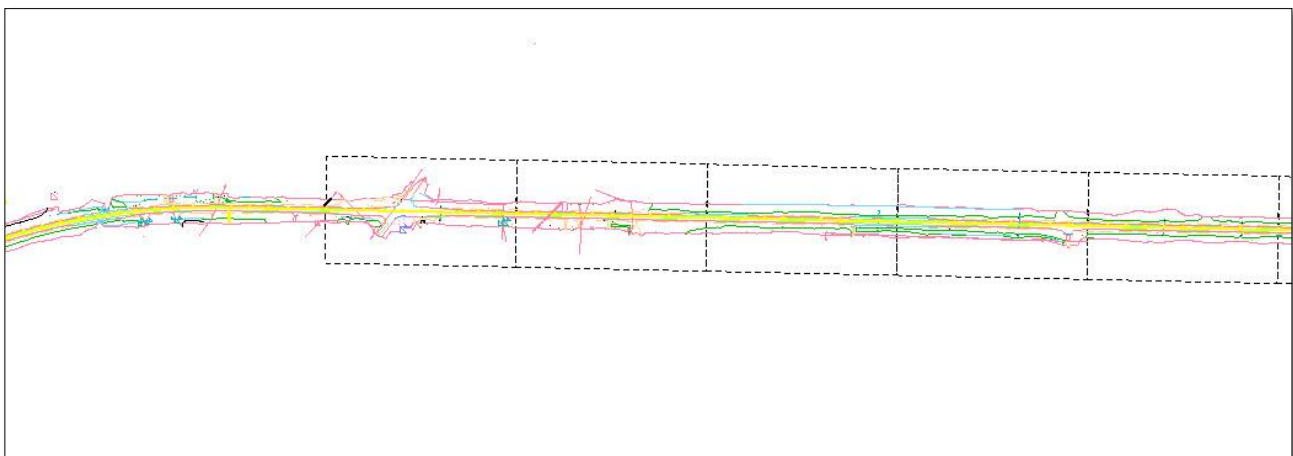
15. Enter the station range for the plan set either by manually typing in the **Begin Station** and the **End Station** or by selecting the corresponding **Select Begin Station** or **Select End Station** icon. Using the icon will allow snapping to the alignment to select the associated station range.



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



17. Dismiss the Plan Sheet Layout tool by selecting the **X** in the upper right corner of the dialog. The plan sheet layout clip boundary shapes will now be visible in the file.

