MONTANA
Department of Transportation

PLANS PRODUCTION FOR PAVEMENT PRESERVATION PROJECTS

Contents

Overview

This document contains the workflows necessary for producing a set of plans for pavement preservation projects, including the title sheet, notes sheets, summary sheets, and typical sections. This document also covers how to create and plot from a sheet set file.

Process Provenance

- Date of development: 3/21/2023
- Revision date: *7/9/2025*
- Application/Tool(s): *AutoCAD / Civil 3D*
- Version(s): *Civil 3D 2024 and 2024 update versions*
- Environment(s): *MDT Civil 3D State Kit r2024 v2.1.1*
- Author: *MDT EngOps Workflow Steering Committee*

Statement of Need

Pavement preservation plans do not require civil objects and thus were not covered in Civil 3D production training. Therefore, separate workflows were necessary to outline the process for creating plans for pavement preservation projects.

Disclaimer: Because the State Kit is continuously being updated and improved, the styles and layers in this documentation may vary from what is in the current version of the State Kit.

Acronyms/Definitions Used in This Document

ACC – Autodesk Construction Cloud, Autodesk's new cloud storage ecosystem with enhanced tools, which will replace BIM 360 when it is retired.

References

Title and Notes Sheets in Autodesk

Typical Sections in Autodesk

Surfacing Calculation Spreadsheet

Summary Sheets in Autodesk

Tips for Summary Sheets in Autodesk

Process Description and Examples

Section I. Title and Notes Sheets

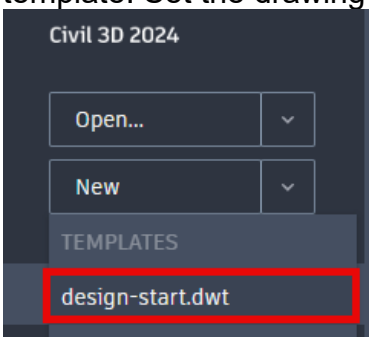
Refer to the Title and Notes Sheets in Autodesk procedure documentation.

Back to top

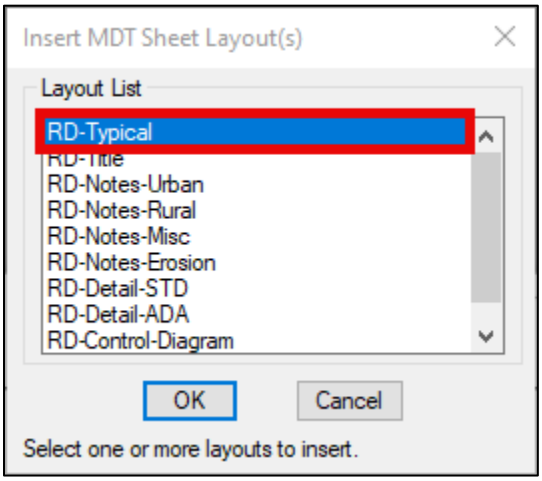
Section II. Typical Sections

Procedure – File Setup

1. Create a new file called ***[UPN#]RDTYP001.dwg*** using the ***design-start.dwt*** template. Set the drawing scale to ***1" = 10'***.



2. Select the *MDT Sheet Layouts* dropdown from the *MDT Sheets* panel in the *MDT Tools* tab in the ribbon and select the *Road Layouts* button.
3. Select the ***RD-Typical*** layout, then select ***OK*** to add the layout to the drawing.



4. Select the newly added ***RD-Typical*** layout.
5. Refer to Section III, starting at the Create Viewport procedure on page 11, in the Typical Sections in Autodesk process documentation for setting up the layouts and typical borders.

