

NCDOT – TSMO Unit

ORD Quick Reference Manual

Version 1.0

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Best Design Practices

Please review the following checklist before proceeding to complete a design in ORD. These practices will ensure the best file management practices and lead to high quality designs.

1. Do NOT place copies of old dgn files in the working directory. Use referencing to view old plans, etc.
2. When creating a new design, create a new basemap (time-permitting) and update linestyles to their latest versions at the minimum.
3. Do NOT transfer documents from ORD back to older versions of MicroStation. Linestyles will not scale properly, and the annotation scale will result in improperly sizes cells, line styles, etc.
4. Work strictly from the ProjectWise environment. Exporting files to work may lead to lost files and the inability to recover work if changes are not saved properly.
5. Follow ALL naming conventions for new files, designs, final PDFs.

Plan Type	.pdf Name	CADD File Name
Signal Design (Geometric)	051234-20200515g.pdf	051234_sig_dsn_20200515.dgn
Mutiple Sheet Signal Design	051234-20200515g#.pdf	All sheets in one file as above
Temporary Signal Plan	051234-20200515g-t#.pdf	051234T#_sig_dsn_20200515.dgn
Temporary Signal Plan Revision	051234-20200515g-r#-t#.pdf	051234T#_sig_rev#_20200515.dgn
Single Metal Pole Loading Sheet	051234-20200515m#.pdf	051234_sig_m#_20200515.dgn
Multiple Metal Pole Loading Sheet	051234-20200515m#&#.pdf	All sheets in one file as above
Signal Revision	051234-202005155g-r#.pdf	051234_sig_rev#_20200515.dgn
Plan of Record (POR)	051234-20200515g-por.pdf	051234_sig_por_20200515.dgn
Plan of Record with Revision	051234-20200515g-r#-por.pdf	051234_sig_por_20200515.dgn
Project Title Sheet (TIP)	Z-6789 tsh.pdf	Z-6789_sig_tsh_20200515.dgn
Electrical Programing Details	051234-20200515e.pdf	051234_sm_ele_20200515.dgn
Multiple Sheet Electrical Detail	051234-20200515e#.pdf	All sheets in one file as above
Signal Communication Plans (SCP)	Z-6789scp#.pdf	Z-6789scp.dgn (All sheets in one file)
Project Special Provisions (PSP)	Z-6789 Signal PSP.pdf	Z-6789_Signal_PSP.docx

051234 = Signal Inventory Number without the Dash (05-1234)
 Date plan was sealed in Year, Month, and Day format, no slashes (5/15/2020 = 20200515)
 Signal Plan = g/sig_dsn; Electrical Detail = e/sm_ele; Metal Pole = m/sig_mp; Revision = r/sig_rev
 # = Sheet or Temporary Number, as needed with multiple sheets or designs; do not number if only 1 is used
 Z-6789 = TIP Project Number

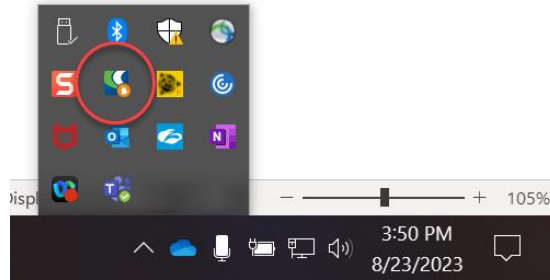
NOTE: Signal Communication Plans are not the same as ITS plans; they are separate documents.

6. Remove all unsealed PDFs at the end of the project lifecycle from the project working directory.
7. Ensure to remove the seal from all final dgn files and move the final plan to the respective CADD Archive folder.

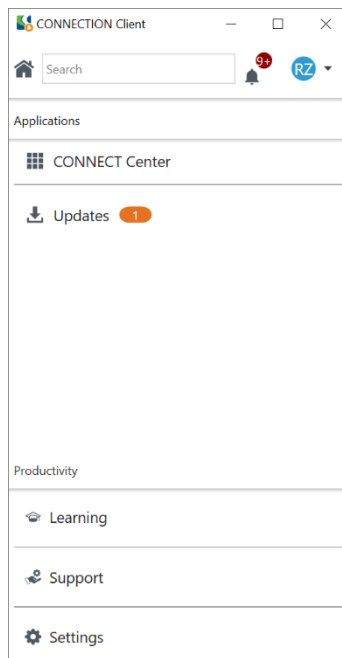
Logging into ProjectWise

There are a couple steps that you must follow to log in to ProjectWise for the first time. *This should only be necessary the first time ProjectWise Explorer is launched and will open straight to the file directory in future attempts.*

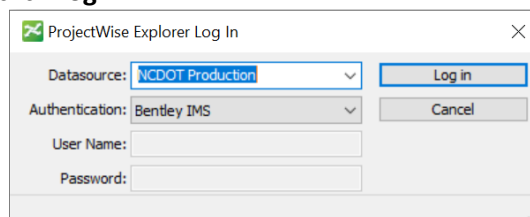
1. Navigate to the Notification Area of your Taskbar and look for the **Connection Client** icon:



2. Ensure that you are logged in, it only requires your NCDOT email and should look like this when complete:



3. Launch **ProjectWise Explorer**, this is in the **Bentley** folder of your Start Menu. When you are prompted to login, select **NCDOT Production** as your Datasource, and **Bentley IMS** as your authentication, then click **Log in**:

