NCDOT – TSMO Unit

ORD Quick Reference Manual

Version 1.1

Updated December 2024

Contents

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

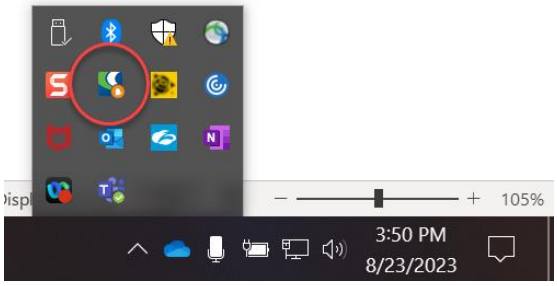
NOTE: Signal Communication Plans are not the same as ITS plans; they are separate documents.

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.

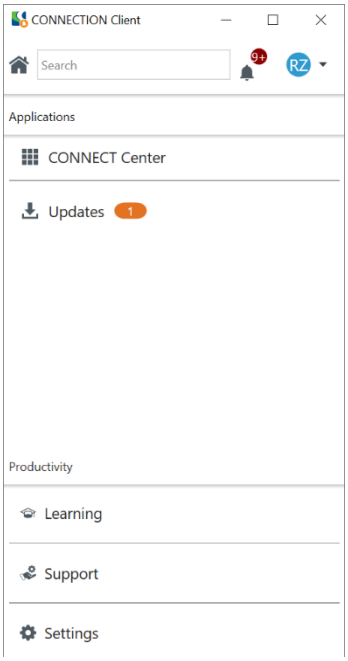
Logging into ProjectWise

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.*

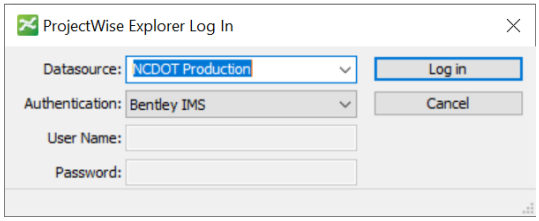
1. Navigate to the Notification Area of your Taskbar and look for the **Connection Client** icon:



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**:

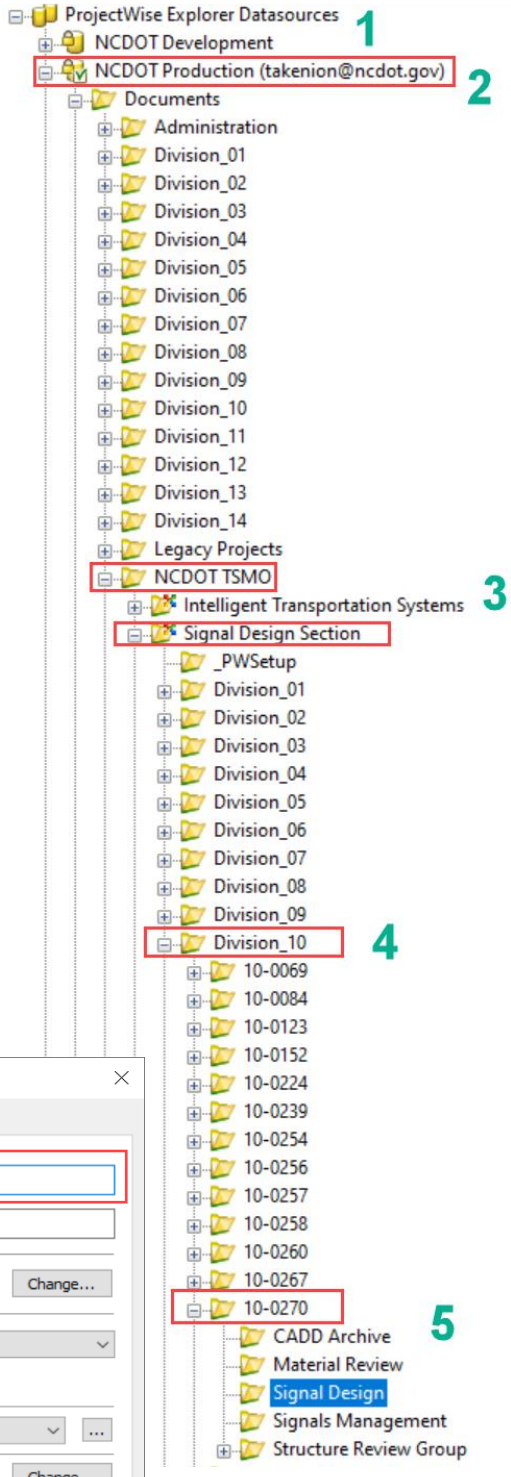


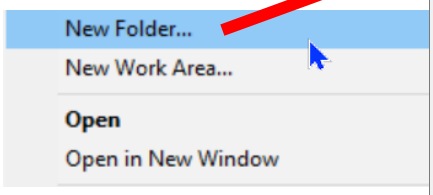
Creating a New Project Folder

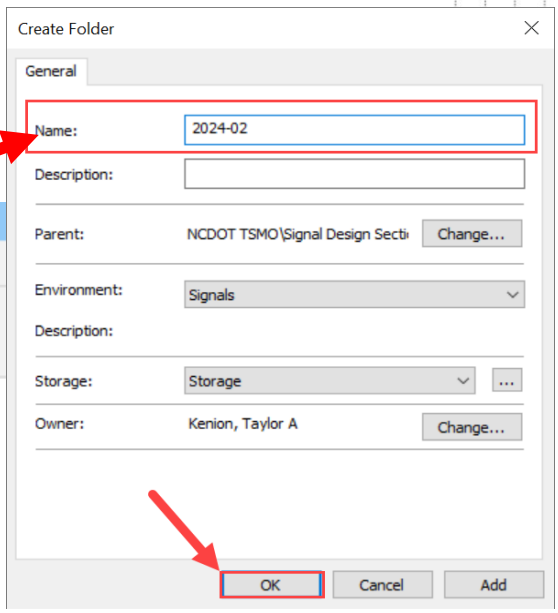
1. Launch ProjectWise and Navigate to the NCDOT Production folder.
2. Select the plus (“+”) icon to expand the Production folder, expand the “Documents” folder, and navigate to the **NCDOT TSMO** folder.
3. The TSMO folder is divided into sections based on each respective unit. Select the respective 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.





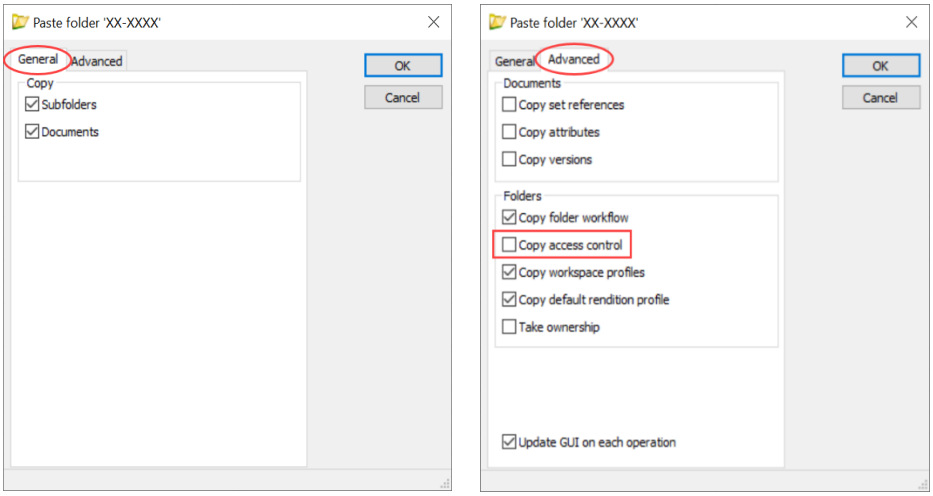


Creating a New Signal Inventory Folder

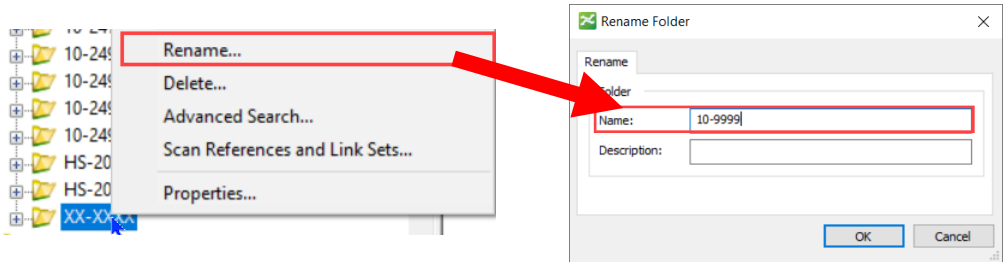
If a new signal inventory folder is necessary (i.e., new installation, no plan on record, etc.), follow these steps to create a new folder in the proper location:

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.