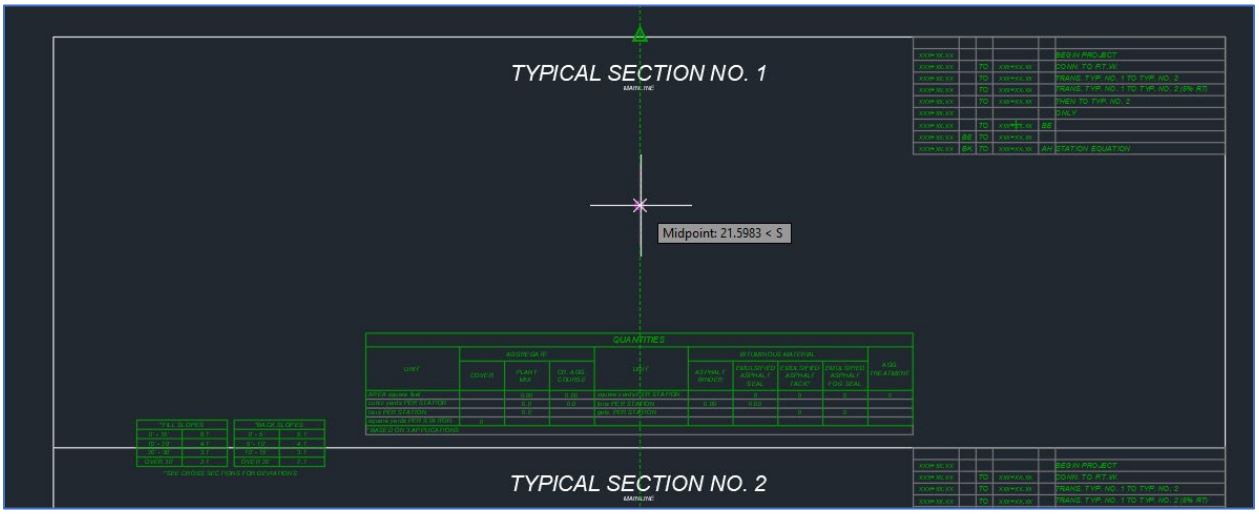
Back to top

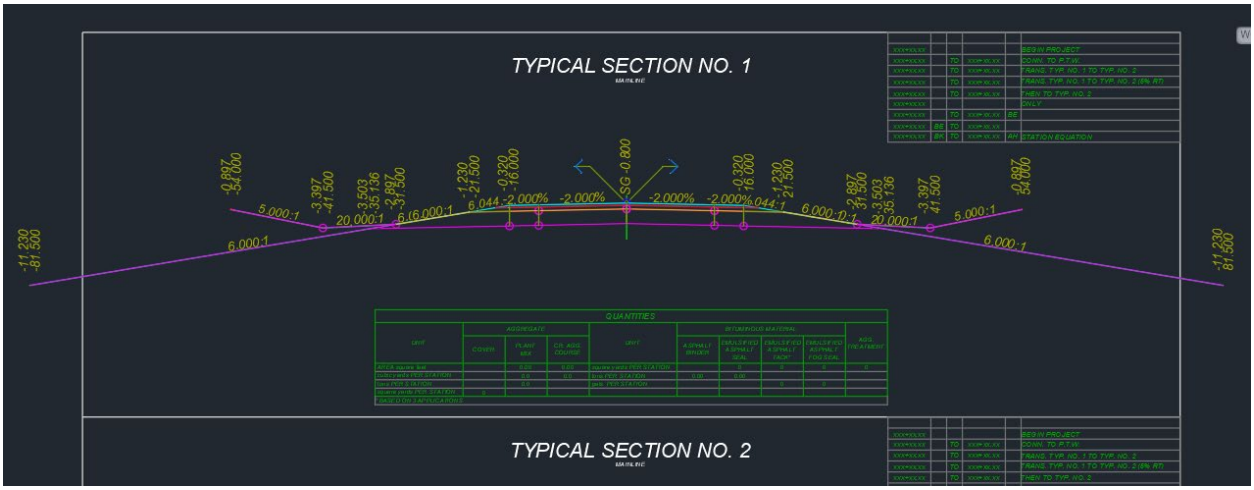
Procedure – Create Typical Sections

1. In the MDT Design tab in the ribbon, select the ***MDT Assemblies & Subassemblies*** palette icon from the MDT Modeling panel. In the palette, select the MDT Assemblies tab, then select the closest appropriate assembly for the project's needs. In this example, the ***MDT Rural 2 Lane*** assembly is used.

   NOTE: Once the basic assembly has been inserted into the drawing, MDT Subassemblies (i.e., curb and gutter) can be added or removed to achieve the desired typical section.

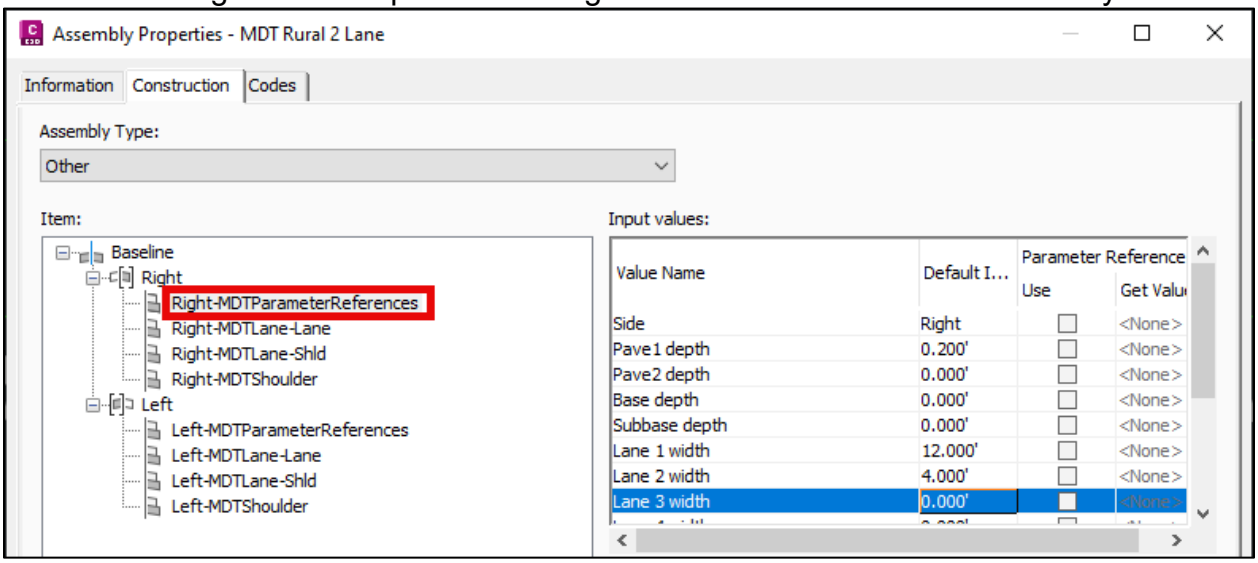
2. When prompted for an insertion point, select a point in the approximate center of the top view area. Once the assembly has been placed, press ***Esc*** to exit the command.



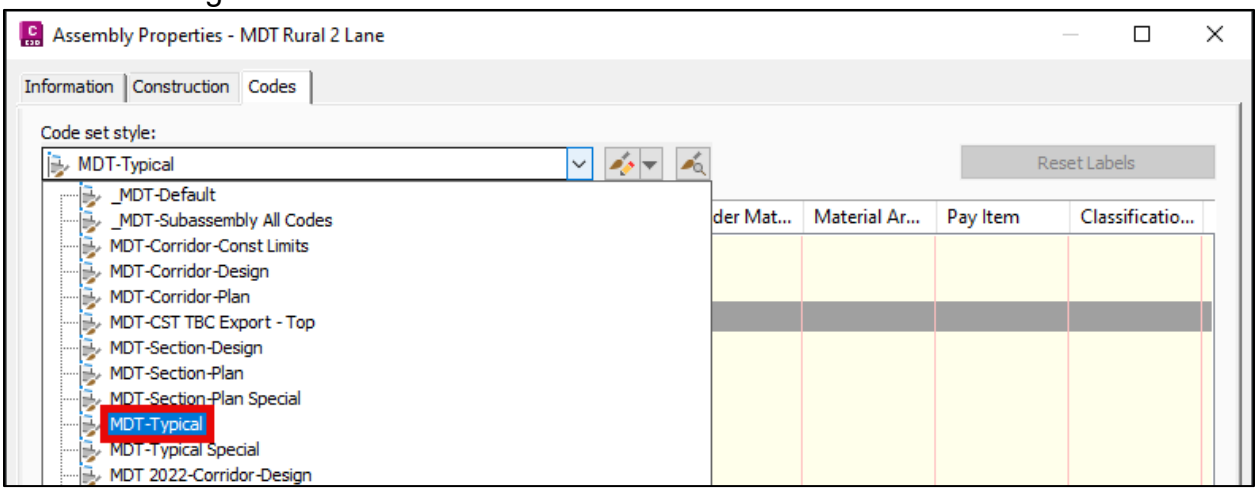


3. Select the center handle of the assembly to open the contextual tab in the ribbon for assemblies. Select ***Assembly Properties***, or right click after selecting the handle and select ***Assembly Properties*** from the list.

4. In the *Assembly Properties* dialog box, select the *Construction* tab. Select the ***MDTParameterReferences*** subassembly from the item list and use the *Input values* section to edit the lane widths and material depths to match the surfacing recommendation for the project. When finished with an item, select ***Apply*** to make the changes. Then repeat the changes for the other side of the assembly.