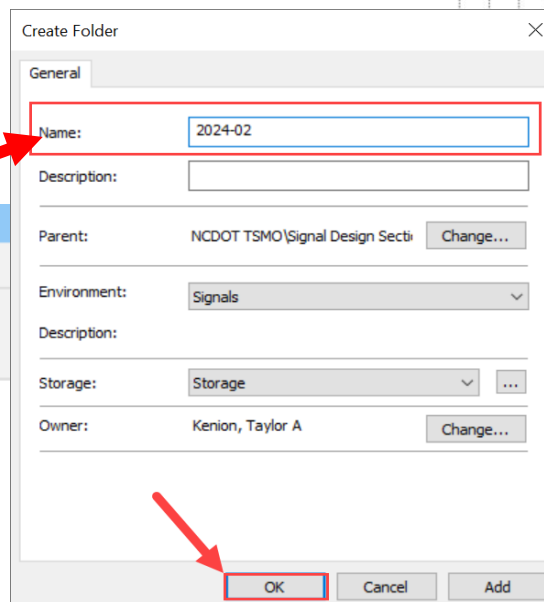
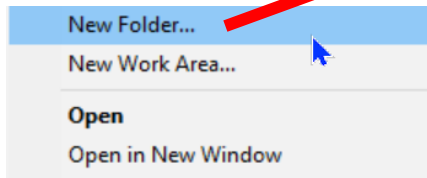
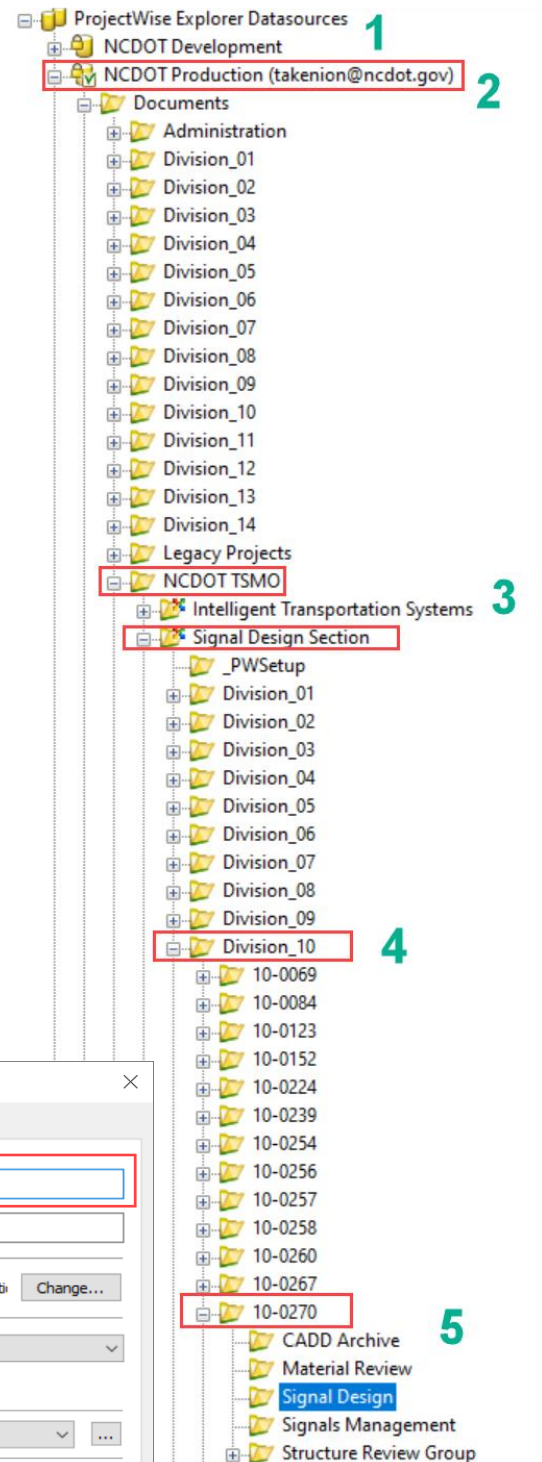


Creating a New Project Folder

1. Launch ProjectWise and Navigate to the NCDOT Production folder.
2. Select the plus (“+”) icon to expand the Production folder, expand the “Documents” folder, and navigate to the **NCDOT TSMO** folder.
3. The TSMO folder is divided into sections based on each respective unit. Select the respective folder for your unit (ITS or Signal Design Section*) and project folders for the 14 Divisions should become visible below the NCDOT TSMO folder.

* The **Intelligent Transportation Systems** folder contains working directories for the ITS Group, Metropolitan Signal Systems Group and the Signal Communications Group. The **Signal Design Section** folder contains working directories for Signal Design, Signals Management and the Structure Review Group.

4. Select the respective Division corresponding to the project and locate the signal inventory number. For each Division_XX folder, all signal inventory numbers should have their corresponding project folders within them, for example 10-0270 is in the Division 10 folder. *If the signal inventory number is not visible, a new folder will need to be created (see [Creating a New Signal Inventory Folder](#))*
5. Select the plus (“+”) icon on the signal inventory number and highlight the **Signal Design** folder.
6. Right Click on the Signal Design Folder and select “New Folder”.
7. Fill in the field for “Name” using the standard four character year followed by the two digit month code (i.e., YYYY-MM) and click OK.
8. The new project folder is now created for use during the life of the project.



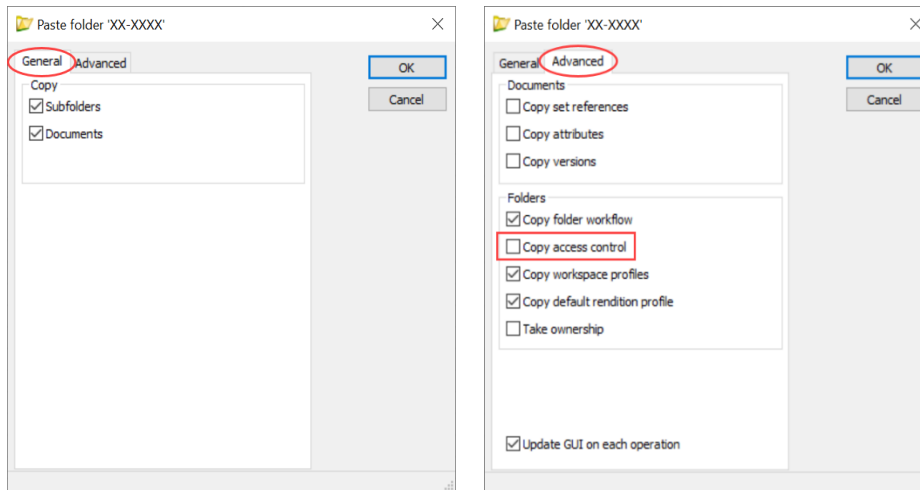
Creating a New Signal Inventory Folder

If a new signal inventory folder is necessary (i.e., new installation, no plan on record, etc.), follow these steps to create a new folder in the proper location:

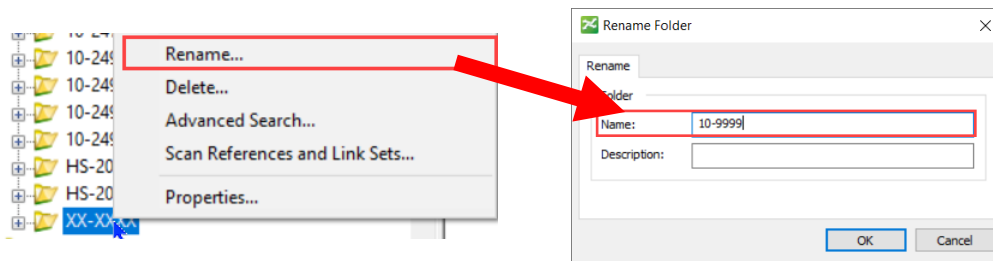
1. Navigate to the **Seed Files** folder located within the **NCDOT TSMO** folder.
2. Locate the seed file structure named "XX-XXXX", right click and select Copy.