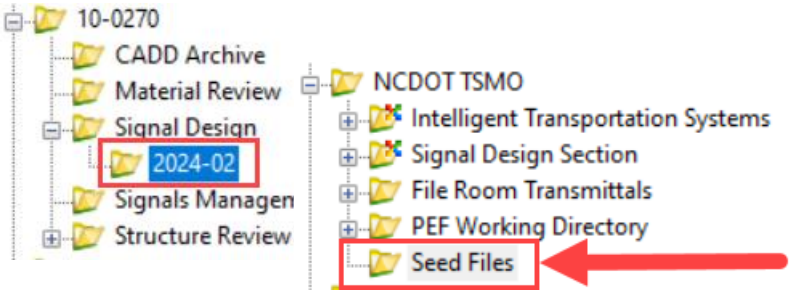
3. Navigate to the appropriate Division Project folder (i.e., for a new signal in Division 10, place the structure in the Division 10 folder), right click and select Paste.
4. In the pop-up menu to “Paste Folder”, under the General Tab ensure Subfolders and Documents are checked. Under the Advanced tab,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



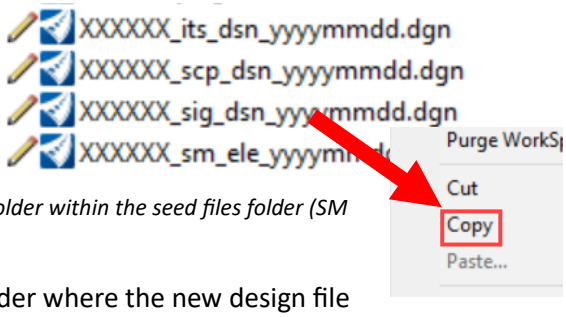
5. Once the file structure has been pasted into the working directory, the new folder will be stored at the bottom of the Division folder in which it was created.
6. To rename the folder, right click on the folder and click Rename.
7. Rename the folder to the appropriate signal inventory number and click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



Creating a New Design File

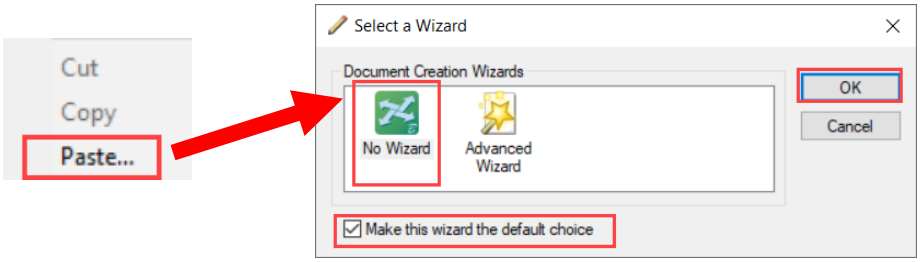


1. Create a new project folder for the signal project. See **Creating a New Project Folder**.
2. Open the project folder where a new design file is needed, for example 10-0270.
3. Navigate to the **Seed Files** folder located within the **NCDOT TSMO** folder.
4. Right click on the preferred seed file 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*

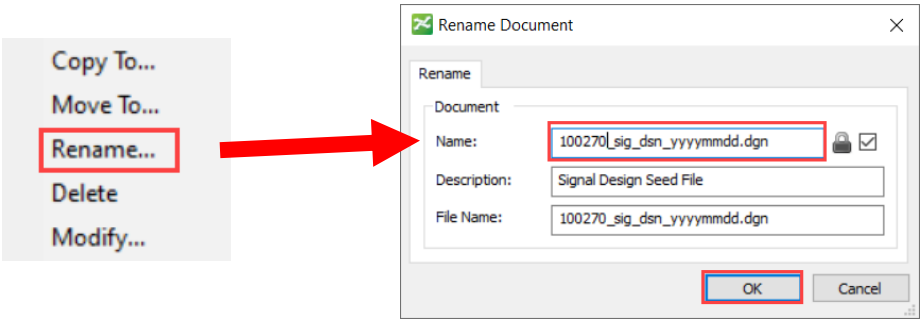


* *If a start drawing is necessary, please see the "SM Start Drawings" folder within the seed files folder (SM Only).*

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).

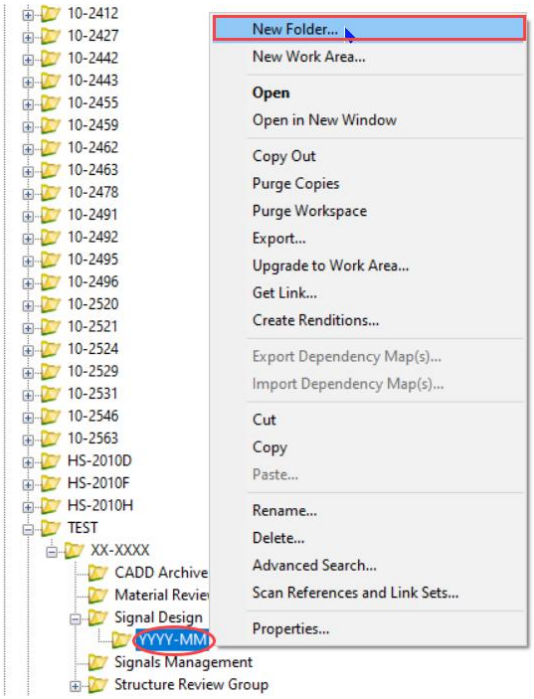


10. Click OK to confirm changes to the file name.
11. The file has been created. To open the file, double click on the design file to launch OpenRoads Designer.

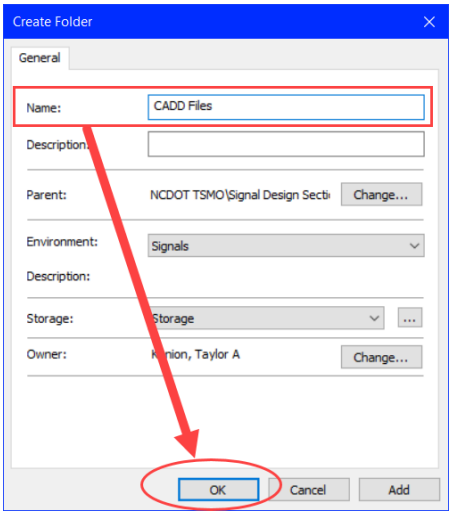
Uploading Reference Material (Alignments, Terrain Models, etc.)

Though the majority of information for all projects going forward should be found on ProjectWise, occasionally information may be received via email. As a result, it is necessary to upload this information to ProjectWise for use in design projects. Note, it is very important to make sure the information that is necessary for a project is uploaded to ProjectWise if referenced in a design file so that anyone may open a file and view the proper information. To upload reference material for a specific project follow these steps:

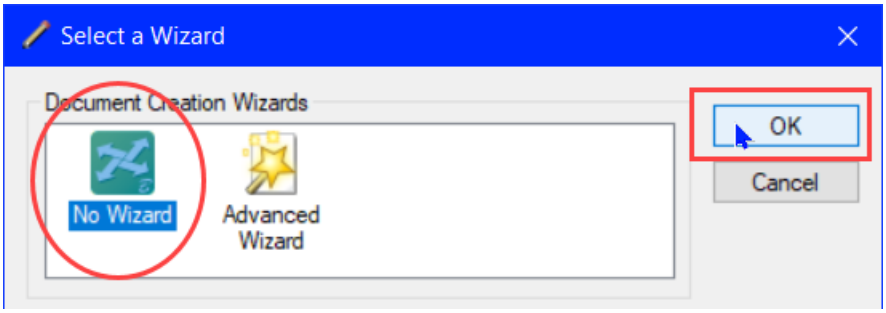
1. Create a new folder in the corresponding project folder by right clicking on the folder where the design file is stored, as shown below (typically the folder labeled YYYY-MM).
2. Select the New Folder button.



3. In the Create Folder pop up window, name the folder “CADD Files”, then click OK to finish creating the folder.



4. The new folder will be opened automatically after creating it. Within the new folder, simply drag and drop the files that need to be uploaded.
5. If the Select a Wizard pop up menu opens, select “No Wizard” and click OK.