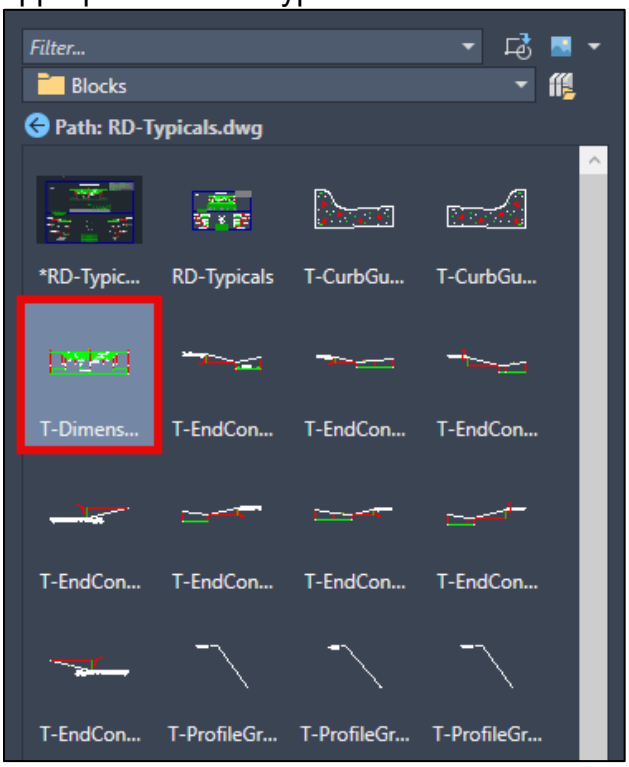


5. In the *Codes* tab of the *Assembly Properties* dialog box, select the drop-down menu for *Code set style*, and select ***MDT-Typical***. Select ***Apply*** and ***OK*** to close the dialog box.

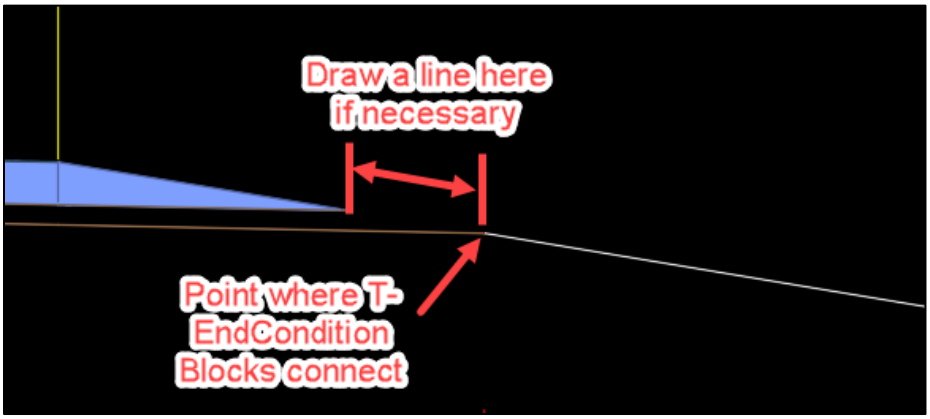


6. Delete the ***MDTDaylightWithSubbase*** subassembly from both sides of the assembly.

7. Use the *Blocks Palette* to insert the ***T-Dimensions*** block and insert it by snapping to the crown of the roadway. Insert the ***T-EndCondition*** blocks as appropriate for the typical section.

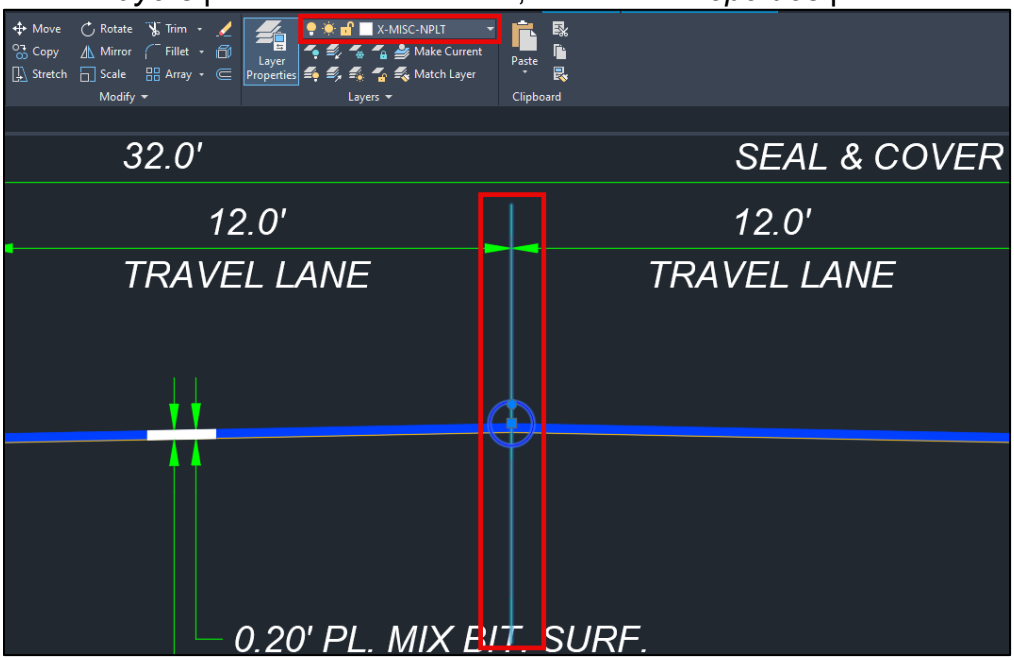


NOTE: The ***T-EndCondition*** blocks are set up to connect to the edge of the CAC on the inslope, so a line or polyline may need to be drawn to connect the rest of the surfacing inslope, like shown in the image below:



Additionally, the "VARIES" text in the ***T-EndCondition*** blocks may need to be changed to "EXISTING" or "AS CONSTRUCTED."

8. Select the assembly handle and change the current layer of the assembly to ***X-MISC-NPLT*** to prevent it from plotting, either using the current layer dropdown on the *Layers* panel in the Home tab, or via the *Properties* palette.



9. Use the ***Explode, Copy***, and ***Move*** tools to label the typical sections and tables to the appropriate standards.
    a. Snap dimensions to the top surface of the subassemblies to ensure that the leader lines are all the same distance from the surfacing section. Refer to Section V of the Typical Sections in Autodesk process documentation for more information regarding dimensions and end condition blocks.
    b. Use the Surfacing Calculation Spreadsheet to assist in calculating typical section quantities.
    c. Delete any unnecessary surfacing columns from the Quantities table.