3. Navigate to the appropriate Division Project folder (i.e., for a new signal in Division 10, place the structure in the Division 10 folder), right click and select Paste.
4. In the pop-up menu to "Paste Folder", under the General Tab ensure Subfolders and Documents are checked. Under the Advanced tab, ensure Copy Access Control is NOT checked and click OK. See below for more information.

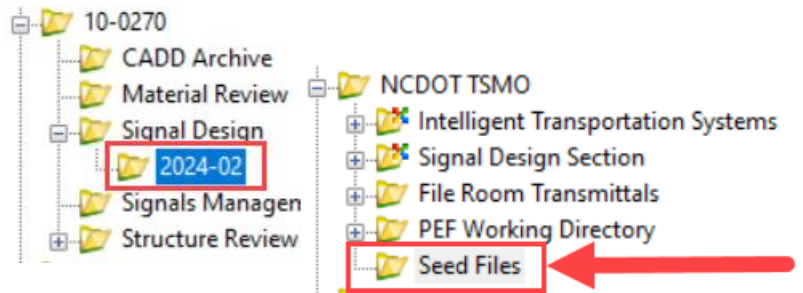


5. Once the file structure has been pasted into the working directory, the new folder will be stored at the bottom of the Division folder in which it was created.
6. To rename the folder, right click on the folder and click Rename.
7. Rename the folder to the appropriate signal inventory number and click OK. The new file has been created.



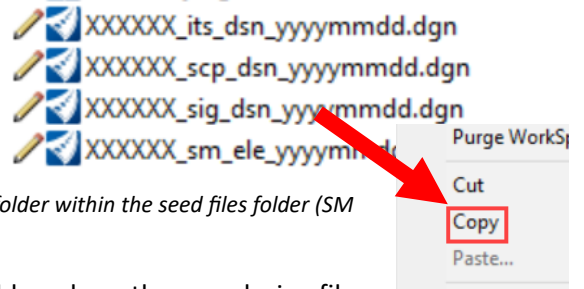
Creating a New Design File

1. Create a new project folder for the signal project. See [Creating a New Project Folder](#).
2. Open the project folder where a new design file is needed, for example 10-0270.



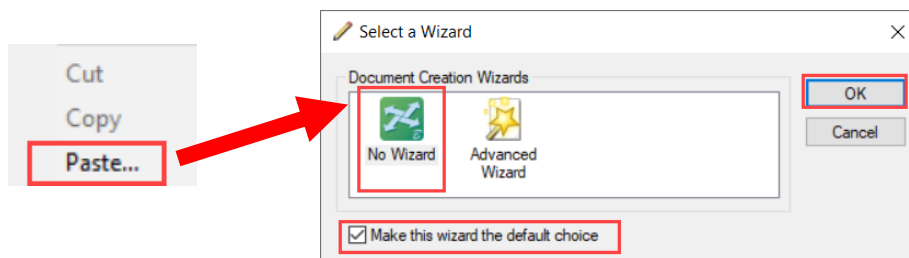
3. Navigate to the **Seed Files** folder located within the **NCDOT TSMO** folder.
4. Right click on the preferred seed file and select “Copy”.

- a. “its” – ITS design blank seed file
- b. “scp” – Signal Communications blank seed file
- c. “sig” – Signal design blank seed file
- d. “ele” – Electrical design blank seed file*

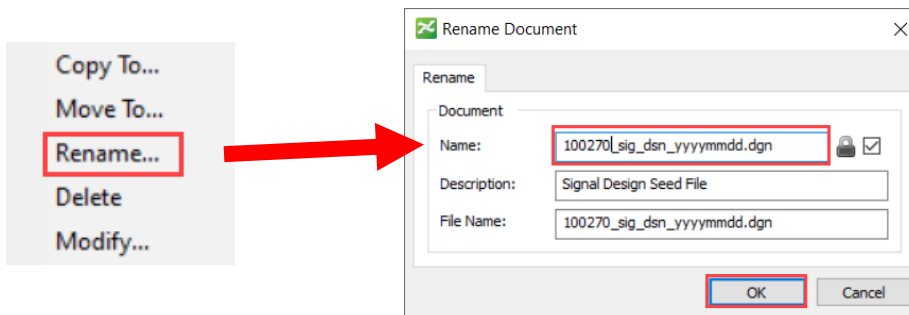


* If a start drawing is necessary, please see the “SM Start Drawings” folder within the seed files folder (SM Only).

5. With the seed file copied, navigate back to the project folder where the new design file is needed.
6. Right click within the project folder and select paste.
7. Select “**No Wizard**” and ensure the box is checked to “**Make this wizard the default choice**”. Click **OK**. *This step may be omitted if the option has already been selected.*



8. With the seed file placed in the project folder, right click on the seed file and click “Rename”.
9. Adjust the name of the file as necessary (see the Signal Design Manual for more details).





10. Click OK to confirm changes to the file name.
11. The file has been created. To open the file, double click on the design file to launch OpenRoads Designer.