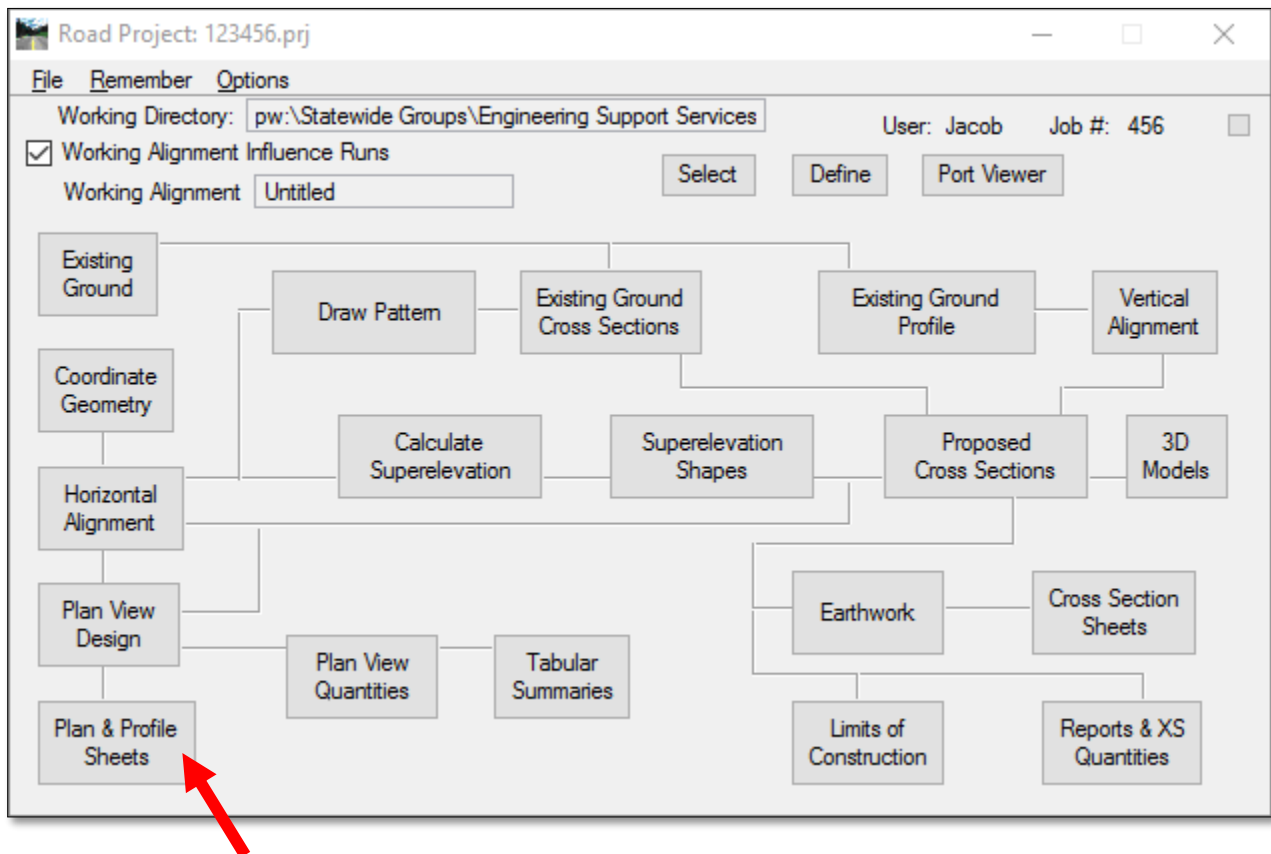




Modifying Sheet Clip Boundary Shapes

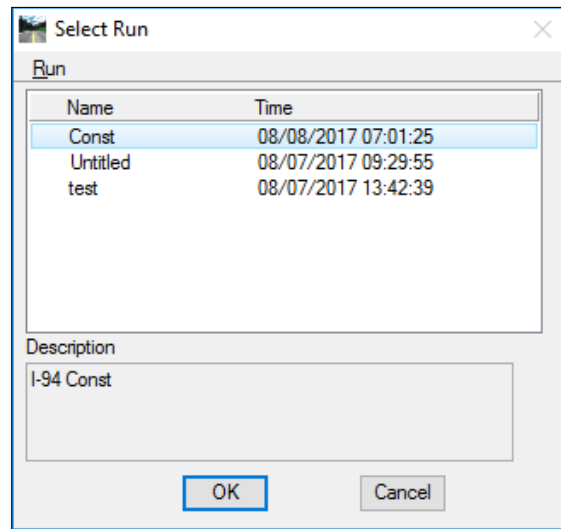
The Plan Sheet Layout tool has a modification tool that can be utilized to change the characteristics of individual sheets that will dynamically update the remaining boundary shapes. If the designer would like to shift the starting station of the first sheet or change the station range shown on a single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

1. In the project base file that contains sheet clips, open the **Project Manager (GEOPAK → ROAD → Project Manager)** and select **Plan & Profile Sheets**.