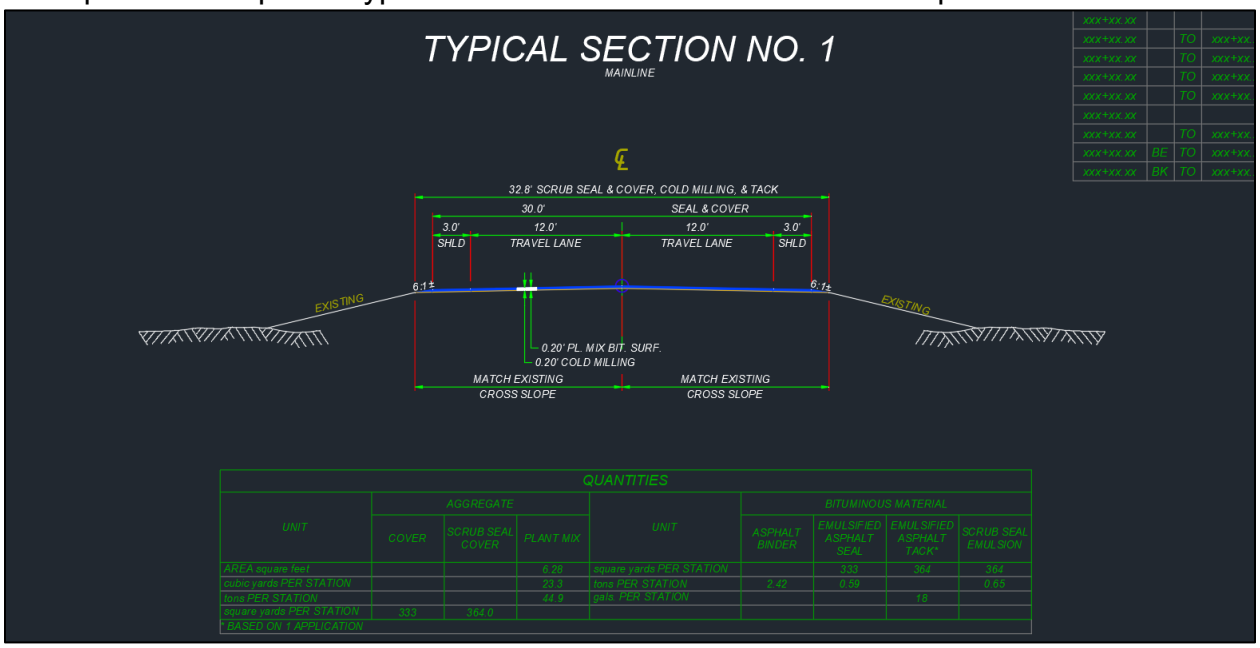
    NOTE: Each item within an exploded block must be individually adjusted and moved. If tables or dimensions are exploded down too many levels, each text and dimension item must be individually moved and adjusted.

10. For superelevated typical sections, change the ***Lane Slope*** input value within the **Left-** and **Right-*MDTLane-Lane*** subassemblies to meet the required superelevation slope. The *MDTLane-Shld* subassembly's lane slope value is tied to the *MDTLane-Lane* value and should not need to be updated. For example, a left curve with a maximum superelevation of 5% would need to be changed to -5% on the left lane slope and +5% on the right lane slope.

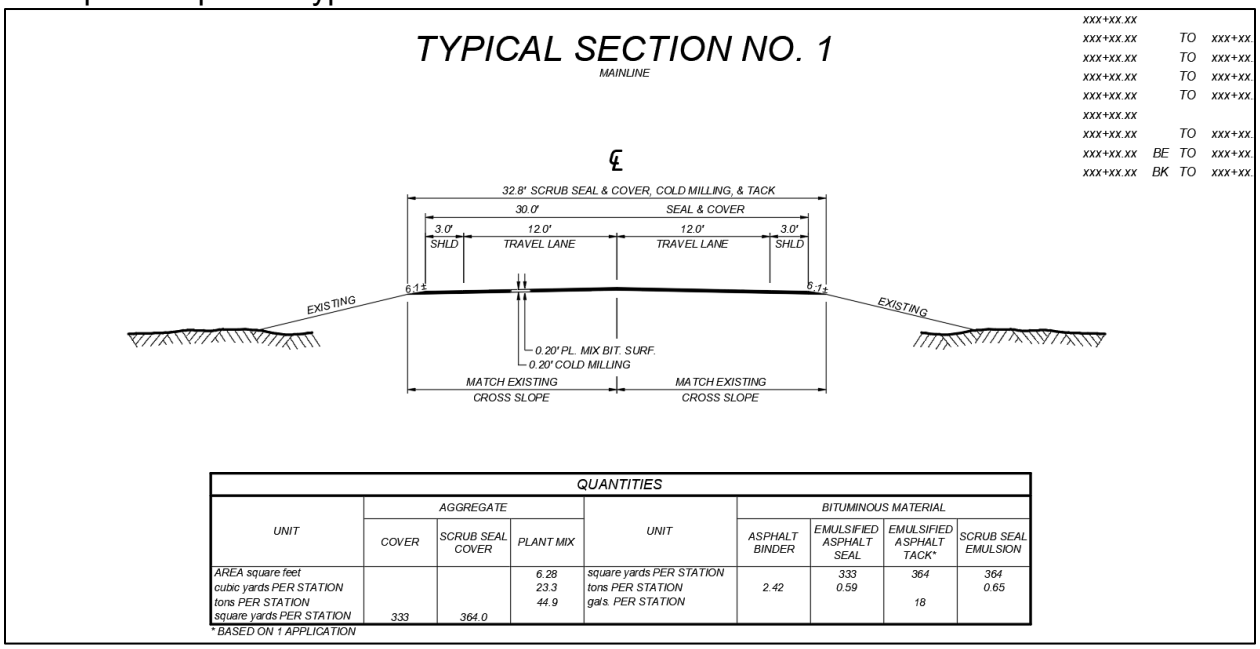
    Delete the Quantities block and instead insert the ***T-TableSuperelevation*** block. Snap it to the midpoint of either the horizontal split border or the bottom border, depending on which half the superelevated typical is located. Then **explode** the block and update the table values as appropriate.

Completed Example – Pavement Preservation Project

Example of a completed typical section for a scrub seal in model space:



Example of a plotted typical section:



Back to top

Section III. Summary Frames

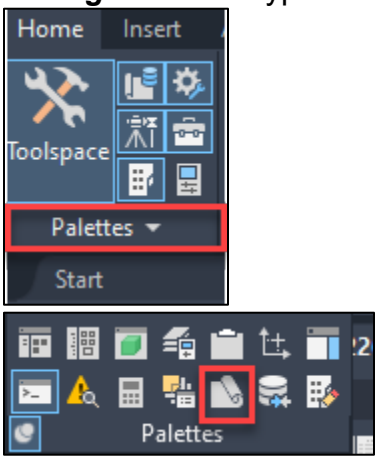
Refer to the Summary Sheets in Autodesk procedure documentation and the Tips for Summary Sheets in Autodesk document for additional information regarding OLEs.