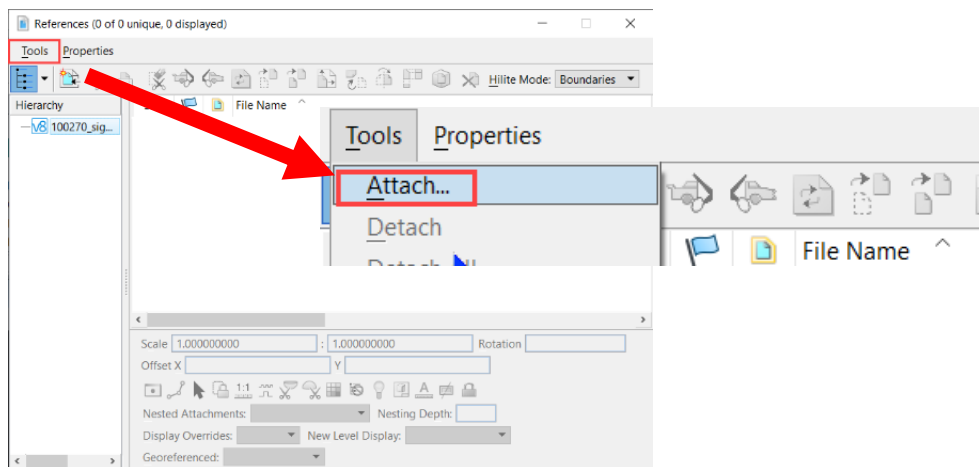
Designing in OpenRoads Designer


Referencing Files

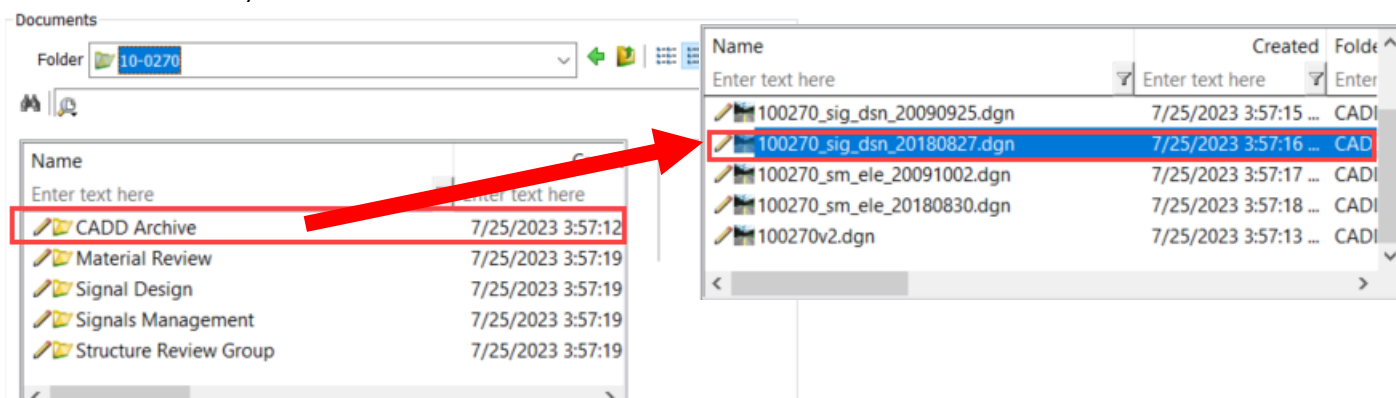
When creating a new design file, the best practice is to reference the previous CADD file from the CADD Archive folder and merge the file into the new design file to make modifications. To reference a file, follow the below for step-by-step instructions to reference a file*.

*** When referencing a file from an outdated version of MicroStation Connect Edition, several steps must be taken to ensure line styles scale properly. See step 6 for more information.**

1. Under the NCDOT_SIG tab in the Drawing workflow, select the  Attach Tools ▾ drop-down menu.
2. Select  References
3. In the Reference flyout, select “Tools” in the upper left corner.
4. Select “Attach”.



5. In the Attach Reference menu, click the “Up One Level”  button 2 times to navigate to the main Signal folder then select the **CADD Archive folder**. This folder contains all previous design files that were sealed. Select the plan with the previous seal date and click OK (or double click the file name).




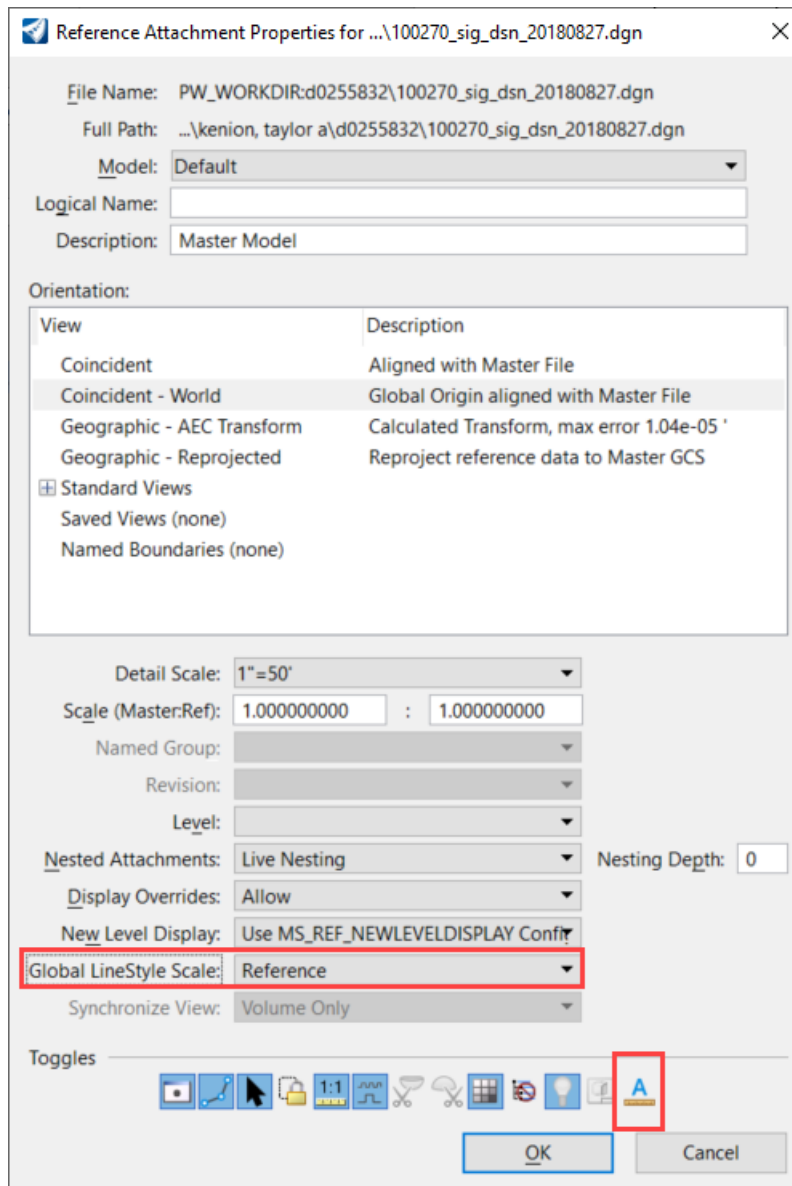
6. If the file being referenced was created in an old version of MicroStation, such as V8i or SS2, please see the below section on [“Reference Settings for MicroStation Connect Edition Files”](#). Otherwise, proceed to [“Reference Settings for OpenRoads Designer Connect Edition files”](#).