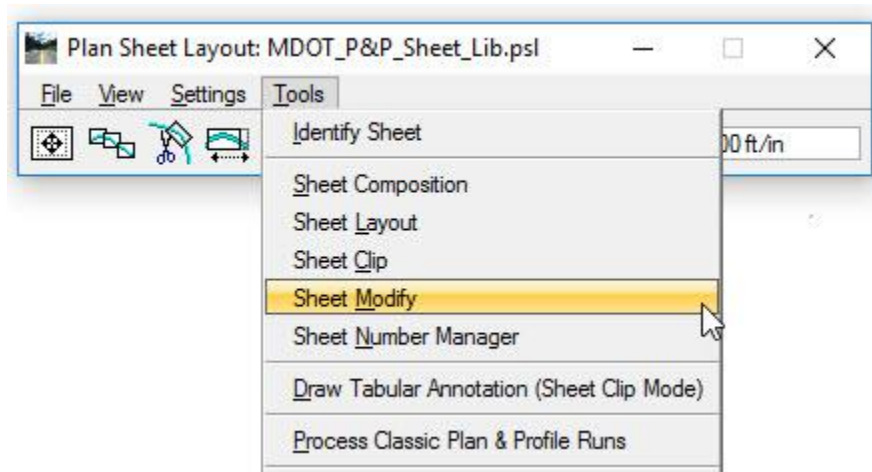




2. In the **Select Run** dialog select the run that was utilized to create the boundary shapes, then select **OK**.

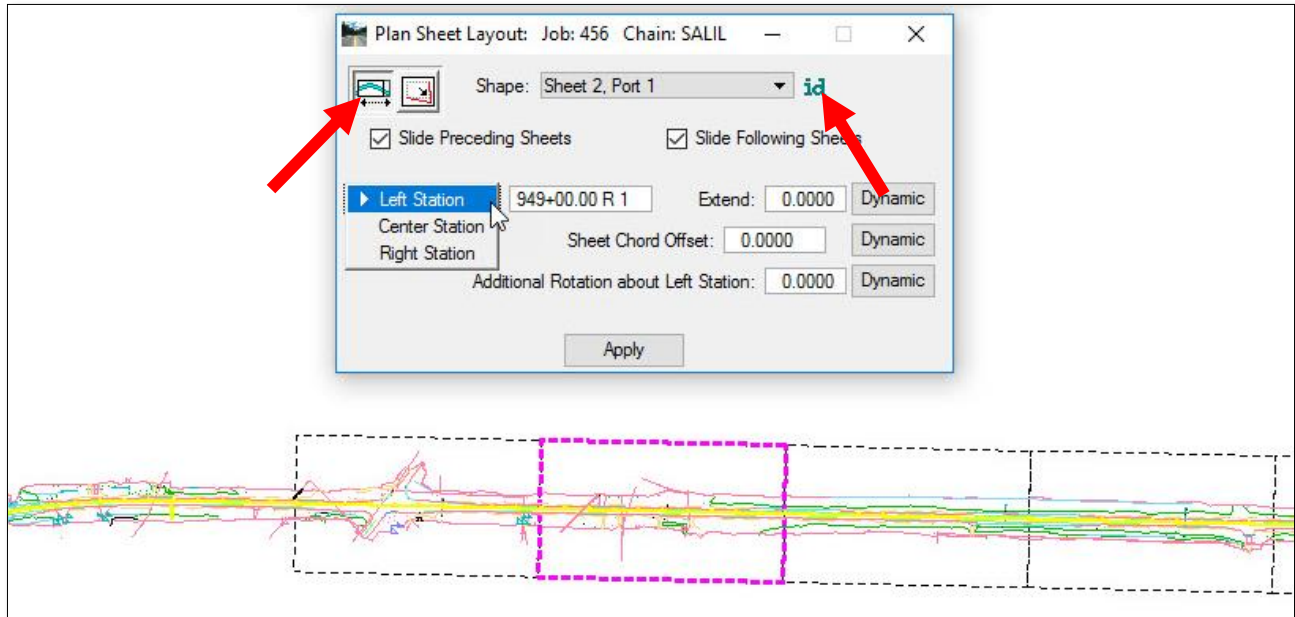


3. In the **Plan Sheet Layout** tool select the **Sheet Modify** tool by going to **Tools → Sheet Modify**.





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 MicroStation window.