Back to top

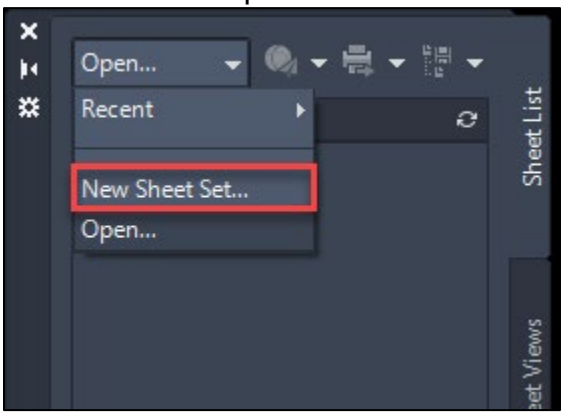
Section IV. Sheet Set Manager (SSM)

Procedure – Create a Sheet Set

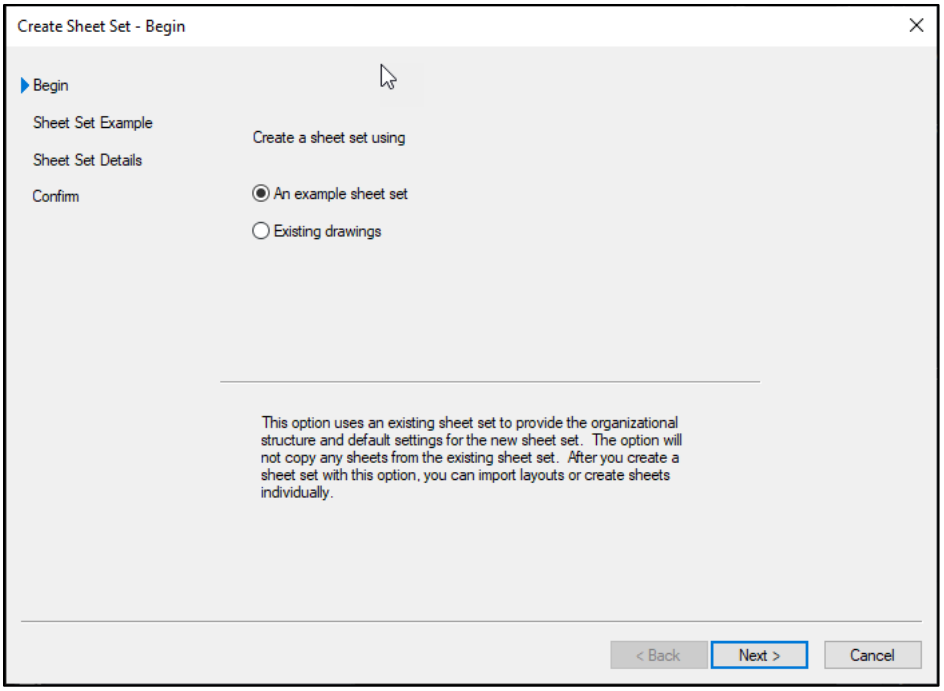
1. In the *Home* tab, select the *Palettes* dropdown menu and select the ***Sheet Set Manager*** icon or type the command ***SSM***.



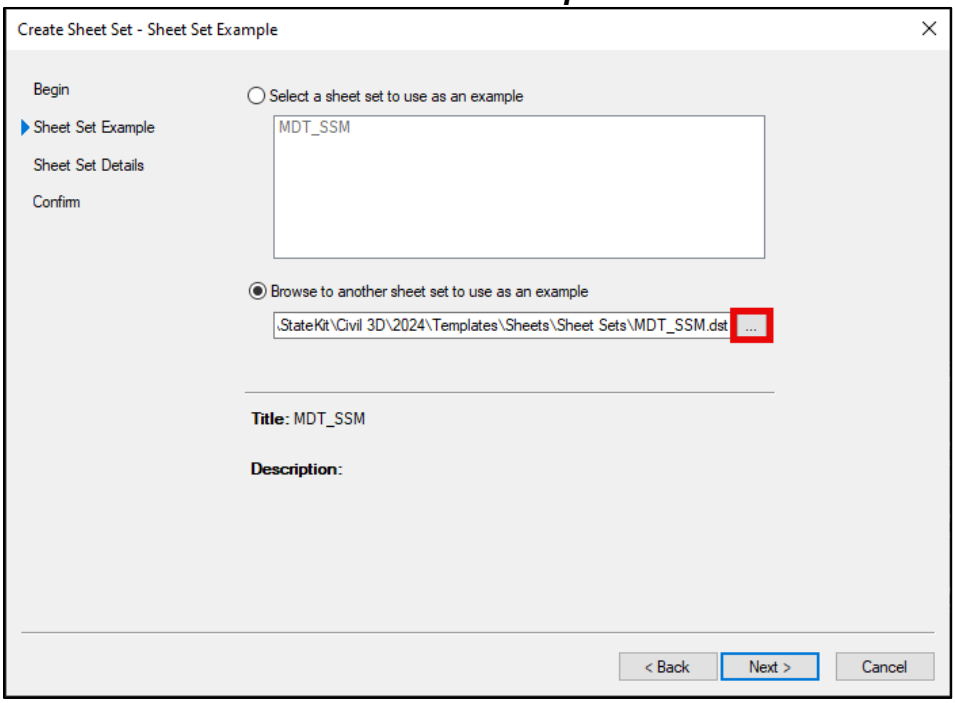
2. In the *Sheet Set Manager* select the *Open…* dropdown menu and select ***New Sheet Set...*** to open the *Create Sheet Set* wizard.



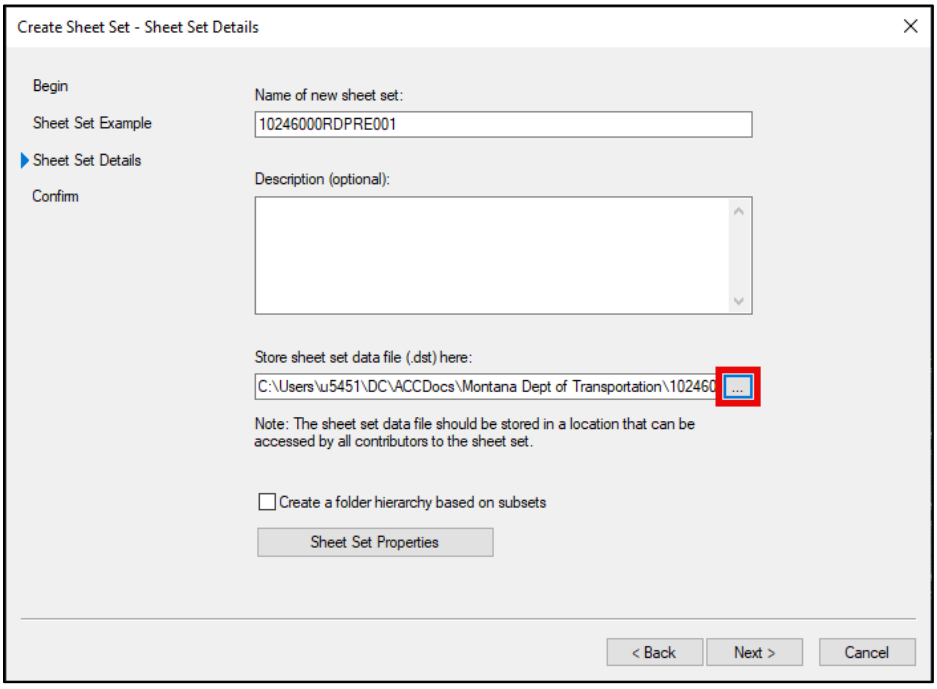
3. In the *Begin* section of the wizard, select create a sheet set using ***an example sheet set***. Then select ***Next***.