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Reference Settings for MicroStation Connect Edition files

Due to the nature of line style scaling in previous versions of MicroStation, when merging files into OpenRoads, several settings must be adjusted on the reference menu before finalizing the reference. See below for step-by-step instructions to finalize the import of the reference file.


7. In the Reference Attachment Properties menu, change the Global LineStyle Scale to “Reference”.
8. Disable the “Use Active Annotation Scale” setting by clicking the  button, making sure the icon is no longer highlighted. See below for a complete view of the proper reference settings.
9. Due to the nature of line styles in Microstation, the annotation scale of the new file must match the drawing scale of the previous plan (i.e., if the scale of a plan was 30 Scale, set the Annotation Scale in the new file to 1”=30’).

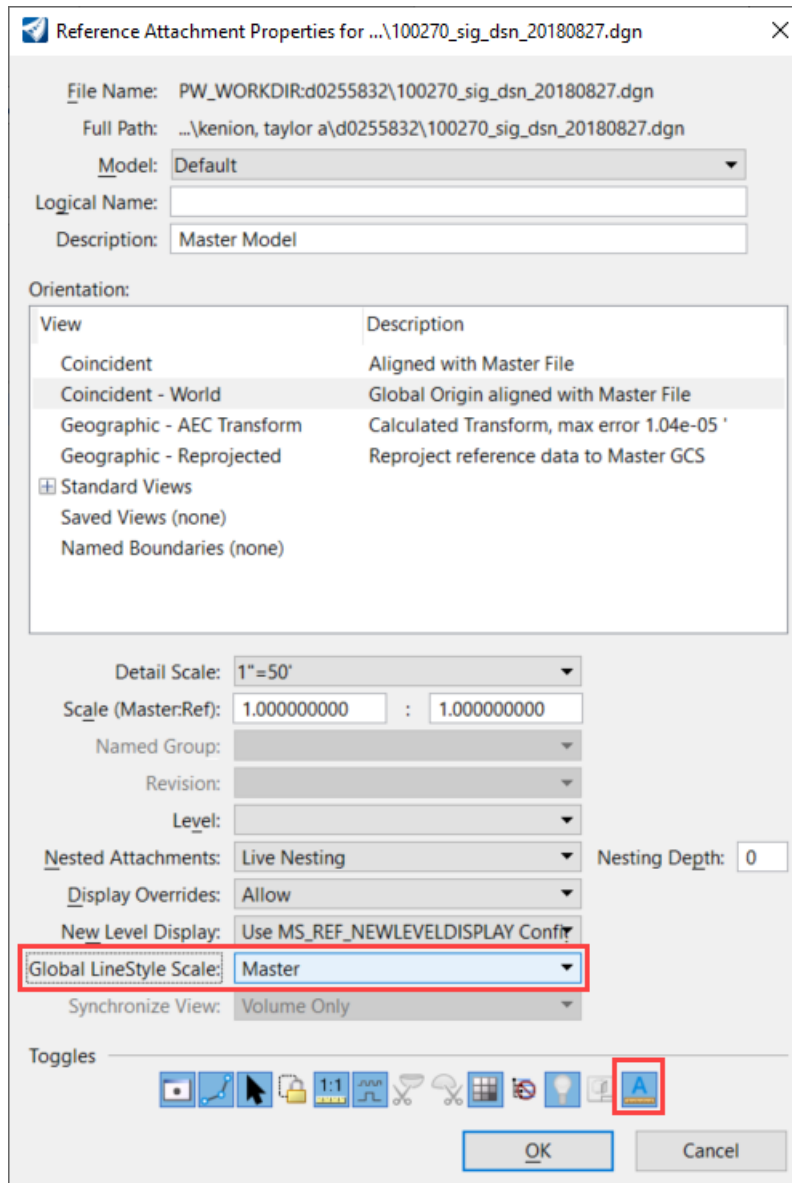


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Reference Settings for OpenRoads Designer Connect Edition files

If referencing a file created using current line styles in OpenRoads Designer, no changes to the reference settings are necessary. See the below instructions for the reference settings of a file created in OpenRoads Designer.

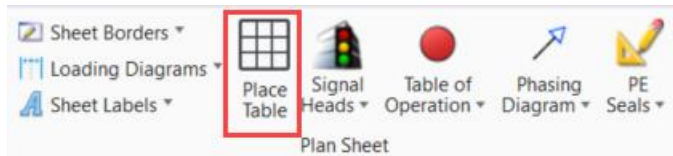
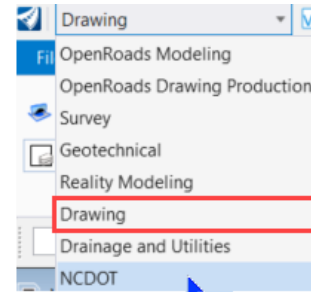
7. In the Reference Attachment Properties menu, ensure the Global LineStyle Scale is set to "Master".
8. Ensure "Use Active Annotation Scale" is toggled on. Verify that the  is highlighted in blue as shown. See below for a complete view of the proper reference settings.



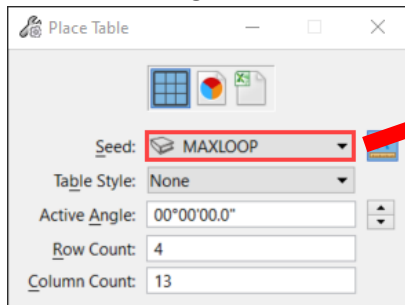
Creating the Loop Chart and Timing Chart

Filling in the loop and timing charts is now easier than ever due to the ability to add and remove columns at the click of a button, similar to using Microsoft Excel. To bring in a chart and fill it in, follow these steps:

1. Ensure the Active Workflow is set to Drawing. The workflow may be accessed in the drop-down menu located in the upper left corner of the screen.
2. Select the NCDOT_SIG tab. Locate and select the “Place Table Tool” located in the Plan Sheet tool selections.