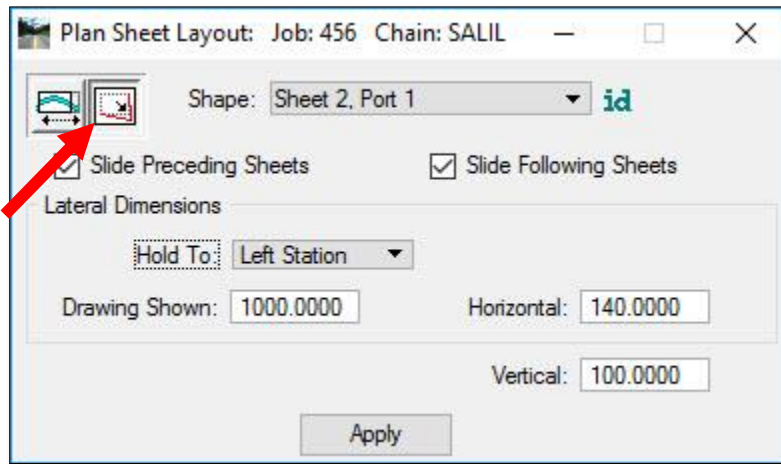


NOTE: The following describes the available sheet modifying settings:

- **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.
- **Sheet Cord Offset:** Entering a value changes the vertical offsets of the sheet clip.
- **Additional Rotation about Left Station:** Allows the user to rotate the sheet based on the left station.
- 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, similar to the inputs noted in **Step 10** of the **Creating Sheet Clip Boundary Shapes** section.



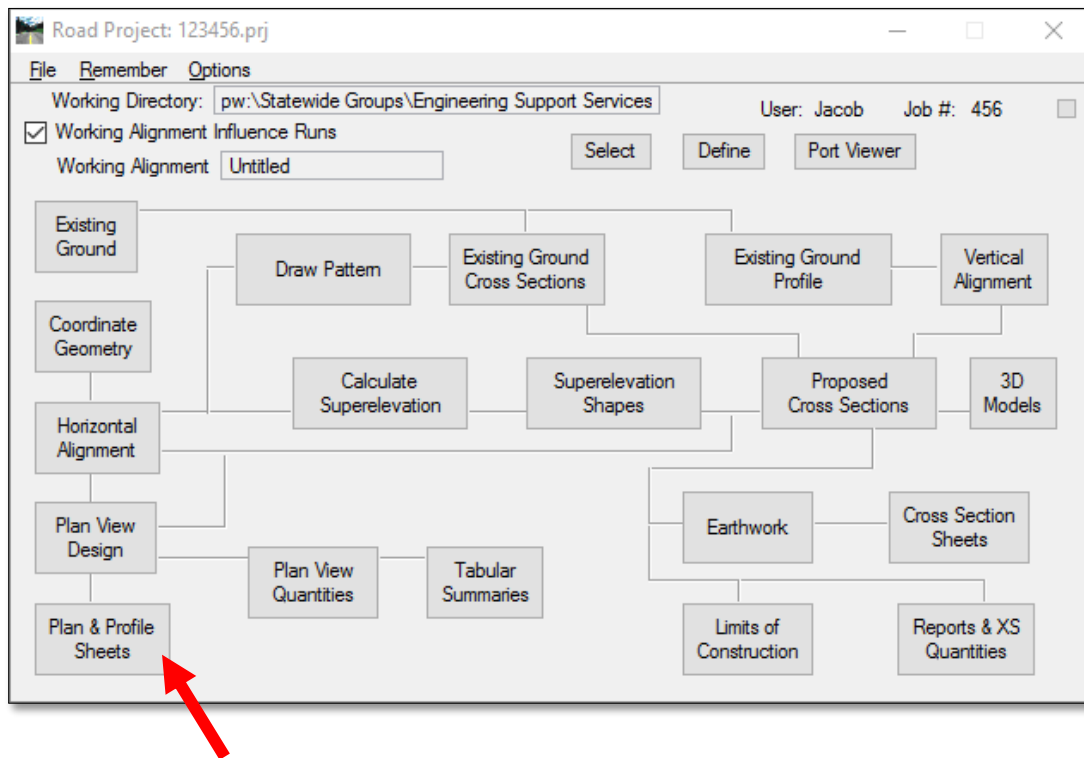
7. Select **Apply** when all changes have been completed to the clip boundary shapes.