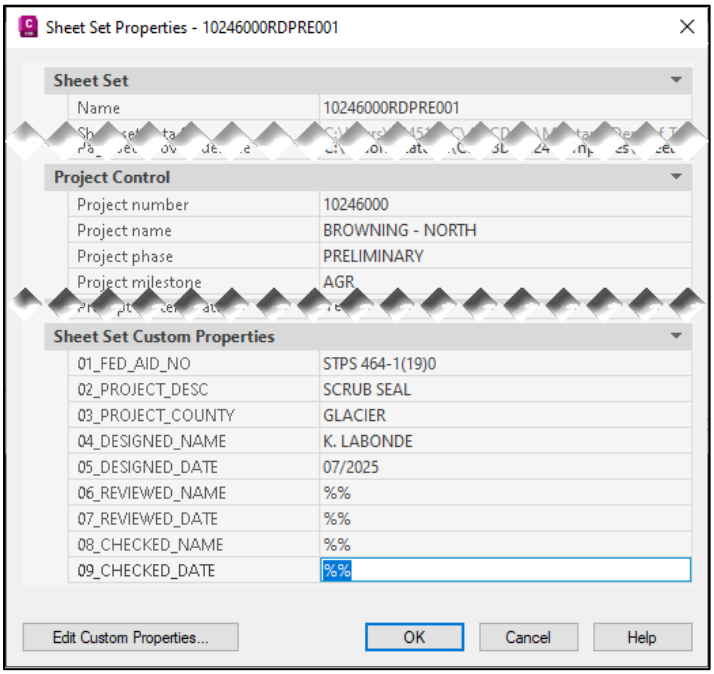
4. In the *Sheet Set Example* section, select the toggle next to ***Browse to another sheet set to use as an example*** and select ***MDT_SSM.dst*** as the sheet set example. If it is not already set, select the ellipsis, then navigate to the following location:
C:\mdoh\StateKit\Civil 3D\2024\Templates\Sheets\Sheet Sets.



5. In the *Sheet Set Details* section, name the sheet set **[UPN#]RDPRE001** and add a description if desired. Use the ellipsis to set the location for the sheet set data file and browse to the project's RD folder on BIM 360/ACC.



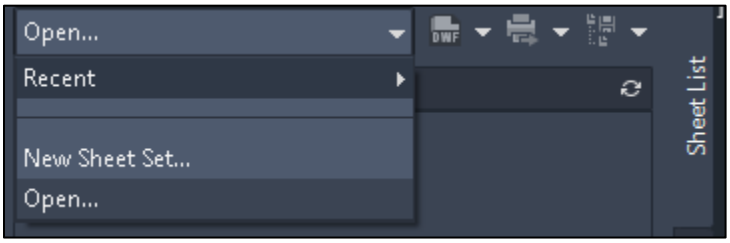
6. Click the ***Sheet Set Properties*** button and populate the custom properties with the appropriate project information in the *Project Control* and *Sheet Set Custom Properties* sections. Type **%%** to blank out a field, such as the reviewed and checked names and dates, until it is ready to be populated later. Setting the properties will automatically populate all title blocks with the project information when layouts are added to the sheet set.



NOTE: The *Sheet Set Custom Properties* can be accessed and edited again by right clicking the open sheet set in the SSM and selecting ***Properties…***.

7. In the *Confirm* section, verify that the settings are correct and click ***Finish*** to create the sheet set.

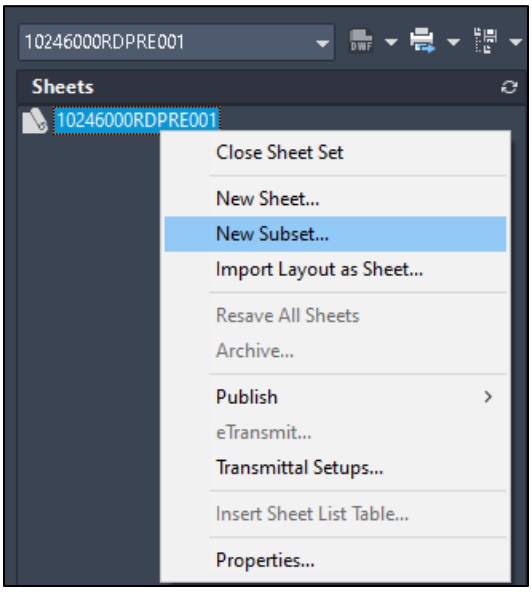
8. Open the sheet set in the Sheet Set Manager by clicking the ***Open…*** dropdown, then clicking ***Open…*** again. Navigate to the project's RD folder in BIM 360/ACC and select the newly created sheet set file.



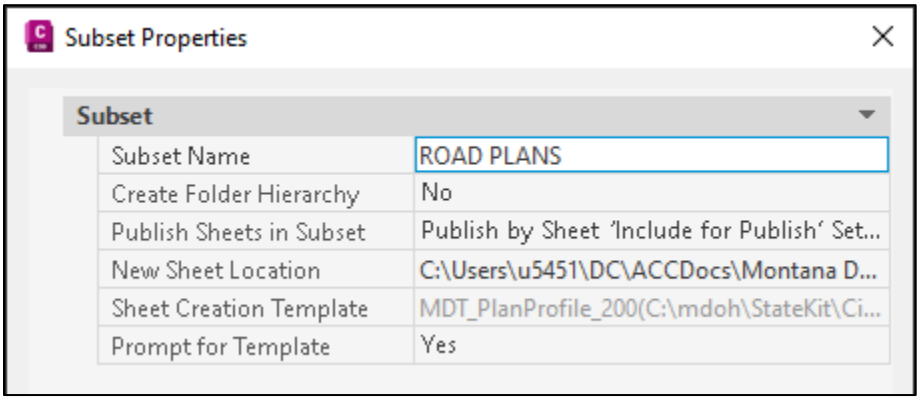
Back to top

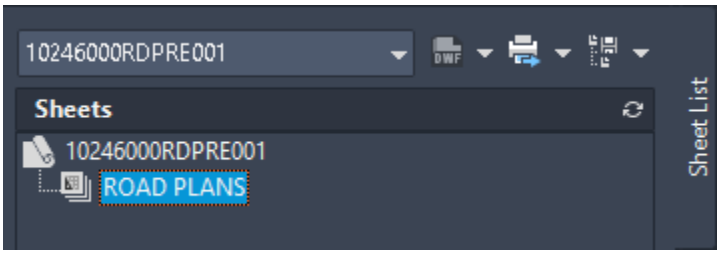
Procedure – Create a Subset

1. Right click on the sheet set in the *Sheet Set Manager* and select ***New Subset...***.



2. Type "***ROAD PLANS***" for the Subset Name as and select ***OK*** in the *Subset Properties* dialog to create the subset.