6. The files are now uploaded to ProjectWise and may be reference in a design as necessary.

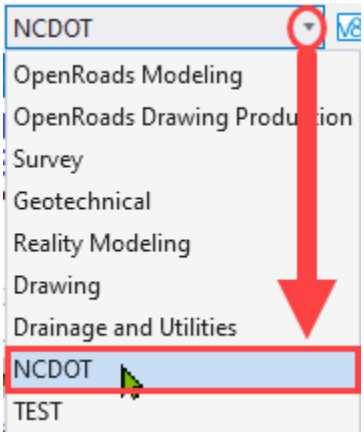
Designing in OpenRoads Designer

Map Tools (OneMap and Bing Maps)

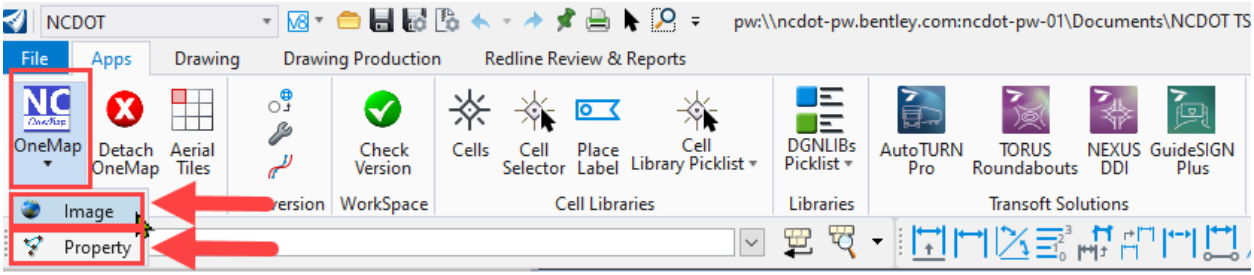
Attaching the OneMap

To aid in basemap creation, the OneMap may be attached using the following steps:

1. Set the Workflow to NCDOT in the upper left corner of the screen. Select the drop-down menu and click NCDOT to select the appropriate workflow.



2. Locate the drop-down menu named “OneMap” and click the icon.
3. Select the “Image” button to attach the OneMap. If Right of Way lines are necessary, the “Property” button may also be clicked to attach county GIS lines in the design file.

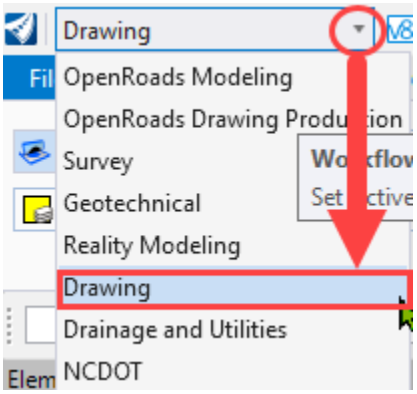


4. To detach the OneMap, select the Detach OneMap tool next to the OneMap drop-down menu.

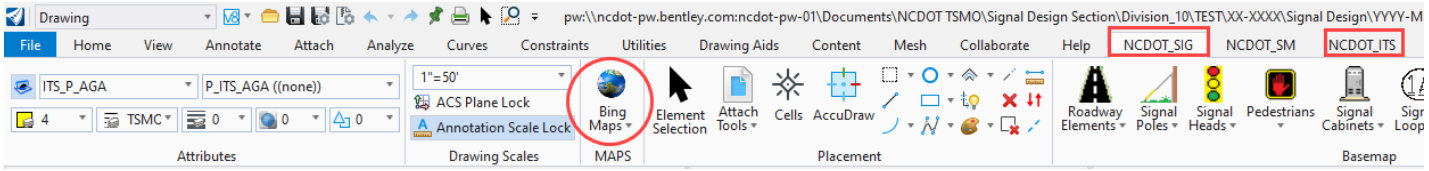
Attaching Bing Maps

As an alternative to the OneMap, Bing Maps provides a lower quality but faster operating image to produce base maps from. To attach the Bing Map, follow these steps:

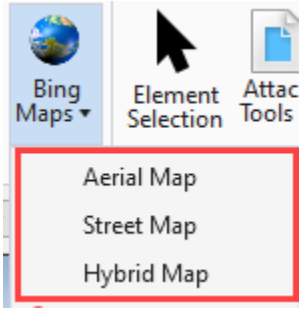
1. Set the Workflow to Drawing in the upper left corner of the screen. Select the drop-down menu and click Drawing to select the appropriate workflow.

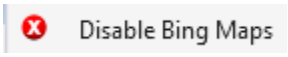


2. Under the NCDOT_SIG or NCDOT_ITS tab, locate the Bing Maps button and click once to open the map selections.



3. In the Bing Maps drop-down menu, select the appropriate map type to attach Bing Maps.



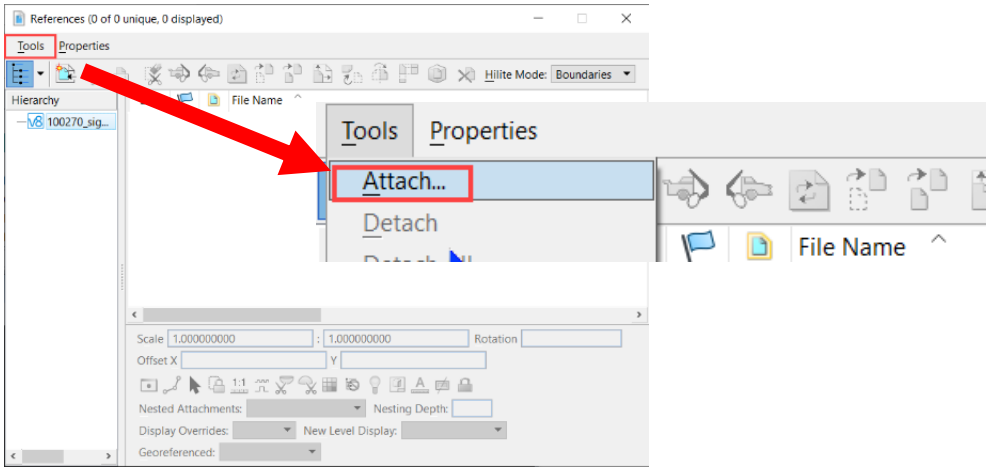
4. To detach Bing Maps, select the  tool in the Bing Maps drop-down menu.

Referencing Files

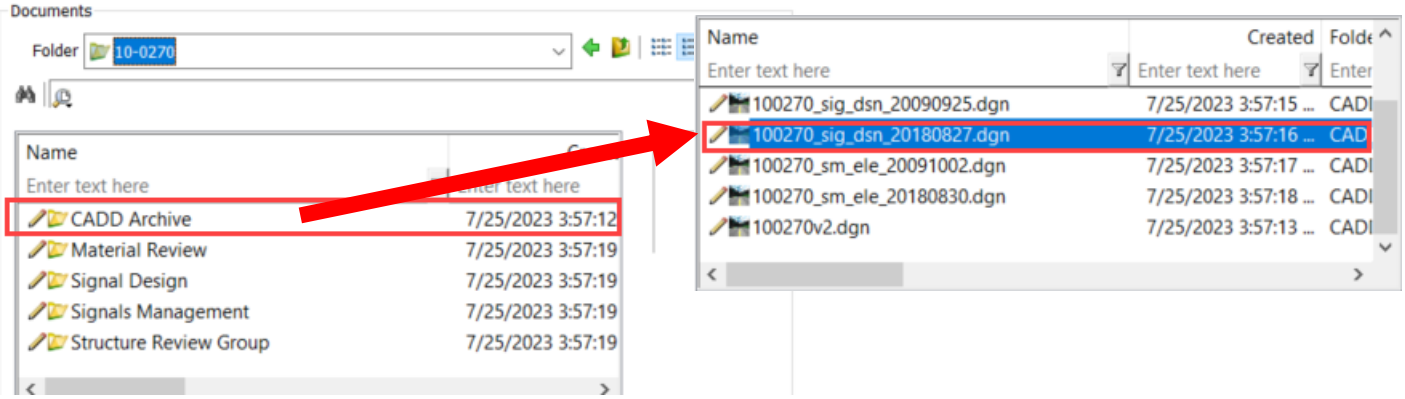
When creating a new design file, the best practice is to reference the previous CADD file from the CADD Archive folder and merge the file into the new design file to make modifications. To reference a file, follow the below for step-by-step instructions to reference a file*.