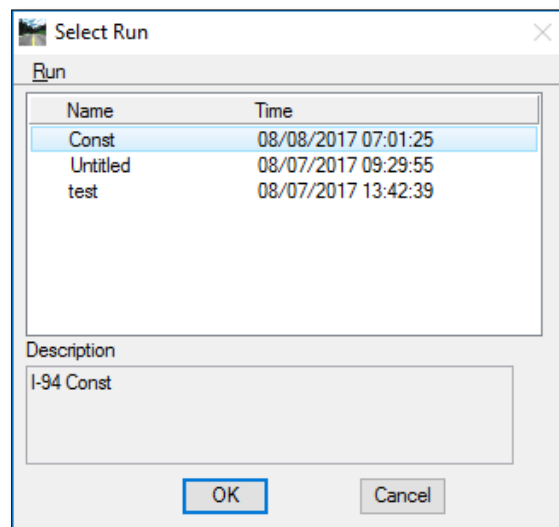
Creating Plan Sheets

Once the Sheet Clip Boundary Shapes have been created and modified to the chosen layout, the plan sheets can be created. Care should be taken to create the desired sheet layout 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 project base file that contains sheet clips, open **Project Manager (GEOPAK → ROAD → Project Manager)** and select **Plan & Profile Sheets**.

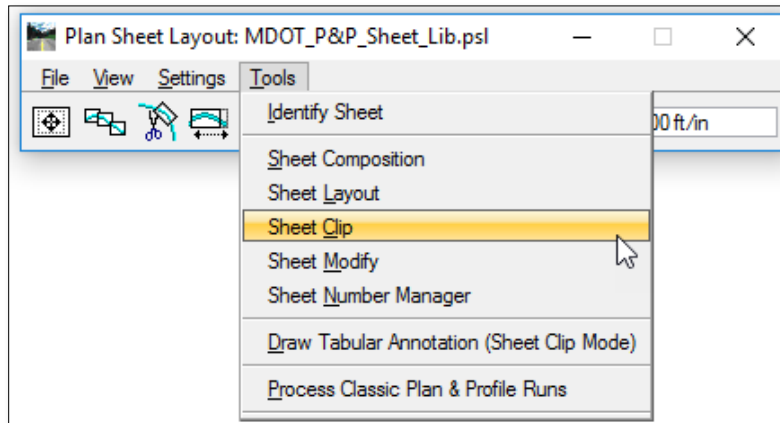


2. In the **Select Run** dialog select the run that was utilized to create the sheet boundary shapes, then select **OK**.





3. In the **Plan Sheet Layout** tool select the **Sheet Clip** tool through the menu **Tools → Sheet Clip**.

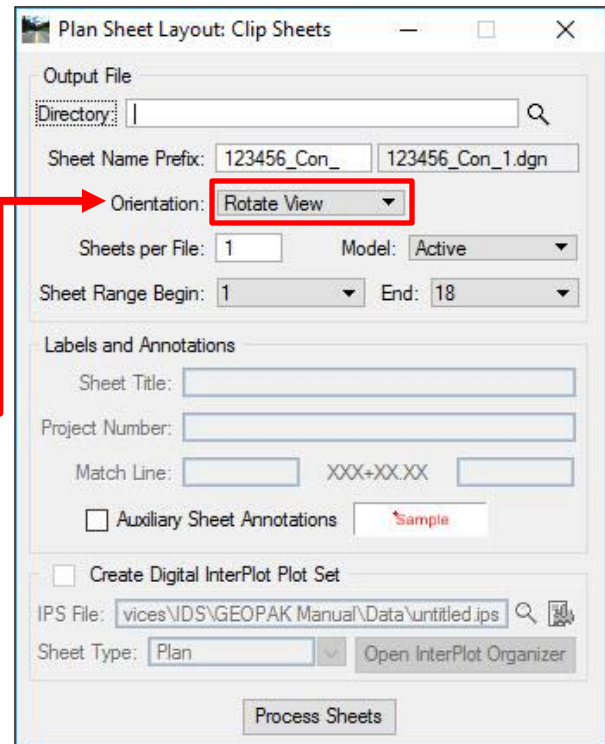


4. In the **Plan Sheet Layout: Clip Sheets** dialog box populate the dialog based on the following, then select **Process Sheets**.