3. In the Place Table pop up menu, use the drop-down menu under the Seed section to select the proper table type (in this example, MAXLOOP – Maxtime Loop Chart) and place the table by left-clicking to confirm.



MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
				-				X	-	X	-	-

4. With the table placed, all cells are editable fields that can be modified by double clicking on the cell or by using the edit text tool and selecting a cell.
5. To add rows/columns to the chart, first select the table by clicking anywhere within the table. ORD should automatically select the “Table Tools” tab where all tabular tools are stored.
6. Use the Rows/Columns tool kit to insert rows above, below, left or right.

MAXTIME DETECTOR INSTALLATION CHART												
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)	TURNS	NEW LOOP	CALL PHASE	DELAY TIME	EXTEND TIME	EXTEND	ADDED INITIAL	CALL	DELAY DURING GREEN	NEW CARD
				-				X	-	X	-	-

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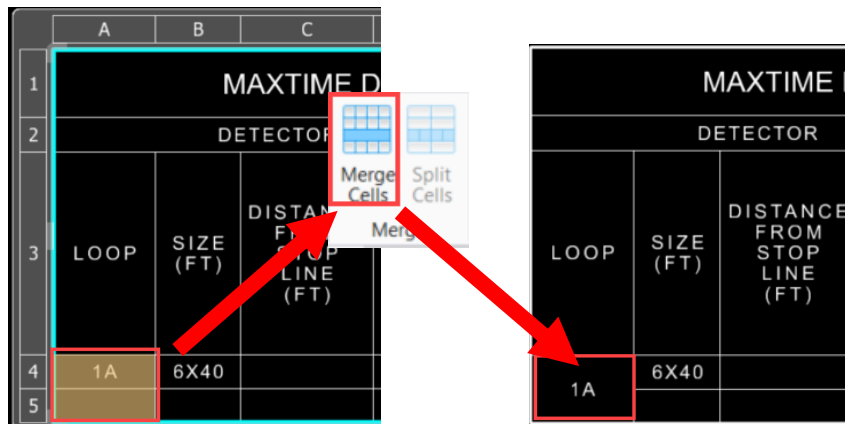
Merging Cells within Tables

With a table placed, several modifications may be necessary to properly show a certain configuration. For instance, when showing dual channel loops, the merge cell tool will be necessary to get the proper spacing. To merge cells within a table, follow these steps:

1. Select the two cells that need to be merged by holding CTRL while clicking on each cell. The cells should be highlighted in a light yellow color once selected.

	A	B	C
1	MAXTIME D		
2	DETECTOR		
3	LOOP	SIZE (FT)	DISTANCE FROM STOP LINE (FT)
4	1A	6X40	
5			

2. Under the Table Tools, select the Merge Cells tool. The two cells should be merged.

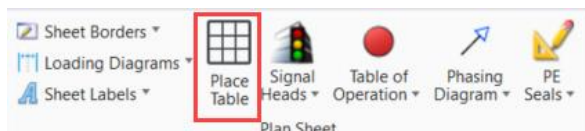
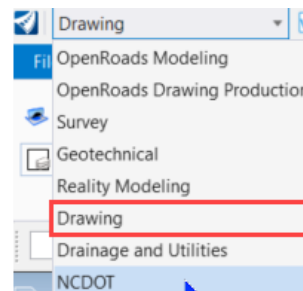


3. Repeat this process for each cell which needs to be merged.

Creating the Table of Operation

Filling in the loop and timing charts is now easier than ever due to the ability to add and remove columns at the click of a button, similar to using Microsoft Excel. To bring in a chart and fill it in, follow these steps:

1. Ensure the Active Workflow is set to Drawing. The workflow may be accessed in the drop-down menu located in the upper left corner of the screen.
2. Select the NCDOT_SIG tab. Locate and select the “Place Table Tool” located in the Plan Sheet tool selections.



3. In the Place Table pop up menu, use the drop-down menu under the Seed section to select the proper table type (ToOP) and place the table by left-clicking to confirm.

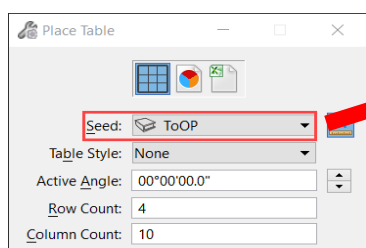
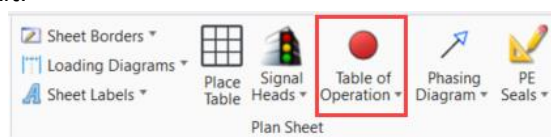


TABLE OF OPERATION							
SIGNAL FACE	PHASE						
	01+5	01+6	02+5	02+6	03+7	03+8	04+7

4. To add rows/columns to the chart, first select the table by clicking anywhere within the table. ORD should automatically select the “Table Tools” tab where all tabular tools are stored.
5. Use the Rows/Columns tool kit to insert rows above, below, left or right and to delete columns of unnecessary phases (See Creating the Loop Chart and Timing Chart for more information).
6. To add the operational icons to the table, select the Table of Operation drop down menu from the Plan Sheet tool kit.



7. Select the appropriate icon, and enable the Center Snap by double clicking on the Center Snap icon.



8. With the appropriate icon selected and the Center Snap enabled, hover over the location in the table in which the icon needs to be placed. The icon should snap to the center of the cell in which the icon needs to be placed. Left click to confirm the placement.