*** 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).

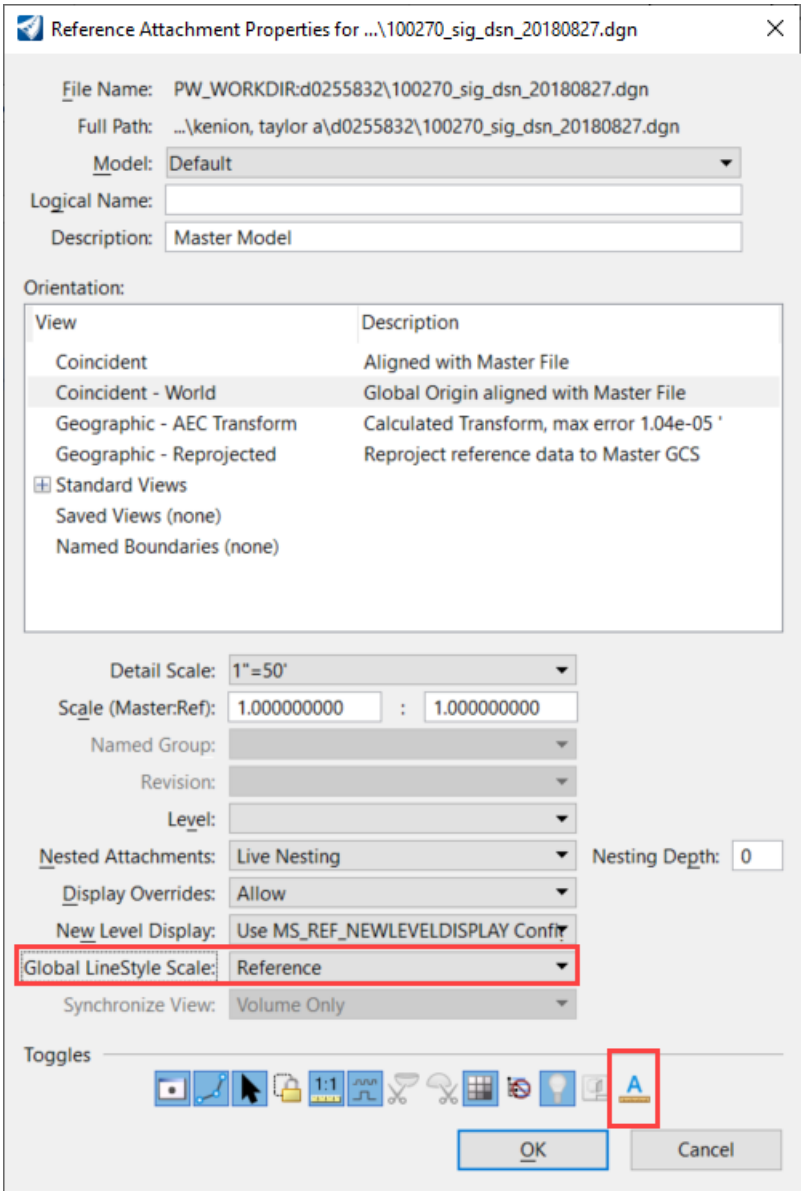


6. If the file being referenced was created in an old version of MicroStation, such as V8i or SS2, please see the below section on "Reference Settings for MicroStation Connect Edition Files". Otherwise, proceed to "Reference Settings for OpenRoads Designer Connect Edition files".

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.

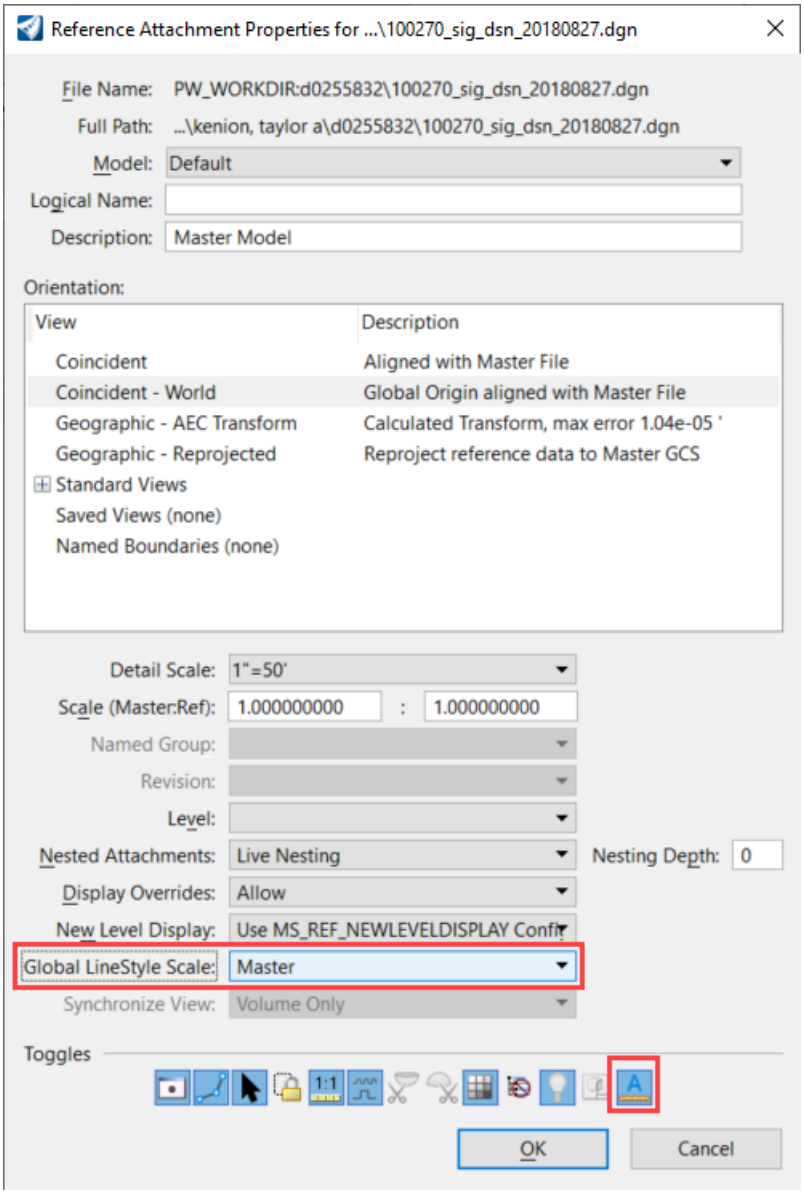
7. In the Reference Attachment Properties menu, change the Global LineStyle Scale to "Reference".
8. Disable the "Use Active Annotation Scale" setting by clicking the button, making sure the icon is no longer highlighted. See below for a complete view of the proper reference settings.
9. Due to the nature 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').



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.

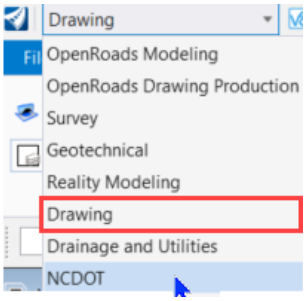
7. In the Reference Attachment Properties menu, ensure the Global LineStyle Scale is set to “Master”.
8. Ensure “Use Active Annotation Scale” is toggled on. Verify that the  is highlighted in blue as shown. See below for a complete view of the proper reference settings.

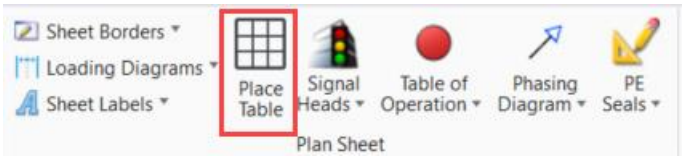


Creating the Loop Chart and Timing Chart

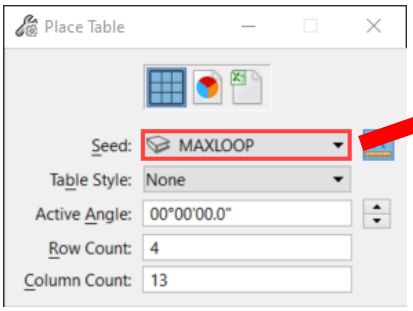
Filling in the loop and timing charts is now easier than ever due to the ability to add and remove columns at the click of a button, similar to using Microsoft Excel. To bring in a chart and fill it in, follow these steps:

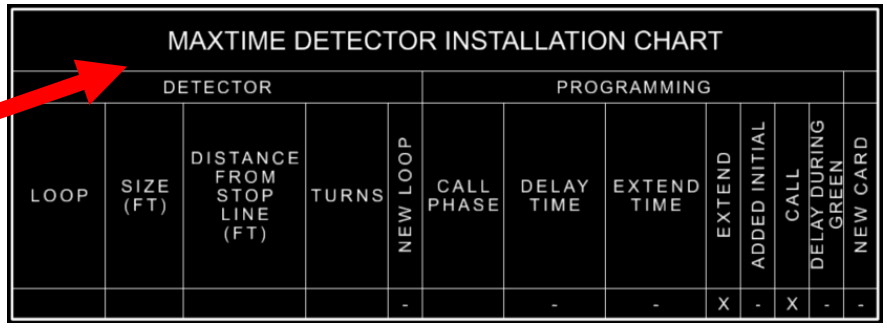
1. Ensure the Active Workflow is set to Drawing. The workflow may be accessed in the drop-down menu located in the upper left corner of the screen.
2. Select the NCDOT_SIG tab. Locate and select the “Place Table Tool” located in the Plan Sheet tool selections.