- **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.



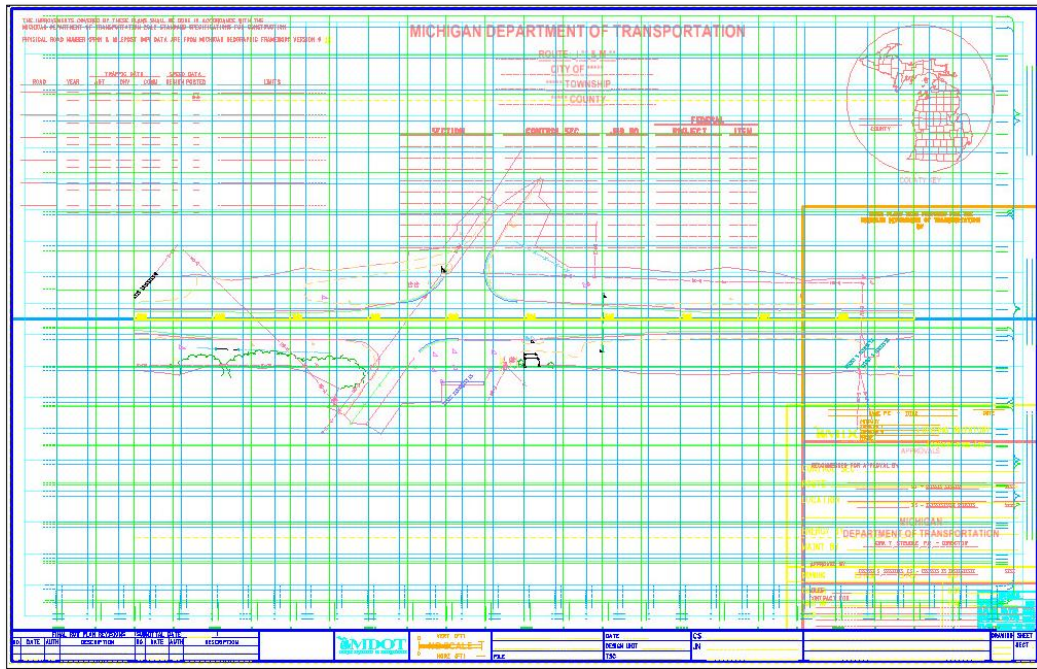
5. After selecting **Process Sheets**, the sheets will be created and stored in the selected directory.



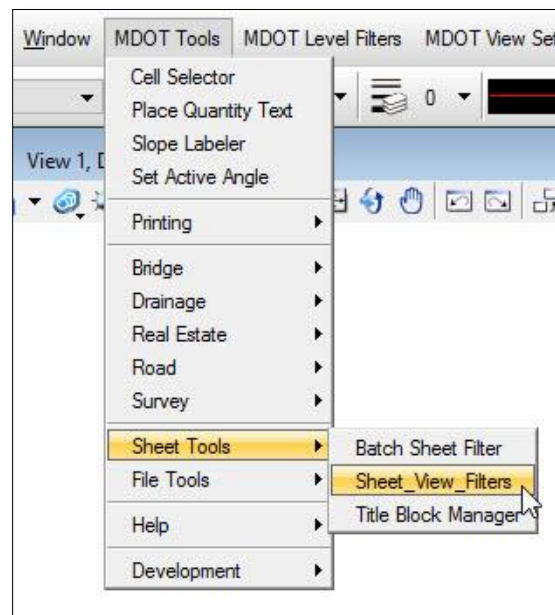
Sheet View Filters

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.