SIGNAL FACE	02+6	04+8
21,22		

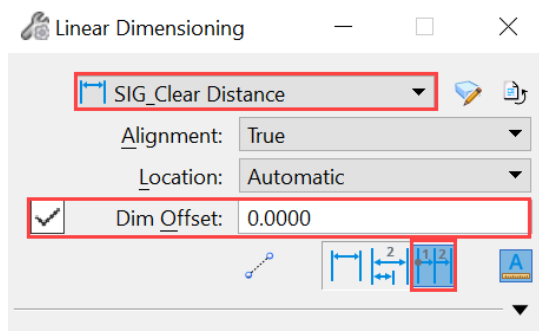
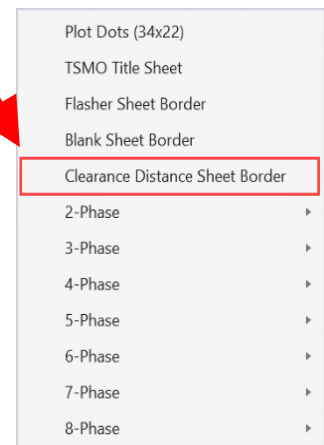
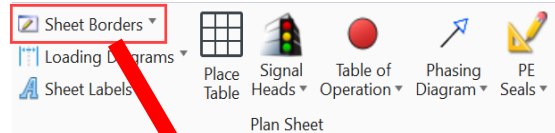
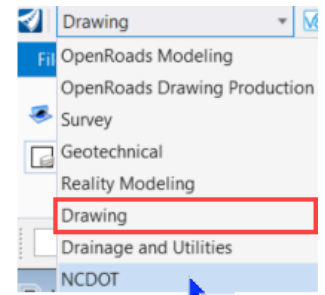


SIGNAL FACE	02+6	04+8	FLASH
21,22	G		

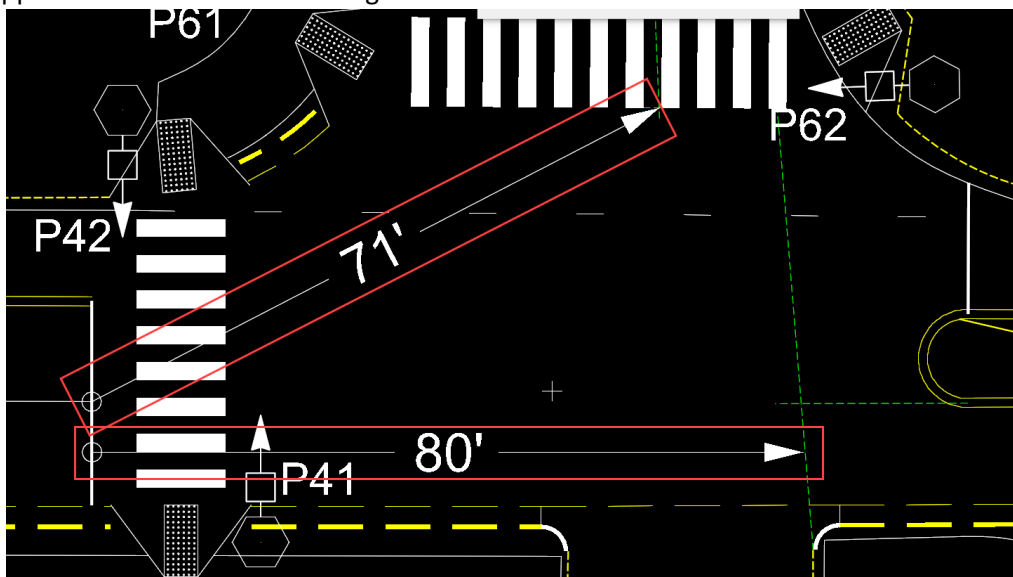
Clearance Distance Sheets

To create a clearance distance sheet in ORD, follow these instructions:

1. Ensure the Active Workflow is set to Drawing. The workflow may be accessed in the drop-down menu located in the upper left corner of the screen.
2. Select the NCDOT_SIG tab. Locate and select Sheet Borders located in the Plan Sheet tool selections.
3. Click Clearance Distance Sheet Border to select the border.
4. Place the Clearance Distance Sheet Border in the drawing and establish the basemap and clearance distance lines that are necessary.
5. Select the Dimension Linear tool .
6. In the drop-down menu for style, select the SIG Clear Distance style.
7. Ensure the dimension offset box is checked and set to 0, and select the Linear Single Dimension type.




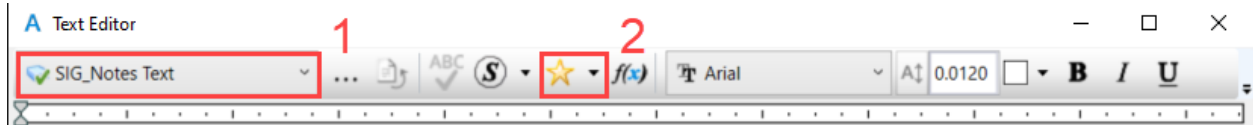
8. Select the point at which the dimension will start followed by the point at which the dimension will terminate. Left click to confirm the selection and place the dimension. The dimension should appear similar to the below image:



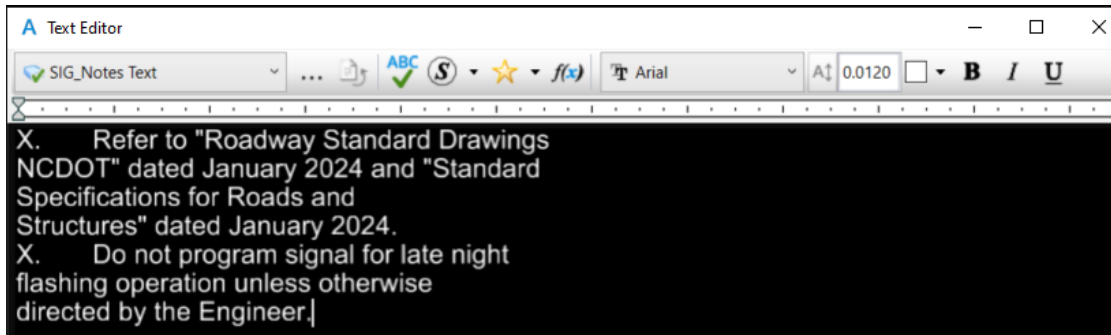
Placing Plan Sheet Notes

As the MDL application that was utilized in MicroStation is no longer supported in ORD, the method of placing notes has changed. The notes for a new plan will now be placed using Text Favorites under the place text tools. See below for in depth steps:

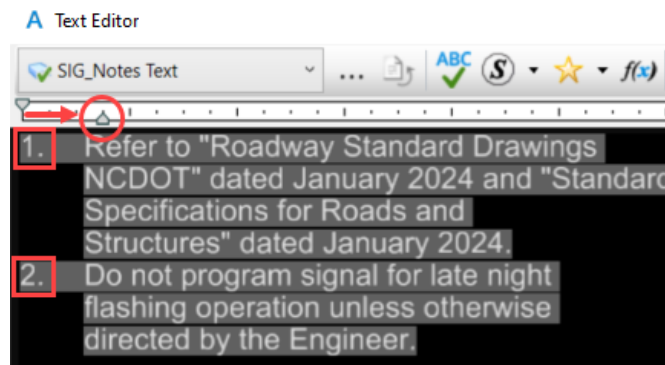
1. Select the Place Text  tool located on the right side of the NCDOT_SIG toolset under the Text tools section.
2. In the Text Editor, select the SIG_Notes Text style from the drop-down menu.
3. With the proper text style selected, navigate to the Text Favorites section of the text editor.