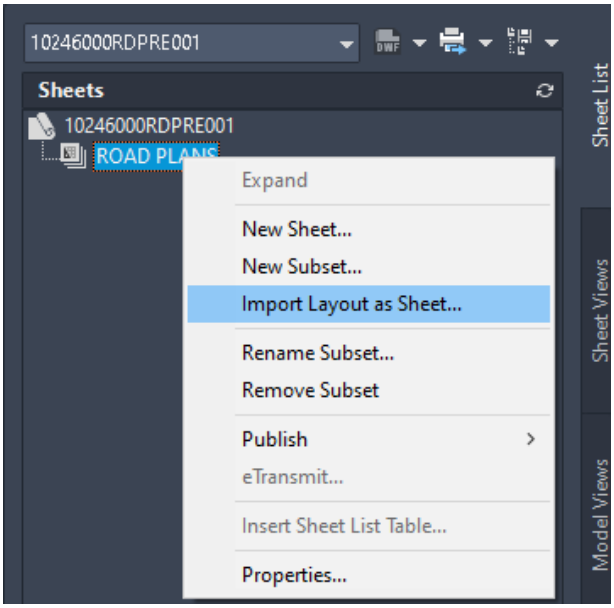




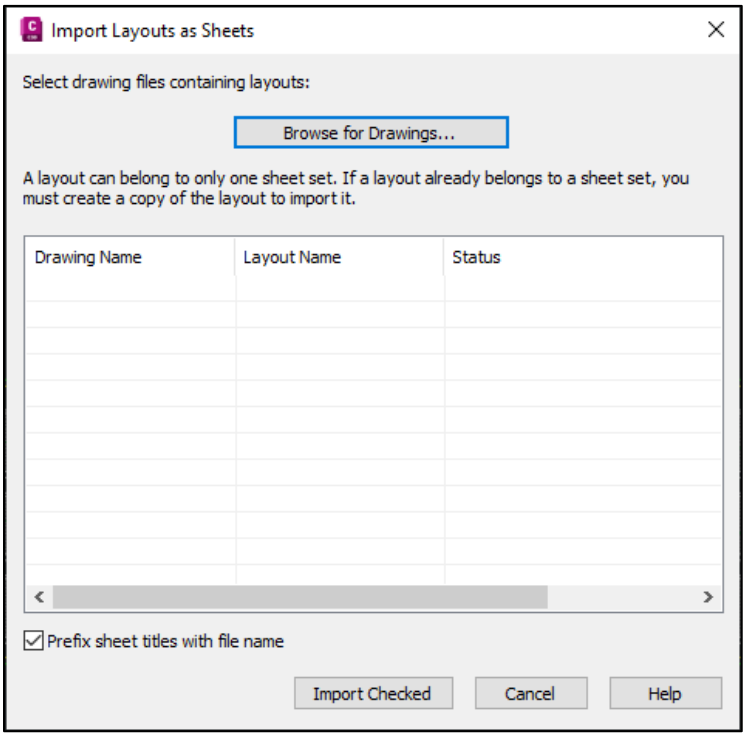
[Back to top](#)

Procedure – Add Sheets to the Sheet Set

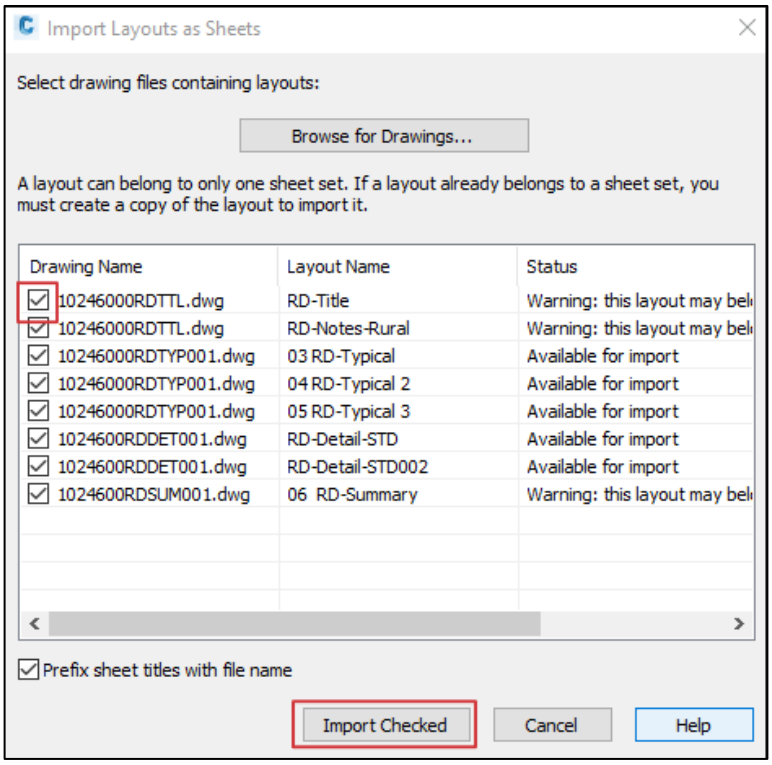
1. Right click on the subset in the *Sheet Set Manager* and select ***Import Layout as Sheet…***



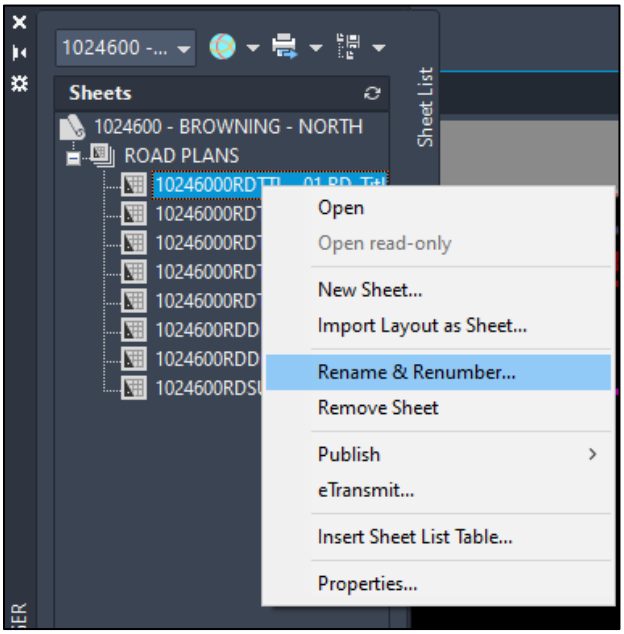
2. In the ***Import Layouts as Sheets*** dialog, select ***Browse for Drawings…***. Browse to the project's RD folder on Autodesk Docs. Using shift or control, select all the drawings containing the desired layouts for plotting and select ***Open***.