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.

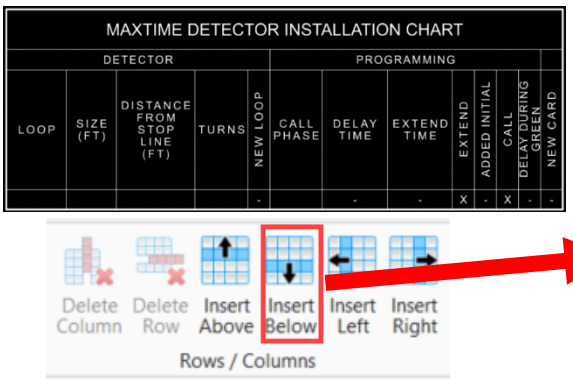


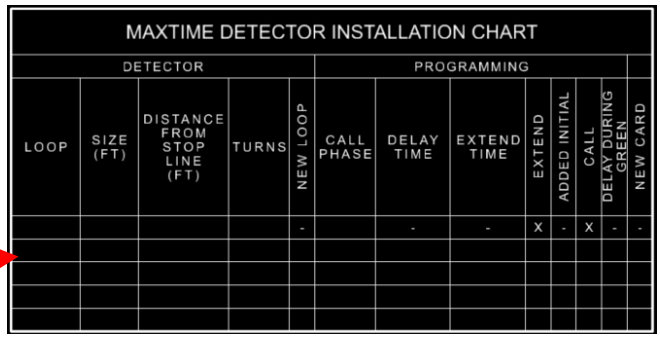


4. With the table placed, all cells are editable fields that can be modified by double clicking on the cell or by using the edit text tool and selecting a cell.

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.

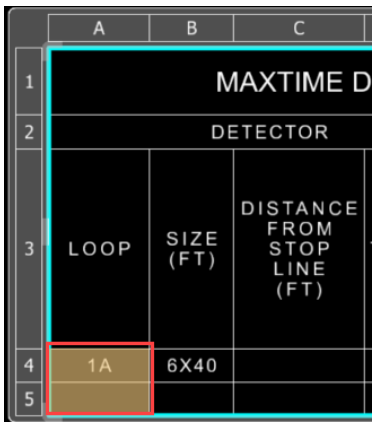




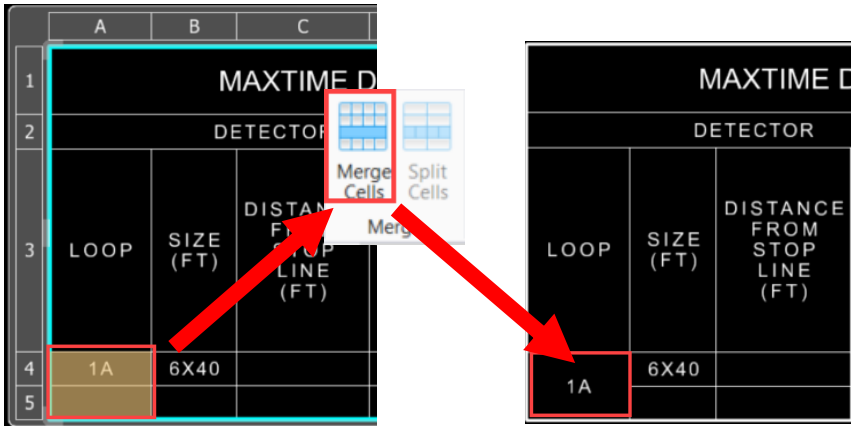
Merging Cells within Tables

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.



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

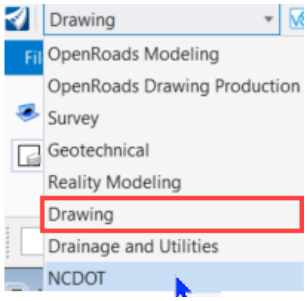


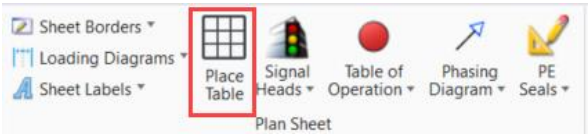
3. Repeat this process for each cell which needs to be merged.

Creating the Table of Operation

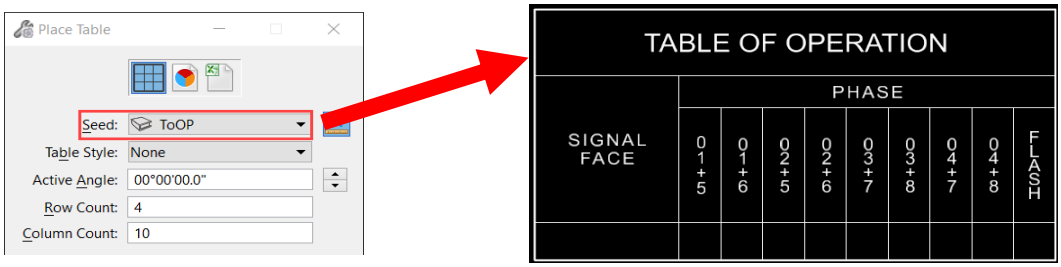
Filling in the loop and timing charts is now easier than ever due to the ability to add and remove columns at the click of a button, similar to using Microsoft Excel. To bring in a chart and fill it in, follow these steps:

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.

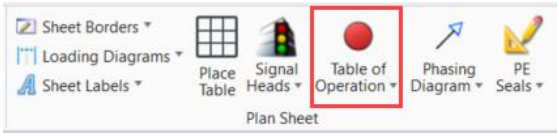




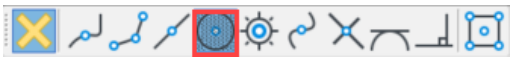
3. In the Place Table pop up menu, use the drop-down menu under the Seed section to select the proper table type (ToOP) and place the table by left-clicking to confirm.



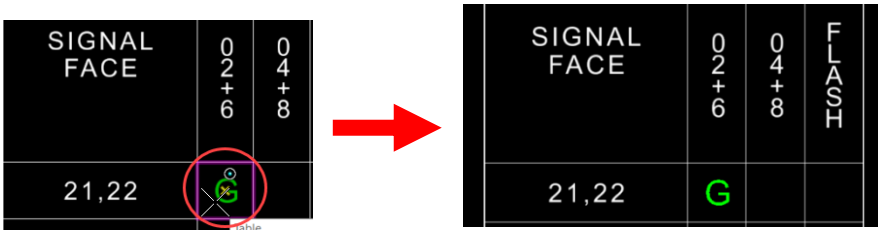
4. To add rows/columns to the chart, first select the table by clicking anywhere within the table. ORD should automatically select the “Table Tools” tab where all tabular tools are stored.
5. Use the Rows/Columns tool kit to insert rows above, below, left or right and to delete columns of unnecessary 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.



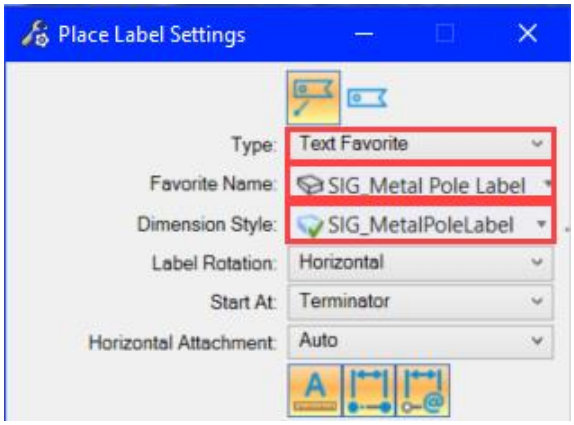
8. With the appropriate icon selected and the Center Snap enabled, hover over the location in the table in which the icon needs to be placed. The icon should snap to the center of the cell in which the icon needs to be placed. Left click to confirm the placement.