4. Select the relevant notes to the project, starting a new line of text between each selection. The result should look similar to this:



5. To format the text properly, first renumber the text "X." to the proper numbering scheme.
6. Next, select the entire text selection and adjust the indent as shown to ensure the text is inline.



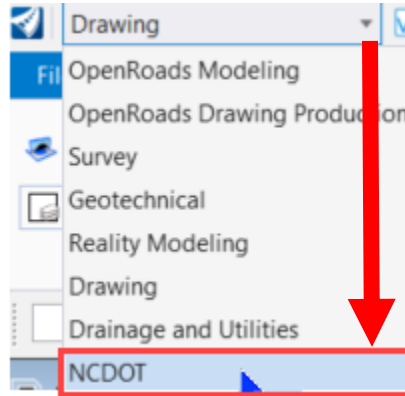
7. The notes may now be placed on the plan sheet by left clicking to confirm at the location where the text is needed.

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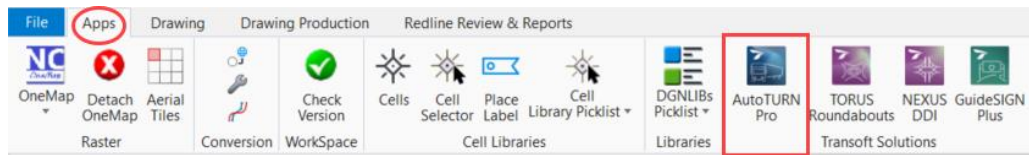
Loading AutoTurn

AutoTurn is utilized to verify stop line locations, check clipping, and ensure vehicles can navigate safely through an intersection regardless of vehicle size. To load AutoTurn, see the following instructions.

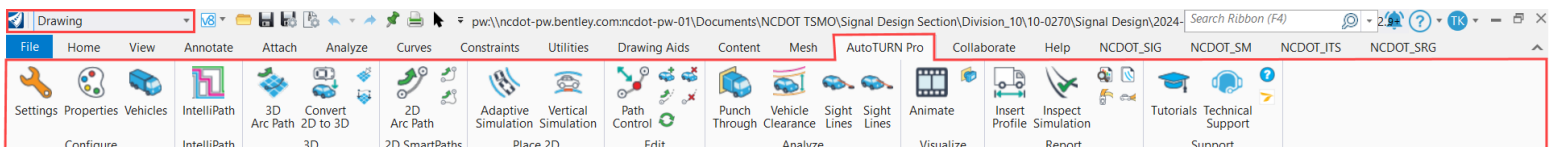
1. In the upper left corner of the screen, set the Active Workflow to “NCDOT” using the drop-down menu.



2. Under the Apps tab within the Transoft Solutions tool set, click the AutoTURN Pro icon to load AutoTurn.




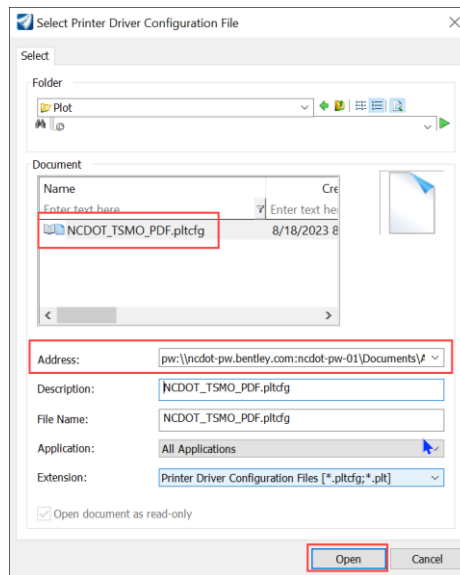
3. In the upper left corner of the screen, set the Active Workflow to “Drawing” using the drop-down menu.
4. The AutoTURN Pro tool kit is now visible. All tools relevant to AutoTURN are in this tab and may now be utilized.



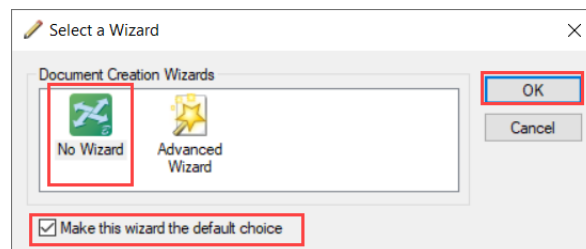
Creating PDFs (Plotting)

Plotting in ORD varies slightly from the previous IPLOT; however, the process is much more straightforward and the ability to create multiple PDFs at a time is quite useful. To prepare a PDF for review, follow these steps:

1. Place a fence around the design file using the plot dots.
2. Select the print  icon in the upper left corner of the screen. This selection will load the Printer Driver Configuration file selector tool.
3. Select the plot configuration file “NCDOT_TSMO_PDF.pltcfg” and click OPEN. *If this is the initial time printing a file*, copy and paste this link in the address bar of the pop up menu, then hit TAB to confirm the address to direct to the correct folder: pw:\\ncdot-pw.bentley.com:ncdot-pw-01\Documents\Administration\Bentley\Configuration_10_12\WorkSpaces\DOT-US North Carolina\Roles\NCDOT_TSMO\Standards\Plot\NCDOT_TSMO_PDF.pltcfg



4. Ensure the proper paper size is selected (ANSI D for Full Size PDFs), and make sure the scale matches the drawing scale. Verify that the pen table “NCDOT_TSMO.tbl” and the design script “PLOT.PEN” are both selected.
5. Click the PRINT TO FILE button. If the Wizard Pop Up appears (see below), select No Wizard and ensure the box is checked to “Make this wizard the default choice”. Click OK to proceed.



6. When the pop up menu appears, the working directory for the current project is automatically selected. If necessary, rename the PDF.
7. Click Save. The PDF will now be saved at the specified location on ProjectWise.