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

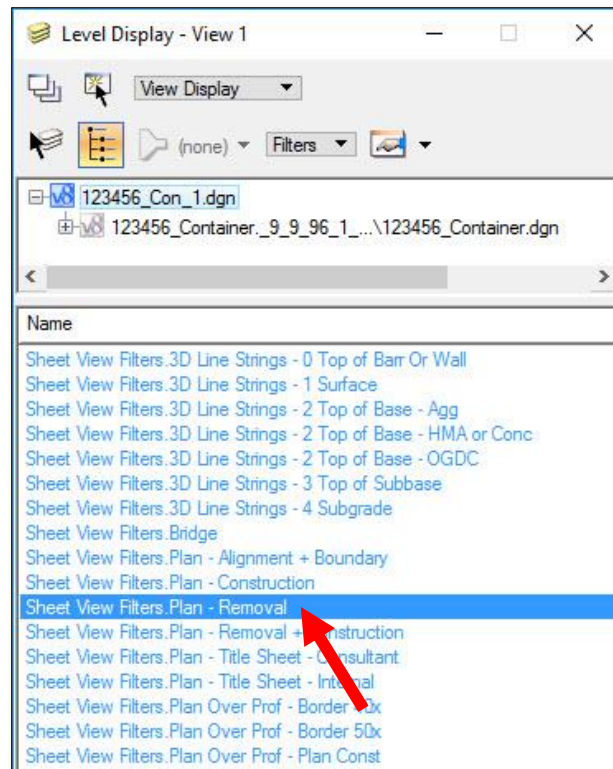


2. Open the **Sheet View Filters** from MDOT Tools. (**MDOT Tools** → **Sheet Tools** → **Sheet_View_Filters**)

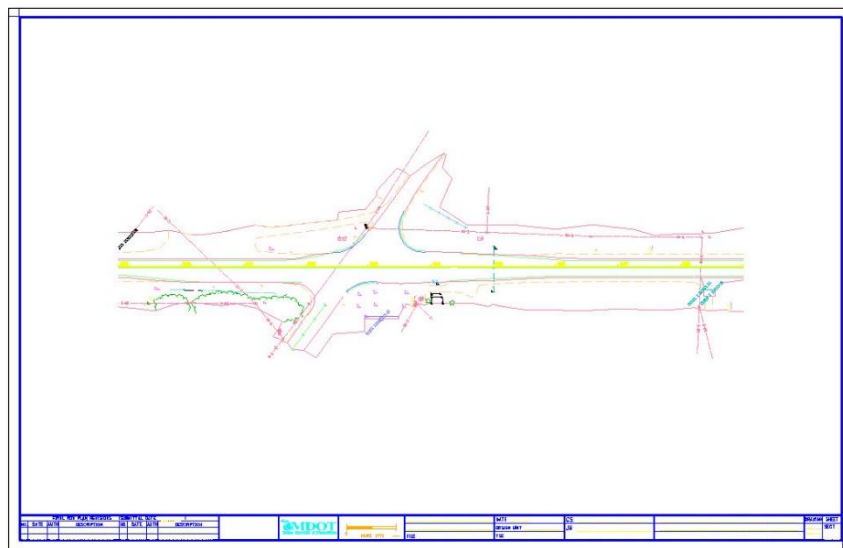




3. In the **Level Display** window showing the available sheet view filters select the applicable sheet view filter to update the level display in the file.

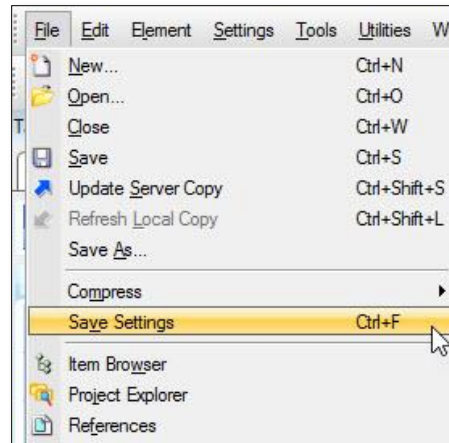


4. Once the view filter has been selected, verify the sheet levels have been updated accordingly and modify the display of any remaining levels as needed.





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



6. 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.