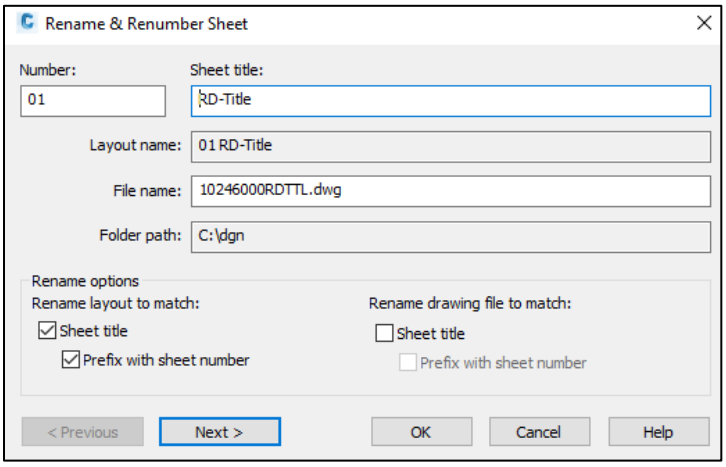
3. Use the checkboxes to select the layouts necessary for plans. Then select ***Import Checked***.



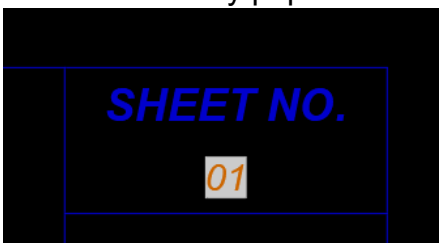
4. Once the layouts are imported, click and drag the layouts into the appropriate sheet order (i.e., Title Sheet, TOC/Notes, Typicals, Summary Frames, etc.). The sheet names and numbers can then be changed by right clicking on a sheet and selecting ***Rename & Renumber…***



5. In the *Rename & Renumber Sheet* dialog, rename and renumber the sheets as desired. Toggle through sheets by selecting the ***Next >*** button.



NOTE: The process of renaming and renumbering the sheet through the SSM will automatically populate sheet numbers on the layouts like shown below.

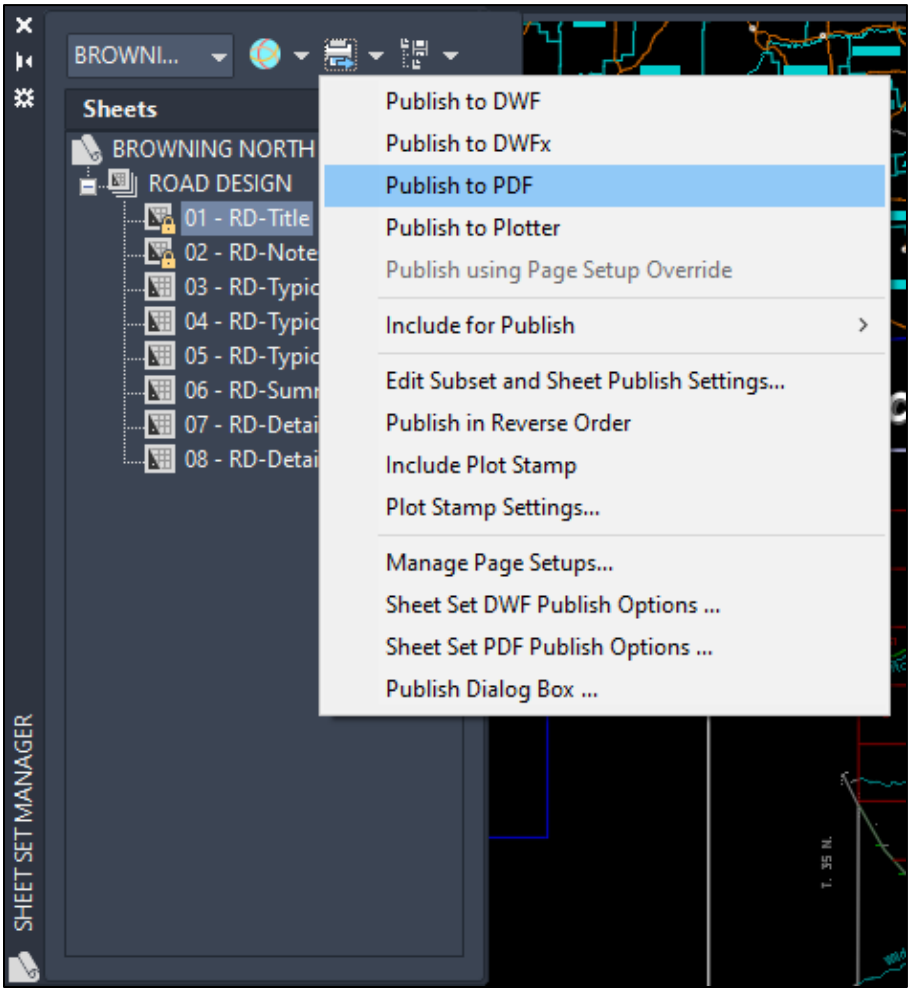


Back to top

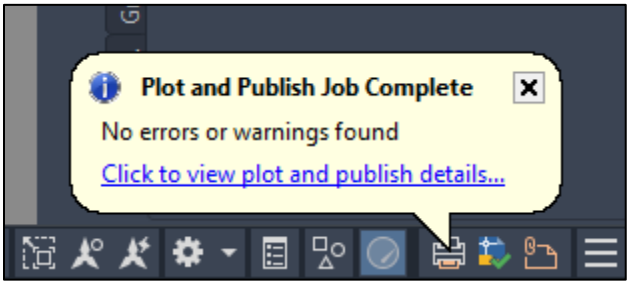
Section V. Plot Sheet Sets

Procedure – Plot a Sheet Set

1. To publish a PDF of a plan set or entire subset, right click either the sheet set or the subset in the ***Sheet Set Manager*** and select ***Publish to PDF***.



2. Select an appropriate location to save the PDF then select ***Print***. A processing window will appear to display progress. Once the print job is complete, the following message will display on the status bar on the bottom right side of the application window, like shown in the image below:



Back to top