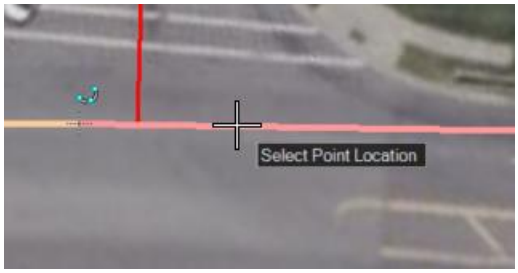
Labeling Metal Poles with Station and Offset

To label metal poles with their corresponding station and offset, a properly formatted Roadway alignment file with stationing data must be available for reference in the design file. With a properly formatted alignment file referenced (see **Referencing Files**), follow these steps to add metal pole labels with their corresponding station and offset:

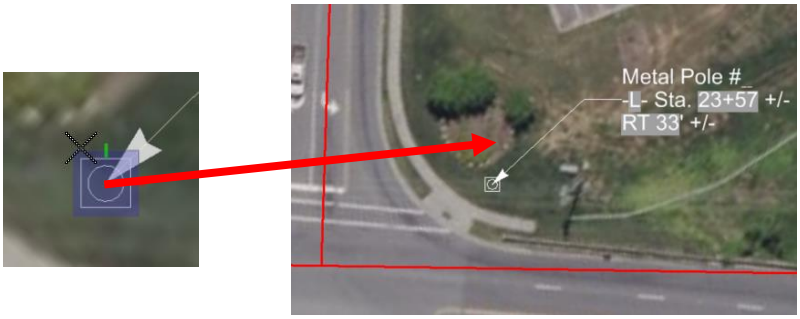
1. In the search ribbon in the upper right corner of the screen, type “Place Label” and click on the Place Label tool to activate it.
2. In the Place Label Settings, use the dropdown menus to ensure the Type is set to Text Favorite, the Favorite Name is set to SIG_Metal Pole Label and the Dimension Style is set to SIG_MetalPoleLabel as shown below.



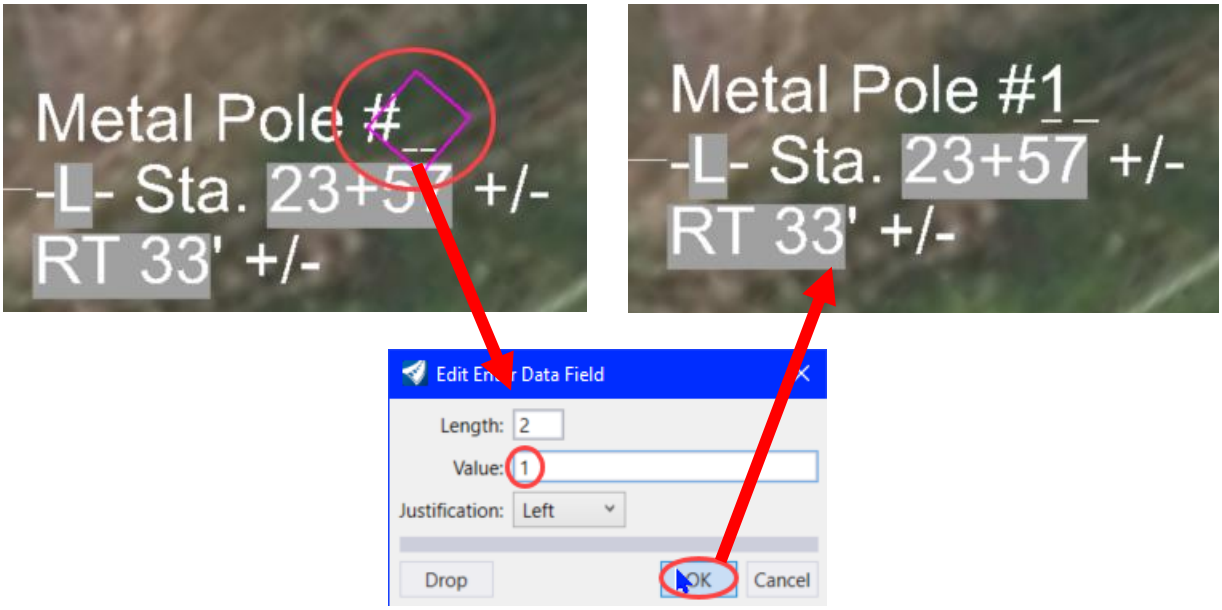
3. With the appropriate settings adjusted in the Place Label Settings, left click on the alignment one to identify the element from which the stationing will be taken. The alignment should appear a translucent grey color when selected.



4. After selecting the alignment, left click the center of the metal pole that will be labeled and place the label by left clicking again to confirm the placement.

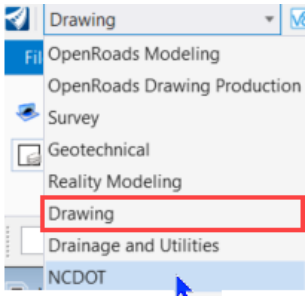


5. The label will display the station and offset for the desired pole location.
6. With the label placed, select the Fill in Single Enter Data Field tool to adjust the pole number in the label.
7. With the tool open, click on the text field next to the # symbol and type the corresponding pole number and click the OK button to confirm the number as shown.

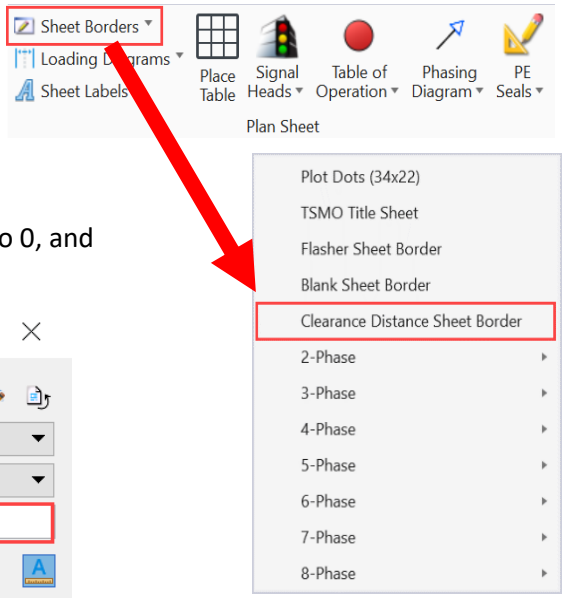


Clearance Distance Sheets

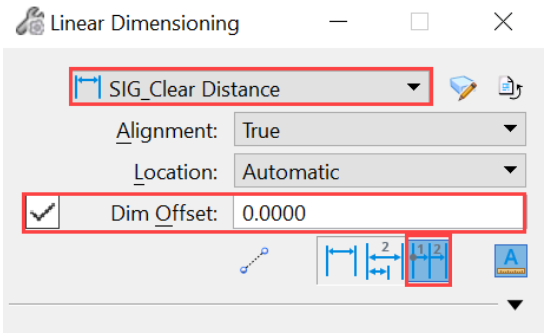
To create a clearance distance sheet in ORD, follow these instructions:



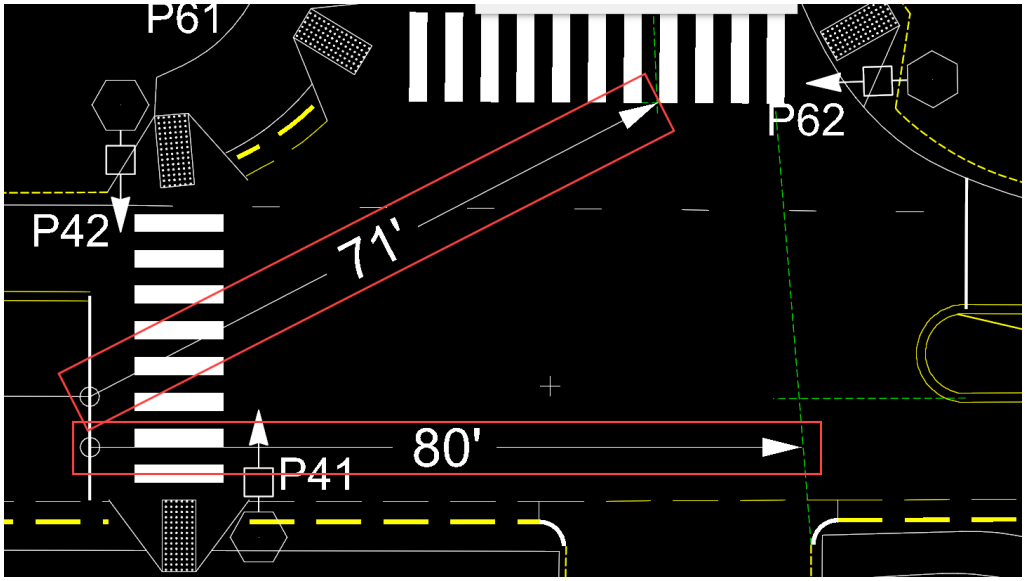
1. Ensure the Active Workflow is set to Drawing. The workflow may be accessed in the drop-down menu located in the upper left corner of the screen.
2. Select the NCDOT_SIG tab. Locate and select Sheet Borders located in the Plan Sheet tool selections.
3. Click Clearance Distance Sheet Border to select 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:

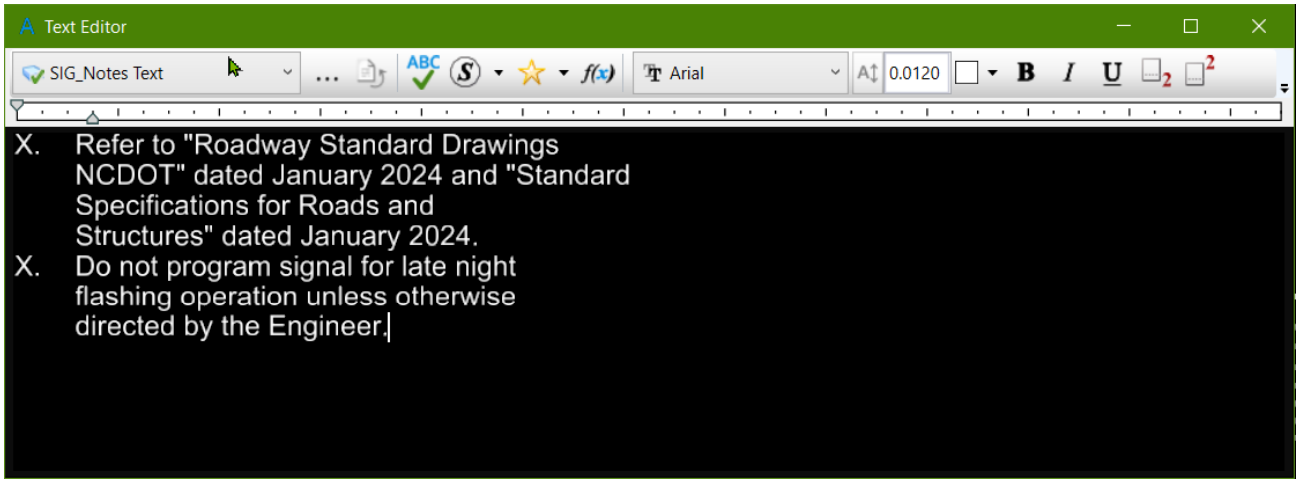


Placing Plan Sheet Notes

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 appropriate Text Style (i.e., SIG_Notes Text) 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 for the project, starting a new line of text between each selection. The result should look similar to this:

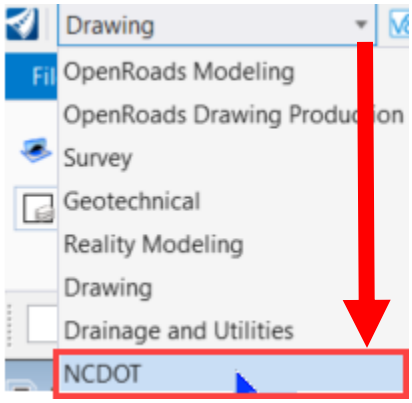


5. To format the text properly, first renumber the text “X.” to the proper numbering scheme.
6. The notes may now be placed on the plan sheet by left clicking to confirm at the location where the text is needed.

Loading AutoTurn

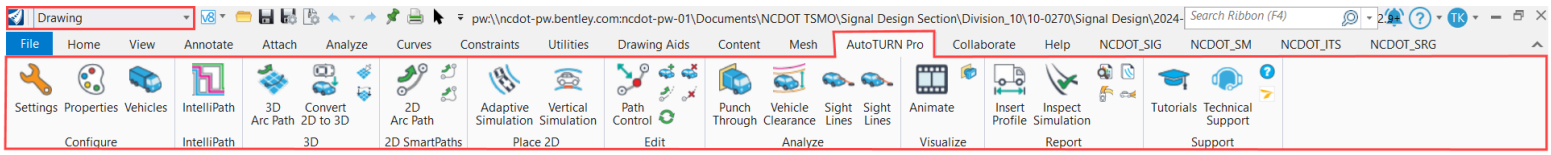
AutoTurn is utilized to verify stop line locations, check clipping, and ensure vehicles can navigate safely through an intersection regardless of vehicle size. To load AutoTurn, see the following instructions.

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.

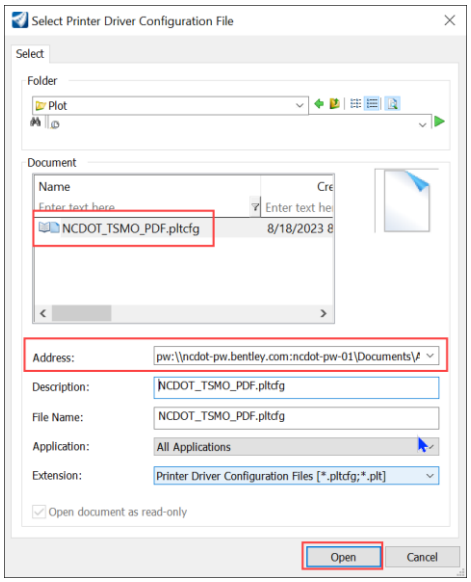
3. In the upper left corner of the screen, set the Active Workflow to “Drawing” using the drop-down menu.
4. The AutoTURN Pro tool kit is now visible. All tools relevant to AutoTURN are in this tab and may now be utilized.



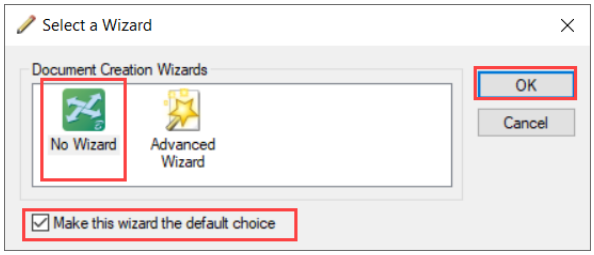
Creating PDFs (Plotting)

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.



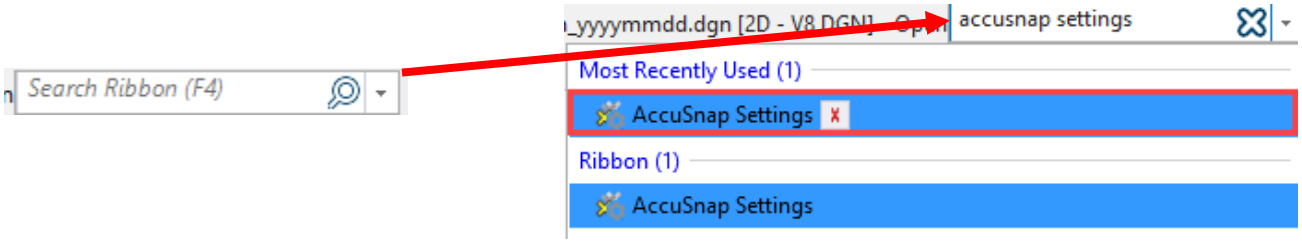
6. When the pop up menu appears, the working directory for the current project is automatically selected. If necessary, rename the PDF.

7. Click Save. The PDF will now be saved at the specified location on ProjectWise.

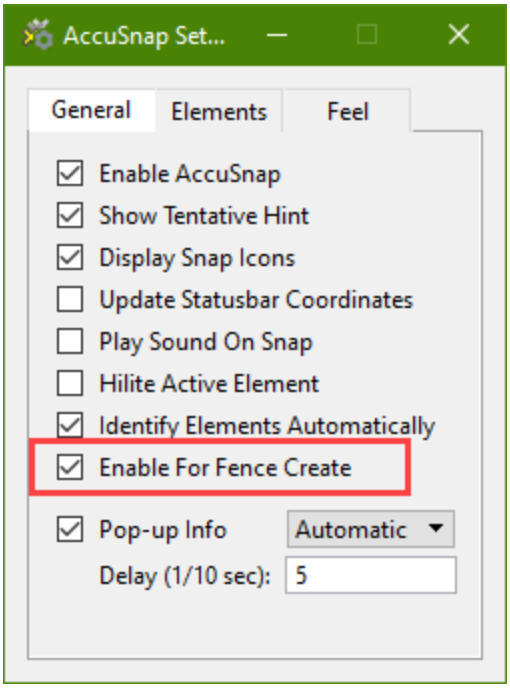
Appropriate Snap Settings

When using plot dots to produce PDFs, the appropriate snap settings must be enabled to properly select the dots. Once these settings are updated, they will remain saved on a per user basis and only need to be set once per user. To enable the appropriate snap settings, follow these steps:

1. In the upper right corner of the ORD window, locate the Search Ribbon and type, “Accusnap Settings”.



2. Select the AccuSnap Settings button.
3. In the AccuSnap Settings, check the “Enable for Fence Create” button.



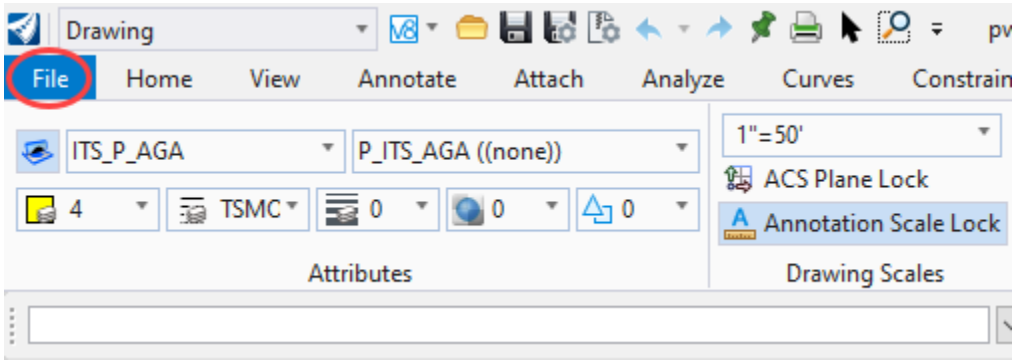
4. Close the AccuSnap Settings. Verify the setting is enable by trying to snap to a plot dot. The plot dot should display a small yellow “X” icon to indicate that it may be snapped to when trying to create a fence as shown.

Design Tips & Tricks

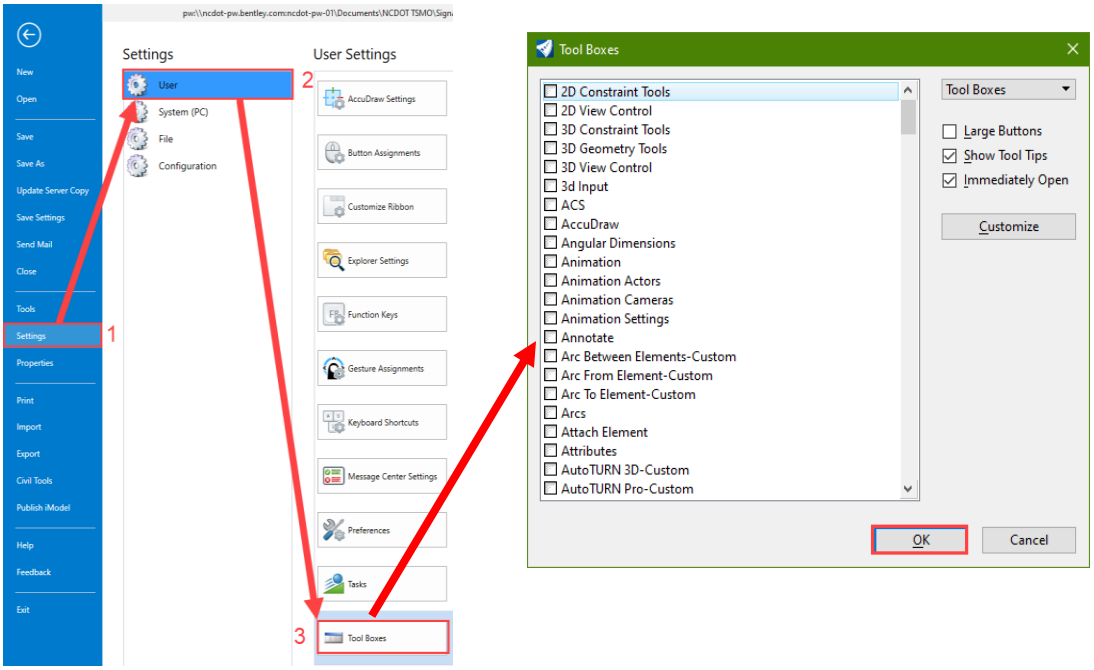
Adding Toolboxes to the User Interface

Often, a user may want to access tools which aren't an integrated portion of the workspace. As a result, individual users can add Toolboxes to their personal user interface to be utilized across designs. To add tools to the interface, follow these instructions:

1. Open a design file and navigate to the upper left corner of the screen and select the blue File button.



2. Select the Settings button on the left side of the screen.
3. Under the User settings, navigate to the Tool Boxes menu and click once. The Tool Box selection window should open in the design file.



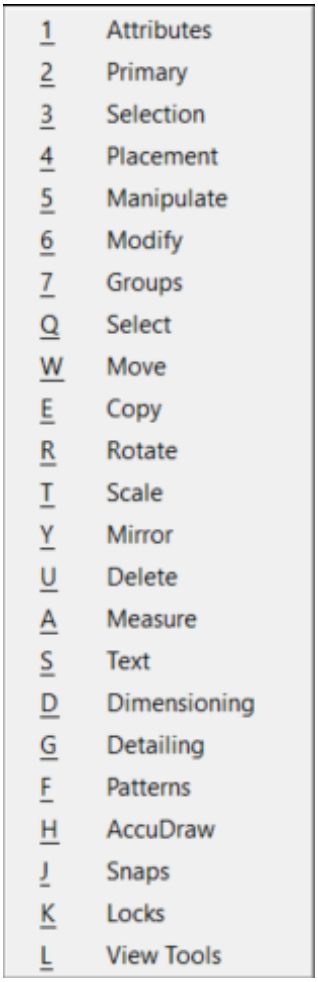
4. In the Tool Boxes Menu, select the appropriate tool boxes, and click OK to open them in the design window.

Quick Access to Commonly Used Tools

When designing in OpenRoads Designer, the workspace is set up to provide access to a unique toolset for the type of plan being developed. As a result, some commonly utilized tools may not be available in the tool bar; however, these tools may be quickly accessed with a hot key, “q”.

The “q” key on the keyboard will open a command menu containing commonly used tools to make adjustments to a plan such as moving, copying and rotating elements without the need to search the ribbon for the appropriate tool. To access these tools follow these steps:

1. When working in a design file, ensure the design window is selected by clicking in the black space of the design.
2. Tap the “q” button the keyboard. The select menu shown below will be displayed.



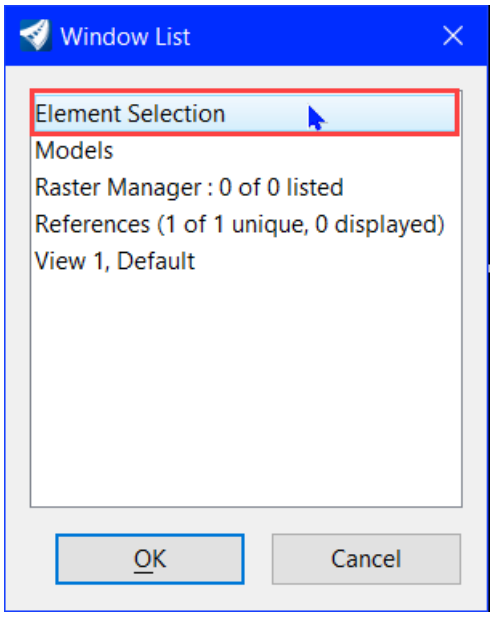
3. Select the necessary tool by tapping the corresponding button on the keyboard (i.e., press “w” to enable the move command).
4. The Move command, for example, is now enabled, and elements may be manipulated as shown below.

5. To disable the command accessed from the quick menu, tap the “q” button twice in a row to revert to the element selection tool.

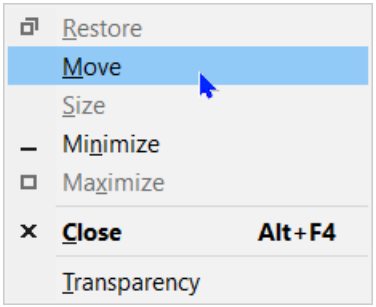
Locating Items That Have Gone Off-Screen

When switching between teleworking and in-office work, users may find that certain menus (i.e., Element Selection) may not be visible when attempting to access this feature. If an element has gone off screen and cannot be located, follow these steps to locate the menu:

1. Locate the  icon in the lower right corner of the screen and click once to open the Window List.
2. Verify that the missing window is listed, then double click on the item in the Window List to make the missing window active. For this example, the item missing is the Element Selection toolbox.



3. With the window activated, press the ALT key *and* SPACEBAR at the same time (ALT + SPACEBAR) to access the manipulate toolbox. This toolbox may appear on any active monitors, so search each screen carefully to locate this menu.



4. In the manipulation menu, click the “Move” button.
5. With the “Move” button selected, use the arrow keys to adjust the position of the missing window until it becomes visible.
6. Continue to adjust the location of the window until the ideal location is reached, then left click to confirm the placement of the menu.
7. The window should now be visible in the design window.